Paleozoic Gastropoda from the Moose River Synclinorium, Northern Maine

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By ARTHUR J. BOUCOT *and* ELLIS L. YOCHELSON

CONTRIBUTIONS TO PALEONTOLOGY

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An investigation of fossils primarily of Devonian age

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CONTENTS

ILLUSTRATIONS

[Plates follow index]

TABLE

CONTRIBUTIONS TO PALEONTOLOGY

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ABSTRACT

Large-scale collecting in the middle Paleozoic strata of the Moose River synclinorium has yielded a few gastropods—one Ordovician species, six species from the Silurian, and two from rocks of Silurian or Devonian age, one of these also occurring in rocks of undoubted Silurian age. The Devonian rocks yielded 17 species, one of which also occurs in the Silurian rocks, and by far the bulk of the specimens.

The few specimens and their unsatisfactory state of preservation have resulted in use of open nomenclature for the most part. Eleven taxa are identified only to the generic level, and six are tentatively compared to previously named species. The generic assignment is questioned in four of the identified species; in only one taxon is the generic and specific designation of common usage accepted without question.

The new bellerophontacean subfamily Plectonotinae is diagnosed. *Crossoceras* is proposed as a new genus of Devonian age with *C. belandi*, new species, as the type. The genus is placed within the Platyceratacea. *Platyceras* (*Orthonychia*) *aroostookensis* is proposed as a replacement name for *P.*? (*O.*) *compressa* Williams and Breger, 1916, not *P. compressum* Nettleroth, 1889. The occurrence of ophiuroid remains and "*Nidulites*," two faunal elements which do not fit conveniently into other faunal studies, is noted.

INTRODUCTION

This paper describes and illustrates gastropods obtained for the most part by Boucot during several years of field investigation in the Moose River synclinorium of northern Maine. Boucot (1961) has delineated the general stratigraphy of the area; Oliver (1960) has described the Early Devonian corals. With the exception of one pleurotomariacean gastropod, all specimens discussed are from rocks of Silurian and Devonian age. One new Silurian bellerophontacean is reserved for publication elsewhere by Boucot. Although John M. Clarke described specimens from this area in 1909, no other work has been done on these mollusks in the intervening years.

In general aspect, the gastropod faunas resemble those of similar age known from the Appalachians, both to the north and to the south. Although the gastropods are of limited stratigraphic utility because of their rarity, occurrences support the correlation of rock units which has been determined from study of other fossil groups (chiefly brachipods and corals).

Except where indicated, the taxonomic classification follows that published by Knight, Batten, and Yochelson (1960). Specimens are rare and some are not well preserved; an open nomenclature has been used for most of the taxa. Future detailed study of middle Paleozoic gastropod faunas will undoubtedly increase the degree to which material can be identified, but because of limited present knowledge in this particular field, a conservative taxonomic approach is warranted. The morphologic terms used follow those given by Cox (1955).

With the exception of a few specimens in limestone, the fossils occur in indurated, cleaved, slightly metamorphosed (chlorite zone) mudstone and siltstone. Most of the specimens were obtained by splitting slabs of matrix on a rock trimmer. These slabs were then soaked in hydrochloric acid and, after all shell material had been dissolved, latex rubber impressions were made from the internal and external molds. These impressions have been figured, though for a few species they have been supplemented by illustrations of the mold, or of the steinkern if it was not destroyed during preparation. The original specimens commonly are in several pieces. More than 8 tons of rock were split to obtain the specimens described herein.

In addition to the gastropods, the occurrence of *Nidulites* and ophiuroid remains is noted. These uncommon fossils do not fit well with any of the major faunal studies, but it seems worthwhile to report their occurrence in Maine.

The locality numbers and the register of localities are in the Silurian-Devonian (SD) catalog of the U.S. Geological Survey. A stratigraphic table prepared by Boucot (1961) is reproduced here as figure 1. All the formations mentioned in the text are shown in this figure except an unnamed conglomerate, an approximate equivalent of the Silurian Hardwood Mountain Formation, that occurs in the Attean quadrangle of northern Maine.

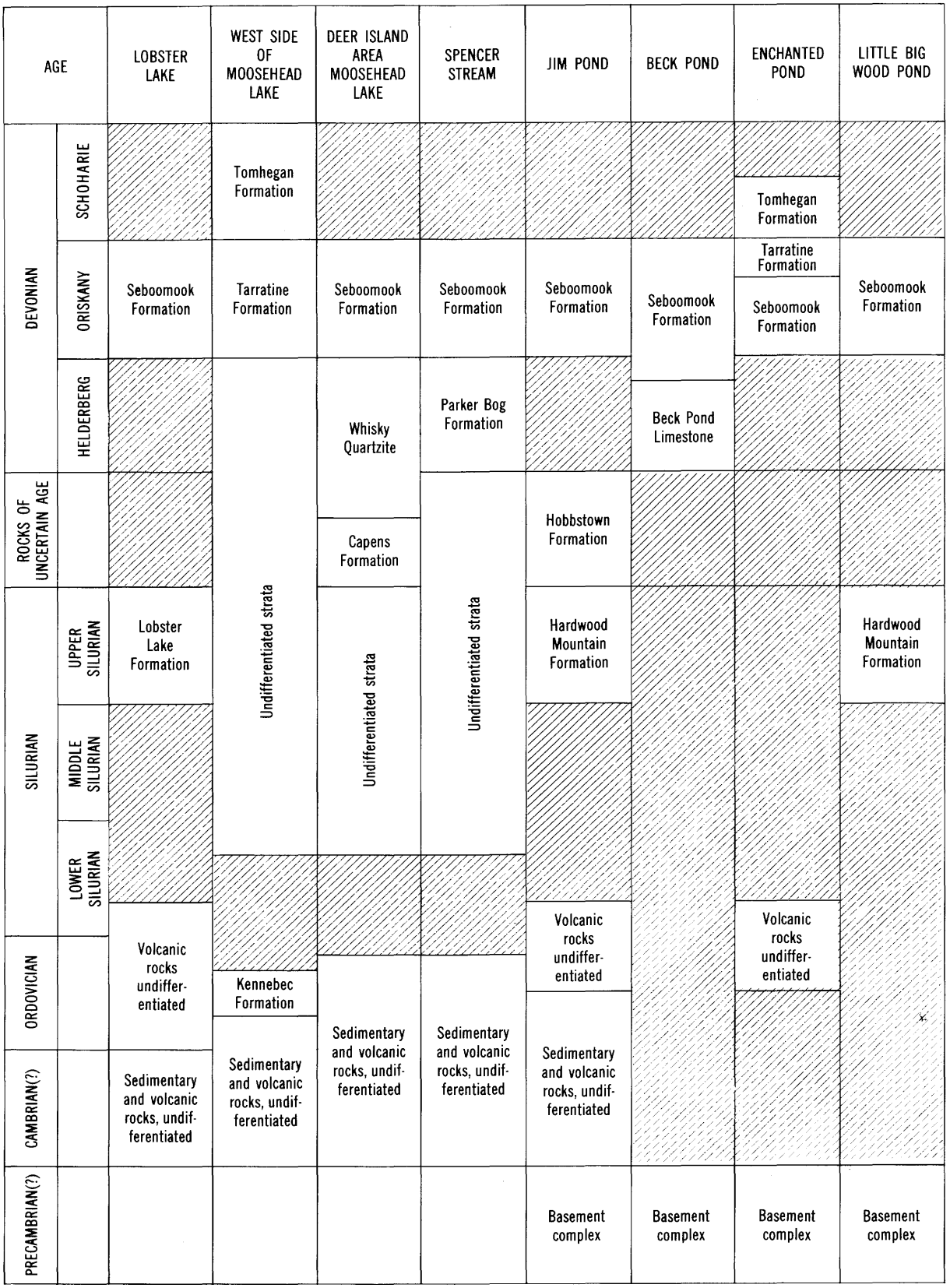

FIGURE 1.—Correlation table of Paleozoic strata in the Moose River synclinorium of northern Maine (after Boucot, 1961).

OCCURRENCE AND DISTRIBUTION OF THE GASTROPODS

Mollusks constitute but a small fraction of the fossils collected from the Moose River synclinorium. At most localities brachiopods are the dominant faunal element; in some localities corals are dominant. Mollusks, the third most common group, are much less abundant than either of these phyla. Pelecypods and gastropods constitute virtually all of the molluscan fauna, the pelecypods being more common than the gastropods. We estimate that there were about one thousand brachiopods collected for each gastropod obtained.

Among these few gastropod specimens, the platyceratids are, by far, the most abundant; members of this family are several times as abundant as all other gastropods combined. Among the remaining specimens, four groups—bellerophontaceans, pleurotomariaceans, all other archaeogastropods combined, and all high-spired gastropods combined—are subequal in abundance, pleurotomariaceans being the most common of the four. So few specimens are involved, however, that the number of specimens within each group cannot be considered significant. The gastropods commonly do not appear to have been collected from former life assemblages; at a few localities there is fairly definite evidence that they were part of death assemblages.

Some inferences about the ecology of the platyceratids can be drawn. Most specimens of the family were collected from localities in the Tarratine Formation where there is an indication that some were from former life assemblages. The Tarratine is divisible into three parts: a limestone lower member (McKenney Ponds Member), the main body of interbedded subgraywacke and slate, and an upper quartzite (Misery Quartzite Member). Except for a few from the limestone, the platyceratids were collected from the main part of the formation. In both parts of the formation the original matrix may have been a soft mud.

In spite of the fact that platyceratids are assumed to have lived on crinoid calyxes throughout their lives, none was found attached. Indeed, crinoid debris is rare in the subgraywacke and slate. This evidence is clearly not enough to abandon the traditional idea regarding the life habit of this group, but it does suggest that not all platyceratids were necessarily restricted at maturity to the substrate of a crinoid host. Other areas may yield information to reinforce the suggestion that some platyceratids were free living in the adult stage.

Not only platyceratids, but all other gastropod specimens are most common in the Tarratine Formation. The faunal distribution is summarized in table 1; of the 22 Silurian and Devonian taxa identified, 10 occur in the Tarratine. Curiously enough, the overlying Tomhegan Formation, which has been collected about one-fourth as intensively as the Tarratine, has yielded fewer specimens but 11 taxa. Only three taxa are common to the two formations. The two formations thus contain the bulk of the taxa discussed in this paper.

The Seboomook Formation, the lateral equivalent of the Tarratine, contains only two species, both of which are common in the Tarratine. The slightly older Beck Pond Limestone has yielded only a few platyceratids. These are identified as *Platyceras* (*Platyostoma*) *ventricosum*, the same species as in the younger beds, but that particular species category is admittedly broad.

Less than a dozen specimens are known from the Silurian, but they are quite distinct from those of the Devonian. *Euomphalopterus*, *Poleumita*, and *Oriostoma* are characteristic Silurian gastropods.

SYSTEMATIC PALEONTOLOGY[1]

Class GASTROPODA
Subclass PROSOBRANCHIA
Order ARCHAEOGASTROPODA
Suborder BELLEROPHONTINA Ulrich and Scofield, 1897
Superfamily BELLEROPHONTACEA M'Coy, 1851
?Family SINUITIDAE Dall in Zittel-Eastman, 1913
?Subfamily SINUITINAE Dall in Zittel-Eastman, 1913
Genus PATELLOSTIUM Waagen, 1880

Patellostium? revolvens (Williams and Breger)

Plate 1, figures 1–4

Bellerophon (*Patellostium*) *revolvens* Williams and Breger, 1916, p. 265, pl. 14, figs. 14, 15, 20, 27.

Description.—These shells are moderately large, are phaneromphalous, and have an explanate aperture. Early growth stages are unknown. Because the whorls expand at a rapid rate, few whorls are completed. The mature state is marked by an expansion of the aperture. The lip expands nearly equally in both lateral and anterior directions. The aperture may have an extremely shallow sinus near the dorsum or may be straight, but neither a deep sinus nor a slit is present. The umbilici are narrow but deep, their upper edges being steeply rounded. From the edges of the umbilicus, the profile is a low smooth curve not interrupted at the dorsum. Ornament is limited to obscure growth lines.

Remarks.—This description is based on a restudy of Williams' and Breger's type lot from glacial drift, probably derived from the Tarratine Formation at Detroit, Somerset County, supplemented by three additional specimens. One of the new specimens is larger than any of the syntypes and shows a few of the growth lines.

[1] In the synonymies in this section, names of founders of species are given for the original reference, but, for brevity, are not repeated in subsequent citations to the same species.

TABLE 1.—*Distribution of gastropods in Paleozoic rocks of the Moose River synclinorium*

Species	ORDOVICIAN	SILURIAN				SILURIAN or DEVONIAN	DEVONIAN																																
	Kennebec Formation	Unnamed formation	Hardwood Mountain Formation		Unnamed conglomerate	Hobbstown Formation	Beck Pond Limestone		Seboomook Formation			Tarratine Formation																							Tomhegan Formation				
USGS Silurian-Devonian loc	4318	3745	3489	3489	5995	3479	3499	3600	2857	2879	3481	2700	2701	2705	2718	2719	2720	2721	2727	2729	2731	2766	2767	2771	2783	2798	2806	2813	2830	2832	2861	2872	2890	3090	3478	2713	2750	2819	2820	2852
Bellerophontacea:																																								
Patellostium? revolvens (Williams and Breger)														×			×																×						×	
"*Bucanella*" *brevilineatus* (Conrad)																																					×		×	×
Gammadiscus? somerseti (Williams and Breger)														×	×	×												×		×	×			×						
Tropidodiscus sp.						×																																		
Plectonotus cf. *P. gaspensis* (Clarke)														×	×	×			×	×					×			×	×						×			×		
Pleurotomariacea:																																								
Mourlonia cf. *M. lucina* (Hall)															×	×	×					×						×												
Bembexia? cf. *B.? adjutor* (Hall)																																							×	
Loxoplocus (*Lophospira*) sp.	×																																							
Ruedemannia sp.														×														×												
Stenoloron cf. *S. plena* (Hall)																																							×	
Euomphalopterus sp.		×																																						
Platyceratacea:																																								
Holopea sp.																																							×	
Platyceras (*Platyceras*) sp.																																					×		×	
(*Platyostoma*) *ventricosum* (Conrad)							×	×		×	×	×	×	×				×		×	×		×	×			×	×				×				×				
(*Orthonychia*) sp.																											×													
Crossoceras belandi n. sp.																							×																	
Microdomatacea:																																								
Elasmonema cf. *E. bellatulum* (Hall)																																						×	×	
Oriostomatacea:																																								
Oriostoma sp.		×																																						
oriostomatid operculum			×																																					
Poleumita sp.		×		×																																				
Pseudophoracea:																																								
"*Euomphalopterus*" *gasconensis* Northrop					×	×																																		
Murchisoniacea:																																								
Murchisonia (*Murchisonia*) sp.																										×										×			×	
(*Murchisonia?*) sp.			×																																		×		×	
Loxonematacea:																																								
Loxonema cf. *L. welleriana* Williams and Breger									×				×															×												

The primary types, catalogued under USNM 59843, consist of five specimens. The original of Williams' and Breger's plate 14, figure 20, an external mold, is here designated lectotype and is reillustrated on our plate 1, figure 1. The steinkern illustrated by Williams and Breger as figure 15, the counterpart of figure 20, the steinkern illustrated as figure 14, and two fragments, are all designated paralectotypes; the original of their figure 27 is missing. *Bellerophon plenus* Billings, as figured by Clarke (1909, p. 153–154, pl. 17, figs. 27–28) from Gaspé, may be the same as this taxon. Clarke's material has not been investigated, and the illustrations, though suggestive of this interpretation, are not conclusive.

The type species of *Patellostium* was redescribed by Knight (1941, p. 236), who showed that it was a steinkern. Consequently, it is difficult to place the genus in any family, and in the last major revision of Paleozoic Gastropoda (Knight, Batten, and Yochelson, 1960, p. I184), the genus was not assigned. The steinkern of *Patellostium? revolvens* closely resembles that of the type species, *P. macrostoma* (Roemer). If these species are congeneric, something more can be deduced of the characters of the genus. *P.? revolvens* appears to have neither a slit nor a well-developed selenizone.

Recent work by Radvan Horný (1962; 1963; oral commun., 1962) has shown that several species from the Silurian and Devonian of Czechoslovakia are characterized by flaring apertures at maturity but that virtually no apertural reentrant is present in the flare. This new information suggests that the interpretation of *Patellostium* presented here is not anomalous. It suggests further that the genus may be related to *Ptomatis* Clarke, 1899, and *Crenistriella* Knight, 1945. There is every likelihood that these genera form a distinct subfamilial or familial group. Pending more detailed investigations, *Patellostium* is here placed questionably within the Sinuitidae.

Occurrence.—Tarratine Formation: USGS loc. 2705–SD, Brassua Lake quadrangle; 2720–SD, Long Pond quadrangle; 2890–SD, Spencer quadrangle. Tomhegan Formation: USGS loc. 2820–SD, Brassua Lake quadrangle.

Figured specimens.—USNM 59843, 126285.

Subfamily BUCANELLINAE Koken, 1925
Genus BUCANELLA Meek, 1871

"Bucanella" brevilineatus (Conrad)

Plate 1, figures 5, 6

Bellerophon brevilineatus Conrad, 1842, p. 269, pl. 16, fig. 6: Hall, 1879, p. 107, pl. 26, figs. 5–7.

Tropidocyclus brevilineatus, Clarke, 1908, p. 229, pl. 17, figs. 7–16; Clarke, 1909, p. 139, pl. 32, figs. 4–7.

Description.—A medium-sized compressed phaneromphalous bellerophontoid gastropod which has a prominent median lobe. The overall shape is compressed, but the median lobe of the shell is high and relatively wide, and has a well-rounded upper surface; its lateral slopes are steep. The upper surface of the lateral lobes are strongly curved and turn rapidly into the flattened outer whorl faces. The umbilical shoulders are rounded, the umbilici are wide, and the umbilical sutures are sharp. Growth lines are prominent and are raised, though not sublamellose; the interspaces are about twice as wide as individual lines. The growth lines are orthocline within the umbilici and across the umbilical shoulders, then curve only slightly prosocline to the median lobe. The upper surface of the median lobe bears curved growth lines slightly finer and possibly more closely spaced than those on the lateral slopes. The relationship of the growth lines on the dorsum to those on the slope is not known. The ornamentation is confined to the coarse transverse collabral lines.

Remarks.—Narrow trilobed bellerophontoids ornamented by prominent growth lines occur in strata of the Hamilton Group (Hall, 1879, p. 107, pl. 26, figs. 5–7), the Gaspé Sandstone (Clarke, 1908, p. 229, pl. 17, figs. 7–16), and beds of late Early Devonian age at Highland Mills, Orange County, N.Y. In the past these bellerophontoids have been assigned to "*Tropidocyclus brevilineatus* (Conrad)." The few specimens from the Tomhegan Formation in Somerset County, Maine, are also judged to be conspecific. All citations in the synonymy are from the literature, and no comparison has been made of the Maine specimens with the types.

For the past several decades, it has been customary to assign most trilobed middle Paleozoic bellerophontaceans to *Bucanella*. At the same time, it has been recognized informally that, fundamentally, these taxa probably have little in common with this genus except general shape. *Bucanella nana*, the type species of the genus, is from beds of Early Ordovician age.

There is a distinct possibility either that the morphology of this form may be reinterpreted by other workers, or that better material may demonstrate conclusively a slit in the aperture of this species. In the past, the aperture always has been interpreted as sinuate. The supposition of a slit in the aperture parallels the findings presented below for *Plectonotus*. Were the presence of a selenizone more strongly inferred, the writers would propose a new genus, but the available material does not yet warrant such a step.

Occurrence.—Tomhegan Formation: USGS loc. 2750–SD, 2820–SD, 2852–SD, Brassua Lake quadrangle.

Figured specimen.—USNM 126369.

Family BELLEROPHONTIDAE M'Coy, 1851
Subfamily TROPIDODISCINAE Knight, 1956
Genus GAMMADISCUS Horný, 1962

Gammadiscus? somerseti (Williams and Breger)

Plate 1, figures 7, 8

Tropidodiscus (Temnodiscus) somerseti Williams and Breger, 1916, p. 271–272, pl. 14, fig. 22.

Description.—These shells are medium sized lanceolate phaneromphalous bellerophontaceans; growth lines form a narrow V-shaped sinus in the outer lip which does not give rise to a selenizone. The whorl profile is lanceolate, being angular at the dorsal crest, gently convex between the dorsum and the umbilical shoulders, and angulated at the umbici, with only the slightest rounding of the shoulders. The sutures are distinct and give a stair-step umbilical profile. The umbilici are moderately wide and occupy more than one-fourth of total width. The growth lines are closely spaced. They are normal to the umbilical angulations, but then curve smoothly to the posterior and rise until, at the dorsum, they make an angle of about 30° with the center of the crest.

Remarks.—Williams and Breger (1916, p. 271–272) based *Tropidodiscus (Temnodiscus) somerseti* on two steinkerns collected at Detroit, Somerset County, Maine; the two are catalogued under USNM 59852. Because the types show few critical features, they are not reillustrated. The larger figured specimen is here designated lectotype, the smaller paralectotype. Beds of Tarratine age are not known to crop out in or near Detroit. Williams' and Breger's specimens undoubtedly were collected from glacial drift. Brachiopods associated with the types clearly indicate that the matrix was derived originally from the Tarratine Formation.

The description of *Gammodiscus? somerseti* given above is based almost entirely on several specimens collected from outcrops of the Tarratine Formation in Somerset County. The new material is considered conspecific with the types; one of the specimens has the exterior preserved and shows a sinuate periphery, rather than a slit as in *Tropidodiscus*. The generic description of *Gammodiscus* was published in a preliminary note (Horný, 1962) but was later given in detail (Horný, 1963, p. 88). The type species is lanceolate in profile and has sinuate growth lines; Williams' and Breger's species is provisionally transferred to *Gammodiscus*. Pending further information on the limits of the genus, the generic reference is here used questionably, inasmuch as the type of the genus is of Ordovician age, and no other species have yet been assigned. The gap in record between the Ordovician type and this Devonian occurrence suggests a need for caution in the generic assignment.

The specimens identified by Williams and Breger (1916, p. 270–271) from the Chapman Sandstone in Aroostook County, Maine, as *Tropidodiscus obex* Clarke differ from this species in being wider and expanding slightly less rapidly. The illustrations of the type (Clarke, 1907, p. 193) are not outstanding, and from neither source is it possible to determine if this species has a sinuate periphery rather than a true apertural slit. *T. curvilineatus* (Conrad) has a similar lanceolate cross section but does have a narrow silt. So little is known about the presence of a slit versus a sinus in the lanceolate Silurian and Devonian bellerophontaceans that meaningful comparison cannot be made with other species.

Occurrence.—Tarratine Formation: USGS loc. 2705–SD, 2813–SD, 2832–SD, Brassua Lake quadrangle; 2718–SD, 2719–SD, 2720–SD, 3090–SD, Long Pond quadrangle; 2861–SD, Moosehead Lake quadrangle.

Figured specimens.—USNM 126282.

Genus TROPIDODISCUS Meek and Worthen, 1866

Tropidodiscus sp.

Plate 1, figure 13

Remarks.—A single specimen of *Tropidodiscus* was collected from a crinoidal limestone in the lower conglomerate member of the Hobbstown Formation. The specimen is a juvenile and is too immature to be assigned to any particular species. It differs from *Gammadiscus? somerseti* (Williams and Breger) in showing a selenizone on the crest. The crest is raised and flattened rather than steeply rounded. This species also appears to have slightly coarser growth lines which are more widely spaced than in *G. somerseti*.

Tropidodiscus curvilineatus (Conrad) is closely related but is distinct. That species has finer growth lines, a more inflated profile, and a less pronounced crest upon which the selenizone is borne.

The species cannot be compared with *T. americanus*, a species described by Williams and Breger (1916, p. 272) as *T. minimus* var. *americanus* and based on a single specimen from the Chapman Sandstone in Aroostook County, Maine. That holotype is more than three times as large as this form and is a steinkern. The steinkern shows one detail of general interest in that the trace of the slit is preserved. The slit is more than one-fifth of the body whorl circumference in depth.

Occurrence.—Hobbstown Formation: USGS loc. 3479–SD, Spencer quadrangle.

Figured specimen.—USNM 126297.

Subfamily PLECTONOTINAE, Boucot and Yochelson, new subfamily

Diagnosis.—Moderately large slit-bearing bellerophontid gastropods having a prominent raised median lobe that forms a trilobed cross section.

Remarks.—Some of the specimens from Maine, studied by Boucot in 1955, so strongly suggested that the aperture of this genus had a slit that a cast of the type species was reexamined. Study of this cast indicates that the V-shaped sinus described by Knight (1941, p. 255–256) in the holotype might better be interpreted as an artificial break. Although Clarke suspected the presence of a selenizone, his original material was too poor to demonstrate this point. The presence of a slit and a deep U-shaped sinus has been confirmed in specimens from widely separated areas. In particular, Boucot and Saul (in Saul, Boucot, and Finks, 1963, p. 1048–1049) have described significant material from the Devonian of Ghana; they also illustrated Maine and Gaspé specimens showing a slit. Undescribed material of *Plectonotus* from Saudi Arabia and Antarctica also shows the slit and selenizone particularly well.

Knight, Batten, and Yochelson (1960, p. I175) had no knowledge of this slit, and they considered *Plectonotus* to be a subgenus of *Bucanella*. Because *Bucanella* lacks a slit, the two generic taxa were placed in the Sinuitidae, and in the subfamily Bucanellinae. This new finding necessitates the removal of *Plectonotus* to the Bellerophontidae. The subfamily Plectonotinae is proposed here to include bellerophontids having a trilobed cross section. Boucot and Saul (in Saul, Boucot, and Finks, 1963, p. 1046–1047) indicated the need for this subfamily but did not formally propose it. This new interpretation will probably lead to the reclassification of several species of middle Paleozoic bellerophontaceans and may result in the establishment of new genera to be included in this subfamily. So far as is known, however, none of the described Bellerophontidae genera should be transferred to this subfamily.

Genus PLECTONOTUS Clarke, 1899

Type species.—*Plectonotus derbyi* Clarke, 1899.

Description.—A narrowly phaneromphalous, wide, bilaterally symmetrical gastropod having a trilobed whorl profile and a U-shaped sinus in the anterior lip which gives rise to a short but distinct slit. The median part of the whorl profile is raised, relatively broad, and only slightly arched; it slopes off sharply on each side. The lateral parts of the shell are narrower than the median lobe and curve sharply into the umbilicus. The umbilical sutures are sharply defined. A broad, raised flat selenizone, set off by two narrow revolving grooves, occupies the center of the dorsum. Ornamentation consists of very faint growth lines and rare spiral lirae.

Remarks.—This redescription of *Plectonotus* is based upon study of an impression of the holotype, a steinkern, of *Plectonotus derbyi* Clarke, 1899, from the Maecuru Group of Brazil, many specimens of *Bellerophon* (*Plectonotus*) *trilobatus* Sowerby, as figured and described by Williams and Breger, 1916, from the Chapman Sandstone of northern Maine, and specimens from the Tarratine Formation in Somerset County, Maine.

As redefined, *Plectonotus* is confined to beds of Early and Middle Devonian age. Species are known from Antarctica, Africa, Asia, North America, and South America; specimens from the Antarctic and Asia have been seen by the writers but are not described. The genus may occur in Europe, but specimens which clearly show the selenizone have not yet been described. The median lobe of *Plectonotus* is broad as contrasted with the median lobe of *Bucanella.*

A smaller but generally similar bellerophontacean is common in the Silurian of Maine but is distinguished by having prominent spiral lirae; this new form is not described herein. Many of the Silurian specimens referred by American authors to *Bellerophon trilobatus* Sowerby probably fall within the undescribed taxa. The enigmatic *Tritonophon* Öpik from the Silurian of Australia is clearly distinguished from *Plectonotus* by its abundant spiral lirae. It is not evident, however, whether *Tritonophon* possesses a slit or simply an apertural sinus.

In addition to the type, *Plectonotus derbyi* Clarke (1899a, p. 70, pl. 3, figs. 14–17), three species are assigned to the genus. These are *Plectonotus? salteri* Clarke (1899a, p. 71, pl. 3, figs. 12–13), also from the Devonian of Brazil; *Bellerophon* (*Plectonotus?*) *gaspensis* Clarke (1907, p. 194) from Grand Greve, Gaspé peninsula; and *Bellerophon* (*Plectonotus*) *fraturnus* Reed described from the Devonian of South Africa and redescribed by Boucot and Saul (in Saul, Boucot, and Finks, 1963, p. 1048). *Bucaniella trilobata* var. *viramundo* Clarke (1899, p. 37, pl. 2, figs. 20–22) is only questionably assigned.

Finally, *Planorbis trilobatus* Conrad (1838, p. 113) may be a representative of this genus but is so poorly known that it definitely falls into the category of a *nomen inquirendum.* Though the species is obviously not a *Planorbis*, it is not evident that the species is better assigned to *Plectonotus* than to other bellerophontacean genera. The most practical course is to leave this name in the genus in which it was originally placed to avoid creating any secondary homonomy.

Plectonotus cf. P. gaspensis (Clarke)

Plate 1, figures 9, 10, 12, 14, 15

Bellerophon (Plectonotus?) gaspensis Clarke, 1907, p. 194, figs.; Clarke, 1908, p. 154, pl. 17, figs. 17, 18.

Bellerophon (Plectonotus) trilobatus Sowerby, Williams and Breger, 1916, p. 266–269, pl. 14, figs. 1a, 1b, 12, 13, 17–19, 28.

Remarks.—Williams and Breger (1916, p. 266–270) present an elaborate synonymy for the specimens which they identified as *Bellerophon (Plectonotus) trilobatus* Sowerby. They included *P. gaspensis* (Clarke) within Sowerby's species. Because this synonymy includes both Silurian and Devonian trilobed forms under the one specific name, the apparent limited stratigraphic range as shown by *Plectonotus* in the restricted sense is masked. Except for their specimens, the material referred to in their synonymy listing has not been investigated. Though it seems probable that several taxa have been confused under the name of Sowerby's species, it seems equally probable that the tangle cannot be unravelled without excellently preserved material. The illustrations provided by earlier authors are not particularly useful.

It is a reasonable assumption that both the new material from Maine and the Devonian specimens described earlier by Williams and Breger belong to Clarke's species. The Maine specimens are steinkerns and, though they show the general characters well, they are not particularly informative as to the nature and individual variation of the specific characters.

Occurrence.—Tarratine Formation: USGS loc. 2705–SD, Brassua Lake quadrangle; 2718–SD, 2719–SD, 2727–SD, 2783–SD, Long Pond quadrangle; 2830–SD, Moosehead Lake quadrangle; 2813–SD, Pierce Pond quadrangle; 2729–SD, 3478–SD, Spencer quadrangle. Tomhegan Formation: USGS loc. 2819–SD, Brassua Lake quadrangle.

Figured specimens.—USNM 59843, 126290, 126370.

Suborder PLEUROTOMARIINA Cox and Knight, 1960
Superfamily PLEUROTOMARIACEA Swanson, 1840
Family EOTOMARIIDAE Wenz, 1938
Subfamily EOTOMARIINAE Wenz, 1938
Tribe PTYCHOMPHALIDES Wenz, 1938
Genus MOURLONIA Koninck, 1883

Mourlonia cf. M. lucina (Hall)

Plate 2, figures 1–3

Euomphalus? rotundus Hall, 1843, p. 172, fig. 4.

Pleurotomaria lucina Hall, 1861,[2] p. 14; Hall, 1862, p. 42, pl. 5, fig. 12; Hall, 1876, pl. 18, figs. 5–11; Hall, 1879, p. 67, pl. 18, figs. 1–11, pl. 30, figs. 10, 11.

Pleurotomaria rotunda (Hall) not Münster, Hall, 1876, pl 18, figs. 1–4.

Eotomaria (Pleurorima) lucina, Grabau and Shimer, 1909, p. 645, fig. 879c.

Mourlonia lucina, Knight, 1944, p. 457, pl. 184, fig. 35.

[2] Listed in Hall's synonymies of 1876 and 1879, but seems to be in error inasmuch as this species name does not occur in the work cited.

Description.—A low-spired rounded gastropod that has a selenizone on the periphery at midwhorl. The nucleus and the early whorls are unknown. The sutures are distinct, though not impressed. The body whorl embraces the penultimate whorl well below the selenizone. The upper surface is flattened near the suture but is not clearly set off and crosses an obscure angulation before it arches into the curved outer face. This curve is interrupted by the relatively wide peripheral selenizone. Below the selenizone, the profile is curved strongly inward to the curved base and then upward and inward, though it is not certain whether there is a narrow umbilicus. Growth lines are steeply prosocline and slightly curved above the selenizone, but they are almost orthocline below. They are distinctly spaced, the distance between them being approximately the width of a lira. The selenizone is slightly raised and is flattened between the two revolving lirae. Lunulae are more closely spaced than the growth lines.

Remarks.—Although a few specimens are available, most are incomplete or poorly preserved juveniles. The type of the species seems to possess spiral ornament that gives it a cancellate appearance unlike the Maine specimens; thus reference to the species can be only provisional. For both the typical representatives and the Maine specimens, there is some question whether the characteristics of the selenizone are truly those of *Mourlonia*. Pending further studies of Devonian gastropods, the generic concept is here used in an expanded manner.

Occurrence.—Tarratine Formation: USGS loc. 2718–SD, 2719–SD, 2720–SD, 2766–SD, Long Pond quadrangle; 2813–SD, Pierce Pond quadrangle.

Figured specimen.—USNM 126288.

Tribe EOTOMARIIDES Wenz, 1938
Genus BEMBEXIA Oehlert, 1888

Bembexia? cf. B.? adjutor (Hall)

Plate 2, figures 6–10

Pleurotomaria adjutor Hall, 1879, pl. 21, fig. 16; pl. 30, fig. 1.
Pleurotomaria (Lophospira) adjutor, Grabau, 1913, p. 354.
Bembexia adjutor, Knight, 1944, p. 457, pl. 184, fig. 29.

Description.—A moderately low spired gastropod having a raised concave-bordered selenizone on the outer whorl face. Sutures are distinct, though not impressed. The body whorl embraces the penultimate whorl a slight distance below the selenizone. The upper whorl surface is inclined at about 30° from the horizontal continuing straight to a spiral lira at its outer edge. Below this lira the profile is slightly concave and nearly vertical to another lira, this one marking the upper edge of the peripheral selenizone. The lower edge of the selenizone is also strongly bordered, below which the

outer whorl face is nearly vertical for a short distance to a slightly finer lira that is embraced except on the body whorl. Below this fourth lira, the outer face continues nearly vertical for a short distance, but then curves abruptly into the flattened base. The base may be narrowly phaneromphalous, but this detail is not known with certainty. The inner lip is slightly reflexed. The selenizone is strongly bordered, raised well above the general surface of the outer whorl face, distinctly concave, and ornamented with nearly straight, closely spaced lunulae having a finer texture than that of the growth lines. Growth lines are straight and are prosocline on the upper surface, but bend to more strongly prosocline just above the selenizone. Their course below the selenizone is unknown; they appear to be straight, opisthocline on the base. They are widely spaced and coarsely lirate; the interspaces are about five times as wide as the lines. Ornament consists of the four spiral threads and the colabral lira.

Remarks.—The description above is based on four juvenile specimens. Several are distorted but, as near as can be determined, all are conspecific. The illustrations of *Pleurotomaria adjutor* Hall suggest characters closely similar to, and possibly identical with, the taxon described above. No authentic specimens of that species are available for comparison, and it seems wiser to delay definite identification until a comparison can be made with the Maine specimens.

The elaborate ornament of this species is certainly not characteristic of the genus *Bembexia;* the species may be the representative of a new genus. *Bembexia* has been used for other elaborately ornamented species, however, for example, *B. ellenae* Conklin, from the Mississippian New Providence Shale. With the material now available, no particular purpose is gained in naming a new genus, and the expanded use of *Bembexia* will be continued.

Occurrence.—Tarrantine Formation: USGS loc. 2705–SD, Brassua Lake quadrangle.

Figured specimens.—USNM 126280, 126293, 126371.

Family LOPHOSPIRIDAE Wenz, 1938
Subfamily LOPHOSPIRINAE Wenz, 1938
Genus LOXOPLOCUS Fischer, 1885
Subgenus LOPHOSPIRA Whitfield, 1886

Loxoplocus (Lophospira) sp.

Plate 2, figures 4, 5

Remarks.—Only two gastropods were obtained during the field investigation from rocks of Ordovician age. Both are moderately high spired and have an angulate periphery. The upper whorl surface is flattened and inclined downward. The angulation at the prominent carinate periphery is the most striking feature of the profile. A second angulation is at the point of the juncture of the penultimate whorl and is covered except on the body whorl. The sutures are distinct but not impressed, and the surfaces between the angulations are little arched. Remnants of growth lines are preserved only near the umbilical region; the umbilicus is possibly anomphalous. The nature of the aperture is not known, but the presence of a selenizone at the peripheral angulation is a likely possibility. In spite of the paucity of detail, there is little question as to the generic affinities of this form, though, of course, specific identification is impossible.

Occurrence.—Kennebec Formation: USGS loc. 4317–CO, Brassua Lake quadrangle.

Figured specimens.—USNM 126277, 126281.

Subfamily RUEDEMANNIINAE Knight, 1956
Genus RUEDEMANNIA Foerste, 1914

Ruedemannia? sp.

Plate 2, figures 20, 21, 24, 25

Remarks.—A medium-sized turbiniform gastropod is known from three external molds. The sutures are distinct, and the body whorl embraces about the midwhorl. The upper whorl surface is steep and sigmoidal in section, being curved outward at its lower edge. The juncture of outer and basal whorl face is marked by a wide, raised and lightly rounded band. Even though growth lines cannot be observed, there is every likelihood that this band is a selenizone. The outer whorl face is concave from below the presumed selenizone to midwhorl, below which it becomes convex but gradually curves inward. Growth lines are prosocline, sweeping strongly backwards on the upper surface; their course on the outer whorl face is unknown. Ornament is confined to the fairly fine, closely spaced growth lines.

The specimens possess the general shell form characteristic of *Ruedemannia* though they lack spiral ornament near the selenizone. The poor preservation, the small amount of material, and, above all, the lack of recent studies of Devonian pleurotomariacean gastropods prevent positive identification on both the specific and generic levels

Occurrence.—Tarratine Formation: USGS loc. 2705–SD Brassua Lake quadrangle; 2813–SD, Pierce Pond quadrangle.

Figured specimens.—USNM 126278, 126368.

Family GOSSELETINIDAE Wenz, 1938
Subfamily GOSSELETININAE Wenz, 1938
Genus STENOLORON Oehlert, 1888

Stenoloron cf. S. plena (Hall)

Plate 1, figure 11

Pleurotomaria plena Hall, 1876, pl. 17, figs. 11–13; Hall, 1879, p. 66, pl. 17, figs. 11–13.

Description.—A medium-sized, phaneromphalous, rotelliform gastropod possessing a narrow selenizone

on the upper half of the whorl just above the periphery. The nucleus is not known, but probably is orthostrophic; sutures are distinct, though not impressed. The upper whorl surface profile is flattened to near its outer limit where it curves smoothly into the outer whorl face, which apparently is moderately well rounded. The body whorl embraces the penultimate whorl at the periphery, a short distance below the selenizone. The base is rounded and narrowly phaneromphalous. Growth lines are straight; they are prosocline above the selenizone and opisthocline below, arched only for an extremely short distance just below the selenizone. The lines are closely spaced, interspaces being only three to four times the width of the lines; they are distinctly raised, though not sublamellose. The selenizone is above the periphery; it is narrow, depressed, and distinctly concave. The lunulae of the selenizone are more closely spaced than are the growth lines.

Remarks.—Only one distorted specimen of this taxon was found in Maine. It closely resembles *Pleurotomaria plena* Hall, 1876, from the Onondaga Limestone of Albany County, N.Y. No specimens of Hall's species are available for comparison, but his illustrations show the Maine form to be identical in nearly all respects, except that the selenizone of the type is apparently somewhat wider than that of the Maine specimen. Until the amount of individual variation in this feature is better known, only a comparison can be made with Hall's species.

Occurrence.—Tomhegan Formation: USGS loc. 2820–SD, Brassua Lake quadrangle.
Figured specimen.—USNM 126307.

Family EUOMPHALOPTERIDAE Koken, 1896
Genus EUOMPHALOPTERUS Roemer, 1876

Euomphalopterus sp.

Plate 1, figure 18

Remarks.—Half a dozen specimens have been found which possess the prominent marginal frill, moderately phaneromphalous umbilicus, and trochoid shape of *Euomphalopterus*. The material is inadequate for specific identification, but seems to be more similar in overall shape and size of umbilical region to the type species, *E. alatus* Wahlenburg, common in the Silurian of northern Europe, than it does to *E. valeria* (Billings), a species common in the Guelph faunal zone. Both species have been reported from Gaspé.

Occurrence.—Hornfels of late Llandovery age: USGS loc. 3475–SD, Stratton quadrangle.
Figured specimen.—USNM 126274.

Suborder TROCHINA Cox and Knight, 1960
Superfamily PLATYCERATACEA Hall, 1859
Family HOLOPEIDAE Wenz, 1938

Genus HOLOPEA Hall, 1847

Holopea sp.

Plate 3, figure 16

Remarks.—This identification of *Holopea* sp. is based on a single broken external mold. The shell is globose and low spired. This form may have had a narrowly phaneromphalous umbilicus. Growth lines are straight and nearly orthocline. Though the specimen is well preserved, its species cannot be identified because it is incomplete. It bears some resemblance to the form from Gaspé identified by Clarke (1908, p. 148) as *Holopea* cf. *antiqua* (Vanuxem).

Occurrence.—Tomhegan Formation: USGS loc. 2820–SD, Brassua Lake quadrangle.
Figured specimen.—USNM 126284.

Family PLATYCERATIDAE Hall, 1859
Genus PLATYCERAS Conrad, 1840
Subgenus PLATYCERAS Conrad, 1840

Platyceras (Platyceras?) sp.

Plate 3, figures 17, 19, 20, 25

Remarks.—A medium-sized gastropod, probably having only the first whorl in contact, is represented by three somewhat distorted specimens. The form of the apical whorl is not known with certainty, though it probably is globose. Because the uncoiled body whorl is compressed, the cross section is almost rectangular in outline rather than ellipsoidal. The shell is nearly bilaterally symmetrical, the early whorls appearing to be sunk below the level of the upper whorl surface. The mature outer whorl face is flattened, horizontal for much of the distance; it then drops outward and downward to the periphery and the whorl cross section is therefore almost triangular. The basal surface of the whorl is flattened and produced gently upwards from the fairly sharp periphery to the shallow umbilicus. The ornament is limited to transverse growth lines which are apparent only in the region of the aperture.

The compressed shape of the shell and the apparent closed coil of the earliest whorl removes this form from close association with the subgenus *Orthonychia*. The subtriangular cross section is most uncommon, and it is a question whether the specimens are properly referred to *Platyceras*. The most similar described species are *Platyceras compressum* Nettleroth, from the Devonian of the Falls of the Ohio River, and *P. carinatum* Hall, from the Devonian of New York State. The Maine

material is too incomplete for a close comparison with either. Further speculation as to the placement of these three species must be delayed until better material is available.

Occurrence.—Tomhegan Formation: USGS loc. 2750–SD, 2820–SD, Brassua Lake quadrangle.

Figured specimens.—USNM 126296, 126305, 126306.

Subgenus PLATYOSTOMA Conrad, 1842

Platyceras (Platyostoma) ventricosum (Conrad)

Plate 3, figures 18, 21, 22

Platyostoma ventricosum Conrad, 1842, p. 275, pl. 17, fig. 5; Williams and Breger, 1916, p. 262–263, pl. 13, fig. ?15, 18 (these authors cite numerous earlier references in their synonymy which is not repeated here); Knight, 1941, p. 253–254, pl. 85, figs. 3a–d.

Platyceras ventricosum, Nettleroth, 1889, p. 168, pl. 25, fig. 10.

Platyceras (Platyostoma) ventricosum, Knight, 1944, p. 473, pl. 193, figs. 3–4; Knight, Batten, and Yochelson, 1960, p. I240, fig. 153–13.

Remarks.—Although this species is the most abundant one in the collections, none of the Maine specimens of *Platyceras (Platyostoma) ventricosum* are particularly well preserved. Insofar as they are preserved, they agree in all respects with the redescription and reillustration of the type of this species (Knight 1941, p. 253–254).

Williams' and Breger's specimens also are distorted. All references in the synonymy given by them (Williams and Breger, 1916, p. 262) could not be checked, but the probability is great that the references all apply to the same general sort of large, rapidly expanding low-spired globose shells. This specific name has been used for years as a "dumping ground," but although good specimens of this species are rare, there is no reason to believe that strikingly different material has ever been assigned to this taxon. The species concept used for this form probably approximates the concept of a Recent species almost as well as any other paleontologic species for which excellently preserved specimens are not available.

No specimens were found attached to crinoid calyxes. In spite of the presumed coprophagous life habitat of this gastropod on crinoid calyxes, crinoidal debris is rare in the beds from which most specimens were obtained.

Occurrence.—Beck Pond Limestone: USGS loc. 3499–SD, 3500–SD, Spencer quadrangle. Seboomook Formation: USGS loc. 2879–SD, 3481–SD, Brassua Lake quadrangle. Tarratine Formation: USGS loc. 2700–SD, 2701–SD, 2705–SD, Brassua Lake quadrangle; 2721–SD, 2731–SD, Long Pond quadrangle; 2767–SD, 2771–SD, 2813–SD, 2872–SD, Pierce Pond quadrangle; 2729–SD, Spencer quadrangle. Tomhegan Formation: USGS loc. 2713–SD, Brassua Lake quadrangle.

Figured specimens.—USNM 126294, 126300, 126308.

Subgenus ORTHONYCHIA Hall, 1843

Platyceras (Orthonychia) sp.

Plate 3, figures 23, 24

Remarks.—One specimen of a large cornucopia-horn-shaped uncoiled gastropod was found. The ornamentation is limited to sinuate growth lines paralleling the irregular aperture. The earliest growth stages are not preserved.

Many species of this subgenus have been described. Williams and Breger (1916) described three species from Maine, in one of which they distinguished two varieties. Each form is based on a single small specimen; none appear to be closely related to this species. In detail, *Platyceras (Orthonychia) compressa* Williams and Breger is flattened, *P. (Orthonychia) aroostooki* Williams and Breger is not twisted, and *P. (Orthonychia) hebes* (Clarke) as recognized by these two authors, and including the two varieties they distinguish, is a low, rapidly expanding cone.

The species figured has more in common with such named Devonian taxa as *Platyceras (Orthonychia) dentalium* (Hall), *P. (O.) tortuosa* (Hall) and *P. (O.) spirale* (Hall), all of which were described originally from Helderberg or Oriskany strata of New York. All have in common a rapidly expanding shell which is clearly an open coil twisted in three dimensions. The superficially similar *P. milleri* Nettleroth, from the Devonian of the Falls of the Ohio River, bears numerous large spines and almost certainly represents another stock.

These three named forms and the single Maine specimen might be distinguished as a subgenus distinct from *Orthonychia*. However, until sufficiently large populations of each species are available to permit some basis for judging the amount of individual variation in what is clearly a highly variable group, any revision of the platyceratids should be deferred.

During this investigation, it was noted that *Platyceras (Orthonychia) compressa* Williams and Breger is a junior homonym of *P. compressum* Nettleroth, 1889 (p. 162, pl. 25, figs. 8, 9), from the Devonian strata exposed at the Falls of the Ohio River. The types of both forms have been examined, and there is no question that they are distinct. Therefore, the name *Platyceras (Orthonychia) aroostookensis* is proposed as a replacement name for *P. (Orthonychia) compressa* Williams and Breger.

Occurrence.—Tarratine Formation: USGS loc. 2813–SD, Pierce Pond quadrangle.

Figured specimen.—USNM 126292.

Genus CROSSOCERAS Boucot and Yochelson, n. gen.

Type species.—*Crossoceras belandi* Boucot and Yochelson, n. sp.

Diagnosis.—Flattened, rapidly expanding platyceratid gastropods ornamented with revolving striations and widely spaced growth lines that extend as transverse frills; apical whorl in contact; body whorl open coiled.

Discussion.—This new genus has a shape similar to *Platyceras* (*Platyostoma*) but that form lacks the prominent transverse frills. No reason for the periodic expansion of the aperture in this genus is apparent.

In addition to the type, only one other species is assigned to *Crossoceras*. This is *Platyceras newberryi* Hall (1859, p. 333–334, pl. 63, figs. 14 a–c).

Crossoceras belandi Boucot and Yochelson, n. sp.

Plate 3, figures 6–15

Description.—A medium-sized, closely coiled horn-shaped gastropod of 1½ or more whorls. The nucleus and the first whorl are coiled discoidally and are in contact, whereas the later whorls are free. The aperture expands rapidly. The outer lip is steeply prosocline in all growth stages, but is slightly irregular. The expansion of the whorl is not uniform, being restricted by growth ridges. The upper surface remains subdiscoidal at all growth stages, and most expansion is below midwhorl. Atop each growth ridge, a central growth line is expanded into an elaborate frill. Almost every fill is irregularly fluted or crenulated. The frills have their maximum width on the outer whorl face and diminish in size toward the umbilicus; the umbilical region itself is free of frills. Other ornamentation consists of fine revolving striations. Grooves on the interior of the shell are the internal reflections of the low rounded transverse ridges upon which the frills are located.

Remarks.—*Crossoceras belandi* is related to *C. newberryi* (Hall), but can be distinguished from that species by its more rapidly expanding aperture and its smaller degree of open coiling. Other described globose platyceratids lack the impressive ornaments of this species.

The species is based on five silicified specimens from near Glenerie, N.Y., supplemented by three specimens from Somerset County, Maine. The Glenerie material is beautifully silicified, but the Maine specimens are less well-preserved steinkerns and external molds, which, however, show enough detail to permit certain identification with the first group. Most of the type lot was collected from the Glenerie Limestone of Chadwick (1908) along New York Highway 9W, 1 mile north of Glenerie and 1 mile south of Cockburn, N.Y.

The species is named for Dr. Jacques Beland, Department of Geology, University of Montreal, who also found specimens of this species in the lower part of the Grand Greve Limestone. That locality is 500 feet south of the Petite Neigette River near the boundary of lots 43 and 44 and the boundary of ranges III and IV of Neigette Township, Rimouski County, Quebec; the approximate latitude is 48°22′ N. and the approximate longitude 68°22′ W. (written commun., J. Beland, 1963).

Holotype.—USNM 126283E. Paratypes USNM 126283A–126283D, 126286A–126286C.

Occurrence.—Tarratine Formation: USGS loc. 2767–SD, Moosehead Lake quadrangle.

Figured specimens.—USNM 126283A, 126283C, 126283E, 126286A.

Superfamily MICRODOMATACEA Wenz, 1938
Family ELASMONEMATIDAE Knight, 1956
Genus ELASMONEMA Fischer, 1885

Elasmonema cf. E. bellatulum (Hall)

Plate 3, figures 1–5

Loxonema bellatulum Hall, 1861, p. 104; Hall, 1862, pl. 4, figs. 4, 5.

Loxonema (*Isonema*) *bellatula*, Hall and Whitfield, 1872, p. 200 (list only).

Isonema bellatula, Meek and Worthen, 1865, p. 252; Meek and Worthen, 1868, p. 443; Hall and Whitfield, 1875, pl. 13, fig. 12; Hall, 1876, pl. 14, figs. 10–15.

Callonema bellatulum, Hall, 1879, p. 51, pl. 14, figs. 10–15, pl. 28, figs. 18, 19; Nettleroth, 1889, p. 175, pl. 20, figs. 4–7; Kindle, 1901, p. 698; Grabau and Shimer, 1909, p. 692, fig. 986; Stauffer, 1911, pl. 10, fig. 10; Grabau, 1913, p. 358; Hubbard and others, 1915, p. 5, Illus. sheet II, fig. 38.

Callonema cf. *bellatulum*, Clarke, 1908, p. 299, pl. 15, fig. 8.

Elasmonema bellatulum, Knight, 1941, p. 110, pl. 52, figs. 5a–c; Knight, 1944, p. 469, pl. 192, fig. 24; Knight, Batten, and Yochelson, 1960, p. I243, fig. 155–3.

Remarks.—Some half dozen specimens in the collection agree with the redescription and reillustration of this species given by Knight (1941, p. 110). One of the best specimens available has the inner lip and the immediately adjacent basal area preserved. This specimen has an indentation in the area of the columella and, presumably, is minutely phaneromphalous. Knight's illustrations indicate that the type of the species is narrowly phaneromphalous. None of the type lot or topotypical specimens are available for comparison. Until the individual variation in the width of the umbilicus is better known, the Maine material can be only tentatively referred to the species. There is considerable variation among the Maine specimens, particularly in the shape of the whorls, but this variation is all attributed to deformation by diagenetic and postdiagenetic events.

Occurrence.—Tomhegan Formation: USGS loc. 2819–SD, 2820–SD, Brassua Lake quadrangle.

Figured specimens.—USNM 126302, 126303, 126316.

Superfamily ORIOSTOMATACEA Wenz, 1938
Family ORIOSTOMATIDAE Wenz, 1938
Genus ORIOSTOMA Munier-Chalmas, 1876

Oriostoma sp.

Plate 2, figures 18, 22

Remarks.—Three specimens, a steinkern, a flattened external mold of the upper whorl surface of a mature specimen, and an external mold of the outer whorl face of a juvenile specimen, indicate the presence of *Oriostoma* in the Moose River area of northern Maine. The material is inadequate for anything more than generic identification.

The specimens are low spired and have a distinct, slightly inclined upper whorl surface. Three spiral cords, the most prominent of which is just below the suture, ornament this surface. The outer whorl face is steeply inclined above the periphery and nearly vertical below this point; the periphery is at or below the midwhorl. This surface is ornamented by five spiral cords. The basal surface and umbilical features are unknown. Growth lines are distinct and sublamellose; they are prosocline on the upper surface and nearly orthocline on the outer whorl face.

Other *Oriostoma* occur in Maine. In the U.S. National Museum collection are specimens from the Silurian of Whiting Bay and Field Point, Edmonds Township, Washington County, Maine. These specimens were generically identified and named in manuscript by H. S. Williams, but descriptions were never published. The specimens are larger and have more closely spaced growth lines; they may represent another species.

Occurrence.—Hornfels of late Llandovery age: USGS loc. 3475–SD, Stratton quadrangle.

Figured specimens.—USNM 126314, 126315.

Oriostomatid operculum

Plate 2, figure 23

Remarks.—The impression of one multispiral operculum is available. Only the outer surface is preserved, but this surface shows the operculum to be a low cone. Sutures are distinctly incised. The individual whorls are wide for a multispiral operculum. The specimen cannot be referred to any particular species of *Oriostoma.*

One specimen in the collections of the U.S. National Museum was identified by H. S. Williams as the operculum of a gastropod. This specimen, from the Silurian at Whiting Bay, Edmonds Township, Washington County, Maine, appears to be identical with the form noted here. Other opercula from Burnt Cove in the same township clearly represent another species or genus.

Occurrence.—Hardwood Mountain Formation: USGS loc. 3469–SD, Spencer quadrangle.

Figured specimen.—USNM 126312.

Genus POLEUMITA Clarke and Ruedemann, 1903

Poleumita sp.

Plate 2, figures 17, 19

Remarks.—Several Silurian gastropods are suggestive of *Poleumita*, but the specimens are too fragmentary for identification to species level. The best specimens are so low spired as to be nearly planispiral. The growth lines are steeply prosocline and are foliaceous; they form incipient spines at four places on the upper and outer whorl face. Other ornament consists of seven or more spiral lirae on the outer whorl face and at least four lirae on the upper whorl face, only one of which is prominent. No information is available on the possible presence of septa in juvenile stages.

Poleumita is here placed close to *Oriostoma* rather than with the Euomphalacea (Knight, Batten, and Yochelson, 1960). This genus may not have had an outer calcitic shell and hence should not be placed in that superfamily. The evidence for neither placement is strong.

Occurrence.—Hornfels of late Llandovery age: USGS loc. 3475–SD, Stratton quadrangle, 3483–SD, Spencer quadrangle.

Figured specimen.—USNM 126279.

Suborder UNCERTAIN
Superfamily PSEUDOPHORACEA Miller, 1889
Family PSEUDOPHORIDAE Miller, 1889

"Euomphalopterus" gasconensis Northrop

Plate 1, figures 19, 21, 22; text figure 2

Euomphalopterus gasconensis Northrop, 1939, p. 212, pl. 22, figs. 3, 4; ?variety p. 212, pl. 23, fig. 4.

Remarks.—The two available specimens do not particularly add to the original species description. The first specimen is a crushed fragment of about one-third of two whorls which originally had a trochiform outline. These whorls show peripheral scooplike spines and prosocline growth lines. The base of the shell, as judged from the internal impressions, was ornamented with transverse growth lines of about the same weight as those on the upper surface of the whorl (fig. 2). In this respect the specimen differs from the holotype, but this difference is not considered significant. The second specimen is a small fragment that only shows the peripheral spines.

This species is generically distinct from any previously described form, but the available material is too poor to form the basis for satisfactory description of a new genus. The holotype, with which the Maine specimens have been compared, is partly buried in a hard matrix and cannot be prepared easily for future study.

Trochus astraliformis Lindstrom, 1881, from the Silurian of Gotland, is probably congeneric with "*Euomphalopterus*" *gasconensis.* The Gotland species has coarse collabral ornament on its base. The spines of

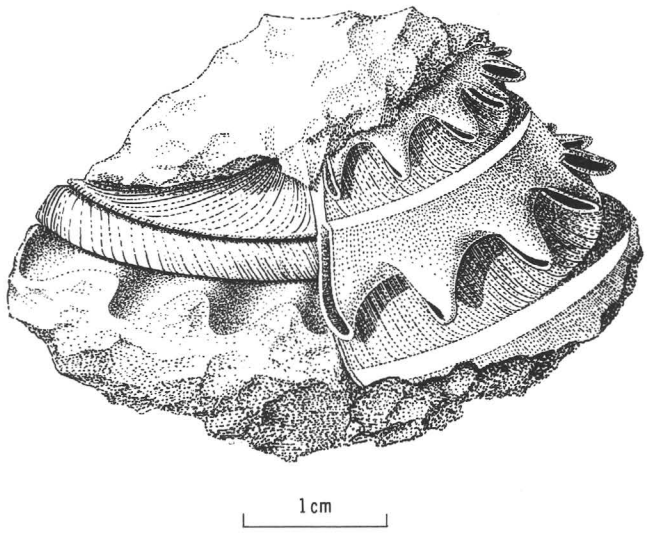

FIGURE 2.—Artist's rendering of *"Euomphalopterus" gasconensis* Northrop, shown with part of the shell removed to reveal the growth lines on the basal surface.

that species extend out at an angle from the whorl, whereas in *"E." gasconensis* the spines appear to be subparallel to the whorl surface.

Williams and Breger (1916, p. 278) described two Devonian species from the Chapman Sandstone as *Pseudotectus*, which may be an allied genus. Neither of their species has anything in common with this species.

Occurrence.—Hobbstown Formation: USGS loc. 3479–SD; Spencer quadrangle. Unnamed conglomerate: USGS loc. 5995–SD, Attean quadrangle.

Figured specimens.—USNM 126316, 144479.

Order ?ARCHAEOGASTROPODA
Suborder MURCHISONIINA Cox and Knight, 1960
Superfamily MURCHISONIACEA Koken, 1896
Family MURCHISONIIDAE Koken, 1896
Genus MURCHISONIA Archiac and Verneuil, 1841
Subgenus MURCHISONIA Archiac and Verneuil, 1841

Murchisonia (Murchisonia) sp.

Plate 2, figures 11, 12

Description.—A high-spired gastropod having a concave selenizone on the periphery bounded by revolving carinae. Sutures are distinct but not impressed. The whorl profile is flattened from the suture to a revolving carina near midwhorl. A lower carina is parallel with the upper one; both border the selenizone and are peripheral. The whorl face below the selenizone proceeds steeply downward for only a short distance to the next suture. The selenizone is distinctly concave between the bordering carinae and apparently is smooth. The growth lines are steeply prosocline above the upper carina and are unknown below. Other ornament is lacking. The base and umbilical condition are unknown, as are all details of the aperture.

Remarks.—Three specimens are available, though only one shows much detail. The single specimen upon which most of the above description is based, although moderately well preserved, is too incomplete to be compared in detail with any of the named species of Devonian *Murchisonia*.

The species named *Goniostropha chapmani* by Williams and Breger (1916, p. 276) is based on a steinkern. Details of the selenizone and whorl profile cannot be compared. That species is probably not conspecific, for it seems to be higher and wider than this species.

Occurrence.—Tarratine Formation: USGS loc. 2798–SD, Pierce Pond quadrangle. Tomhegan Formation: USGS loc. 2713–SD, 2820–SD, Brassua Lake quadrangle.

Figured specimen.—USNM 126299.

Murchisonia (Murchisonia?) sp.

Plate 2, figure 13

Remarks.—High-spired specimens from several localities and horizons may be referred to *Murchisonia*. All specimens are slightly to badly distorted; the figured one is the best preserved. The whorl profile is more swollen at the periphery and has the periphery higher on the whorl than in the previous species. The selenizone is lower and is less prominent. As a result of the inflated whorl profile and the obscure selenizone, the shells superficially resemble *Loxonema*. One or two poorly preserved Maine specimens of that genus may have been confused with *Murchisonia*. In fact, whether this form occurs in the two formations listed or whether material is being combined under one name merely because it is all poorly preserved is an open question.

It is unlikely that this taxon is actually the same as *Goniostropha chapmani* Williams and Breger, although both forms have features in common. Their species may be somewhat more angular at the periphery, but the fact that the single known specimen is a steinkern, makes precise comparison impossible.

Occurrence.—Hardwood Mountain Formation: USGS loc. 3469–SD, Spencer quadrangle. Tomhegan Formation: USGS loc. 2750–SD, 2820–SD, Brassua Lake quadrangle.

Figured specimen.—USNM 126298.

Order CAENOGASTROPODA Cox, 1959
Superfamily LOXONEMATACEA Koken, 1889
Family LOXONEMATIDAE Koken, 1889
Genus LOXONEMA Phillips, 1841

Loxonema cf. L. welleriana Williams and Breger

Plate 2, figures 14, 16

Loxonema welleriana Williams and Breger, 1916, p. 279–280, pl. 13, figs. 2, 3, 5.

Description.—A very highspired gastropod with shallow sutures. The whorl profile is moderately

rounded, and the sutures, while distinct, are not deep. The base is rounded and anomphalous. The columellar lip is slightly reflexed, but is not thickened. The growth lines are unknown, though there is slight evidence of an extremely shallow sinus extending between the sutures. Ornament is unknown.

Remarks.—Several high-spired gastropods of medium size are available; one has the whorl profile well preserved.

Williams and Breger (1916, p. 279–280) identified two species of *Loxonema* from glacial drift boulders which had the lithology of the Tarratine Formation and contained the brachiopod fauna characteristic of that formation. Three specimens were assigned by them to *Loxonema jerseyense* Weller, 1903, and nine specimens to a new species, *L. welleriana.* Several specimens in each group retain growth lines, and though most of the specimens are not well preserved, there is some basis for the distinction drawn by these authors. The original of their plate 15, figure 5, is here designated the lectotype of *L. welleriana;* it is figured for comparison on plate 2, figure 15.

Assuming that the two species do exist and that the original work did not simply distinguish end members of a variable series, the specimens from the Moose River district are more similar to *L. welleriana.* Though the presence of a shallow sinus cannot be confirmed, the whorl profile is similar in that the sutures are shallow and the whorls are not sharply inflated. In contrast, the specimens assigned to *L. jerseyense,* although also extremely high spired, have a more incised suture and a more inflated whorl.

The specimens described by Williams and Breger (1916) as *Mesocoelia tenuella* constitute an enigma. No growth lines are evident, nor is a selenizone clearly displayed. Perhaps these specimens should also be placed within *Loxonema welleriana,* but that particular problem is beyond the scope of this study.

Occurrence.—Seboomook Formation: USGS loc. 2857–SD, Brassua Lake quadrangle. Tarratine Formation: USGS loc. 2701–SD, Brassua Lake quadrangle, 2813–SD, Pierce Lake quadrangle.

Figured specimens.—USNM 59863, 126309, 126310.

Phylum ECHINODERMATA
Class STELLAROIDEA
Order OPHIUROIDEA
Unidentified ophiuroid

Plate 1, figures 20, 23

A block of sandstone used as part of a garage foundation in the village of Long Pond, Long Pond quadrangle, Somerset County, Maine, contained the impressions of three ophiuroids, together with those of brachiopods characteristic of the Tarratine Formation. This block was collected and is figured here because of the rarity of fossil ophiuroids. Identification and description of the specimens is deferred pending their examination by a specialist in this group.

Stratigraphic position.—Tarratine Formation.
Figured specimen.—USNM 126099.

Dasycladacean Alga
Genus MASTOPORA Eichwald

Mastopora sp.

Plate 1, figures 16, 17

Remarks.—Fragmentary subspherical, calcite-filled bodies from the Kennebec Formation, while incomplete, are characteristic of fossils usually referred to *Nidulites.* The external surface bears the characteristic ornament of a honeycomblike surface in which each hexagon is deeply indented by an almost hemispherical concavity. Although the material is not of particular biological significance, this occurrence is useful for records of geographic distribution of Ordovician fossils.

Osgood and Fischer (1960) have demonstrated that the Middle Ordovician fossil commonly cited in the literature as *Nidulites pyriformis* Bassler, and variously classed as a sponge, a receptaculitid, or as *incertae sedis*, seems to be a dasycladacean alga of the genus *Mastopora.*

Occurrence.—Kennebec Formation: Loc. USGS–4318–CO, Brassua Lake quadrangle, Somerset County, Maine.
Figured specimens.—USNM 126471, 126472.

REGISTER OF LOCALITIES

All collections were obtained from Maine. All the numbers are in the permanent register of Silurian-Devonian locality numbers maintained by the U.S. Geological Survey except for 4318–CO which is in the Cambrian-Ordovician register.

USGS locality	Formation	Age	Locality description	Collector, date
2700-SD	Moose River Group Tarratine Formation.	Early Devonian.	Edge of central and east-central ninths of Brassua Lake quadrangle, Somerset County.	A. J. Boucot, July 14, 1949.
2701-SD	do	do	do	Do.
2705-SD	do	do	do	Do.
2713-SD	Moose River Group Tomhegan Formation.	do	Central ninth of Brassua Lake quadrangle, Somerset County.	A. J. Boucot, July 6, 1949.
2718-SD	Moose River Group Tarratine Formatiln.	do	Southeast ninth of Long Pond quadrangle.	A. J. Boucot, 1948.
2719-SD	do	do	do	Do.
2720-SD	do	do	do	Do.
2721-SD	do	do	do	Do.
2727-SD	do	do	East-central ninth of Long Pond quadrangle, about 200 ft east of Jackman-Rockwood road (Route 15), about 3.9 miles east of the Jackman-Long Pond Township boundary by odometer.	A. J. Boucot, July 4, 1949.
2729-SD	do	do	East ninth of Spencer quadrangle, on south shore of Spencer Lake, 2,675 ft northeast from the top of the 1,540-ft hill.	H. Woodard, 1949.
2731-SD	do	do	Central ninth of Long Pond quadrangle in the railroad cut about half a mile from point where the railroad crosses the Jackman-Long Pond boundary to the west, and directly north of the Route 15 symbol.	A. J. Boucot, July 8, 1949.
2750-SD	Moose River Group Tomhegan Formation.	do	Northeast ninth of Brassua Lake quadrangle, Somerset County, Maine, on end of Baker Brook Point. The actual outcrops are ledges about 100 ft in from the point. From them blocks have been moved to the shore, where much of the collection was made.	A. J. Boucot, 1949.
2766-SD	Moose River Group Terratine Formation.	do	Central ninth of Long Pond quadrangle, about 700 feet north of the "F" in Fogg Pond.	A. J. Boucot, July 29, 1949.
2767-SD	do	do	Northwest ninth of Moosehead Lake quadrangle.	A. J. Boucot, July 30, 1949.
2771-SD	do	do	do	A. J. Boucot, August 1, 1949.
2783-SD	do	do	Central ninth of Long quadrangle. North shore of Long Pond, 0.1 mile from the point where the 70° 05′ West meridian crosses the shore.	A. J. Boucot, August 10, 1949.
2798-SD	do	do	Northwest ninth of Pierce Pond quadrangle. On Enchanted Stream, 0.8 mile below the outlet of Little Enchanted Pond.	A. J. Boucot, August 19, 1949.
2806-SD	Moose River Group Tarratine Formation McKenney Ponds Limestone Member.	do	Northwest ninth of Pierce Pond quadrangle, in old sluiceway running southwest from McKenney Ponds, at the foot of the ridge formed by the basement complex. Clastic limestone lies against the ridge from the Ponds to the southwest for about a quarter of a mile, following the course of the underground stream and caves. In scattered outcrops and loose slabs which can have come only from this horizon.	A. J. Boucot, August 22, 1949.
2813-SD	Moose River Group Tarratine Formation.	Early Devonian.	Northwest ninth of Pierce Pond quadrangle, 0.11 mile upstream from the stream which flows through the camp at the north end of Enchanted Pond, in the first outcrop on the north bank of the stream.	A. J. Boucot, August 27, 1949.
2819-SD	Moose River Group Tomhegan Formation, Kineo Volcanic Member.	Devonian	West-central ninth of Brassua Lake quadrangle, Somerset County. This outcrop is 0.7 mile N. 10° W. of "M" in Misery Gore. It is on east bank of stream which crosses Route 15 (Jackman-Rockwood road) about 500 feet north of road.	A. J. Boucot, 1949.
2820-SD	Moose River Group Tomhegan Formation.	do	Northeast ninth of Brassua Lake quadrangle, Somerset County. On Blaine School-Tenmile Swing road, about 3.5 miles north of the bridge over Moose River. This locality is in the ditch on the east side of the road and is usually covered by earth except when heavy rains have deepened the ditch.	A. J. Boucot, June 20, 1948.
2830-SD	Moose River Group Tarratine Formation.	Early Devonian.	Northwest ninth of Moosehead Lake quadrangle.	A. J. Boucot, August 1, 1949.
2832-SD	do	do	Southwest ninth of Brassua Lake quadrangle, on the southwest side of Knob (elevation 2,020 ft) on the ridge en echelon to the northwest with William Mountain.	A. J. Boucot, July 9, 1950.
2852-SD	Moose River Group Tomhegan Formation.	Devonian	North-central ninth of Brassua Lake quadrangle, Somerset County. 0.6 mile N. 47° W. from southeast corner of most prominent point near northwest end of Brassua Lake. Locality is 320 feet S. 30° E. from tip of point at high-water mark, and consists of several large slabs of platy, noncalc., greenish- to bluish-gray, buff-gray-weathering fine-grained sandstone. These slabs are probably very nearly in place, but are so slumped that the dip means nothing; they are alined along the trend N. 45° E. which approximates the strike.	J. Bridge and P. E. Cloud, Sept. 28, 1941.
2857-SD	Moose River Group Seboomook Formation.	do	Southwest ninth of Brassua Lake quadrangle, Somerset County, 0.12 mile S. 40° E. from the outlet of Chase Stream Pond.	A. J. Boucot, August 1950.
2861-SD	Moose River Group Tarratine Formation.	do	Moosehead Lake quadrangle. Scattered outcrops on west Moose Brook Island (island is about 50 by 100 ft) north of Soccatean Point.	A. J. Boucot, Sept. 17, 1950.
2872-SD	do	do	Northwest ninth of Pierce Pond quadrangle, in streambed of Enchanted Stream 0.15 mile downstream from "S" in "Stream," just above the trail to Little Enchanted Pond.	A. J. Boucot, August 19, 1949.

USGS locality	Formation	Age	Locality description	Collector, date
2879-SD	Moose River Group Seboomook Formation.	Early Devonian.	Northeast ninth of Brassua Lake quadrangle, Somerset County. On shore of Tomhegan Cove, on the west side of the small point above the "T" in "Tomhegan Cove."	A. J. Boucot, July 19, 1949.
2890-SD	Moose River Group Tarratine Formation.	do	East-central ninth of Spencer quadrangle, or west-central ninth of Pierce Pond quadrangle. Loose boulder on Hedgehog Mountain, Somerset County.	P. Hurley and J. Thompson, 1948.
3090-SD	do	do	Long Pond quadrangle. Loose block at Parlin Township, Somerset County.	A. J. Boucot, 1953.
3469-SD	Hardwood Mountain Formation.	Late Silurian (Early Ludlow).	About 0.5 mile west of Hardwood Mountain and 2 miles north-northeast of Baker Pond, Spencer quadrangle, Somerset County.	A. J. Boucot, 1952.
3475-SD	Unnamed hornfels.	L. Llandovory (possibly C_4-C_5).	Limestone Hill, Stratton quadrangle, Somerset County.	C. W. Wolfe, 1952.
3478-SD	Tarratine Formation.	Early Devonian.	Baker Pond area, Spencer quadrangle, Somerset County.	A. J. Boucot, August 11, 1952.
3479-SD	Hobbstown Formation.	Late Silurian to Early Devonian.	Puddingstone Hill about 1.2 miles northeast of Baker Pond, Spencer quadrangle, Somerset County.	A. J. Boucot, August 26, 1952.
3481-SD	Seboomook Formation.	Early Devonian.	Baker Pond area, Brassua Lake quadrangle, Somerset County.	A. J. Boucot, 1952.
3483-SD	Hardwood Mountain Formation.	Late Silurian.	Baker Pond area, Spencer quadrangle, Somerset County. About 2.5 miles southwest of Baker Pond, 0.4 mile west of Spencer Stream.	Do.
3499-SD	Beck Pond Limestone.	Early Devonian.	Center of Spencer quadrangle. About 500 ft south of outlet of Beck Pond.	Do.
3600-SD	do	do	Central ninth of Spencer quadrangle, Somerset County.	
5995-SD	Unnamed conglomerate.	Late Silurian.	East side of Sally Mountain, Attean quadrangle, Somerset County.	
4317-CO	Kennebec Formation.	Middle Ordovician.	East-central ninth of Brassua Lake quadrangle, Somerset County, about 0.4 mile northeast from railroad overpass at Somerset Junction on northwest side of abandoned railroad (now surfaced for automobile road).	Do.

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INDEX

[Italic page numbers indicate descriptions]

PLATES 1–3

PLATE 1

FIGURES 1–4. *Patellostium? revolvens* (Williams and Breger) (p. A3).

1. The lectotype, an external impression (× 1.5). Moose River Group, Detroit, Somerset County, Maine. USNM 59843.
2. Side view of latex replica (× 1). Tarratine Formation. Locality 2705–SD, Brassua Lake quadrangle, Somerset County, Maine. USNM 126285.
3. Adapertural view of same replica.
4. External view from which this replica was cast, showing flaring aperture and absence of a slit.

5, 6. *"Bucanella" brevilineatus* (Conrad) (p. A5).

Tomhegan Formation. Locality 2820–SD, Brassua Lake quadrangle, Somerset County, Maine.

5. Left side of latex replica (× 4).
6. Adapertural view of same replica showing sinuate periphery (× 4). USNM 126369.

7, 8. *Gammadiscus? somerseti* (Williams and Breger) (p. A6).

Tarratine Formation. Locality 2718–SD, Long Pond quadrangle, Somerset County, Maine.

7. Adapertural view of latex replica showing periphery. USNM 126282.
8. Right side view of same replica (× 3).

9, 10, 12, 14, 15. *Plectonotus* cf. *P. qaspensis* (Clarke) (p. A8).

9, 10. Dorsal and side views of compressed juvenile steinkern (× 4). Tarratine Formation. Locality 2705–SD, Brassua Lake quadrangle, Somerset County, Maine. USNM 126290.

12. Juvenile steinkern (× 3). Tarratine Formation. Locality 2718–SD, Long Pond quadrangle, Somerset County, Maine. USNM 126370.
14. Mature steinkern showing general profile (× 2). Chapman Sandstone. Presque Isle Stream, Chapman Plantation, Aroostook County, Maine. USNM 59845.
15. Latex replica of exterior clearly showing position of selenizone (× 6) suggested in figure 12. Tarratine Formation. Locality 2718–SD, Long Pond quadrangle, Somerset County, Maine. USNM 126370.

11. *Stenoloron* cf. *S. plena* (Hall) (p. A9).

Tomhegan Formation. Locality 2820–SD, Brassua quadrangle, Somerset County, Maine.

11. Latex replica of slightly distorted exterior (× 2). USNM 126307.

13. *Tropidodiscus* sp. (p. A6).

Lower conglomerate member of Hobbstown Formation. Locality 3479–SD, Spencer quadrangle, Somerset County, Maine. Left side view of latex replica of exterior (× 4). USNM 126297.

16, 17. *Mastopora* sp. (p. A15).

Kennebec Formation. Locality 4318–CO. Brassua Lake quadrangle, Somerset County, Maine.

16. Latex replica of part of a *"Nidulites"* (× 3) USNM 126471.
17. Latex replica of a more complete specimen (× 3). USNM 126472.

18. *Euomphalopterus* sp. (p. A10).

Hornfels of late Llandovery age. Locality 3475–SD, Stratton quadrangle, Maine.

18. Latex replica of incomplete upper surface, showing the frill (× 1). USNM 126274.

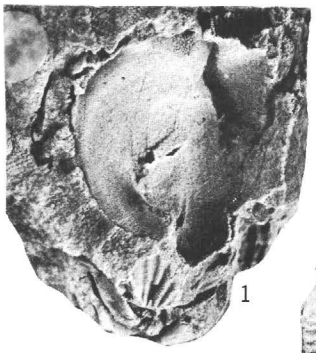
19, 21, 22. *"Euomphalopterus" gasconensis* Northrop (p. A13).

19. Whorl fragment showing the peripheral spines (× 3). Unnamed conglomerate. Locality USGS–5995–SD, Attean quadrangle, Somerset County, Maine. USNM 144479.
21. External mold of basal surface and spines (× 1).
22. Latex replica showing upper surface of spines (× 1). Lower conglomerate member of Hobbstown Formation. Locality 3479–SD, Spencer quadrangle, Somerset County, Maine. USNM 126316.

20, 23. Unidentified ophiuroid (p. A15).

Tarratine Formation. Loose block from village of Long Pond, Long Pond quadrangle, Somerset County, Maine.

20. Latex replica (× 3). USNM 126099.
23. Impression of another specimen (× 3). USNM 126099.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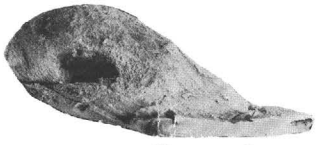
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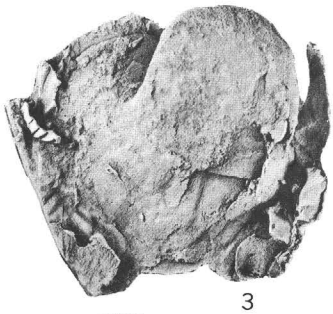
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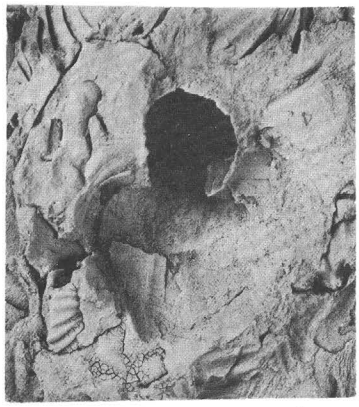
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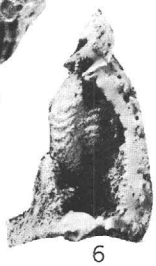
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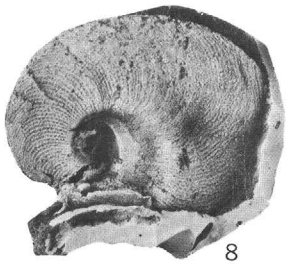
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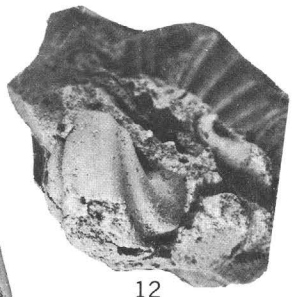
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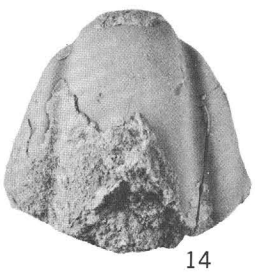
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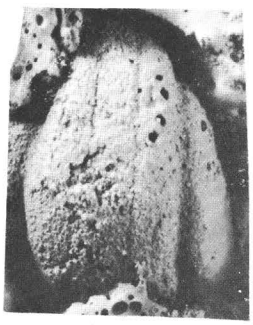
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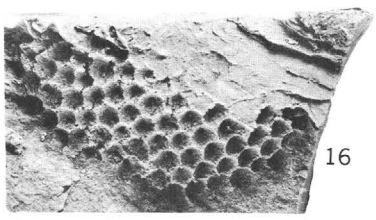
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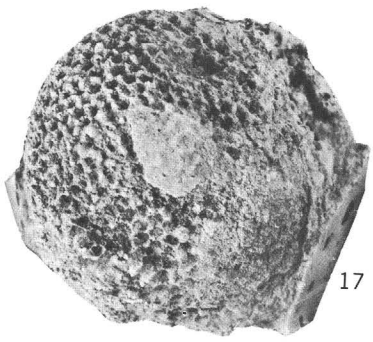
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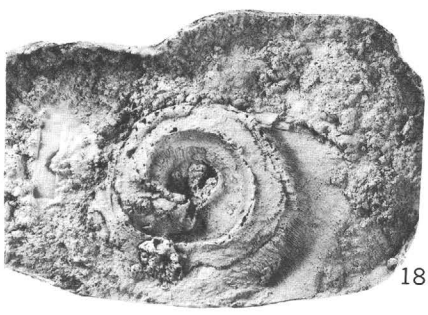
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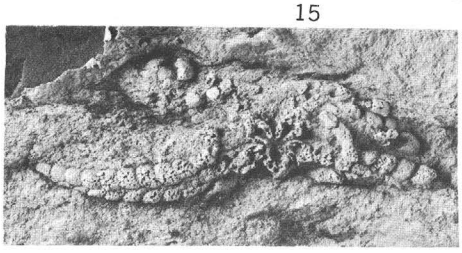
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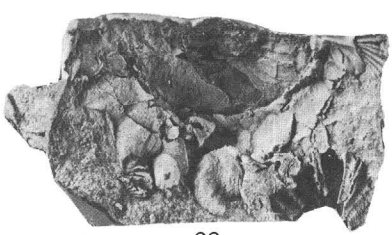
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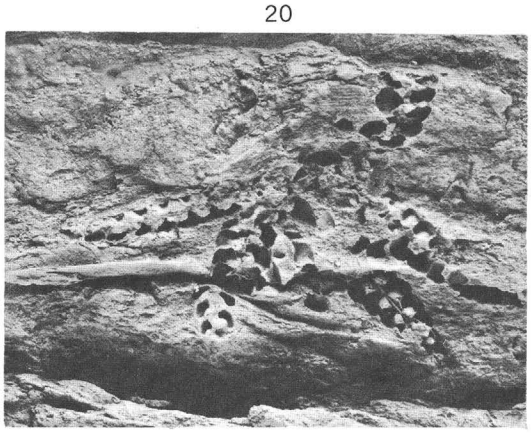
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PALEOZOIC GASTROPODA AND MISCELLANEOUS FOSSILS

PLATE 2

FIGURES 1–3. *Mourlonia* cf. *M. lucina* (Hall) (p. A8).
Tarratine Formation. Locality 2718–SD, Long Pond quadrangle, Somerset County, Maine.
1–3. Latex replica of exterior in side, basal and apical views (× 3). USNM 126288.

4, 5. *Loxoplocus* (*Lophospira*) sp. (p. A9).
Kennebec Formation. Locality 4317–CO, Brassua Lake quadrangle, Somerset County, Maine.
4. Slightly oblique side view of latex replica (× 2). USNM 126277.
5. Latex replica of exterior of slightly distorted specimens (× 2). USNM 126281.

6–10. *Bembexia*? cf. *B.*? *adjutor* (Hall) (p. A8).
Tomhegan Formation. Locality 2820–SD, Brassua Lake quadrangle, Somerset County, Maine.
6, 7. Latex replica of exterior in side and oblique basal views (× 3; × 4). USNM 126371.
8, 9. Latex replica of exterior in side and in slightly oblique views (× 3). USNM 126280.
10. Latex replica of exterior (× 4). USNM 126293.

11, 12. *Murchisonia* (*Murchisonia*) sp. (p. A14).
Tomhegan Formation. Locality 2820–SD, Brassua Lake quadrangle, Somerset County, Maine.
11. Side view of latex replica (× 3). USNM 126299.
12. Side view of latex replica of juvenile stage, the opposite side of the preceding view (× 3). USNM 126299.

13. *Murchisonia* (*Murchisonia*?) sp. (p. A14).
Tomhegan Formation. Locality 2820–SD, Brassua Lake quadrangle, Somerset County, Maine.
13. Side view of latex replica (× 1). USNM 126298.

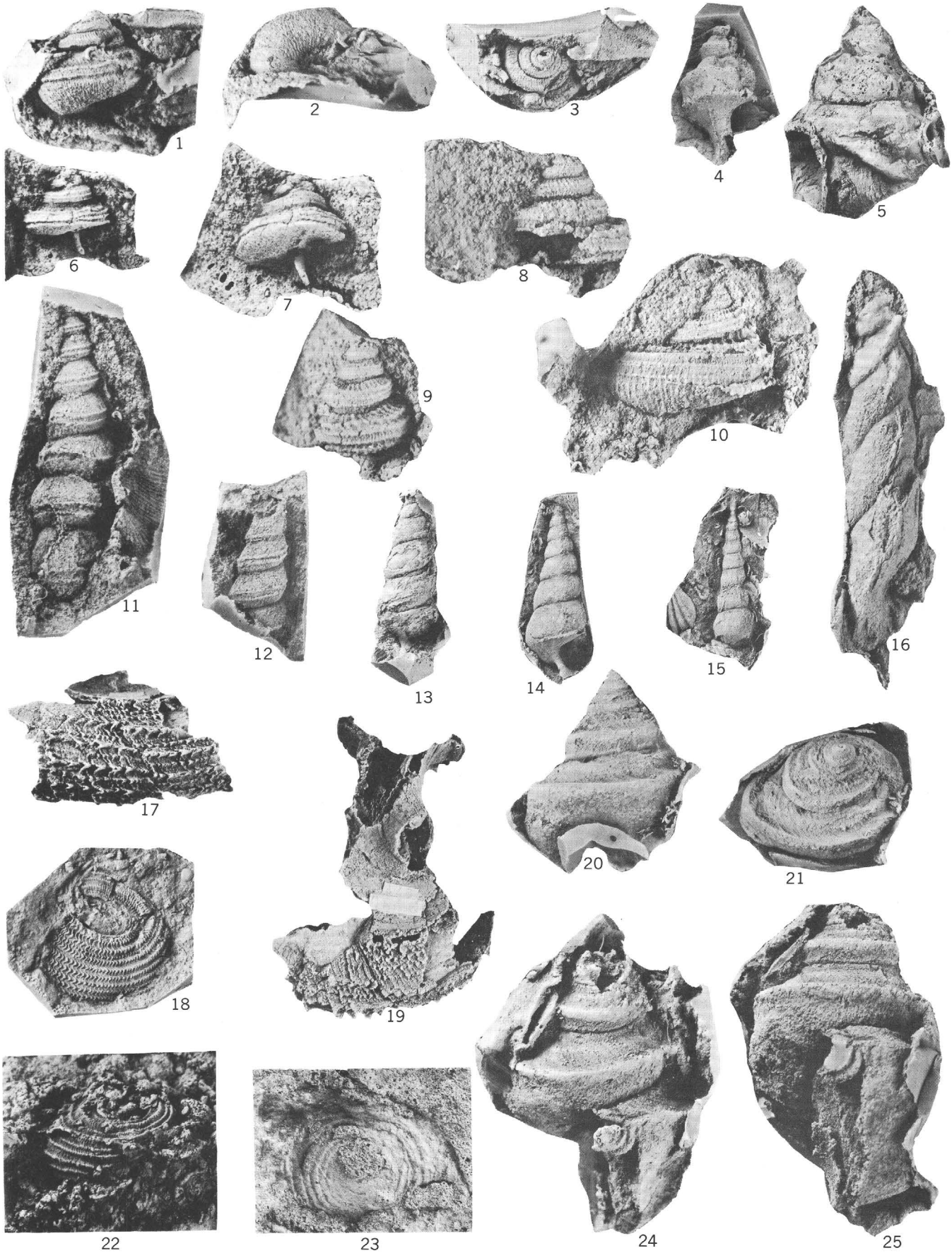
14–16. *Loxonema* cf. *L. welleriana* Williams and Breger (p. A14).
Somerset County, Maine.
14. Latex replica of exterior (× 1). Tarratine Formation. Locality 2813–SD, Pierce Pond quadrangle. USNM 126309.
15. Latex replica of exterior of lectotype; this is taken from the mold figured by Williams and Breger as pl. 13, fig. 5 (× 1). Tarratine Formation. Glacial drift in vicinity of Detroit. USNM 59863.
16. Latex replica of exterior (× 2). Seboomook Formation. Locality 2857–SD, Brassua Lake quadrangle. USNM 126310.

17, 19. *Poleumita* sp. (p. A13).
Hardwood Mountain Formation. Locality 3483–SD, Spencer quadrangle, Somerset County, Maine.
17, 19. Side and apical views of fragment (× 1). USNM 126279.

18, 22. *Oriostoma* sp. (p. A9).
Hornfels of late Llandovery age. Locality 3475–SD, Stratton quadrangle, Maine.
18. Latex replica of upper surface of a strongly distorted specimen (× 2). USNM 126314.
22. Latex replica of slightly distorted specimen in oblique side view (× 2). USNM 126315.

20, 21, 24, 25. *Ruedemannia*? sp. (p. A9).
Tarratine Formation, Somerset County, Maine.
20, 21. Latex replica of exterior in side and oblique top views (× 2). Locality 2813–SD, Pierce Pond quadrangle. USNM 126278.
24, 25. Latex replica of exterior in oblique top and oblique basal views (× 3). Locality 2705–SD, Brassua Lake quadrangle. USNM 126368.

23. Oriostomatid operculum (p. A13).
Hardwood Mountain Formation. Locality 3469–SD, Spencer quadrangle, Somerset County, Maine.
23. Latex replica of exterior (× 2). USNM 126312.



PALEOZOIC GASTROPODA

PLATE 3

FIGURES 1–5. *Elasmonema* cf. *E. bellatulum* (Hall) (p. A12).
Brassua Lake quadrangle, Somerset County, Maine.
1. Apertural view of latex replica showing the narrow umbilical impression behind the reflexed lip (× 3). Kineo Volcanic Member of Tomhegan Formation. Locality 2819–SD. USNM 126313.
2, 3, 4. Latex replica of exterior in adapertural view, oblique view, and side view (× 2; × 3; × 3). Tomhegan Formation. Locality 2820–SD. USNM 126303.
5. Side view of somewhat compressed latex replica (× 2). Tomhegan Formation. Locality 2820–SD. USNM 126302.

6–15. *Crossoceras belandi* Boucot and Yochelson, n. gen. and sp. (p. A12).
6–9. Apical, apertural, adapertural, and basal views of holotype (× 2). Glenerie Limestone of Chadwick (1908). New York 9W 1 mile north of Glenerie and 1 mile south of Cockburn, N.Y. USNM 126283E.
10–13. Basal, apical, adapertural, and apertural views of paratype (× 1). Same locality as above. USNM 126283C.
14. Adapertural view of a juvenile paratype (× 3). Same locality as above. USNM 126283A.
15. Latex replica of paratype in adapertural view exterior (× 3). USNM 126286A. Tarratine Formation. Locality 2767–SD, Moosehead Lake quadrangle, Somerset County, Maine.

16. *Holopea* sp. (p. A10)
Tomhegan Formation. Locality 2820–SD, Brassua Lake quadrangle, Somerset County, Maine.
16. Side view of latex replica (× 2). USNM 126284.

17, 19, 20, 25. *Platyceras* (*Platyceras*?) sp. (p. A10).
17. Latex replica of exterior (× 2). Tomhegan Formation. Locality 2820–SD, Brassua Lake quadrangle, Somerset County, Maine. USNM 126305.
19, 20. Latex replica of exterior, and oblique apical views of steinkern (× 2). Tomhegan Formation. Locality 2820–SD, Brassua Lake quadrangle, Somerset County, Maine. USNM 126306.
25. Side view of compressed and distorted specimen (× 2). Locality 2750–SD, Tomhegan Formation, Brassua Lake quadrangle, Somerset County, Maine. USNM 126296.

18, 21, 22. *Platyceras* (*Platyostoma*) *ventricosum* (Conrad) (p. A11).
Tarratine Formation, Somerset County, Maine.
18. Apical view of latex replica (× 1). Locality 2767–SD, Moosehead Lake quadrangle. USNM 126300.
21. Latex replica of distorted exterior mold (× 1). Locality 2872–SD, Pierce Pond quadrangle. USNM 126294.
22. Apical view of steinkern (× 1). Locality 2701–SD, Brassua Lake quadrangle. USNM 126308.

23, 24. *Platyceras* (*Orthonychia*) sp. (p. A11).
Tarratine Formation. Locality 2813–SD, Pierce Pond quadrangle, Somerset County, Maine.
23. Latex replica of exterior; the center prong of the sinuous aperture is partially obscured by a flap of latex (× 1). USNM 126292.
24. Side view of steinkern of same specimen (× 1). USNM 126292.

PALEOZOIC GASTROPODA