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CANADIAN FOSSIL OSTRACODA: SOME SILURIAN SPECIES

M. J. Copeland

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PREFACE

The two papers contained in this bulletin describe some Palaeozoic ostracods in collections from Silurian rocks of Nova Scotia, and Ellesmere Island, District of Franklin. They continue the description and discussion of Canadian fossil arthropods begun with the publication of Bulletins 60 and 91 of this series.

J. M. HARRISON,
Director, Geological Survey of Canada

OTTAWA, August 16, 1963

GSC Bulletin 117—Fossile Ostracoden Kanadas: Einige Silurische Arten.
Von M. J. Copeland

Die Untersuchung gewisser silurischer Faunen des östlichen und arktischen Kanada hat das Vorhandensein mehrerer gut erhaltener und verschiedenartiger Ostracoden gezeitigt. Darunter befinden sich früher schon erwähnte neue Arten.

Бюллетень 117 — Некоторые Силуриийские виды канадских остракод.
Автор: М. Дж. Копланд

Исследование некоторых силурийских фаун Восточной и Полярной Канады показало наличие нескольких хорошо сохранившихся и разнообразных остракод. Некоторые из этих остракод относятся к новым видам.

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Abstract

Research on certain Silurian faunas from eastern and Arctic Canada has revealed the presence of several well-preserved and diversified Ostracoda. These include numerous new and previously recorded species.

Résumé

Les recherches dans l'Est et l'Arctique canadiens sur certaines faunes Silurien ont révélé la présence de plusieurs ostracodes bien conservées et diversifiées. Ces spécimens comprennent plusieurs espèces nouvelles et antérieurement reconnues.

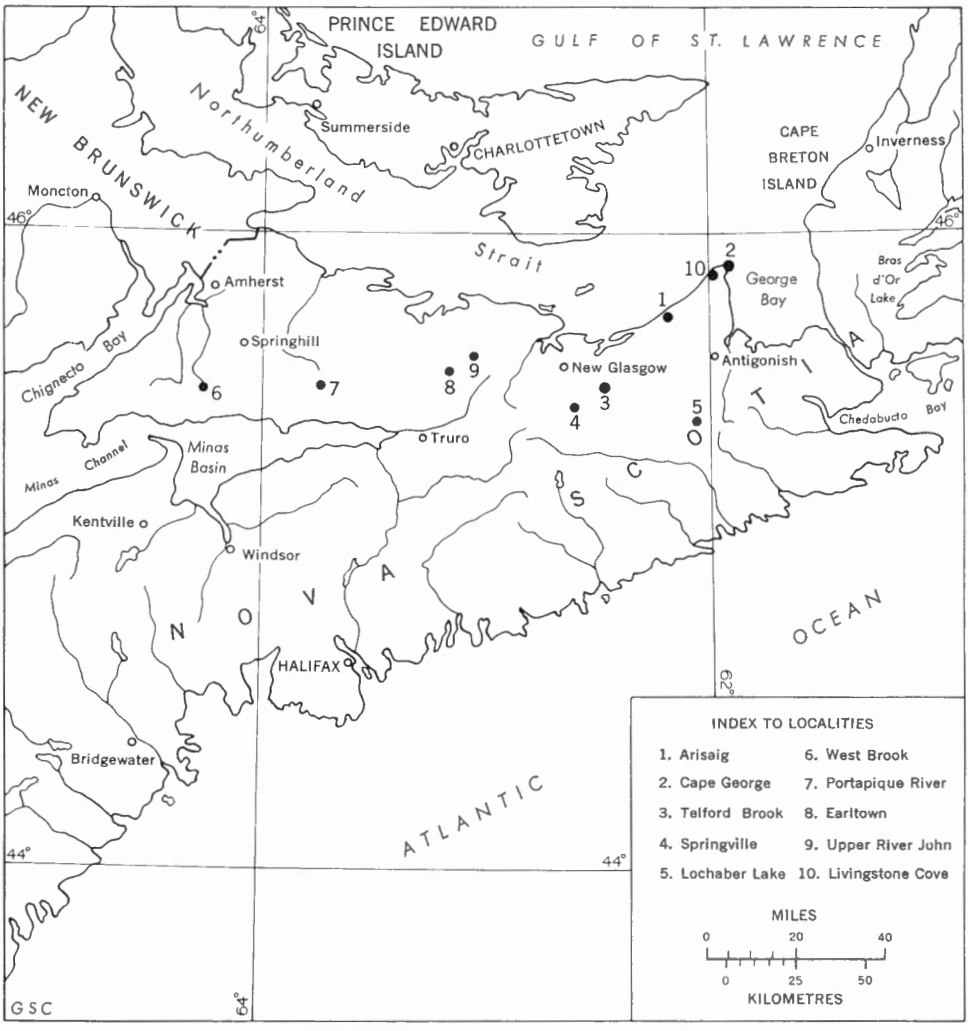

FIGURE 1. Index map showing localities mentioned in text.

Stratigraphic Distribution of Upper Silurian Ostracoda, Stonehouse Formation, Nova Scotia

Recent geological investigations in Antigonish, Cumberland, and Pictou counties, Nova Scotia, have disclosed several occurrences of Upper Silurian Ostracoda. Specimens were obtained from strata of the Stonehouse Formation near Arisaig, Cape George, Lochaber Lake, Telford Brook, and West Brook, and from pebbles and boulders of Silurian age in the Lower Mississippian Horton conglomerates at Livingstone Cove and upper River John (Fig. 1).

Acknowledgment is made of permission to examine several collections obtained by A. J. Boucot, J. R. Griffin, and R. H. Maehl. Specimens of *Pintopsis tricornis* (Ulrich and Bassler) were obtained through courtesy of Dr. Jean M. Berdan of the United States Geological Survey and Dr. G. A. Cooper of the United States National Museum (USNM).

Numerous references have been made to ostracods from the type section of the Stonehouse Formation near Arisaig, Nova Scotia (*see* Copeland, 1960).[1] McLearn (1924, p. 20), however, was the first to show a general stratigraphic distribution of some ostracod species within this formation. Recent investigation of these strata has revealed the presence of several species previously unknown from Nova Scotia, and a possible zonation of Stonehouse strata based on ostracods.

Arisaig

(Figure 1, locality 1)

The type section of the Stonehouse Formation is exposed from Moydart Point, 2 miles southwest of Arisaig pier, southwest along the shore of Northumberland Strait for about 2,000 feet (Fig. 2). It is conformably underlain to the north by the 'Red Bed' of the Moydart Formation (Moydart Zone B of McLearn) and unconformably overlain to the south, with possible fault contact, by volcanic flows and red conglomeratic siltstones of the Mississippian McAras Brook Formation. Other occurrences are on McAdam, MacDonald, Stonehouse, and MacEachern Brooks, the last-named brook exposing an additional 180 feet of strata above the top of the shore section. A conformable, probably gradational, contact is assumed in the covered interval between the uppermost Stonehouse beds on MacEachern Brook and the overlying Lower Devonian Knoydart Formation on MacPherson Brook. Unsuccessful attempts were made by A. J. Boucot to have this contact uncovered by ditching along the main highway. In the bed of McAdam Brook, 3,500 feet upstream from the main highway, vertically inclined beds resembling the Stonehouse and Knoydart are in gradational and conformable contact. There, 50 feet of strata is exposed, grading upward from sparsely fossiliferous, sandy, grey limestone to grey and red shale, grey and pink nodular, conglomeratic siltstone, and massive maroon and red siltstone. The lower limestone beds contain poorly preserved

[1]Names and/or dates in parentheses are those of *References*, p. 12.

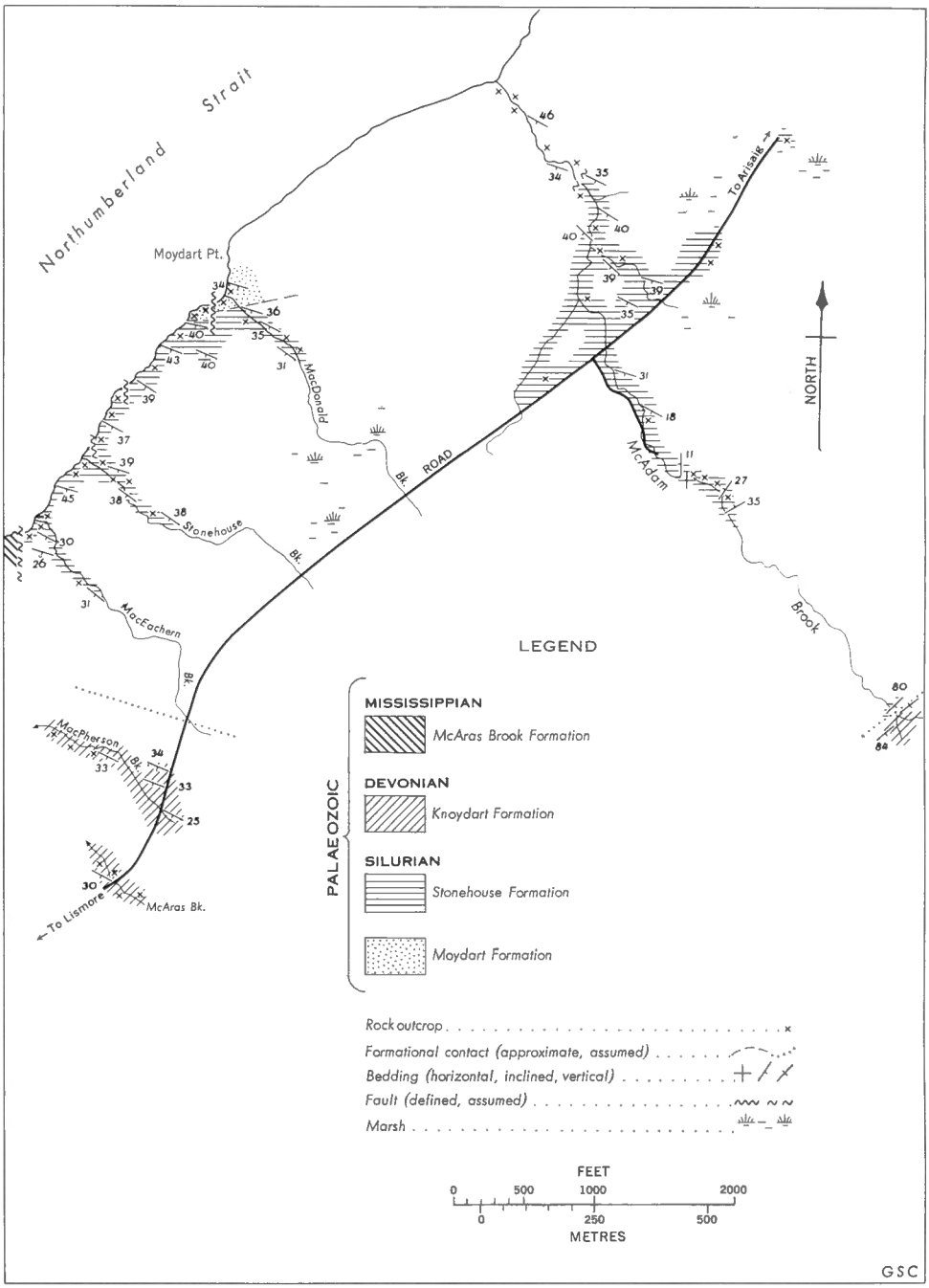

FIGURE 2. Geological sketch map, Stonehouse Formation, Arisaig, Nova Scotia.

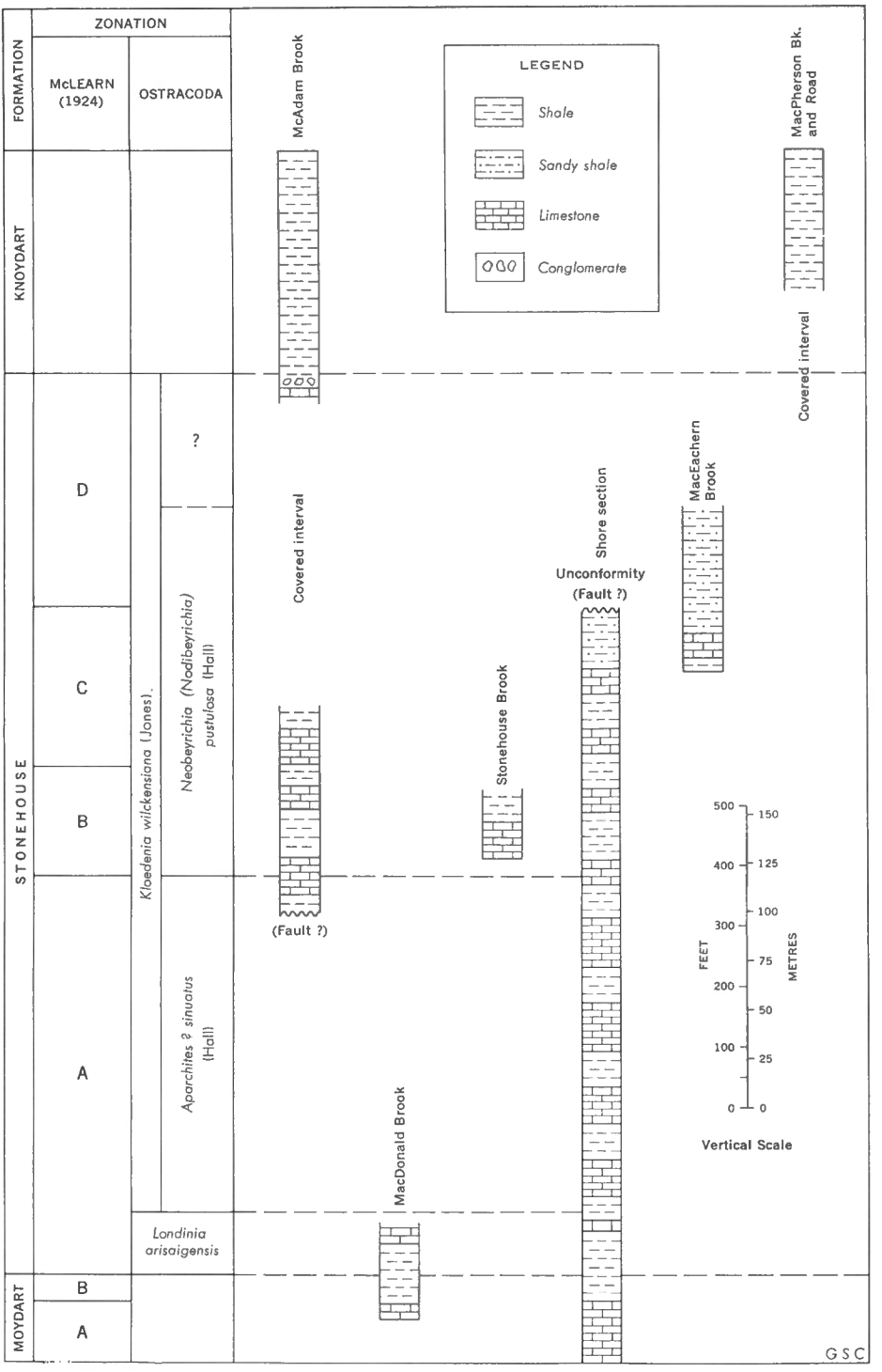

TABLE I. Stratigraphic zonation, Stonehouse Formation, Arisaig, Nova Scotia.

Table II

Stratigraphic Distribution of Ostracoda, Stonehouse Formation, Shore Section, Arisaig, Nova Scotia

Species \ Footage above the base of the Formation	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1270
Sleia kochi? (Boll)																	X	X									
Hemsiella maccoyiana (Jones)												X	X	X	X	X	X	X	X	X	X	X	X	X			
H. maccoyiana mclearni n. subsp.																	X	X	X								
H. maccoyiana sulcata (Reuter)	X	X	X	X					X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Macrypsilon salterianum (Jones)																X	X	X	X	X	X	X	X				
Neobeyrichia sp.	X	X								X		X		X		X	X	X	X	X	X	X	X	X	X	X	
N. (*Nodibeyrichia*) *pustulosa* (Hall)															X	X	X	X	X	X	X	X	X	X	X	X	X
N. (*Nodibeyrichia*) *tuberculata strictispiralis*? (Jones)																		X									
Londinia arisaigensis n. sp.	X	X	X																								
Kloedenia wilckensiana (Jones)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
Aparchites? *sinuatus* (Hall)		X	X	X			X	X	X	X		X	X	X	X	X	X	X	X	X	X	X					
Bythocypris phillipsiana (J and H)	X	X							X	X									X	X							
Cytherellina siliqua (Jones)									X	X		X	X	X						X	X						
Limbinaria? sp.																						X					
Primitia mundula (Jones)									X	X			X	X					X	X	X						

trilobite and pelecypod remains and silicified fragments of *Tentaculites* sp., *Nowakia* sp., *Leioclema* sp., *Rhopalonaria* sp., *Cytherellina*? sp., "*Bythocypris*?" sp., and *Bollia*? sp., a faunal assemblage previously unknown in strata of either the Stonehouse or Knoydart. Farther upstream on McAdam Brook, red siltstone beds typical of the Knoydart Formation are exposed in numerous outcrops.

Rocks of the Stonehouse Formation are predominantly calcareous sandstone and red, green, and grey calcareous shale. Three major lithological subdivisions are recognized: a lower thin, greenish grey, calcareous shale unit with minor calcareous sandstone; an intermediate unit of grey calcareous sandstone and shale; and an upper red and grey calcareous shale and sandstone unit which becomes increasingly sandy towards the exposed top of the formation on MacEachern Brook, and, as on McAdam Brook, may grade upward into red siltstones of the Knoydart Formation. These three subdivisions, about 1,500 feet in total thickness, closely approximate the three-fold ostracod zonation described below (Table I).

Ostracods are common in most of the calcareous sandstone lenses throughout the formation. Specimens of *Neobeyrichia* (*Nodibeyrichia*) *pustulosa* (Hall) are also abundant in numerous thin layers of hematite-stained shale near the base of the upper unit at the mouth of Stonehouse Brook. Specimens are invariably of individual valves and are usually well preserved, except that valves of *N.* (*Nodibeyrichia*) *pustulosa* (Hall) usually are leached away leaving only shale or sandstone casts and moulds.

The most common ostracod species in the Stonehouse Formation is *Kloedenia wilckensiana* (Jones) which occurs throughout the formation (Table II). This species may be used as a general indicator for the correlation of several isolated occurrences of Stonehouse strata in northern Nova Scotia. *Londinia arisaigensis* n. sp. has been found only in the lower 100 feet of the typical Stonehouse section and is the marker fossil for this zone. The intermediate zone between 100 and 650 feet above the base of the formation is generally poorer in ostracod remains than the adjacent units. It contains several common species of which *Aparchites*? *sinuatus* (Hall) is the most abundant and may be used to designate these strata. *Neobeyrichia* (*Nodibeyrichia*) *pustulosa* (Hall) is abundant in the exposed upper 625 feet of the Stonehouse type section and appears to be restricted to this zone. The uppermost approximately 225 feet of the Stonehouse Formation is not exposed, therefore, the upper limit of the occurrence of *N.* (*Nodibeyrichia*) *pustulosa* (Hall) is unknown in the type area. This species is not present in the limestone beds near the Knoydart contact on McAdam Brook, the ostracods there possibly representing younger strata of presently unknown stratigraphic position.

Fifteen species and subspecies of eight ostracod genera have been obtained from the Stonehouse type section (Table II). Most of these have been described previously by Copeland (1960); *Londinia arisaigensis* n. sp., *Hemsiella maccoyiana mclearni* n. subsp., *Macrypsilon salterianum* (Jones) and *Limbinaria*? sp. are recorded here for the first time.

Cape George

(Figure 1, locality 2)

Two small, poorly exposed areas of Stonehouse strata are present on the

northern shore of Cape George, Antigonish county, below Cape George Point (Ami, 1894). One occurs near the mouth of School Brook, the other three fourths of a mile farther west. Both are highly faulted and folded precluding exact stratigraphic measurements. Rocks of Mississippian (Horton Group) age enclose both areas on their landward sides and, at the western end of the School Brook area, unconformably overlie beds of the Stonehouse Formation. Silurian strata within these fault blocks are predominantly thin-bedded red and grey siltstone with minor lenses of fossiliferous, grey, sandy limestone. Ostracoda obtained from the School Brook area are *Aparchites*? *sinuatus* (Hall), *Hemsiella maccoyiana* (Jones) and *Londinia* cf. *L. arisaigensis* n. sp., the last species indicative of the lowest zone of the typical Stonehouse section at Arisaig.

The more westerly area contains *Aparchites*? *sinuatus* (Hall), *Kloedenia wilckensiana* (Jones), *Hemsiella maccoyiana sulcata* (Reuter), and *Macrypsilon salterianum* (Jones). This fauna is interpreted as possibly younger than that of the School Brook area and may indicate correlation with the intermediate zone of the Stonehouse Formation at Arisaig.

Telford Brook, Springville, Lochaber Lake, and West Brook
(Figure 1, localities 3-6)

Stonehouse ostracods are known to occur in two areas of southeastern Pictou county (Maehl, 1961). They were obtained from grey calcareous sandstone and are preserved as casts and moulds. One occurrence on Telford Brook, 1¼ miles south of Nova Scotia highway 4 (Fig. 1, loc. 3) is in a small faulted syncline. Specimens of *Macrypsilon* cf. *M. salterianum* (Jones), *Hemsiella* cf. *H. maccoyiana sulcata* (Reuter) and an indeterminate beyrichiid were identified, indicating a general Stonehouse correlation. A second area of outcrops is east of MacLean and Forbes Lakes between 1 mile and 1¾ miles north of Springville (Fig. 1, loc. 4). *Neobeyrichia* (*Nodibeyrichia*) *pustulosa* (Hall) was recognized from a locality a mile east of the southern end of Forbes Lake and *Neobeyrichia* (*Nodibeyrichia*) *pustulosa* (Hall), *N.* (*Nodibeyrichia*) *tuberculata strictispiralis*? (Jones), *Macrypsilon salterianum* (Jones), *Hemsiella maccoyiana* (Jones), *Hemsiella maccoyiana sulcata* (Reuter), *Kloedenia wilckensiana* (Jones), *Neobeyrichia* sp., an indeterminate beyrichiid, *Cytherellina siliqua* (Jones), and *Aparchites*? *sinuatus* (Hall) were obtained from localities a quarter of a mile north and east of MacLean Lake (Maehl, 1961, pp. 68-69 in part). These ostracods indicate correlation with similar species from the uppermost unit of the Stonehouse Formation at Arisaig.

Indeterminate beyrichiids (cf. *Hemsiella*? sp.) were obtained from rocks of probable Stonehouse equivalence 4,400 feet south of Springville, Pictou county, west of Lochaber Lake, Antigonish county (Fig. 1, loc. 5), and West Brook, Cumberland county (Fig. 1, loc. 6). No specimens were obtained from these localities on which to base more adequate stratigraphic determinations.

Other Localities

Several Silurian pebbles and boulders have been obtained from conglomeratic

rocks of the Mississippian Horton Group. On the shore of Livingstone Cove about half a mile northwest of the pier (Fig. 1, loc. 10) a rounded 6-inch boulder of fossiliferous limestone was found containing specimens of *Aparchites*? *sinuatus* (Hall) and *Kloedenia wilckensiana* (Jones). This locality is geographically situated between the previously mentioned Stonehouse occurrences at Arisaig and Cape George.

In the upper River John area of Pictou county, west of Scotsburn, and on MacKay Brook (Fig. 1, loc. 9) beds of Lower Carboniferous conglomerate contain limestone boulders with the ostracods *Kloedenia wilckensiana* (Jones), *Kloedenia* sp., and *Neobeyrichia* (*Nodibeyrichia*) *pustulosa* (Hall) typical of the upper Stonehouse zone. These boulders may have been derived from Stonehouse strata at localities previously discussed or from as yet poorly known Silurian beds in the Cobequid Upland south and west of the upper River John area. Silurian strata probably equivalent to part of the Stonehouse are present in the eastern Cobequid area near Earltown, Colchester county (Fig. 1, loc. 8), and about 7 miles above the mouth of the Portapique River, Cumberland county (Fig. 1, loc. 7), but, as yet, no ostracods have been found at these localities.

Stratigraphic Position of the Stonehouse Formation

The Stonehouse Formation has been considered of Middle or Upper Silurian age. Williams (1914, p. 133) and McLearn (1924, pp. 20ff.) considered the Stonehouse Formation as equivalent in age to part or all of the Ludlovian Series of Great Britain. Swartz, *et al.* (1942) equated the Stonehouse Formation with the upper part of the Wenlockian, Ludlovian, and Downtonian (emended) Series of Great Britain and the upper part of the Niagaran (Guelph) and Cayugan Series of North America. More recently, Boucot (1960, p. 291 and pers. com.) considered at least the youngest part of the Stonehouse Formation equivalent to the Lower Devonian Gedinnian Series. This was based in part on the occurrence in the uppermost 50 feet of the Stonehouse Formation in Pictou county of a lower Gedinnian brachiopod fauna including *Podolella* sp. and *Proschizophoria* sp. (Maehl, 1961, p. 69).

On the basis of ostracod fauna, correlation with rocks of post-Ludlow age is considered most probable for the Stonehouse Formation. This conclusion is based on the occurrence of similar faunas from Oesel (zone K of Reuter, 1885; Obere Oesel-Gruppe of von Bubnoff) and glacial drift (Obersilurische Diluvialgeschiebe) from northern Germany (Obere Beyrichien-Kalke of Krause, 1891). These European faunas contain specimens of *Neobeyrichia* (*Nodibeyrichia*) *tuberculata* (Kloeden), *Macrypsilon salterianum* (Jones), *Neobeyrichia* (*Neobeyrichia*) *buchiana* (Jones), *Hemsiella maccoyiana* (Jones), and *Kloedenia wilckensiana* (Jones) which Kesling and Wagner (1956, p. 36) assigned a Downtonian age. A similar correlation was suggested by Moberg and Grönwall (1909) for strata in southern Sweden which contained, among other ostracods, *Primitia mundula* (Jones), *Sleia kochi* (Boll), *Hemsiella maccoyiana* (Jones), *Kloedenia wilckensiana* (Jones), and *Cytherellina siliqua* (Jones), all species recorded from the *Beyrichia* limestone and now found in the Stonehouse Formation.

The following ostracod species have been identified from the Stonehouse Formation; their distribution in northern Europe is shown in Table III.

Table III
Distribution of Stonehouse Ostracoda in Northern Europe

	N. Germany (drift) *Beyrichia* Ls.	Oesel and Gotland	Southern Sweden
Sleia kochi (Boll) 1862	X	X	X
Hemsiella maccoyiana (Jones) 1855	X	X	X
Hemsiella maccoyiana sulcata (Reuter) 1885	X		
Neobeyrichia (*Nodibeyrichia*) *pustulosa* (Hall) 1860	X		
Macrypsilon salterianum (Jones) 1855	X	X	X
Bythocypris phillipsiana (Jones and Holl) 1869	X	X	
Kloedenia wilckensiana (Jones) 1855	X	X	X
Primitia mundula (Jones) 1855	X	X	X
Cytherellina siliqua (Jones) 1855	X	X	X

It has been demonstrated by numerous authors that the northern Germany 'Obersilurische Diluvialgeschiebe' is the product of Pleistocene glaciation, probably of the Weichsel stage (Kesling and Wagner, 1956, p. 39). Flow lines of this glaciation were shown (ibid., Fig. 2) indicating derivation of drift boulders from the islands of Gotland and Ostrov Sarema (Oesel). Reuter (1885, p. 666) and Kesling and Wagner (1956, p. 37) considered boulders containing an admixed ostracod fauna (*Hemsiella maccoyiana* from Gotland and *K. wilckensiana* from Oesel) as derived from strata intermediate between the two islands outcropping beneath the Baltic Sea. It is with this fauna that the Stonehouse Ostracoda find their closest affinity.

Systematic Palaeontology

Family Beyrichiidae Matthew 1886

Recent investigation of this complex family has led to numerous new subfamilial taxonomic groupings based largely on ventral metamorphosis of the female brood pouch (crumina). These subfamilies are discussed at length by Martinsson (1962), from observations based on extremely well preserved specimens from Gotland. Three of these beyrichiid subfamilies are recognized in the Stonehouse collections: Amphitoxotidinae Martinsson 1962, Beyrichiinae Matthew 1886, and Kloedeniinae Ulrich and Bassler 1923.

The Amphitoxotidinae is represented in the Stonehouse Formation by three previously noted species, *Sleia kochi*? (Boll), *Hemsiella maccoyiana* (Jones), and *Hemsiella maccoyiana sulcata* (Reuter), and two unrecorded species, *Macrypsilon salterianum* (Jones) and *Hemsiella maccoyiana mclearni* n. subsp. One questionable amphitoxotidine, *Hemsiella*? *equilatera* (Hall), has been reported from this formation but was not recognized during the present study. Dimorphs of *Macrypsilon salterianum* (Jones) have been adequately figured and described by Kesling

and Rogers (1957); specimens from the Stonehouse Formation are figured here for the first time (Pl. I, figs. 4, 5). *Hemsiella maccoyiana mclearni* n. subsp. (Pl. I, figs. 1, 2) is somewhat similar to another Stonehouse ostracod, *Hemsiella maccoyiana sulcata* (Reuter) (Pl. I, fig. 3), but is sufficiently dissimilar to warrant description. There is little doubt that both of these presently designated subspecies are specifically distinct from *Hemsiella maccoyiana* (Jones).

Hemsiella maccoyiana mclearni n. subsp.

Plate I, figures 1, 2

Description. Valve ovate, hingeline straight, four-fifths greatest valve length. Length 2.1 mm; height 1.3 mm. Trilobate. In the female, L1 and L2 small, ovate, separated by a shallow groove from the brood pouch. S2 broad, deep, near mid-length of valve, extending vertically from dorsal margin to brood pouch and delimiting the posterior margin of the pouch as a curved, shallow groove. L3 large, dissected into three nodes by a posterior dorsal, curved to angular, groove delimiting a posterior dorsal comma-shaped portion, and an oblique ventral furrow in the position of the syllobial groove. Velate ridge interrupted, extending from the posterior dorsal corner of the valve onto the anterior surface of the brood pouch, separated from the dorsal part of the pouch by a distinct, smooth groove. Anterior, nearly marginal, velate ridge extending from the pouch to the anterior dorsal corner of the valve. Sulci and grooves smooth, nodes moderately reticulate, brood pouch with coarse longtitudinally anastomosing striae on both dorsal and ventral surfaces. Male valve unknown.

Remarks. This subspecies is closely related to *Hemsiella maccoyiana sulcata* (Reuter). *Hemsiella maccoyiana mclearni* is less anteriorly plenate, subtriangular in lateral view, and has more coarsely reticulate nodes, a longitudinally striate brood pouch and a distinct oblique syllobial(?) groove dividing L3.

Occurrence. Stonehouse Formation, type section on the shore of Northumberland Strait, 800 to 900 feet above the base of the formation.

Types. Holotype, GSC No. 14560; paratype, GSC No. 14561.

The subfamily Beyrichiinae is represented in the Stonehouse collections by two species, *Neobeyrichia (Nodibeyrichia) pustulosa* (Hall) and *Neobeyrichia (Nodibeyrichia) tuberculata strictispiralis*? (Jones). The former species was described in detail by Copeland (1960, pp. 96-98). The latter subspecies was questionably included by Copeland (ibid.) with *Neobeyrichia (Nodibeyrichia) pustulosa.* An imperfect mould, apparently showing only four nodes on the broadly curved L3 and possibly differing from *N. (Nodibeyrichia) pustulosa*, is now recognized (hypotype, GSC No. 14567) and questionably retained in the subspecies.

The beyrichiid subfamily Kloedeniinae is represented in Stonehouse strata by the type species of the genus *Kloedenia, Kloedenia wilckensiana* (Jones). This species differs from other North American kloedenids in having L2 projecting above the dorsal margin, in lacking a distinct boundary between the female brood pouch and the lateral surface of the valve, and in being punctate rather than

reticulate. These features have been discussed previously by Henningsmoen (1954), Kesling (*in* Kesling and Wagner, 1956), and Martinsson (1962, 1963) and serve, in part, to distinguish two distinct groups within *Kloedenia* as presently accepted, that of the typically European type species *K. wilckensiana* and a group typified by the North American beyrichiine-like species *Kloedenia normalis* Ulrich and Bassler.

The remaining Stonehouse beyrichiid is closely related to the genus *Kyamodes* Jones. Like *Kloedenia, Kyamodes* is divisible into distinct taxonomic groups, one typified by the Devonian type species *Kyamodes whidbornei* Jones, another by *Kyamodes tricornis* Ulrich and Bassler, and a third by *Kloedenia kiesowi* Krause. *K. whidbornei* is characterized by a very short, small L2, indistinct marginal shoulders, strong L1, and pronounced ventral overreach by the left valve. The group of *K. tricornis* Ulrich and Bassler has well-developed marginal structures and median lobes (L2 and L3), and weaker, somewhat ridge-like L1 and L4. L2 is constricted ventrally, more narrowly connected with the ventral surface of the valve. L4 is nearly confluent with L3. This group is here separated from the genus *Kyamodes* Jones and constitutes the new genus *Pintopsis*.

Pintopsis n. gen.

Type species. Kyammodes tricornis Ulrich and Bassler 1923

Species. Drepanellina confluens Ulrich and Bassler 1923
Kyammodes swartzi Ulrich and Bassler 1923
Kyammodes tricornis Ulrich and Bassler 1923

Diagnosis. Smooth, quadrilobate Beyrichiidae, lobes ventrally confluent. L2 somewhat constricted ventrally. L4 closely associated or fused with L3. L2 and L3 prominent, extending to or slightly beyond the dorsal margin. Brood pouch (crumina) ventrally striate.

Remarks. There is little doubt that the typical species of *Kyamodes* Jones 1888, *K. whidbornei* Jones, belongs within the Beyrichiidae but this species has not yet been proved to be dimorphic. Jones depicted *K. whidbornei* with differing lobation on each valve, L1 and L3 extending to or beyond the dorsal margin, small L2, and the left valve with conspicuous ventral overreach of the right. Only *K. whidbornei*, its varieties *elliptica* and *obsolescens*, and possibly *Welleria primitioides* Kummerow 1924 (as suggested by Henningsmoen, 1954, p. 32) are here retained within the genus *Kyamodes*.

Pintopsid species are somewhat similar to those of *Londinia* Martinsson but differ mainly on the basis of their lobation. Both are quadrilobate, *Londinia* prominently so, but the two posterior lobes of *Pintopsis* are closely associated or confluent. Also, species of *Londinia* have lobes increasing in width ventrally whereas pintopsid species have L2 noticeably constricted (but not isolated) ventrally. The brood pouch (crumina) of *Londinia* is more distinctly set off from the lateral surface of the valve than that of female specimens of *Pintopsis*.

The group characterized by *Kloedenia kiesowi* Krause 1891 was recently placed in the genus *Londinia* by Martinsson (1963). This genus is represented in the Stonehouse collections by one new species.

Londinia arisaigensis n. sp.

Plate I, figures 16-26

Description. Quadrilobate. Valves smooth, semi-ovate; hinge straight, four fifths length. Greatest length and height median. Anterior and posterior margins subequal, dorsal angles obtuse, abrupt. Velate structure a bend-like swelling paralleling the free margin. Marginal ridge sharp, prominent, slightly reduced beneath brood pouch of female, male left valve extending ventrally beyond overlapped right valve.

In the male, left valve outline broadly rounded, right valve more elongate. Sulci short, broad, mostly in dorsal half of valve, S2 reaching mid-height of valve. Lobes united ventrally, L1 and L4 ridge-like, crescent-shaped, paralleling anterior and posterior margins. L2 and L3 cone-shaped, bluntly pointed, extending above dorsum, joined and slightly elevated ventrally to form a horseshoe-shaped curve. Measurements of two male valves: length 2.4 mm, 2.8 mm; height 1.5 mm, 1.8 mm.

In the female, valves semi-ovate in outline. Sulci broad, generally shallower than in male. S1 and S3 confined to dorsal half of valve S2 extending to brood pouch (crumina) and curving posteriorly to delimit posterior margin of pouch. In the dorsal half, lobes similar to those of the male but L1 and L2 short, limited ventrally by the brood pouch. L3 extending in an oblique posterior ventral direction nearly to velate swelling, elevated above general valve surface, limited anteriorly by S2 and distinct from low, ridge-like, crescentric L4. Brood pouch large, elongate-ovate, situated anterior ventrally and overhanging valve margin, abruptly elevated above valve surface especially posteriorly. Ventral surface of pouch ornamented with up to ten fine, smooth, longitudinal striae. Measurements of two female valves: length 3.0 mm, 3.5 mm; height 1.9 mm, 2.2 mm.

Remarks. This species agrees more nearly with *Londinia reticulifera* Martinsson 1963 than with the type species, *L. kiesowi* (Krause). *Londinia arisaigensis* differs from *L. reticulifera* in having L2 and L3 smooth, S2 shorter, and, in female valves, L3 more inclined posterior ventrally.

Occurrence. Stonehouse Formation, type section on the shore of Northumberland Strait, 0-100 feet above the base of the formation, and at Cape George where incomplete specimens were obtained from the School Brook fault block.

Types. Holotype, GSC No. 14562; paratypes, GSC Nos. 14563, a, b, 14564, a-e.

Family PRIMITIOPSIDAE Swartz 1936

This family is represented in the Stonehouse collections by one poorly preserved specimen questionably referred to the genus *Limbinaria* Swartz 1956. The presence, on this specimen, of a distinct dorsal ridge and the apparent lack of a tuberculate marginal structure apparently restrict it from the genus *Clavofabella* Martinsson 1955. Until both dimorphic forms of this species are available no definite taxonomic position can be assigned.

Limbinaria? sp.

Plate I, figure 6

Description. Valve subovate, truncated dorsally by straight hinge extending four fifths of greatest length. Cardinal angles rounded, subequal, obtuse. Free margin evenly rounded with a continuous velate ridge and flat? marginal surface, hinge depressed beneath dorsal ridge. Surface moderately convex, evenly and coarsely reticulate with a larger, deeper sulcal pit in mid-dorsal half. Smooth groove between velar and dorsal ridges and lateral valve surface. Slight sulcal depression mid-dorsally restricted from sulcal pit by an obscure transverse ridge. Length 0.74 mm, height 0.50 mm.

Remarks. The only specimen obtained is slightly incomplete ventrally. If it is correctly assigned to *Limbinaria*? it represents a male dimorph. The present specimen is less coarsely reticulate but somewhat similar to *L.*? *altoonensis* (Swartz) 1932 in having a wide, flat marginal surface.

Occurrence. Between 30 to 54 feet above the mouth of MacEachern Brook, which enters Northumberland Strait 85 feet stratigraphically below the top of the shore section of the Stonehouse Formation, Arisaig, Nova Scotia.

Type. Figured specimen, GSC No. 14565.

Four other ostracod species are present in the Stonehouse Formation, *Aparchites*? *sinuatus* (Hall),* *Bythocypris phillipsiana* (Jones and Holl),* *Primitia mundula* (Jones), and *Cytherellina siliqua* (Jones). These species were described previously (Copeland, 1960) and, except for *Aparchites*? *sinuatus* (Hall), remain unchanged. Anders Martinsson has suggested (pers. com.; 1963, p. 540) the possible similarity of *A. sinuatus* and *Amygdalella* cf. *A. subclusa* Martinsson 1956. No evidence of dimorphism has been found in specimens of *A.*? *sinuatus* such as that present in species of *Amygdalella*, but the generic designation of *Aparchites sinuatus* (Hall) is questioned.

References

Ami, H. M.
1894: Notes on a collection of Silurian fossils from Cape George, Antigonish county, Nova Scotia, with descriptions of four new species; *Proc. and Trans. Nova Scotian Inst. Sci.*, ser. 2, vol. 1, pt. 4, pp. 411-415.

Boucot, A. J.
1960: Lower Gedinnian brachiopods of Belgium; *Mem. Inst. Géol., Univ. Louvain*, vol. XXI, pp. 279-344.

Copeland, M. J.
1960: Ostracoda from the Upper Silurian Stonehouse Formation, Arisaig, Nova Scotia, Canada; *Palæontology*, vol. 3, pt. 1, pp. 93-103.

*Figures of these species were reversed in the 1960 paper. Figures 19 and 20 of Plate 23 are *Bythocypris phillipsiana* (Jones and Holl) and Figures 21 and 22 are *Aparchites sinuatus* (Hall).

Henningsmoen, G.
1954: Silurian ostracods from the Oslo region, Norway; *Norsk. Geol. Tidsskr.*, vol. 34, No. 1, pp. 15-71.

Hoskins, D. M.
1961: Stratigraphy and paleontology of the Bloomsburg Formation of Pennsylvania and adjacent States; *Penn. Geol. Surv.*, Bull. G. 36, 125 pp.

Kesling, R. V. and Rogers, K. J.
1957: Size, lobation, velate structures, and ornamentation in some beyrichiid ostracods; *J. Pal.*, vol. 31, No. 5, pp. 997-1009.

Kesling, R. V. and Wagner, P. L.
1956: Silurian ostracods collected by Dr. Carl Ludwig Rominger from glacial deposits in Germany; *Contrib. Mus. Pal., Univ. Michigan*, vol. 13, No. 2, pp. 33-79.

Krause, A.
1891: Beitrag zur Kenntniss der Ostrakoden-Fauna in Silurischen Diluvialgeschieben; *Zeit. Deutsch. Geol. Gesell.*, vol. 43, pp. 488-521.

Maehl, R. H.
1961: The older Palaeozoic of Pictou county, Nova Scotia; *Nova Scotia Dept. Mines*, Mem. 4.

Martinsson, A.
1962: Ostracodes of the family Beyrichiidae from the Silurian of Gotland; *Pal. Inst. Univ. Uppsala*, No. 41, 369 pp.
1963: Kloedenia and related Ostracode genera in the Silurian and Devonian of the Baltic area and Britain; *Pal. Inst. Univ. Uppsala*, No. 42.

McLearn, F. H.
1924: Palaeontology of the Silurian rocks of Arisaig, Nova Scotia; *Geol. Surv. Can.*, Mem. 137.

Moberg, J. C. and Grönwall, K. A.
1909: Om Fyledalens Gotlandium; *Lunds Univ. Årsskrift*, N.F., Afd. 1, No. 5, pt. 1.

Reuter, G.
1885: Die Beyrichien der Obersilurischen Diluvialgeschiebe Ostpreussens; *Zeit. Deutsch. Geol. Gesell.*, vol. 37, pp. 621-679.

Swartz, C. K. *et al.*
1942: Correlation of the Silurian Formations of North America; *Bull. Geol. Soc. Amer.*, vol. 53, pp. 533-538.

Williams, M. Y.
1914: Arisaig-Antigonish district, Nova Scotia; *Geol. Surv. Can.*, Mem. 60.

Some Silurian Ostracoda from Ellesmere Island, District of Franklin

Introduction

The Ostracoda described in this report were collected by J. W. Kerr in west-central Ellesmere Island, on the northwest side and about 2 miles inland from the sharp bend of Canyon Fiord (GSC loc. 47652). They occur in reefal limestone beds with specimens of *Scutellum* sp., *Encrinurus* sp., cf. *Pentamerus* sp., cf. *Halysites* sp., *Tollina* sp., and cephalopod, echinoderm, spiriferid brachiopod, and pelecypod remains. These fossils are from strata of the undivided Allen Bay-Read Bay Formation, 660 to 700 feet below the base of the Cape Phillips Formation. Specimens of *Atrypa* sp., *Leptaena* sp., cf. *Favosites* spp., *Heliolites* sp. cf. *H. megastoma* (M'Coy), *Syringopora verticillata* Goldfuss, *Catenipora* sp., and *Halysites* sp. cf. *H. nitida* Lambe, are present in reefal limestone beds 60 to 360 feet above (300 to 600 feet below the base of the Cape Phillips Formation). The most probable age of the Ostracoda is apparently Late Llandoverian or Wenlockian. (Megafossils identified by B. S. Norford.)

The occurrences of Silurian ostracods from the central and southern Canadian Arctic islands are recorded in several geological and palaeontological publications, i.e., Jones (1852, 1856, 1858)[1], Salter (1853), Ami (1906), Lee (1912), Teichert (1937), Thorsteinsson (1958), and Martinsson (1960). A partial listing of these ostracods, as designated in those publications, is:

Beyrichia (*Beyrichia*) *arctigena* Martinsson
B. clathrata Jones
B. kloedeni M'Coy
B. plagosa Jones
B. rugulifera Jones
B. sigillata Jones
Bythocypris constricta Teichert
Cytheropsis concinna? Jones
Dihogmochilina latimarginata (Jones)
Isochilina grandis canadensis Ami (nude)
?*Kloedenia* sp.
Leperditia alta? (Conrad)
L. arctica Jones (*L. balthica arctica* Jones)
L. cf. *L. caeca* Jones
L. gibbera Jones
L. hisingeri Schmidt
L. hisingeri fabulina Jones
L. phaseolus (Hisinger)
L. phaseolus guelphica Jones
L. cf. *L. whiteavesi* Jones

[1]Names and/or dates in parentheses are those of *References* p. 19.

Mastigobolbina sp.
Primitia mundula arctica Ami (nude)
Zygobeyrichia sp.

Many of these species occur in strata of the Read Bay, Cape Phillips, or Sutherland River Formations exposed on Devon, Beechey, and Cornwallis Islands near the shores of Wellington Channel and Barrow Strait. In addition, specimens close to *Beyrichia* (*Beyrichia*) *arctigena* Martinsson have been obtained from Prince of Wales Island and Ellesmere Island, and *Leperditia arctica* Jones occurs on northern Somerset Island. Leperditiid ostracods, common in Upper Silurian strata of the central Canadian Arctic, also occur in numerous collections of Middle Silurian rocks from the southern Canadian Arctic (Southampton Island). These latter ostracods are identifiable with species from Ontario and Manitoba as noted by Teichert (1937, pp. 44-46). The most easterly occurrence of Silurian ostracods in this area was reported by Poulsen (1934) who recorded *Euprimitia*? sp. and *Ceratocypris symmetrica* Poulsen, of Late Llandoverian age, from strata of the Cape Schuchert Formation of North Greenland.

The Ostracoda described here from Ellesmere Island are new. No beyrichiids or leperditiids, prominent in Silurian strata elsewhere in the Canadian Arctic, are present. Also, no similarity exists between the Ellesmere Island and Greenland ostracods of approximately the same age. The Ellesmere Island specimens occur in biohermal (?) limestone beds, indicating their development under somewhat specialized marine conditions.

Eight genera are represented in this collection: "*Beecherella*", *Spinobairdia*?, *Longiscula, Aparchites, Macronotella*?, *Entomozoe, Elpezoe*?, and *Cypridina,* all recorded previously from strata of Silurian and/or Lower Devonian age in North America or Europe. The association in one collection of podocopid, palaeocopid, and myodocopid Ostracoda is of particular interest.

Systematic Palaeontology

"*Beecherella*" *berdanae* n. sp.

Plate II, figures 2a-d

Description. Species known from one carapace, valves agape ventrally. Carapace subtriangular in lateral and cross-sectional views, highest in anterior third, longest and widest ventrally. Antero-dorsal shoulder short, steeply inclined; hinge inclined, about half the length of the carapace; postero-dorsal shoulder slightly convex, nearly aligned with hinge. Postero-ventral termination acute, possibly abraded on type specimen. Left valve with slight dorsal overreach and probable ventral overlap of right. Both valves with a thin ridge along ventral and anterior contact margins. A distinct, low carina present at the juncture of the nearly flat ventral and slightly more curved lateral surfaces. Carina extending the length of the valves, but not in contact anteriorly with the marginal ridge. Length 1.3 mm; height 0.5 mm.

Remarks. This specimen does not appear to show the base of a posterior ventral

spine as is typical of other "*Beecherella*" species, restudied by Berdan (1960). This may, however, be due to abrasion of the specimen. Berdan (ibid.) restricted the genus *Beecherella* to the type species *B. carinata* Ulrich which has a duplicature and both anterior and posterior ventral spines. These features are either unknown or absent on several species of "*Beecherella*" described by Ulrich. The taxonomic position of these species is presently in doubt.

"*Beecherella*" *berdanae* n. sp. appears to have some features in common with "*Beecherella*" *angularis* Ulrich but is more pronouncedly angular in lateral view and apparently lacks the small posterior spine of "*B.*" *angularis*.

Type. Holotype, GSC No. 17110.

Spinobairdia? *arctica* n. sp.

Plate II, figures 1a-d

Description. Carapace elongate, ovate in lateral view, lozenge-shaped in dorsal view, subtriangular in cross-section. Anterior margin rounded in lateral view, compressed in antero-ventral part; posterior margin more narrowly curved; dorsal and ventral margins smoothly convex. Greatest length and height near median; greatest width in ventral half of valve. Lateral surface of each valve with a bluntly rounded, dorso-ventrally compressed, ventral alate projection situated near mid-length of the valve. Slight concavity of the posterior edge of this alate structure giving it a posterior inclination. Hinge straight, short, less than one half the greatest length of the valve, situated near mid-valve, slightly depressed. Hingement and muscle scars unknown. Left valve overreaching right mid-dorsally, and overlapping it, except anteriorly, around contact margin. Greatest overlap near mid-venter. Measurements of holotype: length 1.7 mm, width 1.2 mm, height 0.9 mm; paratypes: length 1.1-1.3 mm, height 0.7 mm, width variable due to preservation of alate projections.

Remarks. This species is very questionably assigned to *Spinobairdia* Morris and Hill. It lacks the so-called lateral "bairdian aspect" and is much more robust than the typical species, *S. kellettae* Morris and Hill. The alate lateral extensions of this species are intermediate in size, shape, and position to similar appearing structures occurring on species of *Spinobairdia* and *Pseudocyproides* Morris and Hill. Species of *Spinobairdia* have a mid-laterally situated spine and species of *Pseudocyproides* have a ventrally situated, thin, lateral expansion extending along the posterior three quarters of each valve. The compressed lateral extensions of *S.*? *arctica* are considered more nearly similar to the round spine-like projections of *Spinobairdia kellettae*. Until hinge and muscle scar features can be observed the position of this species is uncertain.

Types. Holotype, GSC No. 17111; paratypes, GSC Nos. 17111a-c.

Longiscula sp.

Plate II, figure 4

Description. Carapace elongate, kidney-shaped, posterior half larger than anterior.

Dorsal margin broadly curved, highest in posterior half. Anterior and posterior margins curved, nearly symmetrical. Ventral margin curved, concave, deepest part of concavity slightly anterior of mid-valve. Left valve slightly overlapping right along ventral margin. Dorsal overlap, if present, unknown. Surface smooth. Greatest length 1.6 mm; greatest height 0.8 mm; greatest carapace width 0.6 mm.

Remarks. This species is somewhat similar in lateral view to *Longiscula smithii* (Jones) (=*Rishona*? *smithii* (Jones) of Sohn, 1960, p. 80), *Pontocypris arcuata* Ulrich and Bassler, and possibly *Bythocypris phaseolus* Jones and *Bythocypris*? *reniformis* Jones. The former two species may be assigned to *Longiscula* Neckaja 1958, having L/R ventral overlap and R/L dorsal overlap. The latter two species are somewhat similar to *Longiscula* sp. in lateral shape only, their valves apparently being equal.

Figured specimen. GSC No. 17112.

Aparchites tolmachoffi n. sp.

Plate II, figures 3a-d

Description. Carapace small, subovate in lateral view, postplete, swollen posteriorly. Cardinal angles obtuse. Greatest length (1.1 mm) median; greatest height (0.8 mm) in posterior third; greatest width (0.76 mm) slightly posterior of median. Hinge straight, two thirds greatest length, slightly incised except at cardinal angles. Valves equal, meeting evenly along entire free margin. No velar ridge. Surface smooth.

Remarks. Aparchites tolmachoffi somewhat resembles *Aparchites chuchlensis* Pribyl but is not as subovate in lateral view and is slightly wider. Neither of these species bears a velar ridge, making their inclusion within the genus *Aparchites* somewhat questionable.

Types. Holotype, GSC No. 17113; paratypes, GSC Nos. 17113a-c.

Macronotella? *canyonensis* n. sp.

Plate II, figure 5

Description. Carapace elongate, slightly preplete, greatest length and width near median. Length 1.8 mm; height 1.1 mm; width of carapace 0.7 mm. Hinge straight, three fourths greatest length. Valves equal, each with a faint ventral marginal ridge. Surface punctate, smooth along the free margins, hinge, and on the round near-median adductoral muscle spot.

Remarks. This species is not known to be dimorphic similar to the type species, *Macronotella scofieldi* Ulrich, as shown by Kesling, Crafts, Darby, Shubak, and Smith (1960). Also, it does not show the abrupt marginal bend or ridge and hinge groove typical of *Libumella* Rozhdestvenskaya 1959. *Libumella*? *dubia* (Tolmachoff) is somewhat similar to *Macronotella*? *canyonensis* n. sp. but appears to have a shorter hingeline, larger muscle spot, and is more coarsely and regularly punctate.

The present species is allied to *Macronotella* Ulrich but without proof of dimorphism is only questionably assigned to the genus.

Type. Holotype, GSC No. 17114.

Entomozoe gigas n. sp.

Plate II, figures 9a-e

Description. Carapace elongate, semi-ovate, amplete to slightly preplete. Free margins smoothly curved. Hingeline nearly straight, three fifths greatest length. Cardinal angles rounded. Long, narrow, somewhat postero-ventrally inclined nuchal furrow situated slightly anterior of mid-valve, extending from the dorsal margin about two thirds the greatest height of the valve. Anterior and posterior margins with a narrow flattened border on each valve, extending onto the dorsum and paralleling the posterior half of the hinge. Marginal border parallel to valve contact except anteriorly, giving the appearance of a cypridinacean-like anterior gape. Left valve strongly overlapping right along the venter. Length 9.0 mm; height 5.4 mm; width of carapace 5.2 mm.

Remarks. The only specimen is, in part, a steinkern, showing little of the shell ornamentation. Preservation of the shell at the anterior extremity of the specimen is imperfect, but, as interpreted, the area between the flattened marginal ridges is occupied by the valve contact. Valve material in this area is broken but is present at least in the ventral part where it shows left over right overlap. The dorsal part of the anterior valve contact area is covered by matrix.

This species is very similar to the smaller, robust, *Entomis phalanga* Kegel, 1926, in that both possess a flattened ridge along the free margin of each valve. In the Lower Devonian *Entomis phalanga*, however, this ridge is continuous whereas on *Entomozoe gigas* it is absent along the mid-venter. Specimens of the imperfectly known Upper Silurian and Lower Devonian species *Entomis angelini* Jones, 1884, and *Entomis lindstroemi* Jones, 1887, are somewhat similar to *Entomozoe gigas* in lateral view but differ in size and sulcation and are less robust in dorsal view.

Type. Holotype, GSC No. 17115.

Elpezoe? *borealis* n. sp.

Plate II, figures 7a-e, 8

Description. Carapace subspherical in lateral view, rounded-ovate in end and dorsal views. Dorsal and posterior margins broadly convex; ventral and anterior margins slightly convex, nearly at right angles to each other; antero-ventral corner rounded. Prominent, antero-dorsal angle slightly overhanging the nearly vertical anterior margin. Anterior part of valves with slight depression, limited posteriorly by very low valvular elevations. Left valve slightly overlapping right valve antero- and postero-dorsally, and along the posterior half of the venter; right valve slightly overlapping left along the anterior half of the venter. Postero-ventral angle with a vertically elongate, slightly curved, opening between the valves, the caudal siphon.

Anterior margin without rostral gape, valves meeting evenly. Antero-ventral angle with slight boss or prominence. Ovate, adductoral(?) scar, 0.8-0.9 mm in diameter, situated in antero-ventral quarter slightly below mid-height of valve, 1.4 mm from anterior margin, 3.0 mm below dorsum. Muscular impressions(?) visible only on antero-ventral part of scar, consisting of numerous, poorly preserved radiate-linear markings.

Measurements of holotype: length 7.0 mm, height 6.1 mm, width 4.5 mm.

Remarks. This species is somewhat like *Entomoconchus scouleri* M'Coy in lateral view but lacks the anterior marginal furrows of that species. The presence on *E.? borealis* n. sp. of a slight anterior marginal depression bounded posteriorly by indistinct valvular elevations indicates its probable relationship to *Elpezoe inchoata* (Barrande), type species of the genus *Elpezoe*. No previous description has been made of the adductoral musculature of species of this genus. If the ovate scar with radiate-linear impressions described above is the adductoral scar, it is very similar to that occurring on *E. scouleri* M'Coy. A question arises as to the identification of this impression as the adductoral scar since other, more indistinct, semi-ovate, radiate-linear areas occur on the postero-ventral and antero-dorsal parts of the right valve of the holotype. Somewhat similar shell impressions are reported on specimens of *Cypridina radiata* Jones and *Cypridina aciculata* Scott and Summerson.

Type. Holotype, GSC No. 17116.

Cypridina franklini n. sp.

Plate II, figures 6a-c

Description. Carapace subspherical in lateral view, rounded-ovate in end and ventral views. Dorsal and free margins broadly convex except at rostral notch and caudal siphon. Rostrum prominent, overhanging well-developed sinus. Rostral incisure elongate, transverse, extremities rounded. Antero-ventral margin with slight prominence. Left valve slightly overlapping right antero-ventrally and along the posterior half of the venter. Caudal siphon ovate in end view, slightly protuberant and bluntly pointed in lateral view, situated on posterior margin slightly below mid-valve. Surface smooth.

Measurements of holotype: length 2.35 mm, height 1.9 mm, width 1.7 mm.

Remarks. This species appears very similar to *Cypridina postsilurica* Tschernyschew but is less prominently rostrate. *Cypridina tyrrhenica* Canavari, of Early Ludlovian age, is similar to *C. franklini* n. sp. but apparently lacks left valve ventro-posterior overlap.

Type. Holotype, GSC No. 17101.

References

Ami, H. M.
1906: Preliminary lists of organic remains from Beechey Island, Lancaster Sound, in the District of Franklin; *in* Low, A. P., Report on the Dominion Government

Ami, H. M. (*conc.*)
Expedition to Hudson Bay and the Arctic Islands on board the D.G.S. *Neptune* 1903-1904; Ottawa, pp. 329-330.

1906: Preliminary lists of the species of organic remains from blocks of limestone from Southampton Island; *ibid.*, pp. 331-335.

Berdan, J. M.
1960: Revision of the Ostracode Family Beecherellidae and redescription of Ulrich's types of *Beecherella; J. Pal.*, vol. 34, No. 3, pp. 467-478; pl. 66.

Jones, T. R.
1852: *In*, Salter, J. W., "Geology"; Appendix to, Sutherland, P. C., Journal of a Voyage in Baffin's Bay, and Barrow Straits in the years 1850-1851, etc., London, 2 vols., pp. ccxvii-ccxxxiii.

1856: Notes on the Palaeozoic bivalved Entomostraca, No. III. Some species of *Leperditia; Ann. Mag. Nat. Hist.*, ser. 2, vol. 17, pp. 81-101, pls. 6, 7.

1858: Notes on the Palaeozoic bivalved Entomostraca, No. IV. Some North American Species; *Ann. Mag. Nat. Hist.*, ser. 3, vol. 1, pp. 241-257, pls. 9, 10.

Kesling, R. V., *et al.*
1960: Middle Ordovician Black River ostracods from Michigan, Introduction and Part I the Nature of *Macronotella; Univ. Mich. Contr. Mus. Pal.*, vol. 15, No. 13, pp. 293-314, 3 pls.

Lee, G. W.
1912: Note on Arctic Palaeozoic fossils from the *Hecla* and *Fury* Collections; *Roy. Phys. Soc. Edinburgh, Proc.*, vol. 18, pp. 255-264, 8 text figs.

Martinsson, A.
1960: Ostracods; *in* Boucot, A. J., *et al.*, A late Silurian fauna from the Sutherland River Formation, Devon Island, Canadian Arctic Archipelago; *Geol. Surv. Can.*, Bull. 65, pp. 15-20, 4 text figs., Pl. IV.

Poulsen, Ch.
1934: The Silurian faunas of North Greenland. I. The fauna of the Cape Schuchert Formation; *Meddel. om Grønland*, vol. 72, pt. 2, No. 1, Copenhagen.

Salter, J. W.
1853: *On* Arctic Silurian Fossils; *Quart. J. Geol. Soc. London*, vol. 9, pp. 312-317.

Sohn, I. G.
1960: Palaeozoic Species of *Bairdia* and Related Genera; *U.S. Geol. Surv.*, Prof. Paper 330-A, 105 pp., 6 pls.

Teichert, C.
1937: Ordovician and Silurian faunas from Arctic Canada; *Rept. Fifth Thule Expedition* 1921-24, vol. 1, No. 5, 169 pp., 24 pls.

Thorsteinsson, R.
1958: Cornwallis and Little Cornwallis Islands, District of Franklin, Northwest Territories; *Geol. Surv. Can.*, Mem. 294, 134 pp.

PLATES I-II

PLATE I

Figures 1, 2. *Hemsiella maccoyiana mclearni* n. subsp. (Page 9)
Lateral views of two female left valves; x15. Holotype, GSC No. 14560; paratype, GSC No. 14561.

Figure 3. *Hemsiella maccoyiana sulcata* (Reuter) (Page 9)
Lateral view of a female right valve; x16. Hypotype, GSC No. 14511.

Figures 4, 5. *Macrypsilon salterianum* (Jones)
Lateral views of male and female right valves; x16. Hypotypes, GSC Nos. 14566, a.

Figure 6. *Limbinaria*? sp. (Page 12)
Lateral view; x17. Figured specimen, GSC No. 14565.

Figures 7-15. *Pintopsis tricornis* (Ulrich and Bassler) (Page 10)
Baltimore and Ohio Railroad cut between Pinto and McKenzie, Maryland; 85 feet horizontally below the top of the McKenzie Formation.
7, 8. Lateral and ventral views of a female right valve; x16. Hypotype, USNM No. 142247.
9, 10. Lateral and ventral views of a female left valve; x16. Hypotype, USNM No. 142248.
11, 12. Lateral views of two male right valves; x16. Hypotypes, USNM Nos. 142249, 142250.
13, 14. Lateral and ventral views of a male left valve; x16. Hypotype, USNM No. 142251.
15. Ventral view of an incomplete female left valve; x16. Hypotype, USNM No. 142252.

Figures 16-26. *Londinia arisaigensis* n. sp. (Page 11)
16, 17. Lateral and ventral views of a female right valve; x10. Paratype, GSC No. 14563.
18. Lateral view of a female left valve; x10. Holotype, GSC No. 14562.
19, 20, 24. Lateral views of three male left valves; x15. Paratypes, GSC Nos. 14564, a, b.
21, 25, 26. Lateral views of three male right valves; x15. Paratypes, GSC Nos. 14564c, d, e.
22. Lateral view of a female right valve; x10. Paratype, GSC No. 14563a.
23. Ventral view of a female right valve; x17. Paratype, GSC No. 14563b.

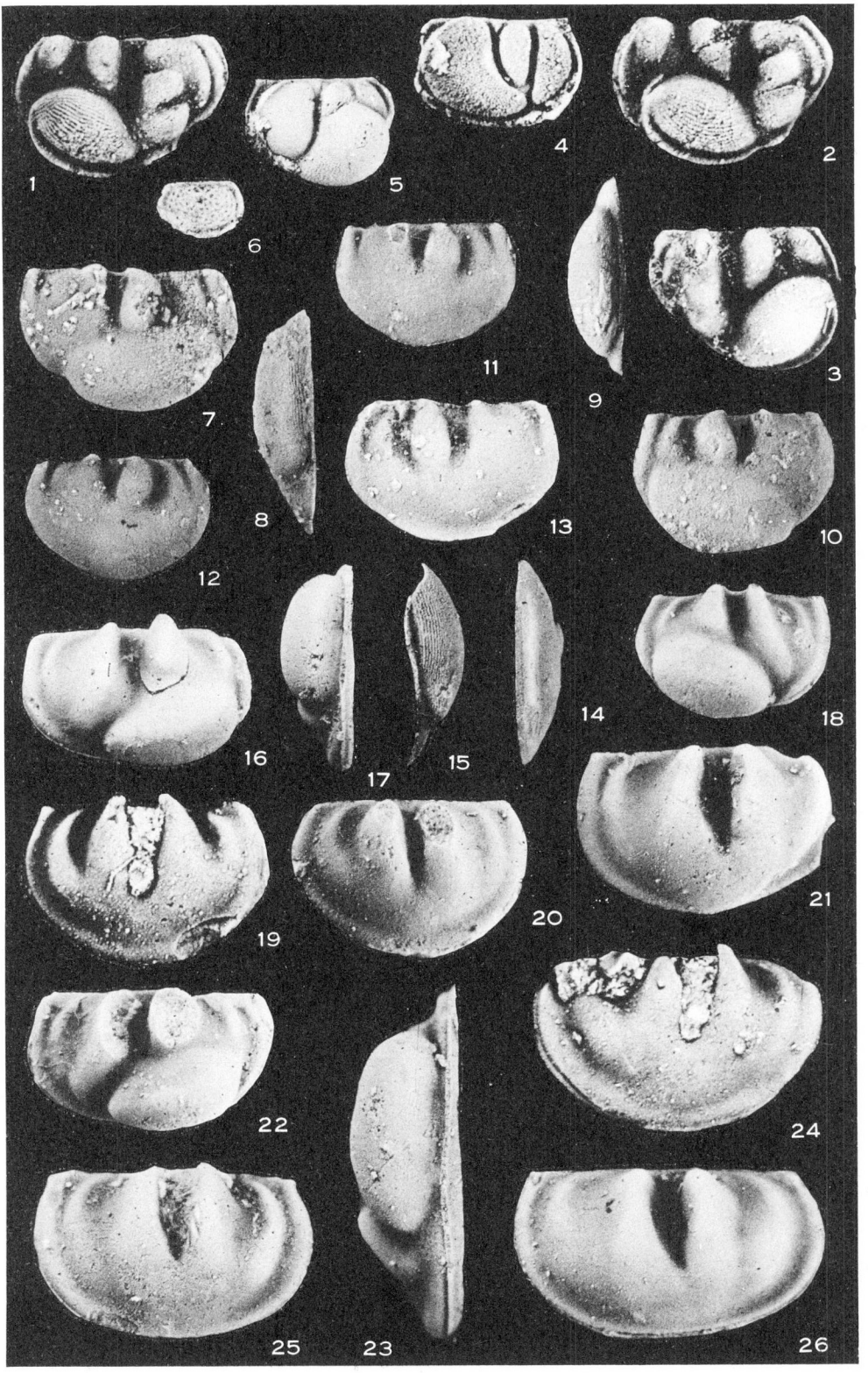
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PLATE II

Figures 1a-d. *Spinobairdia*? *arctica* n. sp. (Page 16)
Anterior, right lateral, ventral, and dorsal views of four specimens; x15. Paratypes, GSC Nos. 17111a-c; holotype, GSC No. 17111.

Figures 2a-d. *"Beecherella" berdanae* n. sp. (Page 15)
Ventral, right lateral, anterior, and dorsal views; x15. Holotype, GSC No. 17110.

Figures 3a-d. *Aparchites tolmachoffi* n. sp. (Page 17)
Left lateral, right lateral, dorsal, and ventral views of four specimens; x15. Holotype, GSC No. 17113; paratypes, GSC Nos. 17113a-c.

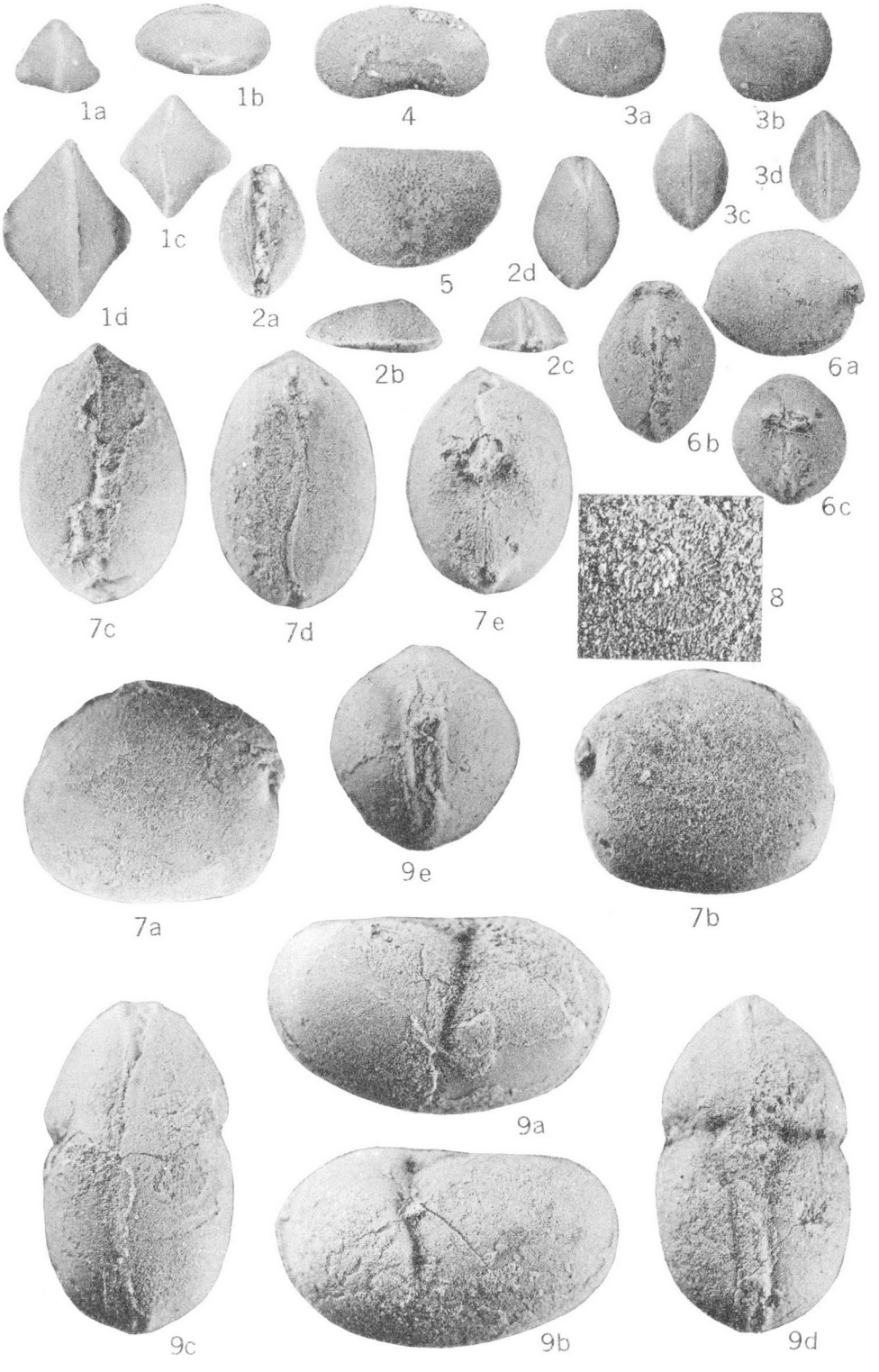
Figure 4. *Longiscula* sp. (Page 16)
Right lateral view; x15. Figured specimen, GSC No. 17112.

Figure 5. *Macronotella*? *canyonensis* n. sp. (Page 17)
Left lateral view; x15. Holotype, GSC No. 17114.

Figures 6a-c. *Cypridina franklini* n. sp. (Page 19)
Right lateral, ventral, and anterior views; x10. Holotype, GSC No. 17101.

Figures 7a-e, 8. *Elpezoe*? *borealis* n. sp. (Page 18)
Right lateral, left lateral, dorsal, ventral, and anterior views; x5.4. Adductoral muscle scar(?), much enlarged. Holotype, GSC No. 17116.

Figures 9a-e. *Entomozoe gigas* n. sp. (Page 18)
Right lateral, left lateral, ventral, dorsal, and anterior views; x5.5. Holotype, GSC No. 17115.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