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DEPARTMENT OF NATURAL RESOURCES
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DIVISION OF GEOLOGICAL SURVEY
Thomas M. Berg, Chief

Report of Investigations No. 142

PENNSYLVANIAN TRILOBITES OF OHIO

by

David K. Brezinski
Myron T. Sturgeon
and
Richard D. Hoare

Columbus
1989



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ABSTRACT

Trilobites represent a relatively rare and neglected part of the Pennsylvanian marine fauna of Ohio. Specimens discussed herein were collected from 22 Ohio counties and 12 separate marine units ranging from Atokan to Virgilian. Pottsville trilobite species, *Sevillia trinucleata*, *S. sevilensis*, *Ameura missouriensis*, and *Ditomopyge scitula*, are present most commonly in the Lower and Upper Mercer marine units; *S. trinucleata* has been reported from the Morrowan Sharon marine unit. Allegheny marine units contain *A. missouriensis* and *D. scitula* throughout; *S. trinucleata* is present only in the Zaleski and Putnam Hill units. *Ameura missouriensis* and *D. scitula* are present in the lower Conemaugh Brush Creek, Cambridge, and Portersville units, but are replaced in the Ames unit by *Ditomopyge decurtata*.

Because of their long ranges, *S. trinucleata*, *A. missouriensis*, and *D. scitula* have little biostratigraphic utility. However, *S. sevilensis* and *D. decurtata* are good index fossils, marking the top of the Atokan and base of the Virgilian, respectively.

Ohio Pennsylvanian trilobite species inhabited shallow-water, nearshore, muddy environments, and all except *D. decurtata* are associated with molluscan communities which lived close to the ancient shoreline.

INTRODUCTION

LOCATION AND SCOPE OF STUDY

Trilobites are typically rare and localized in their occurrences in Pennsylvanian rocks of North America. As a result, their distributions, both stratigraphically and paleoecologically, are poorly known. The few cases where the stratigraphic distribution of Pennsylvanian trilobites was reconstructed (Chamberlain, 1969; Pabian and Fagerstrom, 1972) are based on only a handful of occurrences. For Pennsylvanian strata of Ohio, however, sufficient data have now been accumulated to allow a reliable documentation of the stratigraphic and paleoecologic distribution of trilobites.

This study is concerned with the distribution of trilobites from marine units of Pennsylvanian rocks of Ohio. These marine units crop out in the east-central and southeastern portions of the state from Geauga County on the north to Lawrence County on the south (fig. 1). Localities in 22 Ohio counties and one locality in Brooke County, West Virginia, across the Ohio River from Steubenville, Ohio, were sampled. Sampling also was conducted in Pennsylvanian units of adjacent Pennsylvania, although the information gleaned from this sampling does little to change either the stratigraphic or the geographic distributions established from the Ohio occurrences.

The main purpose of this investigation is to evaluate the stratigraphic distribution of Pennsylvanian trilobite faunas in Ohio. When combined with the known stratigraphic distribution of other faunal components currently or recently described, trilobite faunas provide an additional means by which the marine units can be correlated, thereby aiding in the exploration and development of economic resources. Other salient objectives include the description and illustration of the trilobite species present within the Pennsylvanian marine units of Ohio and the determination of their paleoecological relationships in an attempt to understand better the life habits and ecological preferences of Pennsylvanian trilobites. Lastly, it is hoped that this study will spark interest and further collecting, thereby supplementing and broadening our current knowledge of

Pennsylvanian trilobite evolution, paleoecology, and geographic distribution.

METHOD OF INVESTIGATION

Pennsylvanian invertebrates which have been collected for the past 40 years and stored within the collections at Ohio University (Athens, Ohio) form the major basis of this study. These collections contain over 200 identifiable trilobite specimens from over 50 localities in the Pottsville, Allegheny, and Conemaugh Groups of the Pennsylvanian System in Ohio (Appendix). Additional specimens and localities were provided by numerous colleges and museums in Ohio and geologic researchers who have conducted field work in the state. These and recent collections made by the senior author supplement the Ohio University collections. Thus, a total of 83 localities were sampled for this study.

The ranges of the trilobite species were plotted using observed occurrences as well as occurrences reported from other studies. The plotted ranges were compared to the ranges of these species as reported from other areas of the United States in an effort to refine their stratigraphic utility. In an effort to comprehend the paleoecology and paleoecologic distributions of the trilobite species, the types of lithologies and associated fauna of earlier collections were noted and compared with collections made more recently from known paleoecological settings.

Illustrated specimens and all additional Ohio University specimens have been placed in the repositories of the Orton Museum at The Ohio State University (OSU) in Columbus, Ohio. Specimens from Brooke County, West Virginia, and all additional specimens collected by the senior author are repositied in the collections of the Section of Invertebrate Fossils at the Carnegie Museum of Natural History (CMNH) in Pittsburgh, Pennsylvania.

In paleontological studies such as this, determination of relative abundances of rare faunal components is difficult inasmuch as one is never certain whether the abundance of a particular fossil in a collection truly reflects unbiased sampling. Insofar as many of the samples used in this study contain specimens collected over a number of visits to many of the localities, relative abundance data are meaningless. As a result, presence/absence data are used in the

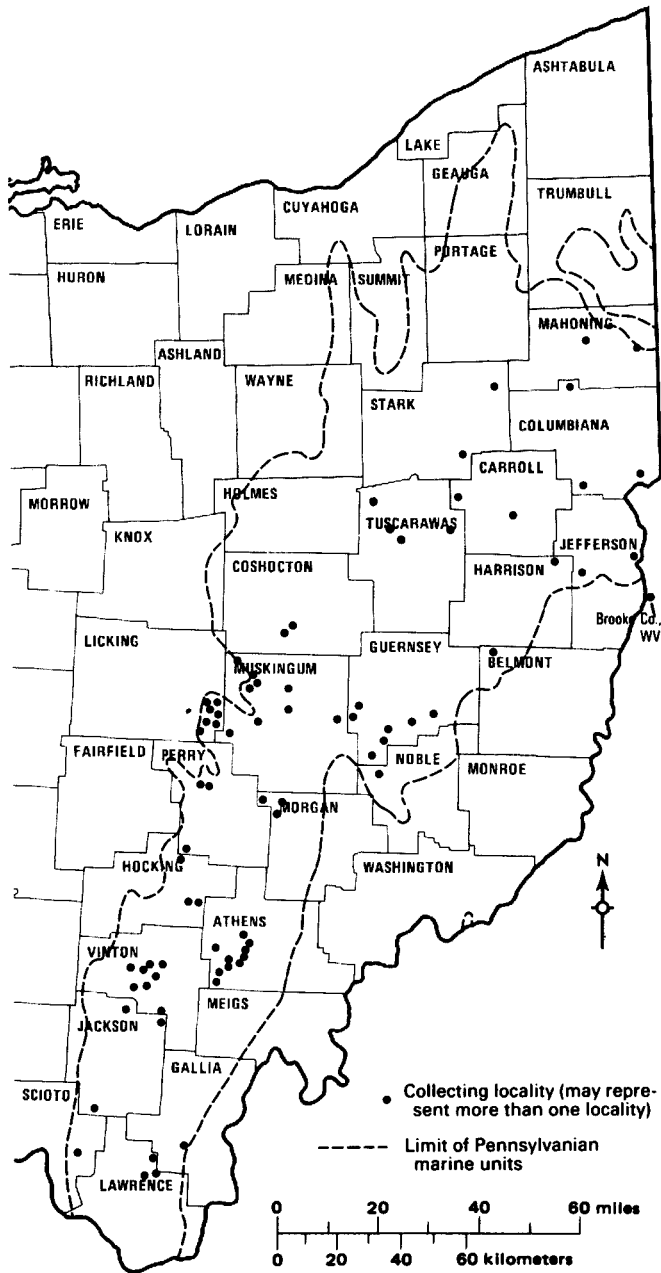


FIGURE 1.—General distribution of collecting localities of Pennsylvania trilobites in eastern Ohio.

evaluation of paleoecology and stratigraphic distribution. Readers can evaluate for themselves the absolute numbers given in the Appendix.

Terminology employed in this investigation follows that proposed for trilobites by Harrington (1959), Shaw (1957), and Richter and Richter (1949). Figure 2 illustrates the major morphologic features of the Pennsylvania trilobite *Ditomopyge*.

PREVIOUS INVESTIGATIONS

Studies dealing with North American Pennsylvania trilobite stratigraphy, distribution, or taxonomy are truly rare;

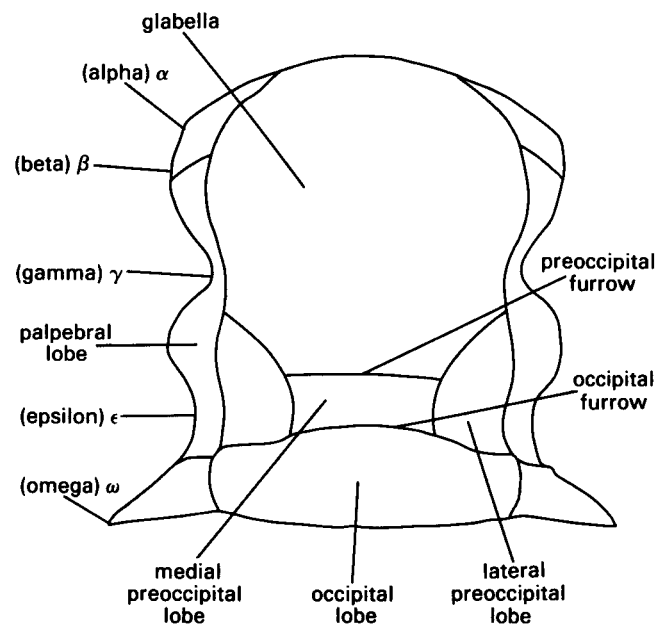
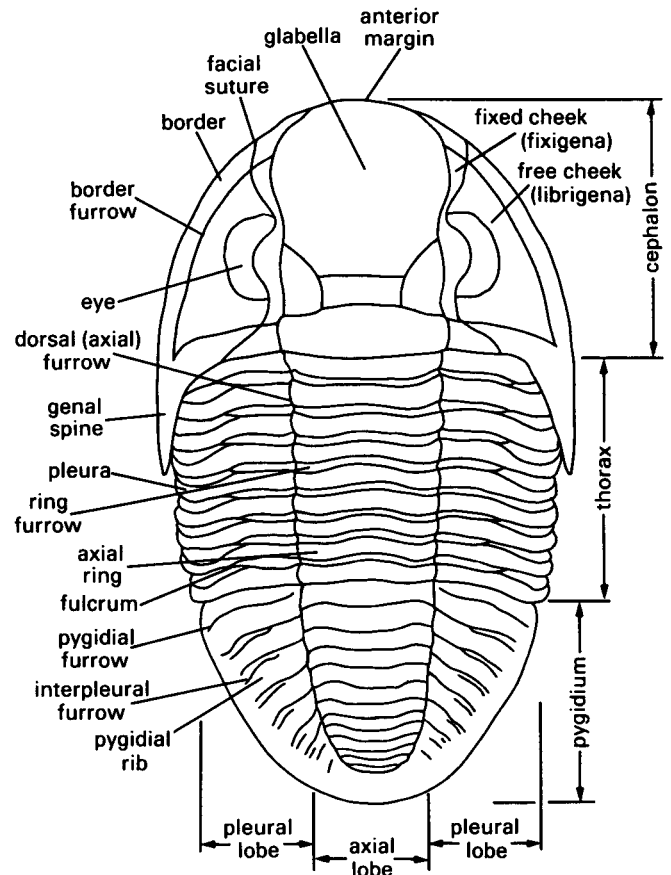


FIGURE 2.—Generalized morphology of trilobites as illustrated by the Pennsylvania trilobite *Ditomopyge*, including detail of central cephalic region. Terminology from Harrington (1959), Shaw (1957), and Richter and Richter (1949).

consequently, such studies dealing only with Ohio Pennsylvanian trilobites are even more rare. The earliest works discussing trilobites from the Carboniferous strata of Ohio were those of Claypole (1884a, b), Herrick (1887), and Vogdes (1887). Herrick (1887) enumerated some Upper Carboniferous (Pennsylvanian) trilobites known at that time and described the new species *Phillipsia trinucleata*, which he recovered from east-central Ohio, in addition to several new species from the Mississippian Waverly Group of Ohio. Mark (1912) provided lists of fossils, including trilobites, from various localities in the Conemaugh Group of Ohio. Morningstar (1922) listed numerous Pottsville localities and units in Ohio which yielded trilobite specimens. She described *Phillipsia* (= *Ameura*) *sangamonensis* and illustrated a pygidium of *Phillipsia* (= *Sevillia*) *trinucleata*. More recently, the only discussions regarding Pennsylvanian trilobites from Ohio have been from paleoecological studies. Peterson (1973) examined the Ames marine unit in Carroll, Guernsey, and Jefferson Counties and noted that trilobites were recovered at two localities from the marine shale which overlies the limestone. Hansen (1973) noted a similar occurrence within the Portersville unit. Rollins and others (1979) found *Ameura* specimens within the shaly intervals of the Cambridge unit in Guernsey County. Brezinski (1984) compiled distribution data on three species of Pennsylvanian trilobites from the Conemaugh Group of Pennsylvania and Ohio. Brezinski (1988) also published an overview of Appalachian Carboniferous trilobites.

ACKNOWLEDGMENTS

Many thanks are extended to Stig M. Bergström of The Ohio State University, Joseph T. Hannibal of the Cleveland Museum of Natural History, and Lee M. Gray of Mount Union College for making numerous specimens from collections under their jurisdiction available for study. Harold B. Rollins, John R. Anderson, Richard M. Busch, and Alan Saltzman were kind enough to lend and donate specimens from their private collections.

The Appalachian Basin Industrial Associates provided partial support for field expenses. The Department of Geology and Planetary Sciences of the University of Pittsburgh provided photographic facilities. Carla A. Kertis critiqued the initial drafts of this report.

STRATIGRAPHY

The rocks of the Pennsylvanian System in Ohio are approximately 1,100 feet thick and are divided, in ascending order, into the Pottsville, Allegheny, Conemaugh, and Monongahela Groups. The rocks are all sedimentary and consist of nonmarine sandstones, shales, underclays, coals, ironstones, and limestones and marine limestones, ironstones, flints, and shales. Table 1 lists the units in the Pottsville through lower Conemaugh Groups. Many of these units are thin and discontinuous and may be only local in occurrence. Traditionally, subdivision of the Pennsylvanian into groups and lesser units has been based primarily upon coals that normally occur 20 to 30 vertical feet apart (see also Sturgeon and Hoare, 1968, p. 6-11, and Hoare, Sturgeon, and Kindt, 1979, p. 5-10).

Trilobites are present only in marine beds that are restricted within the 700 feet of strata in the Pottsville, Allegheny, and Conemaugh Groups. These marine units are normally only a few inches to several feet thick, but several shale units have thicknesses of 30 or more feet.

STRATIGRAPHIC DISTRIBUTION AND PALEOECOLOGY

Although trilobites are far from common within the Pennsylvanian marine units of Ohio, sufficient data may be gleaned from currently available information to produce a reasonably good idea of their stratigraphic and paleoecologic distribution. In fact, the data presented herein are, at present, the most comprehensive published for any state. Even though several of the species range through much of the stratigraphic section, others are distinctly restricted stratigraphically. The distribution of Pennsylvanian trilobites from Ohio, as outlined in table 2, is based mainly on the present study; however, the work of other authors has been incorporated.

STRATIGRAPHIC DISTRIBUTION

Probably the two least stratigraphically useful trilobite species are *Ameura missouriensis* and *Ditomopyge scitula*. Both species range from the upper Pottsville Group to the lower Conemaugh Group. *Ditomopyge scitula* was recovered in each of the marine units included in its range. *Ameura missouriensis*, although long ranging like *Ditomopyge scitula*, is much rarer and was not found at all in the Upper Mercer, Putnam Hill, Vanport, Columbiana, or Portersville units in Ohio. The ranges exhibited by these two species in Ohio overlap their known ranges from other areas of the United States (table 3). The range of *Ameura missouriensis*, when examined in Pennsylvanian strata of adjacent states, is extended somewhat. This observation is based mainly on the work of Chow (1951), who found *Ameura* within the Mill Creek Limestone of northeastern Pennsylvania, a unit he correlated with the Ames of western Pennsylvania and eastern Ohio. Moreover, Brezinski (1988) has recovered *A. missouriensis* from the Portersville unit of adjacent Pennsylvania, and Hansen (1973) noted the presence of this species in the Portersville of Ohio.

The stratigraphic distribution of *Sevillia trinucleata* in Ohio ranges through the Pottsville Group and into the lower Allegheny (Morrowan to lower Desmoinesian) and represents the most detailed documentation of this species range yet described. In the Cordilleran region the stratigraphic occurrence of *S. trinucleata* is within the range exhibited for Ohio, but does not occur any higher or lower.

Sevillia sevellensis in Ohio is restricted to the Lower Mercer marine unit (upper Atokan). In the Eastern Interior Basin, *S. sevellensis* is known only from Atokan units (Seville Limestone), and in the Cordilleran region from the Upper Morrowan and Atokan (Oquirrh Formation). Thus, the Ohio range of *S. sevellensis* is within its range as known elsewhere in the United States.

It is likely that the most biostratigraphically useful Pennsylvanian trilobite species in Ohio is *Ditomopyge decurtata*, which appears abruptly within the Ames marine unit. Even though the upper range limit of *D. decurtata* is not known in Ohio, this uncertainty does not detract from its biostratigraphic utility. The Ames, therefore, marks a significant interval of change in the trilobite fauna from *Ditomopyge scitula*-*Ameura missouriensis*, which persisted from the upper Pottsville to the middle Conemaugh (Atokan-Missourian), to *Ditomopyge decurtata*, which survived through the Virgilian and into the Lower Permian. Elsewhere in the United States a similar faunal turnover has been noted (see Chamberlain, 1969, text-fig. 4), even though *Ameura missouriensis* has been recorded well into the Lower Permian (Pabian and Fagerstrom, 1972). *Ditomopyge scitula*, although known from the Lower Virgilian, is no longer the

TABLE 1.—Lower Conemaugh, Allegheny, and Pottsville stratigraphic units in Ohio¹

Group	Unit	Lithology
CONEMAUGH	SKELLEY	limestone, shale
	Duquesne	coal, underclay, limestone, redbed
	Lower Grafton	shale, sandstone
	GAYSPORT	limestone, shale, sandstone
	AMES	limestone, shale
	Ames	coal, underclay, shale, sandstone
	Harlem	coal, underclay
	Rock Riffle	limestone
	Round Knob	redbed
	Saltsburg	shale, sandstone
	NOBLE	limestone, shale
	Upper Bakerstown	coal, underclay, shale
	Ewing	limestone
	Cow Run	shale, sandstone
	PORTERSVILLE	shale, limestone
	Anderson	coal, underclay
	Bloomfield	limestone
	Bakerstown	shale, sandstone
	CAMBRIDGE	limestone, shale
	Wilgus	coal, underclay
	Buffalo	shale, sandstone
	BRUSH CREEK	limestone, shale
	Brush Creek	coal, underclay, shale, sandstone
MASON	shale	
Mason	coal, underclay	
Upper Mahoning	redbed, shale, sandstone	
Mahoning	coal (No. 7A)	
Thorton	underclay	
Lower Mahoning	limestone, redbed, shale, sandstone	
ALLEGHENY	(UNNAMED)	shale
	Upper Freeport	coal (No. 7), underclay, shale, limestone, sandstone
	Bolivar	coal, underclay
	Shawnee	limestone
	Bolivar	shale, sandstone
	DORR RUN	shale
	Lower Freeport	coal (No. 6A), underclay, limestone, shale, sandstone
	Upper Kittanning	coal, underclay, shale, sandstone
	WASHINGTONVILLE	shale
	Middle Kittanning	coal (No. 6), underclay
	Leetonia	limestone
	Middle Kittanning	shale, sandstone
	TUSCARAWAS	shale
	Strasburg	coal (No. 5A)
	Oak Hill	underclay
	Strasburg	shale, sandstone
	COLUMBIANA	shale, limestone
	Lower Kittanning	coal (No. 5), underclay, shale, sandstone
	Lawrence	coal, underclay, shale, sandstone
	FERRIFEROUS	ironstone, limonite
	VANPORT	limestone, flint, shale
	Scrubgrass	coal, shale, sandstone
	Clarion	coal (No. 4A), underclay
	Canary	ironstone
	Clarion	shale, sandstone
	Winters	coal, underclay
	ZALESKI	flint, limestone
Ogan	coal, underclay, shale, sandstone	
POTNAM HILL	limestone, shale	
Brookville	coal (No. 4), underclay	
Homewood	shale, sandstone	

POTTSVILLE	Tionesta	coal (No. 3B), underclay, shale, sandstone
	BIG RED BLOCK	ironstone, limonite
	UPPER MERCER	limestone, flint, shale
	Bedford	coal, underclay, shale, sandstone
	SAND BLOCK	ironstone, limonite
	(unnamed)	shale, sandstone
	Upper Mercer	coal (No. 3A), underclay, shale, sandstone
	LOWER MERCER or LITTLE RED BLOCK	ironstone, limonite
	(unnamed)	shale
	LOWER MERCER	limestone, shale
	Middle Mercer	coal, underclay, shale, sandstone
	Flint Ridge	coal, underclay, shale, sandstone
	BOGGS	limestone, flint, ironstone, shale
	Lower Mercer	coal (No. 3), underclay, shale, sandstone
	LOWELLVILLE or POVERTY RUN	limestone, ironstone, shale
	Vandusen	coal, underclay, shale, sandstone
	BEAR RUN	shale, ironstone
	Bear Run	coal, underclay
	Massillon	shale, sandstone
	QUAKERTOWN	shale
Quakertown	coal (No. 2), underclay, shale, sandstone	
GUINEA FOWL	ironstone, limonite	
(unnamed)	shale	
ANTHONY	shale	
Anthony	coal	
Sciotoville	underclay	
(unnamed)	shale, sandstone	
SHARON	ironstone, shale	
Sharon	coal (No. 1), underclay, shale, conglomerate, sandstone	
HARRISON	ironstone	

¹Marine units indicated by **BOLDFACE CAPITALS**, brackish-water units indicated by **MEDIUM CAPITALS**. The stratigraphic names listed in this table are the traditional/historical names used for the Pennsylvanian units in Ohio. Revisions in the nomenclature and in correlations are expected as a result of the Division of Geological Survey mapping program currently underway.

TABLE 2.—Stratigraphic distribution of Pennsylvanian trilobites in Ohio¹

Group	Marine unit	Species
CONEMAUGH	Ames limestone and shale	
	Portersville shale and limestone	○ ●
	Cambridge limestone and shale	● ●
	Brush Creek limestone and shale	● ●
ALLEGHENY	Washingtonville shale	●
	Columbiana shale and limestone	
	Vanport limestone, flint, and shale	●
	Zaleski flint, limestone, and shale	○ ●
	Putnam Hill limestone and shale	● ●
POTTSVILLE	Upper Mercer flint, limestone, and shale	● ●
	Lower Mercer limestone and shale	● ●
	Sharon ironstone	○ ●

¹Solid circles represent observed occurrences, open circles represent documented occurrences from other studies.

most common Pennsylvanian trilobite species after the Missourian. The reason for this change in trilobite composition is not at present understood, but it appears to have occurred concomitantly across North America.

PALEOECOLOGY

Little is known or has been written about the paleoecology of Pennsylvanian trilobites. With the present data, however, a better understanding of their paleoecology is possible. On the basis of comparative morphology of the Ohio Pennsylvanian trilobites and that of trilobite species whose paleoecology and life habits are better known, it is possible to postulate a reasonable life mode for Ohio trilobites. The five Ohio Pennsylvanian trilobite species possess many similar salient morphologic features. These include: an inflated frontal glabellar lobe, moderate vaulting of the exoskeleton, fine to medium granular surface ornament, nearly hemispherical eyes dorsally situated, moderate to long genal spines, and moderately wide pleural fields on the thorax and pygidium. Similar morphologic characteristics exhibited by the Late Mississippian trilobite *Paladin chesterensis* led Brezinski (1983a) to postulate that this species possessed a motile, benthic life mode. Brezinski proposed that *P. chesterensis*, with only dorsal and lateral visual fields, a

moderately narrow axis, and granular surface ornament, was unlike interpreted burrowing and swimming forms, which typically exhibit a smooth exoskeleton with a broad and highly vaulted axis. Furthermore, interpreted swimming forms commonly exhibit a ventral as well as dorsal and lateral visual fields. The large inflated frontal glabellar lobes displayed by the Ohio Pennsylvanian trilobites indicate that the exoskeleton of these species housed a large digestive system within. Such anatomical attributes are consistent with detritus feeding, grazing, or scavenging life modes.

Much can be discerned about the paleoecology of extinct animals by examining their distribution with regard to lithology and associated fauna. Brezinski (1983b) outlined a continuum of lithofacies and biofacies which would be expected in an onshore-to-offshore setting in a typical Appalachian Pennsylvanian marine unit. The lithologic variation includes a nearshore dark-gray shale grading offshore into a calcareous shale to shaly limestone, which in turn grades into offshore bedded limestone. During regression, a nodular-bedded limestone was deposited on the main limestone bench which had developed during stillstand (maximum transgression). With regard to biofacies, Brezinski (1983b) proposed that a nearshore molluscan-dominated biofacies graded offshore into several brachiopod-

TABLE 3.—Comparison of ranges of Pennsylvanian trilobite species from Ohio with those from other areas of the United States

Group	Series	Marine unit	Ohio	Eastern Interior Basin	Midcontinent region	Cordilleran region
POTTSVILLE	Morrowan	Sharon				
	Atokan	Lower Mercer	<i>Sevillia trinucleata</i>	<i>Sevillia sevillensis</i>	<i>Sevillia sevillensis</i>	<i>Sevillia sevillensis</i>
Upper Mercer						
ALLEGHENY	Desmoinesian	Putnam Hill				
		Zaleski				
		Vanport				
		Columbiana				
CONEMAUGH	Missourian	Washingtonville				
		Brush Creek				
		Cambridge				
		Portersville				
CONEMAUGH	Virgilian	Ames				

dominated biofacies. Moreover, an opportunistic chonetid brachiopod biofacies formed during transgression, whereas during regression the brachiopod *Crurythyris* inhabited the high-stress conditions. A relationship has been demonstrated between the biofacies described above and the distribution of trilobites in the lower Conemaugh of Pennsylvania and Ohio (Brezinski, 1984). Present data further illustrate such a relationship. Table 4 indicates the relationship between trilobite species and preferred lithologic and biologic associations.

Sevillia trinucleata most commonly is found within nearshore shales and calcareous shales and is typically associated with a molluscan-dominated biofacies. A similar relationship can be seen for *Ameura missouriensis* and *Ditomopyge scitula*. The latter two species, however, exhibit an even stronger preference toward shale lithofacies. This relationship indicates that *Sevillia trinucleata*, *Ameura missouriensis*, and *Ditomopyge scitula* inhabited nearshore molluscan-dominated environments. This interpretation is also indicated by the work of Hansen (1973), who found that *A. missouriensis* was present within a regressive, relict-mature community of the Portersville unit. At present, insufficient data are available to arrive at such an interpretation regarding *Sevillia sevillensis*. Although data for *Ditomopyge decurtata* are likewise sparse, the distribution of this species can be evaluated and compared to that of *Ditomopyge* sp. (now known to be *D. decurtata*) of Brezinski (1984). In both studies *D. decurtata* was most common within the nodular-limestone lithofacies and *Crurythyris* biofacies. Both of these facies are present overlying the main limestone bench of the Ames unit. Brezinski (1983b) postulated that these facies developed during deltaic progradation which occurred concomitantly with the Ames regression. Miller and Swineford (1957) also recorded *D. decurtata* from a nodular limestone overlying the Virgilian Haskell Limestone of Kansas and concluded that this facies was deposited within a shallow bay environment.

Ditomopyge scitula exhibits an interesting morphologic variation throughout its range in the Pennsylvanian marine units of Ohio. Figure 3 illustrates a reduction in average width and length of pygidia of *D. scitula* from the Lower Mercer through the Portersville units. This gradual decrease in size through time is also reflected in the range of the number of ribs and rings displayed by pygidia of this species. Such a reduction in size during the existence of a lineage is uncommon, and in fact is contrary to Cope's Rule, which states that the average size of an animal species tends to increase through time. Although the reason for the size reduction in *Ditomopyge scitula* is not at present understood, it can be speculated that it is in some way the

result of the tendency of this species to inhabit high-stress nearshore environments. Perhaps the smaller size is selected for in the nearshore setting, or maybe the size reduction is the result of neoteny.

SYSTEMATIC PALEONTOLOGY

Genus *Sevillia* Weller, 1936
Sevillia trinucleata (Herrick)
 Pl. 1, figs. 1-3, 7-9, 12, 14, 15

Phillipsia trinucleata Herrick, 1887, p. 64, pl. 1, figs. 23a-e, pl. 2, fig. 32, pl. 3, fig. 21; Vogdes, 1890, p. 134; S. Weller, 1898, p. 424; Girty, 1903, p. 478, pl. 10, figs. 11, 12; Morningstar, 1922, p. 274, pl. 16, fig. 19; J. M. Weller, 1936, p. 712.

Proetus trinucleata Vodges, 1887, p. 81, 82, pl. 2, figs. 7-9.
Sevillia trinucleata J. M. Weller, 1936, p. 712; Chamberlain, 1969, p. 57, 58, pl. 12, figs. 9-11, 14-16, 19, 20, 23, 27, 28, 31-33; Hahn & Hahn, 1970, p. 320.

Ameura? sp. Easton, 1962, p. 103, pl. 13, figs. 28a, b (not fig. 27).

Cephalon of medium relief and vaulting. Glabella subpyriform in outline, sides sinuous; frontal glabellar lobe moderately inflated, evenly convex, slightly overhanging anterior border furrow. Highest point of glabella located along its posterior terminus. Two sets of lateral glabellar lobes well developed, oval in outline, and smooth. Medial preoccipital lobe small, subrectangular to oval in outline. Lateral preoccipital lobes subtriangular in outline, basal furrows deep, shallowing laterally. Border furrow narrow, moderately deep; margin sharply rounded at crest. Dorsal furrow deep, moderately narrow, and sinuous. Occipital furrow straight, deep, and of moderate width. Occipital ring wide, downsloping into occipital furrow, highest along posterior terminus. Palpebral lobes of medium size, crescentic in outline, flattened distally. Eyes large and hemispherical. Ocular platform narrow. Lateral border furrow much wider than in front of glabella, extending well onto a narrow and long genal spine. Lateral marginal crest sharply rounded. Facial sutures only slightly to moderately divergent from γ (gamma) to β (beta), sharply rounded to subtriangular at β , β slightly wider (transverse) than ϵ (epsilon).

Thorax composed of nine nearly equisized segments. Axis strongly convex and semicircular in transverse profile. Pleurae flat adjacent to dorsal furrow, becoming sharply convex-up and steeply inclined at fulcrum, extending out to rounded tips.

TABLE 4.—Relationship of Ohio Pennsylvanian trilobite species to lithology and associated marine fauna¹

Species	Lithofacies				Biofacies			
	Shale	Calcareous shale	Nodular limestone	Limestone	Molluscan	Chonetid	<i>Crurythyris</i>	Spirifer-productid
<i>Sevillia trinucleata</i>	4	8	0	2	9	2	0	0
<i>Sevillia sevillensis</i>	0	1	2	0	2	0	0	1
<i>Ameura missouriensis</i>	6	2	1	1	8	2	0	0
<i>Ditomopyge scitula</i>	26	6	2	2	24	3	0	1
<i>Ditomopyge decurtata</i>	1	0	4	1	0	1	4	1

¹Numbers represent number of samples per lithology or faunal association. Differences in totals between lithofacies and biofacies are the result of uncertain assignments of some samples.

Pygidial measurements of Sevilla trinucleata

	<i>Pygidial width (mm)</i>	<i>Pygidial length (mm)</i>	<i>Number of ribs</i>	<i>Number of rings</i>
\bar{x} (average)	12.33	10.43	10	18
range	5.50-18.00	3.00-17.50	9.0-10.0	17.0-19.0
N (number)	22	22	13	10

Pygidium semi-elliptical in outline, 0.83 to 0.85 times as long as wide, of moderate vaulting and relief. Axis 0.31 to 0.35 the maximum pygidial width and 0.88 to 0.90 the total pygidial length, composed of 15 to 20 rings which are rounded in transverse profile and sided with distinct, slightly concave shoulders. Each ring narrow (sagittal) and ornamented by six to seven small granules. Ring furrows deep and narrow. Pleural fields flat proximally and of even

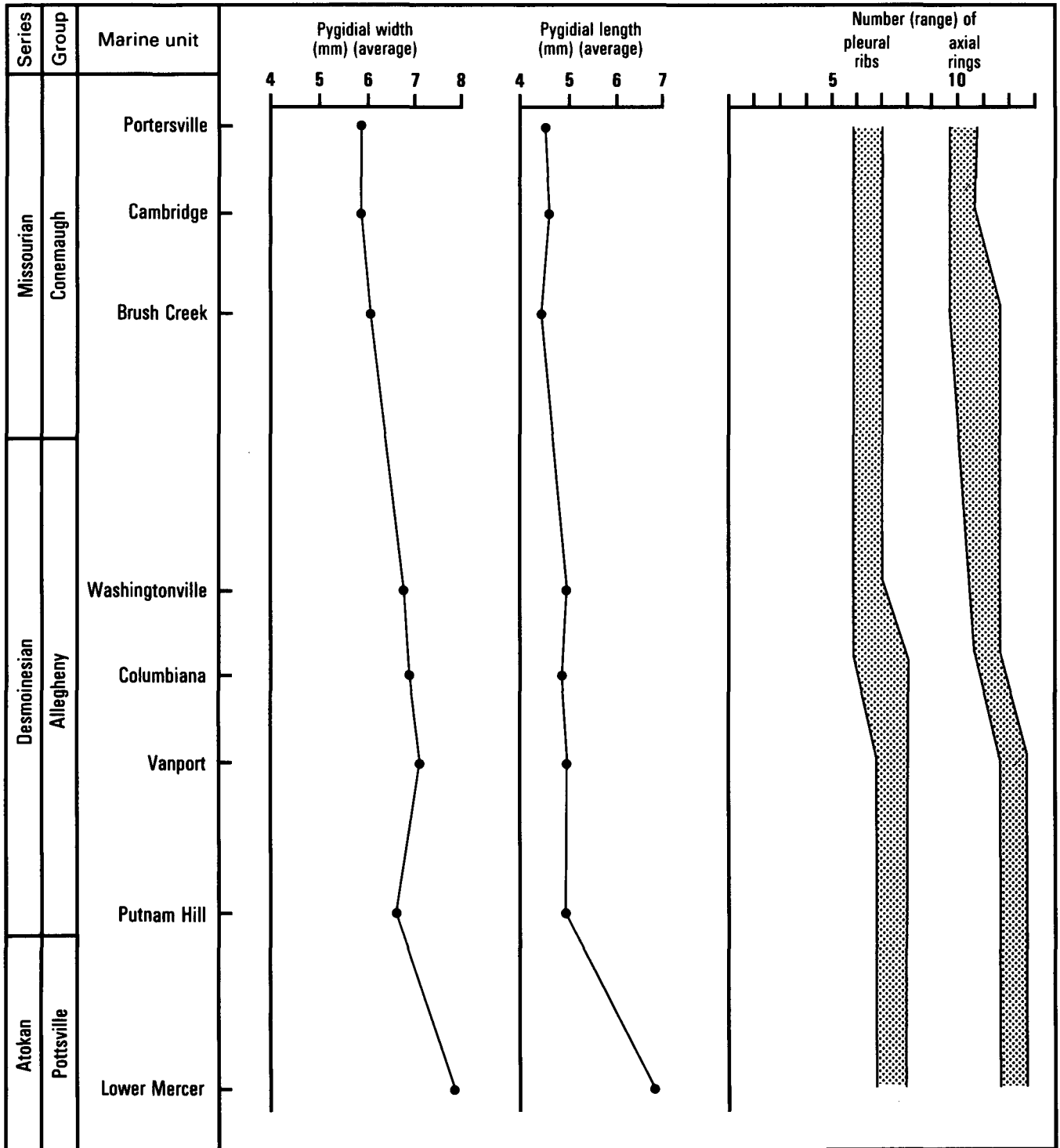


FIGURE 3.—Stratigraphic variations in pygidial size and in number of axial rings and pleural ribs of *Ditomopyge scitula* from Pennsylvanian strata of eastern Ohio.

convexity to border, composed of 9 to 12 ribs. Border of moderate width, slightly wider posteriorly than laterally, downsloping to margin. First two pleural ribs extending onto border. Pleural furrows deep, narrow, and straight.

Discussion.—*Sevillia trinucleata* is by far the most abundant lower Pennsylvanian trilobite in Ohio, but it is by no means common. It is most typically found in the Lower Mercer, but also has been observed in the Upper Mercer, and Morningstar (1922) noted its presence in the Sharon marine unit. Morningstar's reports of *S. trinucleata* from the Sharon marine unit in Ohio are the only basis for placement of the initial occurrence of this species within the Morrowan of the Appalachian Basin. The material which Morningstar recovered from the Sharon was poorly preserved and only tentatively assigned to *S. trinucleata*. Thus, unequivocal assignment of *S. trinucleata* to the Sharon is lacking.

Sevillia trinucleata can be distinguished from *S. sevillensis* by the more parabolic versus subtriangular outline of the pygidium, the semicircular transverse profile of the pygidial axis, the shorter length-to-width ratio of *S. sevillensis* (figs. 4I, J, N, O), and the near isolation of the posteriormost lateral glabellar lobe on the cranium of the latter. The ranges of both species are fairly concurrent, and their ranges in Ohio strata are similar to those described from other areas of North America (Chamberlain, 1969).

Occurrence.—Rare in the Lower Mercer unit, very rare in the Upper Mercer, Putnam Hill, and Zaleski (Black Flint) units; reported by Morningstar (1922) from the Sharon unit.

Repository.—Designated neotypes, OSU 28135A; hypotypes, OSU 28135B, 28135C, 29173, 29174, 29179.

Sevillia sevillensis Weller
Pl. 1, figs. 4-6

Sevillia sevillensis J. M. Weller, 1936, p. 712, 713, pl. 95, figs. 1a-3; Shimer & Shrock, 1944, p. 653, pl. 276, figs. 14-16; J. M. Weller, 1959, p. 401, fig. 308, 5a, b; Wanless, 1958, p. 22, table 3, p. 46; Chamberlain, 1969, p. 56, 57, pl. 13, figs. 1-14, 25, 26, 31; Hahn & Hahn, 1970, p. 319, 320.

Sevillia sp. Chamberlain, 1964, p. 229, pl. 2, figs. c, f-k (not d, e).

No crania of this species were available from the Ohio collections; therefore, the description below is modified from J. M. Weller (1936) and Chamberlain (1969).

Glabella strongly inflated, gibbous, only moderately laterally inflated in frontal lobe. Medial preoccipital lobe oval in outline, of about same height as posterior portion of glabella. Lateral preoccipital lobes subpyramidal, descending steeply into occipital furrow, slightly lower in elevation than medial lobe. Basal furrow narrower and deeper medially than laterally, intersecting the dorsal furrow slightly anterior to palpebral midline at an acute angle. Three pairs of glabellar furrows evident, becoming shallower anteriorly. Posteriormost glabellar lobe slightly inflated and oval in outline. Occipital lobe wide, highest at the posterior edge, sloping into deep, narrow, and sinuous occipital furrow. Palpebral lobe crescentic in outline, flattened adaxially. Dorsal furrow narrow and sinuous. Facial sutures diverging moderately from γ to β , subangular at β , narrowest at γ and ϵ . Frontal border furrow narrow, almost flattened medially. Border rounded through margin. Eyes

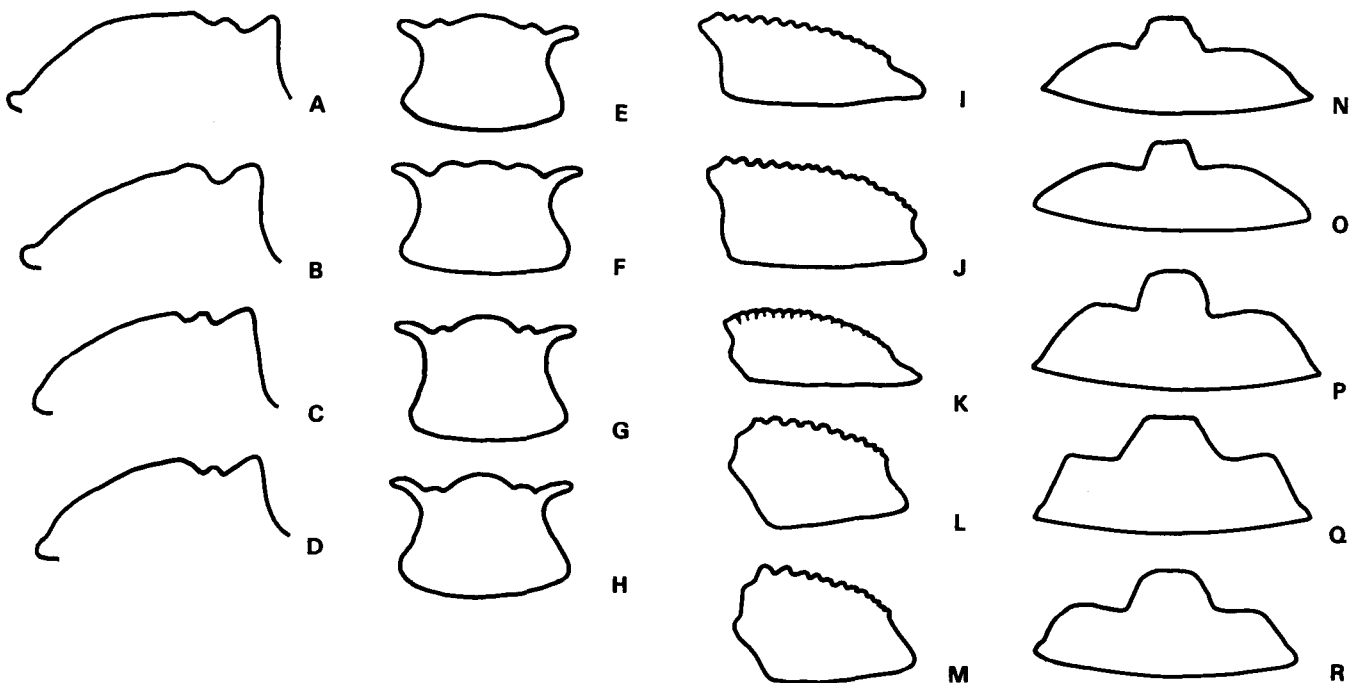


FIGURE 4.—Comparison of cranidial and pygidial profiles of Pennsylvanian trilobites of Ohio. A-D, longitudinal cranidial profiles: A, *Sevillia trinucleata*; B, *Ameura missouriensis*; C, *Ditomopyge scitula*; D, *Ditomopyge decurtata*. E-H, transverse anterior profiles: E, *Sevillia trinucleata*; F, *Ameura missouriensis*; G, *Ditomopyge scitula*; H, *Ditomopyge decurtata*. I-M, longitudinal pygidial profiles: I, *Sevillia trinucleata*; J, *Sevillia sevillensis*; K, *Ameura missouriensis*; L, *Ditomopyge scitula*; M, *Ditomopyge decurtata*. N-R, transverse pygidial profiles: N, *Sevillia trinucleata*; O, *Sevillia sevillensis*; P, *Ameura missouriensis*; Q, *Ditomopyge scitula*; R, *Ditomopyge decurtata*.

hemispherical with a narrow groove marking ocular platform. Free cheek descending steeply from ocular platform onto broad, flat, slightly concave border, which is sharply rounded to a flattened outer surface at margin. Genal spine long and slender with narrow trough extending along its length from lateral border.

Thorax composed of nine segments, axis highly vaulted, pleural fields flattened adjacent to dorsal furrow, convex-up and steeply inclined at pleural tips.

Pygidial measurements of Sevilla sevilensis

	Pygidial width (mm)	Pygidial length (mm)	Number of ribs	Number of rings
\bar{x} (average)	12.13	9.38	10	17.50
range	5.50-16.00	4.00-13.00	9-11	17-18
N (number)	4	4	2	2

Pygidium subtriangular in outline, moderately vaulted, 0.76 to 0.80 as long as wide. Axis composed of 16 to 18 rings which are subtrapezoidal in transverse cross section and separated by narrow and deep furrows. Each ring exhibiting 8 to 10 granules at posterior apex. Axis approximately 0.33 times the maximum anterior width of pygidium. Posteriormost ring of axis slightly overhanging terminus. Pleural fields composed of 10 to 11 distinct ribs separated by sharp, sinuous furrow and exhibiting sharp crest ornamented with row of fine granules. In transverse profile pleural lobes strongly convex, rising gently out of a distinct dorsal furrow and curving to border flange. Border flange slightly convex, descending steeply to margin, but more gently inclined than outer surface of pleural ribs, inclination shallowing posteriorly. Border slightly wider posteriorly than laterally.

Discussion.—Ohio specimens of *Sevilla sevilensis* Weller are restricted to the Lower Mercer marine unit, although it seems quite likely from its range elsewhere (Weller, 1936; Chamberlain, 1969) that *S. sevilensis* may occur in other Pottsville marine units. Pygidia of *S. sevilensis* can be distinguished by the subtriangular outline, subtrapezoidal transverse profile of the axis, and by the axial terminus which overhangs the border (figs. 4J, O).

Occurrence.—Very rare in the Lower Mercer unit.

Repository.—Hypotype, OSU 29172.

Genus *Ameura* Weller, 1936

Ameura missouriensis (Shumard)

Pl. 1, figs. 10, 11, 13; pl. 2, figs. 1-4

Phillipsia missouriensis Shumard, 1858, p. 225, 226; Herrick, 1887, p. 59, 60; Vogdes, 1887, p. 86; Keyes, 1894, p. 235; S. Weller, 1898, p. 422; J. M. Weller, 1936, p. 713.

Phillipsia major Shumard, 1858, p. 226, 227; Meek, 1872, p. 238, pl. 3, figs. 2a-c; Herrick, 1887, p. 60, 61; Vogdes, 1887, p. 85, 86, pl. 3, fig. 14; Hare, 1891, p. 35, pl. 1, figs. 5, 8a-c; Keyes, 1894, p. 238, 239, pl. 32, figs. 8a-d, 9; S. Weller, 1898, p. 422; Girty, 1903, p. 477, 478; Grabau & Shimer, 1910, p. 304; Walter, 1924, p. 335-339, pl. 26, figs. 27, 28.

Proetus longicaudus Hall, 1861, p. 80; Hall, 1862, p. 108, 109, 168, pl. 10, figs. 7-9; Hall, 1876, pl. 20, figs. 32-34; H. S. Williams, 1881, p. 156; Hall & Clarke, 1888, p. 131-133, pl. 20, figs. 32-34; S. Weller, 1898, p. 505, 506.

Phillipsia (*Griffithides*?) *sangamonensis* Meek & Worthen, 1865, p. 271-273; Meek & Worthen, 1873, p. 615-618, pl. 32, fig. 4a, b; White, 1884, p. 174-176; pl. 39, figs. 4, 5.

Phillipsia sangamonensis Heilprin, 1886, p. 274, fig. 14, p. 277, fig. 14a, p. 446, fig. 14, p. 458, fig. 14a; Herrick, 1887, p. 61, 62, pl. 5, fig. 13.

Griffithides sangamonensis Vogdes, 1887, p. 99, pl. 3, figs. 7, 8; S. Weller, 1898, p. 302; Grabau & Shimer, 1910, p. 305, fig. 1616a, b.

Phillipsia nodocostatus Hare, 1891, p. 33, pl. 1, figs. 1a-c, 2-4, 5, 8a-c; S. Weller, 1898, p. 423.

Ameura sangamonensis J. M. Weller, 1936, p. 713, 714; Shimer & Shrock, 1944, p. 637, pl. 275, figs. 25-27; Chow, 1951, p. 31, 32, pl. 4, fig. 8a-d; J. M. Weller, 1959, p. 401, figs. 308a, b; Branson, 1961, p. 179, 180; Pabian & Fagerstrom, 1968, p. 205, 206, fig. 10.

Ameura major J. M. Weller, 1936, p. 714; Shimer & Shrock, 1944, p. 637, pl. 275, figs. 23, 24; Chamberlain, 1969, p. 61, 62, pl. 13, figs. 17, 20, 21; Hahn & Hahn, 1972, p. 337, 338.

Ameura missouriensis Chamberlain, 1969, p. 60, 61, pl. 13, figs. 15, 16, 18, 19, 32-34; Pabian & Fagerstrom, 1972, p. 811-813, pl. 1, figs. 1-13; Hahn & Hahn, 1972, p. 338-340.

Cephalon smooth and moderately vaulted, parabolic in outline. Glabella subrectangular in outline, moderately inflated, and widest between palpebral lobes. Dorsal furrow sharp and sinuous. Highest and widest points of glabella coincident. Longitudinal profile anterior to highest point straight and downsloping to border. In transverse profile glabella of low convexity to the anterior, becoming more strongly convex posteriorly and descending laterally almost vertically into dorsal furrow. Frontal glabellar lobe broadly rounded anteriorly, slightly overhanging border furrow. Lateral preoccipital lobes suboval, moderately inflated. Palpebral lobes crescentic in outline, gently downsloping into dorsal furrow, located very posteriorly with respect to glabella. Preoccipital furrow widest at occipital furrow, shallowing and recurving anterolaterally, meeting dorsal furrow at palpebral midline. 2 p furrow shallow and faint, 3 p furrow generally obsolete. Occipital ring of medium width and lower in elevation than posterior terminus of glabella. Occipital furrow deep, narrow, sinuous. Facial sutures broadly rounded at γ , moderately divergent from γ to β , broadly rounded at β . Eyes medium in size and hemispherical in outline. Ocular platform flat and very narrow. Border furrow broadest and nearly flat lateral to eye, becoming narrower and more concave to the anterior and posterior, and extending well onto a long slender genal spine, which extends nearly the length of the thorax.

Thorax composed of nine segments lacking ornamentation. Pleurae flat adjacent to dorsal furrow, becoming broadly convex at fulcrum, sharply rounded into blunt pleural spines.

Pygidial measurements of Ameura missouriensis

	Pygidial width (mm)	Pygidial length (mm)	Number of ribs	Number of rings
\bar{x} (average)	12.23	15.23	10.00	18.57
range	4.10-21.0	5.50-25.0	9.0-11.0	15.0-21.0
N (number)	22	22	15	14

Pygidium of medium vaulting, subtriangular in outline, 1.10 to 1.20 times as long as wide. Axis highly vaulted, composed of 14 to 20 rings, evenly convex in transverse profile with shoulders. Axis makes up 0.90 the total pygidial length. Ring furrows narrow, deep, slightly sinuous in larger holaspids. Rings evenly rounded in longitudinal profile. Pleural fields evenly convex, almost flat at dorsal furrow and meeting border at 45 degrees, and composed of 10 to 14 ribs. Pleural furrows narrow and straight. Border wide, slightly convex, downsloping and extending to margin. On larger individuals, border widening noticeably posteriorly. Anteriormost two ribs extending slightly onto border.

Discussion.—*Ameura missouriensis* is the largest of the Pennsylvanian trilobites of Ohio. Specimens, if complete, commonly would attain lengths of 6 cm and could be as large as 9 cm. Moreover, *A. missouriensis* is probably the Pennsylvanian trilobite species most easily recognized. It is the only species known from the Pennsylvanian in which the glabella is widest between the eyes and tapers forward and also lacks a medial preoccipital lobe. The pygidium of *A. missouriensis* is parabolic, much like *Sevillia sevillensis*; however, *A. missouriensis* possesses a very wide and posteriorly mucronate border (fig. 4K).

Occurrence.—Very rare in the Lower Mercer, Zaleski, and Washingtonville units, rare in the Brush Creek and Cambridge units.

Repository.—Hypotypes, OSU 29168, 29169, 29175, 29180.

Genus *Ditomopyge* Newell, 1931

Ditomopyge scitula (Meek & Worthen)

Pl. 2, figs. 5-8, 10-12

- Phillipsia* (*Griffithides*) *scitula* Meek & Worthen, 1865, p. 270, 271.
Griffithides ornata Vogdes, 1895, p. 589-591.
Phillipsia (*Griffithides*) *ornata* Smith, 1897, p. 271-273, pl. 22, fig. 6.
Griffithides ornatus S. Weller, 1898, p. 302; Girty, 1911, p. 156; Girty, 1915, p. 220; J. S. Williams, 1933, p. 431, 432.
Griffithides parvulus Girty, 1911, p. 145; Girty, 1915, p. 268-270, pl. 18, figs. 14, 15; Walter, 1924, p. 334; J. S. Williams, 1933, p. 431.
Griffithides scitulus Walter, 1924, p. 331-334, fig. 28, pl. 27, figs. 11-14.
Ditomopyge lansingensis Newell, 1931, p. 268, 269, pl. 31, figs. 31, 32; J. M. Weller, 1935, p. 505-507, text-figs. 11-14.
Griffithides olsoni J. S. Williams, 1933, p. 429-435, figs. 1, 2.
Ditomopyge parvulus J. M. Weller, 1935, p. 505-507, 509, text-fig. 4c; J. M. Weller, 1936, p. 711; J. M. Weller, 1937, text-fig. 4c; Chamberlain, 1969, p. 59, 60, pl. 13, figs. 22, 23, 27-30; Hahn & Hahn, 1970, p. 181.
Ditomopyge olsoni J. M. Weller, 1935, p. 506-511, figs. 1-8c, 16-24; J. M. Weller, 1936, p. 711; Shimer & Shrock, 1944, pl. 275, fig. 3; Hahn & Hahn, 1970, p. 179; Brezinski & Stitt, 1982, p. 1242-1248, pl. 1, figs. 1-8, text-figs. 1-3; Kues, 1982, p. 239-243, figs. 1-9.
Griffithides conwayensis Wheeler, 1935, p. 53-56, pl. 6; Pabian & Fagerstrom, 1972, p. 807.
Ditomopyge conwayensis Chamberlain, 1969, p. 59; Bucurel & Chamberlain, 1977, p. 405.
Ditomopyge scitula J. M. Weller, 1936, p. 711; Shimer & Shrock, 1944, pl. 275, figs. 4-6; Pabian & Fagerstrom, 1972, p. 790-798, 808-811, text-figs. 3A-8, 17A, 18, 19A-C; Brezinski & Stitt, 1982, pl. 1, figs. 1-8, table 1, text-figs. 1-3; Kues, 1982, p. 239-243, figs. 1-9.
Ditomopyge parvulus Wanless, 1958, table 3, p. 46; Branson, 1965, p. 27, 28, figs. 1A, B.
Ditomopyge ornata Hahn & Hahn, 1970, p. 179, 180; Bucurel & Chamberlain, 1977, p. 405-410, text-figs. 1-3; Brezinski & Stitt, 1982, p. 1242-1248, text-figs. 1-3.

Cephalon of moderate relief and vaulting. Glabella pyri-form and moderately to highly inflated. Frontal glabellar lobe descending steeply anteriorly to anterior margin, but poorly defined border may be evident on smaller holaspid or meraspid individuals. Maximum convexity of frontal glabellar lobe in longitudinal profile located in a line between points of β . Glabella 0.75 the total cranial length, covered with fine granular ornament which becomes coarser posteriorly. Posterior end of glabella nearly flat in longitudinal profile and of same height as medial preoccipital lobe.

Medial preoccipital lobe subrectangular in outline, separated from glabella by shallow, broad preoccipital furrow. Medial lobe covered by small granules which are coarser laterally. Lateral preoccipital lobes subtriangular in outline, rounded posteriorly. Lateral preoccipital furrow narrow, moderately deep, widening anterolaterally. Dorsal furrow moderately deep between eyes, shallowing to the posterior and anterior. Palpebral lobes crescentic in outline, gently sloping into dorsal furrow. Occipital furrow moderately sinuous, deep, and of medium width. Occipital ring wide, convex, gently downsloping into occipital furrow, ornamented with a row of small granules along posterior margin. Facial sutures moderately divergent from γ to β , acutely rounded at β . Eyes hemispherical and medium size. Ocular platform flat and narrow. Lateral border furrow sharply concave, border well defined, sharply rounded at apex, becoming more prominent posteriorly and laterally from β , shallowing anteriorly. Border furrow extending well onto genal spine. Genal spines narrow, extending to fourth or fifth thoracic segment.

Thorax composed of nine nonuniform segments. Axial rings semicircular in transverse profile, exhibiting seven small granules along posterior crest. Pleural areas flat adjacent to dorsal furrow, sharply convex at fulcrum, descending steeply (approximately 60 degrees) to rounded pleural tips. Posterior edge of each pleura ornamented with three to four granules.

Pygidium semicircular to parabolic in outline, exhibiting moderate vaulting and relief. Axis 0.83 to 0.86 the total pygidial length and 0.40 to 0.43 the maximum pygidial (anterior) width, composed of 10 to 13 rings which are subtrapezoidal in transverse profile, and ornamented with six to seven granules along posterior edge. Interrring furrows narrow and deep. Pleural areas composed of 7 to 10 ribs which are inclined out of dorsal furrow and sharply geniculate at fulcrum, descending steeply to border flange. Border of moderate width, inclined toward margin at a shallower angle than distal portion of ribs, narrower at anterior termination than to posterior. Margin rounded to double.

Discussion.—Pabian and Fagerstrom (1972) and Brezinski and Stitt (1982) have statistically shown that a number of North American trilobite species assigned to the genus *Ditomopyge* are in fact a single species, *D. scitula* (Meek & Worthen), which apparently was quite flexible morphologically. These species include *D. parvula* (Girty), *D. lansingensis* Newell, *D. olsoni* (Williams), *D. ornata* (Vodges), and *D. conwayensis* (Wheeler).

Ditomopyge scitula is the most common Pennsylvanian trilobite in Allegheny and Conemaugh strata of Ohio in addition to being the longest ranging of the Pennsylvanian species (Lower Mercer through Portersville). This species is much rarer in Pottsville marine strata than it is in either Allegheny or Conemaugh strata.

Ditomopyge scitula can be distinguished by the strongly geniculate pleural ribs on the pygidium as well as the subtrapezoidal transverse profile of the pygidial axis. Cranial characters of *D. scitula* are essentially identical to *D. decurtata* (Gheyselink) except that the longitudinal profile of the medial preoccipital lobe of *D. scitula* is the same elevation as the posterior portion of the glabella, whereas the medial preoccipital lobe of *D. decurtata* is lower in elevation than the portion of the glabella which is directly in front of it. Additionally, *D. decurtata* consistently exhibits a faint anterior border.

Occurrence.—Very rare in the Lower and Upper Mercer units, rare in the Putnam Hill, Zaleski, Vanport, Columbiana, Washingtonville, Brush Creek, Cambridge, and Portersville units.

Repository.—Hypotypes, OSU 29170, 29176, 29178.

Ditomopyge decurtata (Gheyselinck)
Pl. 2, figs. 9, 13-15

Phillipsia (*Neophillipsia*) *decurtata* Gheyselinck, 1937, p. 56, fig. 14b.

Ditomopyge decurtata J. M. Weller, 1944, p. 320, 321, pl. 49, figs. 3a, b; Shimer & Shrock, 1944, p. 645, pl. 275, figs. 1, 2; Mudge & Yochelson, 1962, p. 96, 97, pl. 17, figs. 31-33; Hahn & Hahn, 1970, p. 175; Owens, 1983, p. 26, pl. 4, figs. 1, 2.

Glabella of low relief and vaulting, subpyriform in outline. Frontal glabellar lobe reaching anterior margin on some specimens; on others a poorly developed border is present. Lateral border on fixigenae becoming evident at point of maximum lateral expansion to frontal glabellar lobe. Dorsal furrow shallow but distinct. Posterior portion of glabella ornamented by fine granules. Medial preoccipital lobe subrectangular, almost square, in outline, of lower height than posterior terminus of glabella, and ornamented by fine granules. Preoccipital furrow shallow, moderately broad, but poorly defined. Lateral preoccipital lobes subtriangular in outline, of low elevation in profile, and covered with very fine granular ornamentation. Palpebral lobes crescentic in outline, midline located at intersections of dorsal furrow and preoccipital furrow. Occipital furrow shallow, moderately wide, and straight. Occipital lobe moderately wide (sagittal) and gently downsloping to furrow, ornamented with a row of fine granules along posterior terminus. Anterior facial sutures diverging moderately from γ to β , acutely rounded at β , α and ω about the same width.

Eyes hemispherical, ocular platform moderately well developed. Librigenae slightly convex to straight, descending from ocular platform into distinct, sharply concave border furrow. Margin subrounded, descending outward, outer surface covered with fine subparallel terrace lines. Border furrow extending far onto genal spine. Genal spine extending approximately to third thoracic segment.

Thorax composed of nine articulating segments. Axis of nearly same width all along length. Axial rings semicircular in transverse profile, each being of medium width, ornamented along posterior margin with a row of seven to nine small granules. Pleural fields moderately broad and flat proximally, sharply rounded at fulcrum, then descending

steeply to sharply rounded pleural spines. Pleural furrows sharp, well defined.

Pygidial measurements of *Ditomopyge decurtata*

	Pygidial width (mm)	Pygidial length (mm)	Number of ribs	Number of rings
\bar{x} (average)	4.61	3.41	6	10.5
range	3.0-6.0	2.40-4.10	6	10-11
N (number)	8	8	8	8

Pygidium semicircular to subparabolic in outline, of low to moderate vaulting, 0.72 to 0.75 as long as wide. Axis of medium width, composed of 10 to 12 rings, and 0.37 to 0.40 the total pygidial width at anterior end. Axis extending to, but not onto, flangelike border, and 0.81 to 0.84 the total pygidial length. Each ring subtrapezoidal in profile with well-rounded corners. Ornamentation on top of each ring consisting of five to six fine granules. Pleural fields composed of seven to eight ribs which are strongly convex in transverse profile especially at fulcrum, nearly flat at dorsal furrow, and meeting and continuing onto border at nearly a 45-degree angle. Each rib rounded in longitudinal profile. Border flange extending around entire pygidium, narrowest at anterior end, becoming wider posteriorly, rounded at the margin.

Discussion.—*Ditomopyge decurtata* is the most biostratigraphically useful of the Pennsylvanian trilobites from Ohio, inasmuch as it is relatively common and yet stratigraphically restricted to the Ames marine unit. Although some judicious collecting might yet produce *D. decurtata* from younger (e.g., Gaysport or Skelley) units, its abrupt appearance in the Ames and the disappearance of *D. scitula* immediately prior to the Ames marks a significant faunal change in the trilobite fauna of Ohio and of North America.

Ditomopyge decurtata can be distinguished from *D. scitula* by the more subrounded transverse profile to the axis, lack of geniculation to the pleural ribs of the pygidium, lack of strong anterior inflation to the glabella, and the more subdued (i.e., lower in elevation) medial preoccipital lobe on the cranium of the latter (figs. 4D, H, M, R versus figs. 4C, G, L, Q).

Occurrence.—Rare in the Ames unit.

Repository.—Hypotypes, OSU 29177, CMNH 34604.

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APPENDIX.—COLLECTING LOCALITIES

Specimens providing the basis for this report come from 12 stratigraphic units at 83 localities listed below in Athens, Belmont, Carroll, Columbiana, Coshocton, Gallia, Guernsey, Harrison, Hocking, Jackson, Jefferson, Lawrence, Licking, Mahoning, Morgan, Muskingum, Noble, Perry, Scioto, Stark, Tuscarawas, and Vinton Counties, Ohio, and Brooke County, West Virginia (see fig. 1). The localities are listed in numerical order under the respective counties and civil townships, which are arranged alphabetically according to county and township names. The capitalized first letter(s) of the locality designation indicates the county, the small letter(s) the civil township, and the number following is our file number for that particular locality in the township. Exposures are located by sections or fractions thereof, by reference to various natural or cultural features, and/or by reference to elevation numbers on pertinent 1:24,000 topographic maps, which are indicated in capital letters. This information is followed by the name of the stratigraphic unit(s) and, in parentheses, the number of collections made at the described locality, where known; the Ohio Division of Geological Survey (OGS) file number(s) of the stratigraphic section(s) at or near the locality; and the names of identified genera and species, with absolute abundances of that species recovered indicated in parentheses. It should be noted that most of the deep and strip mines are no longer active.

ATHENS COUNTY:

Athens Township:

- Aa-41. Exposure at cliff on east side of Ohio Rte. 56, 0.4 mile (0.64 km) south of junction of Ohio Rtes. 56 and 682, THE PLAINS. Brush Creek (numerous). OGS 12158. *Ditomopyge scitula* (32), *Ameura missouriensis* (17).
- Aa-53. Exposure on southeast and south sides of Ohio Rte. 56, 0.75 mile (1.2 km) south of junction of Ohio Rtes. 56 and 682, THE PLAINS. Brush Creek. *Ditomopyge scitula* (1).
- Aa-63. Exposure on northeast side of U.S. Rte. 33 bypass just southeast of junction with Ohio Rte. 550, ATHENS. Cambridge. *Ameura missouriensis* (1), *Ditomopyge scitula* (1).
- Aa-68. Undescribed locality at Athens, location uncertain, ATHENS. Brush Creek. *Ditomopyge scitula* (1).

Lee Township:

- Ale-4. Exposure along creek and Athens County Rd. 80, E½SE¼ sec. 5, THE PLAINS. Brush Creek. OGS 11545. *Ditomopyge scitula* (1).
- Ale-19. Exposure in Diamond Stone Quarries, Inc., Plant No. 1 on east side of Athens County Rd. 71, NE¼ sec. 7, ALBANY. Brush Creek. *Ameura missouriensis* (1).

Waterloo Township:

- Aw-47. Cut along abandoned B & O RR at New Marshfield, SW¼SE¼NW¼ sec. 9 (not numbered on topographic map), THE PLAINS. Brush Creek. *Ditomopyge scitula* (4).
- Aw-49. Exposure along Waterloo Twp. Rd. 27 just west of road junction at elevation 699 on 1961 The Plains topographic map, ctr. sec. 2, THE PLAINS. Brush Creek (1). OGS 7619. *Ditomopyge scitula* (1).
- Aw-55. Exposure in NW¼SE¼ sec. 2, THE PLAINS (this location is probably the same as Aw-49). Brush Creek. *Ditomopyge scitula* (2).
- Aw-57. Exposure on northwest side of Fox Lake, NW¼ NE¼NE¼ sec. 1, THE PLAINS. Brush Creek. *Ameura missouriensis* (1).

BELMONT COUNTY:

Flushing Township:

- Bf-1. Exposure 0.5 mile (0.8 km) northwest of Ohio Rte. 331 bridge over Boggs Fork northwest of Holloway, NW¼ sec. 9, PIEDMONT. Ames (1). *Ditomopyge decurtata* (1).

CARROLL COUNTY:

Center Township:

- Cac-3. Undescribed locality near Carrollton, location uncertain, CARROLLTON. Ames (1). *Ditomopyge decurtata* (7).

Rose Township:

- Car-2. Exposures in strip mines of James Bros. Coal Co. south of Huff Run in secs. 25, 26, 27, 32, and 33, MINERAL CITY. Columbiana and Washingtonville.

OGS 15098. Washingtonville: *Ditomopyge scitula* (6).

COLUMBIANA COUNTY:

Perry Township:

- Cp-3. Exposures at abandoned Brookwood Mine and along Brookwood Hollow between U.S. Rte. 62 on the west and Perry Twp. Rd. 766 (Egypt Rd.) on the east, S½NW¼ sec. 29, SALEM. Columbiana (1). OGS 3778. *Ditomopyge scitula* (14).

St. Clair Township:

- Csc-2. Exposure along Longs Run, NW¼ sec. 10, EAST LIVERPOOL NORTH. Vanport (1). OGS 2039. *Ditomopyge scitula* (2).

Washington Township:

- Cw-2. Undescribed exposure at Salineville, location uncertain, SALINEVILLE. Cambridge (1). *Ditomopyge scitula* (1), *Ameura missouriensis* (1).

COSHOCTON COUNTY:

Jackson Township:

- CSj-1. Abandoned borrow pit approx. 200 ft (65 m) west of Ohio Rtes. 16 and 83 and 0.5 mile (0.8 km) south of junction with Ohio Rte. 541, RANDLE. Upper Mercer (1). *Sevillia trinucleata* (2).

Virginia Township:

- CSV-4. Prospect pits and road exposures along Mill Fork in vicinity of Simco-Peabody Coal Co. tippel and end of Nickel Plate RR spur, S½ sec. 3, N½ sec. 8, and NW¼ sec. 9, CONESVILLE. Columbiana, Putnam Hill, Vanport, and Washingtonville. Columbiana: *Ditomopyge scitula* (3).

GALLIA COUNTY:

Harrison Township:

- GAh-1. Exposure on west side of Harrison Twp. Rd. 3 (Smoky Row Rd.) at junction with Rice Rd. and Fox Branch, NW¼NE¼SE¼ sec. 30, RODNEY. Cambridge (1). *Ditomopyge scitula* (3).

GUERNSEY COUNTY:

Adams Township:

- Ga-1. Abandoned quarry on north side of driveway extending east from Adams Twp. Rd. 11, S-ctr. sec. 25, BLOOMFIELD. Cambridge and Portersville. Cambridge: *Ameura missouriensis* (1); Portersville: *Ditomopyge scitula* (3).

Cambridge Township:

- Gca-4. Exposure at southeast corner of I-70/I-77 interchange, BYESVILLE. Cambridge (1). *Ameura missouriensis* (4).

Jackson Township:

- Gja-2. Exposure on west side of I-77 at milepost 40, 1.8 miles (2.9 km) south of Byesville (Ohio Rte. 209) exit, just north of rest area on east (northbound) side, w. ctr. sec. 3 (not numbered on topographic

- map), BYESVILLE. Brush Creek, Cambridge, and Portersville. OGS 15936. Portersville (2): *Ditomopyge scitula* (3).
- Oxford Township:
Go-1. Exposure in road cut on south side of I-70 east of junction with Ohio Rte. 513, NW¼ sec. 25, ANTRIM. Ames (1). *Ditomopyge decurtata* (1).
- Spencer Township:
Gs-1. Exposure along Spencer Twp. Rd. 322 northwest of junction with Guernsey County Rd. 211 at elevation 835 on 1961 Caldwell North topographic map, SW¼SE¼ sec. 25, CALDWELL NORTH. Portersville (numerous). *Ditomopyge scitula* (19).
- Westland Township:
Gwe-1. Abandoned John Gress & Sons quarry (later Ace Landfill) approximately 0.3 mile (0.5 km) north of U.S. Rte. 40 and 0.25 mile (0.4 km) east of New Concord, NEW CONCORD. Cambridge and Portersville. Cambridge (1); *Ameura missouriensis* (3); Portersville (2): *Ditomopyge scitula* (12).
- Wills Township:
Gwi-4. Exposure along north side of I-70 0.2 mile (0.3 km) east of rest stop, SE¼NW¼NE¼ sec. 14, OLD WASHINGTON. Ames (1). *Ditomopyge decurtata* (1).
- Undescribed locality:
Guc-1. Undescribed exposure, location uncertain. Ames (1). *Ditomopyge decurtata* (1).
- HARRISON COUNTY:
German Township:
HAg-2. Undescribed locality near Germano, location uncertain, AMSTERDAM. Ames (1). *Ditomopyge decurtata*.
- HOCKING COUNTY:
Falls Gore Township:
Hfg-5. Abandoned strip mines of Hocking Valley Brick Co. south of Falls Gore Twp. Rd. 363 (Aurand Rd.), SE¼ sec. 31, GORE. Lower Mercer (numerous). OGS 7070. *Sevillia sevilensis* (1), *Ameura missouriensis* (1).
- Starr Township:
Hs-3. Slump behind Hocking County Garage 0.5 mile (0.8 km) south of Union Furnace Post Office, NW¼SW¼ sec. 23, UNION FURNACE. Lower Mercer (1). OGS 12876. *Sevillia sevilensis* (2).
- Hs-7. Exposure along east side of Hocking County Rd. 26 (Laurel Run Rd.), just south of bridge over Hocking River at elevation 699 on 1961 Union Furnace topographic map, NE¼NE¼NW¼ sec. 11, UNION FURNACE. Lower Mercer and Dorr Run. OGS 9297. Lower Mercer (1): *Sevillia trinucleata* (1).
- JACKSON COUNTY:
Hamilton Township:
Jh-3. Exposure along Jackson County Rd. 18 (Jackson Furnace Rd.) in vicinity of BM 691 just east of Tattle Creek (labelled Jackson Furnace Creek on 1961 South Webster topographic map), SE¼NE¼ and NE¼SE¼ sec. 34 (Morningstar's locality 6), SOUTH WEBSTER. Sharon. *Sevillia trinucleata*.
- Milton Township:
Jmi-2. Exposure on north side of Jackson County Rd. 58 (Buckeye Furnace Rd.) along Buffer Run, SW¼ SE¼ sec. 24, MULGA. Vanport (1). *Ditomopyge scitula* (16).
- Washington Township:
Jw-1. Exposure 0.25 mile (0.4 km) south of the Town House (not labelled on topographic map), NW¼ sec. 22 (Morningstar's locality 87), HAMDEN. Zaleski. *Sevillia trinucleata* (2), *Ameura missouriensis* (1), *Ditomopyge scitula* (1).
- JEFFERSON COUNTY:
Island Creek Township:
JEic-3. Exposure along west side of Ohio Rte. 7 approx. 2 miles (3.2 km) north of junction of Ohio Rte. 7 and U.S. Rte. 22, E¼SW¼ sec. 32, KNOXVILLE. Brush Creek, Cambridge, and Portersville. Brush Creek (1): *Ditomopyge scitula* (2).
- Wayne Township:
JEwa-1. Exposure on north side of Pennsylvania RR (now Conrail) east of junction with Jefferson County Rd. 36 (Seminary Rd.) at elevation 985 on 1960 Smithfield topographic map, approximately 1.5 miles (2.4 km) north of Bloomingdale, SE¼ sec. 24, SMITHFIELD. Ames (1). *Ditomopyge decurtata* (2).
- LAWRENCE COUNTY:
Aid Township:
La-1. Abandoned strip mine of Belville Mining Co., Inc., along Coffee and Tea Creek, N½ sec. 2, WATERLOO. Cambridge (1). OGS 14644. *Ameura missouriensis* (7).
- La-2. Undescribed locality in abandoned strip mine of Belville Mining Co., Inc., sec. 5, location uncertain, SHERRITTS. Cambridge. *Ameura missouriensis* (4).
- Symmes Township:
Ls-1. Abandoned strip mines of Belville Mining Co., Inc., on south side of Johns Creek, sec. 35, SHERRITTS. Cambridge (2). OGS 4706. *Ameura missouriensis* (11), *Ditomopyge scitula* (2).
- LICKING COUNTY:
Franklin Township:
Lifr-1. Exposure along Franklin Twp. Rd. 310, N¼SW¼ sec. 19, GLENFORD. Lower Mercer (1). OGS 6295. *Sevillia trinucleata* (2), *Sevillia sevilensis* (1).
- Lifr-2. Exposure along Licking County Rd. 312 (Flint Ridge Rd.), NE¼SE¼ sec. 11, GLENFORD. Lower Mercer and Vanport (1). OGS 6293. Lower Mercer: *Ditomopyge scitula* (1).
- Hopewell Township:
LIho-1. Abandoned cannel coal mine on west side of Hopewell Twp. Rd. 288 approx. 0.2 mile (0.3 km) north of junction with Licking County Rd. 312 (Flint Ridge Rd.), west of Flint Ridge Park, GLENFORD. Lower Mercer (numerous). OGS 6294. *Sevillia trinucleata* (6), *Ameura missouriensis* (1).
- LIho-4. Exposure along Hopewell Twp. Rd. 288 just south of bridge elevation 1085 on 1961 Glenford topographic map approx. 0.5 mile (0.8 km) north of former Fairview School, GLENFORD. Lower Mercer. OGS 16041. *Sevillia trinucleata* (1), *Ameura missouriensis* (1).
- LIho-5. Exposure along east side of Hopewell Twp. Rd. 291 approx. 0.15 mile (0.25 km) north of junction with Licking County Rd. 312 (Flint Ridge Rd.) approx. 0.1 mile (0.16 km) east of house at BM 1143, ctr. west edge sec. 13, GRATIOT. Lower Mercer. *Sevillia trinucleata* (1).
- LIho-6. Exposure along Limestone Hollow on Glenn Willey Farm on east side of Hopewell Twp. Rd. 288 approx. 0.2 mile (0.3 km) north of bridge elevation 1085 on 1961 Glenford topographic map, GLENFORD. Lower Mercer (numerous). *Sevillia trinucleata* (16).
- LIho-8. Undescribed localities on Flint Ridge, locations uncertain, GLENFORD? Lower Mercer. *Ditomopyge scitula* (1), *Ameura missouriensis* (2).
- Madison Township:
LIIm-1. Float around radio tower on Bald Knob north of Licking County Rd. 301 (Blue Jay Rd.), south of Madison Twp. Rd. 300 and west of Madison Twp. Rd. 313, approx. 2.0 miles (3.2 km) southeast of

Newark (Morningstar's locality 46), HANOVER. Lower Mercer. *Sevillia trinucleata* (7), *Sevillia sevilensis* (2).

MAHONING COUNTY:

Canfield Township:

Mc-6. Undescribed locality (quarry?) near Canfield, location uncertain, CANFIELD. Putnam Hill. *Ditomopyge scitula* (2).

Poland Township:

Mp-1. Abandoned quarry with lake managed by Lowellville Rod and Gun Club east of Quarry Rd. and north of U.S. Rte. 224 southwest of Lowellville, CAMPBELL. Vanport (1). OGS 5014. *Ditomopyge scitula* (1).

Mp-3. Exposures along Furnace (Grindstone) Run (type locality of Lowellville unit), south of Lowellville and Mahoning River and east of Kennedy Rd., CAMPBELL. Lowellville (Poverty Run), Lower and Upper Mercer (4). Upper Mercer: *Ditomopyge scitula* (1).

MORGAN COUNTY:

Bloom Township:

MOB-3. Exposure along Morgan County Rd. 9, 0.5 mile (0.8 km) northwest of Durant, SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 24, PHILO. Portersville (1). *Ditomopyge scitula* (2).

Deerfield Township:

MOd-1. Exposure at junction of Morgan County Rd. 74 and Deerfield Twp. Rd. 269 and southeast and west along roads on south side of Island Run, NW $\frac{1}{4}$ sec. 2, ROKEBY LOCK. Brush Creek (1). OGS 7837. *Ameura missouriensis* (1).

York Township:

MOy-1. Undescribed exposure, SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 35. DEAVER-TOWN. Portersville (1). *Ditomopyge scitula* (1).

MUSKINGUM COUNTY:

Cass Township:

MUC-1. Exposure along Muskingum County Rd. 48 (Shannon Rd.) approx. 3.0 miles (4.8 km) southeast of Frazeyburg (Morningstar's locality 43), DRESDEN. Lower Mercer. *Sevillia trinucleata* (2), *Ameura missouriensis* (1).

MUC-3. Exposure on The Highlands along Cass Twp. Rd. 77 approx. 0.5 mile (0.8 km) northeast of elevation 1010 on 1962 Dresden topographic map, DRESDEN. Lower Mercer. *Ditomopyge scitula* (1).

MUC-5. Exposure in ravine on south side of tributary to Big Run southwest of farm buildings and elevation 826 on 1962 Dresden topographic map, sec. 3, DRESDEN. Lower Mercer (2). *Sevillia trinucleata* (2).

Falls Township:

MUF-3. Exposure along Ohio Rte. 146 approx. 0.4 mile (0.64 km) northwest of Bartlett Run, ZANESVILLE WEST. Lower Mercer (1). *Sevillia sevilensis* (1).

Hopewell Township:

MUHo-16. Exposure at right-angle bend in Hopewell Twp. Rd. 284 south of road junction at elevation 1038 on 1962 Gratiot topographic map, E ctr. sec. 3, GRATIOT. Columbiana or Vanport, probably Vanport (1). *Ditomopyge scitula* (1).

Jackson Township:

MUj-2. Exposure on Muskingum County Rd. 38 (Hamby Hill Rd.) 0.5 mile (0.8 km) southeast of former Fairview (Jackson) School and approx. 3 miles (4.8 km) northwest of Frazeyburg, SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 7 (Morningstar's locality 45), PERRYTON. Lower Mercer. *Sevillia trinucleata* (1).

Madison Township:

MUma-5. Exposure along tributary on east side of North Branch of Symmes Creek approx. 0.6 mile (0.95 km) north of crossroads at Symmes Ford, ADAMS-VILLE. Upper Mercer (1). *Sevillia trinucleata* (1).

Union Township:

MUu-2. Exposure along tributary to Crooked Creek west of former Richard Rice (later Tony Fazekas) farm buildings on Muskingum County Rd. 65 approx. 1.5 miles (2.4 km) south of New Concord (Condit's locality 43), NEW CONCORD. Ames (1). *Ditomopyge decurtata* (1).

Washington Township:

MUWa-1. Exposure in channel of Blount Run approx. 1.0 mile (1.6 km) east of Gilbert and above abandoned road bridge (Morningstar's locality 37), ADAMS-VILLE. Lower Mercer and Putnam Hill (1). OGS 620. Putnam Hill: *Ditomopyge scitula* (1).

MUWa-2. Undescribed exposure, location uncertain. Lower Mercer (1). *Ditomopyge scitula* (1).

NOBLE COUNTY:

Noble Township:

Nn-1. Exposure on west side of small creek behind Belle Valley School, SE $\frac{1}{4}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 20, CALDWELL NORTH. Portersville (1). OGS 12896. *Ditomopyge scitula* (3).

PERRY COUNTY:

Monday Creek Township:

Pmc-4. Strip mine of Logan Clay Products Co., ctr. sec. 19, GORE. Putnam Hill (1). *Ditomopyge scitula* (1).

Reading Township:

Pr-3. Exposure in abandoned B & O RR cut south of Somerset, NW $\frac{1}{4}$ sec. 10, SOMERSET. Lower Mercer (1). OGS 8427. *Sevillia trinucleata* (1).

Pr-5. Exposure in road cut along Ohio Rte. 668, NW $\frac{1}{4}$ sec. 22, SOMERSET. Lower Mercer (1). *Sevillia trinucleata* (3).

SCIOTO COUNTY:

Porter Township:

SCP-2. Exposure near mouth of Sugar (now Sugar Camp) Creek on former Joseph Jenkins farm, SW $\frac{1}{4}$ sec. 14 (Morningstar's locality 2), WHEELERSBURG. Sharon. *Sevillia trinucleata*.

STARK COUNTY:

Lexington Township:

Sle-30. Undescribed locality on West Ely St. in Alliance, location uncertain, ALLIANCE. Vanport (1). *Ditomopyge scitula* (3).

Sandy Township:

Ss-3. Abandoned strip mines of Magnolia Mining Co., NE $\frac{1}{4}$ sec. 4, WAYNESBURG. Washingtonville (numerous). *Ditomopyge scitula* (27), *Ameura missouriensis* (1).

TUSCARAWAS COUNTY:

Dover Township:

Td-3. Strip mine of Kimble Coal and Limestone Co., SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 1, STRASBURG. Putnam Hill (1). *Ditomopyge scitula* (1).

Warren Township:

Tw-2. Abandoned Dutton strip mine in hollow on west side of Tuscarawas County Rd. 90, NW $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 33, MINERAL CITY. Washingtonville (1). *Ditomopyge scitula* (1).

Wayne Township:

Twy-4. Undescribed locality near Dundee, locality uncertain, STRASBURG. Putnam Hill (1). *Ditomopyge scitula* (1).

York Township:

Ty-3. Abandoned strip mine, formerly a borrow pit, of Zoar Mining Co. on east side of I-77 and Stone Creek, NW $\frac{1}{4}$ sec. 17, NEW PHILADELPHIA. Putnam Hill (1). *Ditomopyge scitula* (2).

VINTON COUNTY:

Elk Township:

- Vel-4. Abandoned strip mine on north side of Elk Twp. Rd. 14, NE $\frac{1}{4}$ sec. 15, ZALESKI. Putnam Hill (4). *Ditomopyge scitula* (4).
- Vel-6. Exposures along Elk Twp. Rd. 17, ctr. sec. 17, ALLENSVILLE and ZALESKI. Lower Mercer (1). OGS 153. *Ditomopyge scitula* (1).
- Vel-11. Abandoned strip mine on south side of Elk Twp. Rd. 21, N $\frac{1}{2}$ NE $\frac{1}{4}$ sec. 17, ZALESKI. Putnam Hill (2). OGS 1438. *Sevillia trinucleata* (1).
- Vel-15. Abandoned J. A. Crow strip mine on south side of U.S. Rte. 50, NW $\frac{1}{4}$ sec. 27, MCARTHUR. Putnam Hill (4). OGS 11819. *Ditomopyge scitula* (6).
- Vel-16. Exposure along abandoned road, SW $\frac{1}{4}$ sec. 12, ZALESKI. Zaleski (1). OGS 60. *Sevillia trinucleata* (1), *Ameura missouriensis* (1), *Ditomopyge scitula* (1).
- Vel-28. *la* (1). Abandoned strip mines on southeast side of Elk Twp. Rd. 20, SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 20, HAMDEN. Vanport (1). *Ditomopyge scitula* (1).
- Vel-35. Exposure along Elk Twp. Rd. 14, SE $\frac{1}{4}$ sec. 11 (Morningstar's locality 91), ZALESKI. Zaleski. *Sevillia trinucleata* (2).

Richland Township:

- Vr-2. Abandoned strip mine on opposite sides of U.S. Rte. 50, W $\frac{1}{2}$ sec. 1, ALLENSVILLE. Vanport (1). OGS 187. *Ditomopyge scitula* (5).

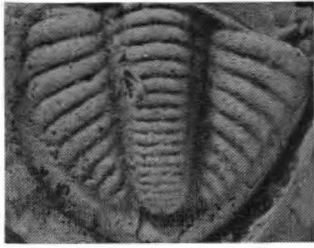
BROOKE COUNTY, WEST VIRGINIA:

Cross Creek Township:

- WVBcc-1. Exposure along opposite sides of N & W RR tracks at east end of Ohio River Bridge, STEUBENVILLE EAST. Ames (5). *Ditomopyge decurtata* (62).

PLATE 1

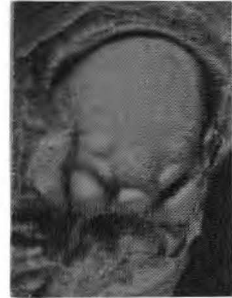
- FIGURES 1-3, 7-9, 12, 14, 15. *Sevillia trinucleata* (Herrick).
- 1-3. Dorsal, posterior, and lateral views of latex cast of external mold of hypotype pygidium, X2.5; Lower Mercer limestone, Pr-5; OSU 29179.
 - 7-9. Dorsal, lateral, and anterior views of partial cranidium collected by Herrick and herein designated as neotype, X2.0; Lower Mercer limestone, Flint Ridge; OSU 28135A.
 - 12. Dorsal view of latex cast of external mold of nearly complete hypotype pygidium, X2.0; Lower Mercer limestone, LIm-1; OSU 29174.
 - 14. Dorsal view of partially exfoliated hypotype pygidium, X1.5; Lower Mercer limestone, LIho-6; OSU 29173.
 - 15. Dorsal view of latex cast of external mold of hypotype pygidium, X2.0; Lower Mercer limestone, Flint Ridge; OSU 28135B.
- 4-6. *Sevillia sevilensis* Weller. Dorsal, lateral, and posterior views of pygidium, X3.0; Lower Mercer limestone, Hs-3; OSU 29172.
- 10, 11, 13. *Ameura missouriensis* (Shumard).
- 10, 11. Dorsal and lateral views of partial pygidium, X2.0; Brush Creek shale, Aa-41; OSU 29175.
 - 13. Dorsal view of crushed cranidium; Cambridge limestone, Ga-1, X1.5; OSU 29180.



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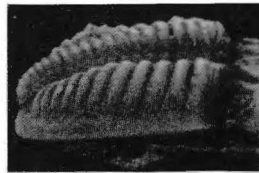
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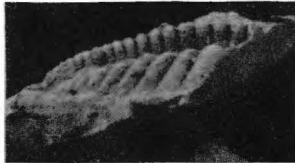
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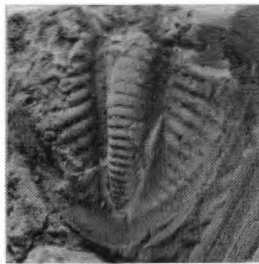
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PLATE 2

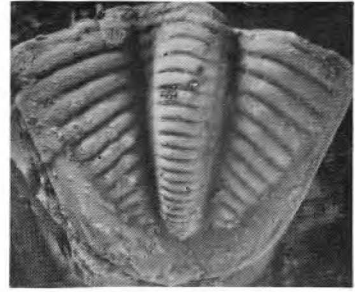
- FIGURES 1-4. *Ameura missouriensis* (Shumard).
- 1, 3. Dorsal and oblique views of partial unexfoliated cephalon, X1.5; Cambridge limestone, La-1; OSU 29169.
 - 2, 4. Posterior and dorsal views of unexfoliated pygidium, X1.5; Brush Creek shale, MOd-1; OSU 29168.
- 5-8, 10-12. *Ditomopyge scitula* (Meek & Worthen).
- 5, 7, 8. Lateral, dorsal, and anterior views of partial unexfoliated cephalon, X3.0; Washingtonville shale, Ss-3; OSU 29170.
 - 6. Dorsal view of incomplete exoskeleton, X3.0; Washingtonville shale, Ss-3; OSU 29178.
 - 10-12. Lateral, dorsal, and posterior views of unexfoliated pygidium, X2.5; Washingtonville shale, Ss-3; OSU 29176.
- 9, 13-15. *Ditomopyge decurtata* (Gheyselinck).
- 9. Dorsal view of epoxy cast of mold of nearly complete exoskeleton, X2.5; Ames limestone, Guc-1; CMNH 34604.
 - 13-15. Dorsal, lateral, and posterior views of unexfoliated pygidium, X3.0; Ames limestone, JEwa-1; OSU 29177.



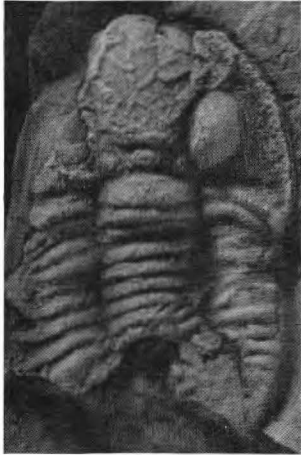
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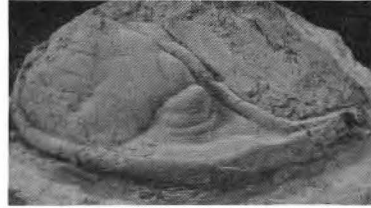
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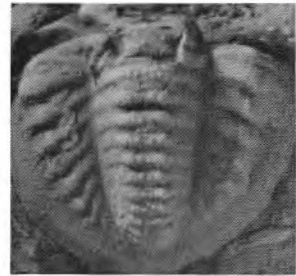
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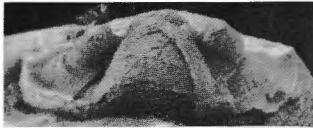
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