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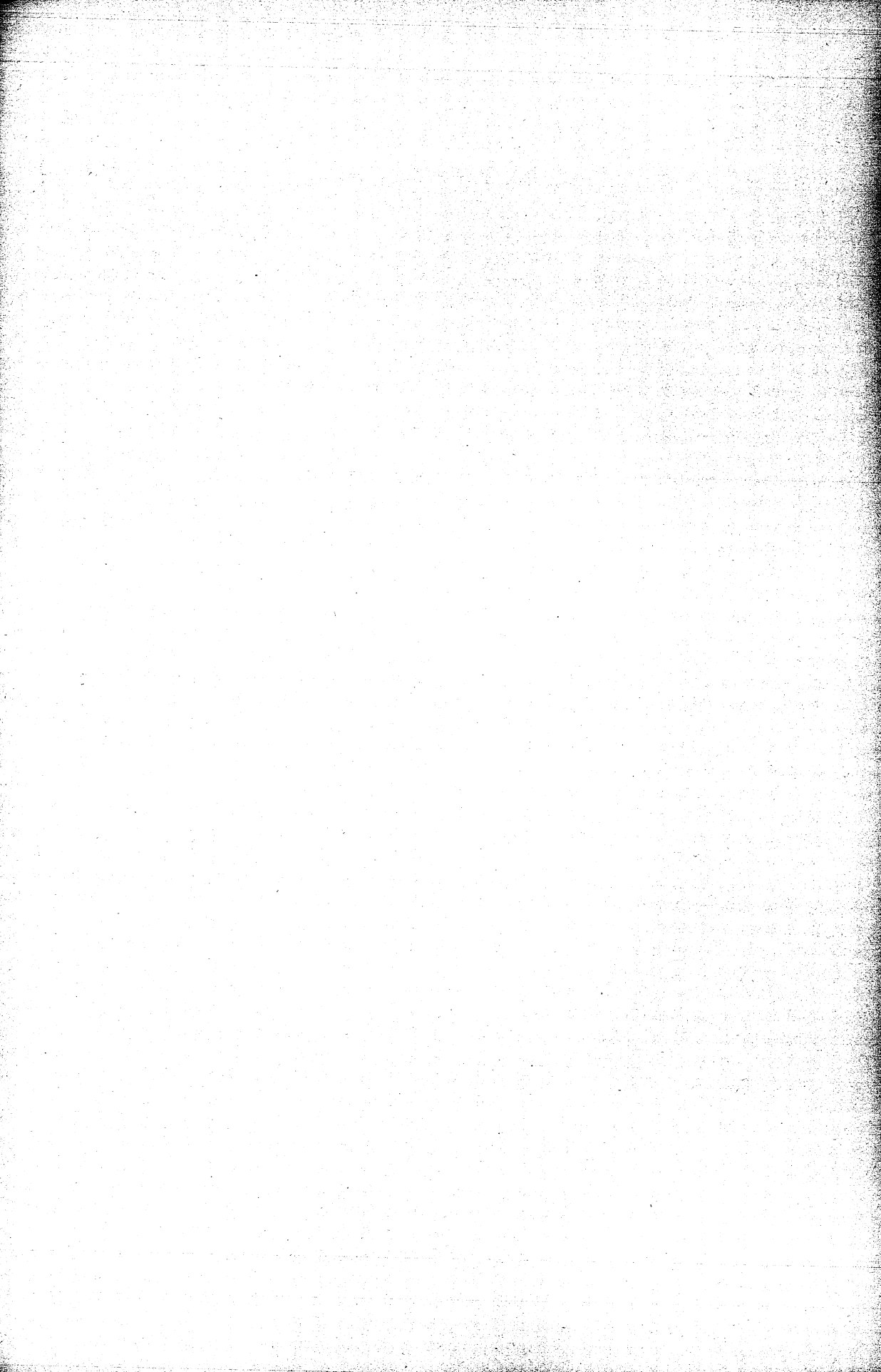
NEW SPECIES OF THE BRACHIOPOD *CYRTINA*
FROM THE MIDDLE DEVONIAN HAMILTON STRATA
OF SOUTHWESTERN ONTARIO

BY

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ABSTRACT -- Brachiopods from the Middle Devonian strata of southwestern Ontario are removed from the over-extended species *Cyrtina hamiltonensis* (Hall), which is based upon specimens from New York state. They are assigned to four new species of *Cyrtina*. *C. angularis*, the largest (attaining over 20 mm in width), is from the Widder Formation, wherein it occurs abundantly in Unit 11 (the "*Cyrtina* bed" at the Widder locality); it is characterized by a deep subangular sulcus with a median depression and a fold with at most only a shallow depression. *C. southworthi*, a small species from the lower part of Unit 14 of the Widder Formation, has very fine spinules on its surface and no median depression in either the fold or the low and broad sulcus. *C. coultisorum*, a small *Cyrtina* from the Hungry Hollow Formation, differs from *C. southworthi* in having a prominent high fold, conspicuous growth lamellae, and coarse spinules. *C. arkonensis*, a medium-size species from the Arkona Shale at various localities, is distinguished from *C. angularis* by its shallow rounded sulcus and more numerous costae. The four species of this brachiopod genus are so distinctive that they can readily be used in stratigraphic work.

INTRODUCTION

ONE OF THE MOST PERSISTENT invertebrates in the widespread Middle Devonian Hamilton seas was the genus *Cyrtina*. This brachiopod flourished throughout the long period of time required for the slow deposition of approximately one hundred feet of sediment in what is now southwestern Ontario.

The shales and limestones formed there in that interval have been divided into four formations, in ascending order, the Arkona Shale, Hungry Hollow Formation, Widder Formation, and Ipperwash Limestone. Specimens of *Cyrtina* occurring in those formations differ so much from each other that a collector familiar with the area can readily tell in which bed the fossil was found. Ontario specimens from the lower three formations have been mentioned in geological literature by many writers, always as *Cyrtina hamiltonensis* (Hall).

James Hall himself (1867) included in this species not only the specimens he had found in "the Hamilton shales of Canada West" but those from New York State, Iowa, Ohio, and Maryland -- fossils from the Schoharie Sandstone, Onondaga Limestone, Cedar Valley Limestone, and Chemung

Group as well as from the Hamilton. His original description of *Cyrtia hamiltonensis* (1857), however, applied to New York brachiopods from "the shales of the Hamilton group: Shores of Seneca lake, Moscow, York, Darien, and Eighteen-mile creek."

Hall's types of *Cyrtina* are on deposit in the American Museum of Natural History, New York, the type specimen of his *hamiltonensis* not indicated. In 1963, after studying these types, the senior author designated as lectotype of *Cyrtina hamiltonensis* the first specimen of the species illustrated by Hall in 1857, a fossil found at Moscow (now Leicester), New York, probably from the Moscow Formation.

Study of the specimens of *Cyrtina* found in southwestern Ontario show five distinct species in the Thedford-Arkona-Ipperwash region: one each in the Arkona Shale, Hungry Hollow Formation, and Ipperwash, and two in the Widder Formation, which has a thickness of more than forty-five feet. None of them is *Cyrtina hamiltonensis* (Hall).

Cyrtina staufferi Wright & Wright, occurring in the Ipperwash Limestone, was described in a paper on that formation published in 1963. Descriptions of the four new species of *Cyrtina* from the three lower beds are here presented. All specimens are catalogued and deposited in the Museum of Paleontology, The University of Michigan.

The authors are deeply grateful to Dr. Robert V. Kesling, Director of that Museum, and to Dr. G. Arthur Cooper, Paleobiologist Emeritus, National Museum of Natural History, Smithsonian Institution, without whose help this paper would never have reached completion. They thank Karl Kutasi for his assistance in photography.

EXPLANATION OF PLATE 1

All figures x 3

FIGS. 1-13 -- *Cyrtina angularis* sp. nov. 1-5, holotype UMMP 61509, posterior, dorsal, anterior, lateral, and ventral views; Widder Formation, Paisley's quarry. 6, 7, paratypes UMMP 61512 and 61515, inclined ventral views showing attached *Hederella thedfordensis* Bassler; Widder Formation, Hungry Hollow, collected by Charles Southworth. 8-12, paratype UMMP 61513, posterior, dorsal, anterior, posterior, and lateral views; Widder Formation, Paisley's quarry. 13, paratype UMMP 61510, dorsal view; Widder Formation, Hungry Hollow, collected by Charles Southworth.

FIGS. 14-21 -- *Cyrtina coultisorum* sp. nov. 14-17, holotype UMMP 61523, posterior, dorsal, anterior, and ventral views; Hungry Hollow Formation, tile yard. 18-21, paratype UMMP 61531, posterior, dorsal, anterior, and posterior views; Hungry Hollow Formation, Hungry Hollow.

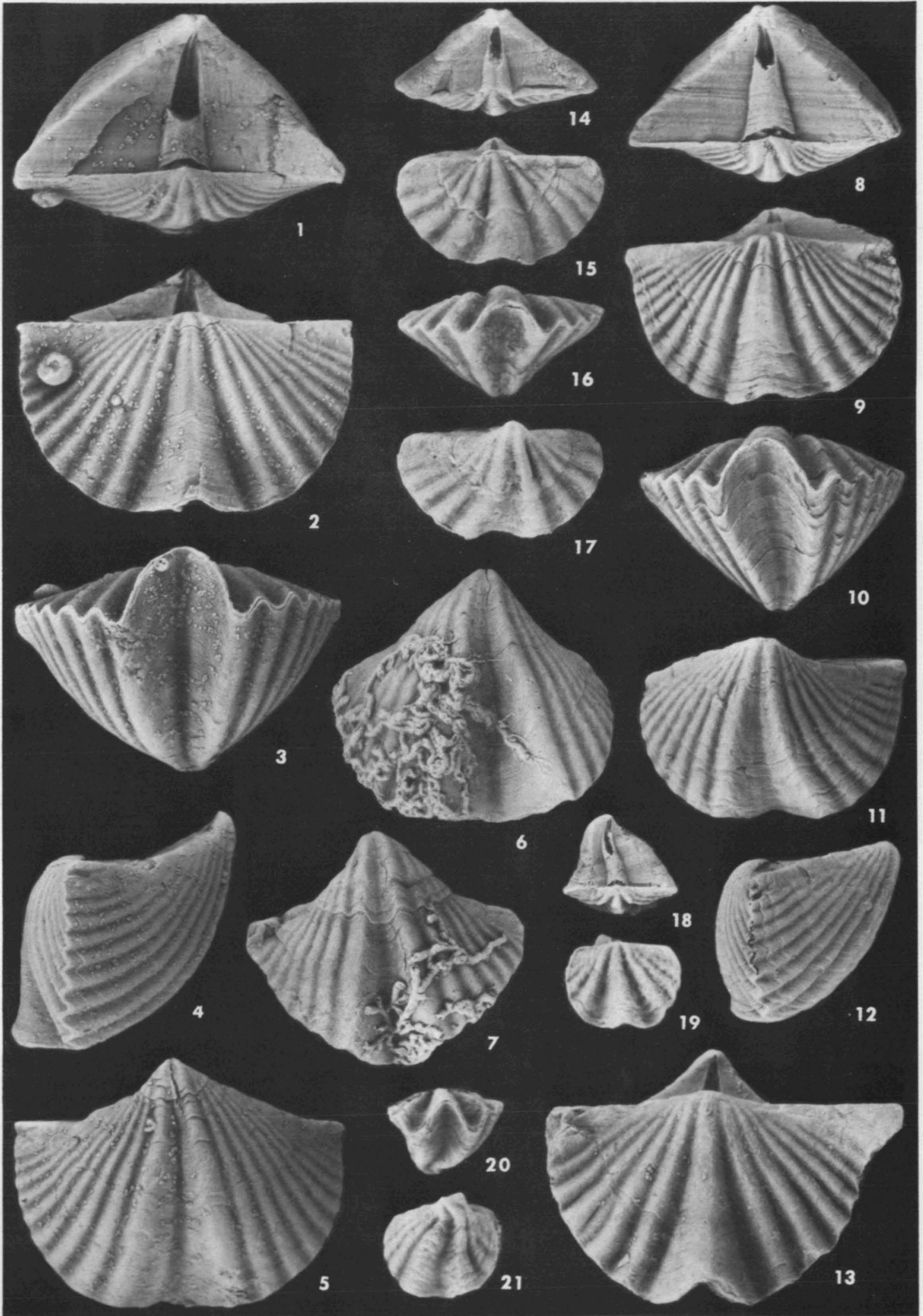


PLATE 1

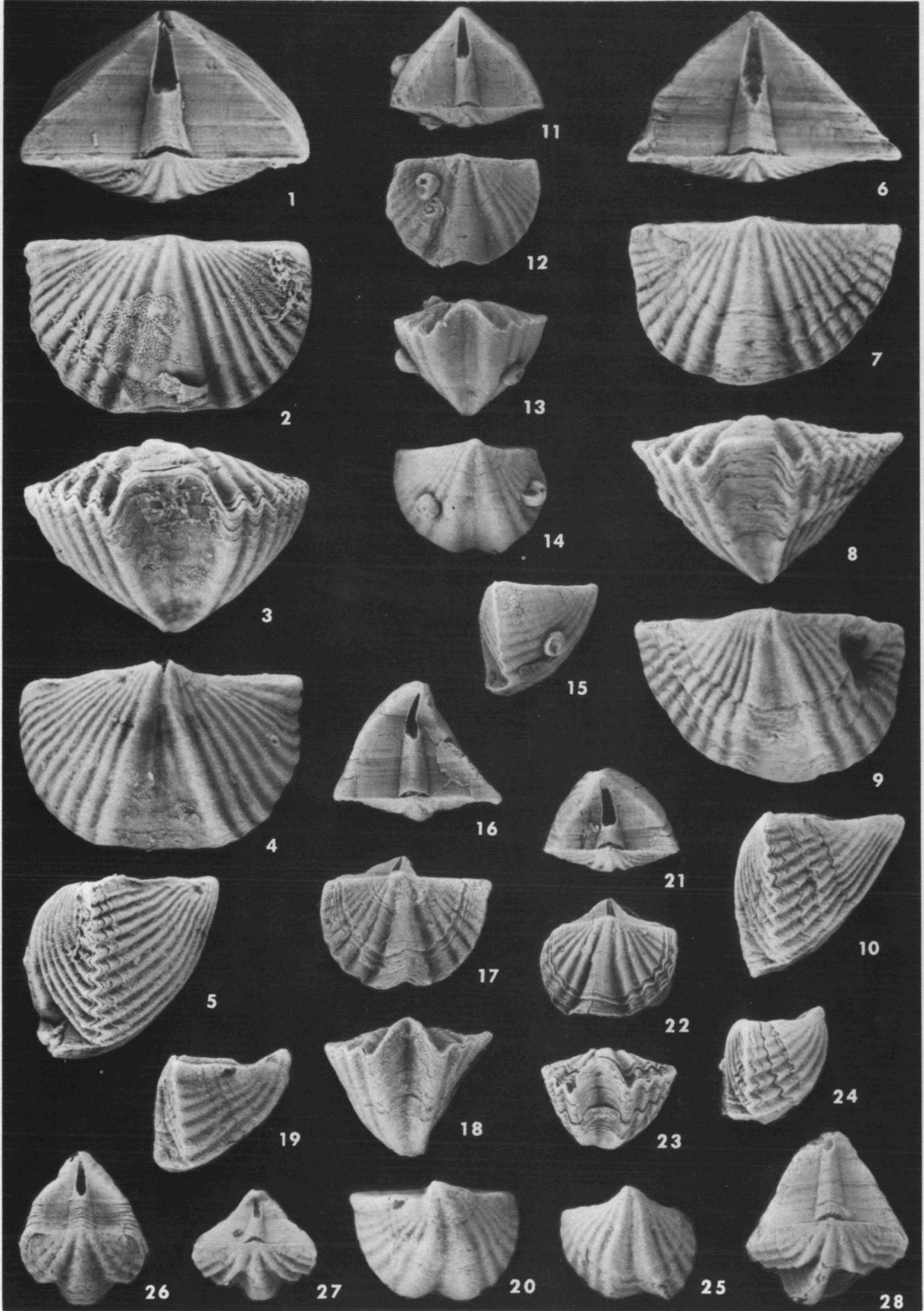


PLATE 2

LIST OF LOCALITIES

LOCALITY

1. "*Cyrtina* bed" -- a small depression in the land, about 1 mile southeast of Thedford, Ontario, on west side of Highway 82.
2. "Paisley's quarry" -- now a small outcrop in field between Highway 82 and unpaved diagonal road, about 3 miles north and about $1\frac{1}{2}$ miles west of Thedford, Ontario.
3. Hungry Hollow -- banks of the Ausable River, about 2 miles east and about $\frac{1}{4}$ mile north of Arkona, Ontario.
4. "Jim Bell's quarry" -- now a lumberyard, on west side of the Ridge Road just north of 21 Sideroad, about $\frac{1}{2}$ mile north and about $\frac{3}{4}$ mile east of Thedford, Ontario.
5. "Fraser's farm" -- formerly the property of the late Robert Fraser, having rock exposure on north side of the Ausable River, about 2 $\frac{3}{4}$ miles northeast of Arkona, Ontario.
6. "Crinoid hill" -- small outcrop of Arkona Shale on south side of Ausable River, a short distance downstream from Fraser's farm.
7. Tile yard -- about 1 mile north of center of Thedford, Ontario, and about $\frac{1}{8}$ mile east of road leading north from Thedford.
8. Rock Glen -- about $\frac{3}{4}$ mile east and about $\frac{3}{4}$ mile north of the center of Arkona, Ontario.

SYSTEMATIC DESCRIPTIONS

Phylum BRACHIOPODA

Class ARTICULATA

EXPLANATION OF PLATE 2

All figures x 3

FIGS. 1-10 -- *Cyrtina arkonensis* sp. nov. 1-5, paratype UMMP 31281, posterior, dorsal, anterior, ventral, and lateral views; Arkona Shale, Fraser's farm. 6-10, paratype UMMP 31280, posterior, dorsal, anterior, ventral, and lateral views; Arkona Shale.

FIGS. 11-25 -- *Cyrtina southworthi* sp. nov. 11-15, holotype UMMP 61516, posterior, dorsal, anterior, ventral, and lateral views; note attached *Spirorbis*; Widder Formation, Jim Bell's quarry, collected by Edward P. and Jean D. Wright. 16-25, paratypes UMMP 61518 and 61517, posterior, dorsal, anterior, lateral, and ventral views; Widder Formation, Jim Bell's quarry, collected by Edward P. and Jean D. Wright.

FIGS. 26-28 -- *Cyrtina coultisorum* sp. nov. Paratypes UMMP 61525, 61527, and 61524, inclined (posterodorsal) views showing interareas; Hungry Hollow Formation, tile yard.

Order SPIRIFERIDA Waagen, 1883
 Suborder SPIRIFERIDINA Waagen, 1883
 Superfamily SUESSIACEA Waagen, 1883
 Family CYRTINIDAE Fredericks, 1912
 Genus CYRTINA Davidson, 1858

Cyrtina Davidson, 1858, p. 66-68; Whidborne, 1893, p. 111-112.

Spinocyrtina Fredericks, 1916, p. 18, and 1926, p. 413 -- type species *Cyrtina hamiltonensis* Hall, 1857, Middle Devonian Hamilton Group, New York.

Type species of *Cyrtina*. -- *Calceola heteroclita* DeFrance, 1828, v. 32, p. 306, pl. 80, figs. 3, 3a, and 3b, by designation of Hall & Clarke, 1894.

CYRTINA ANGULARIS sp. nov.

Pl. 1, figs. 1-13; pl. 4, figs. 1-28

Cyrtina hamiltonensis Hall, 1867, pl. 44, figs. 38-40, 41, 42, ?43, 44, 48, and 49.

Cyrtina hamiltonensis Hall & Clarke, 1894, pl. 28, figs. 23, 24, ?26 (same as pl. 44, fig. 43, Hall, 1867), fig. 27 (same as pl. 44, fig. 39, Hall, 1867), fig. 28 (same as pl. 44, fig. 38, Hall, 1867), fig. ?33 (same as pl. 44, fig. 44, Hall, 1867), figs. 43, 45, 46, and 53.

Description. -- Shell of medium size (larger specimens around 20 mm wide), triangular-subpyramidal; cardinal extremities slightly extended in some specimens. Hinge line straight, greatest width along hinge line. Surface lateral to fold and sulcus marked by 5 or 6 costae, occasionally 7 or 8, in the majority of mature specimens. Costae separated by furrows having about same width as costae. Surfaces of costae, furrows, fold, and sulcus covered with fine spinules. Most growth lamellae inconspicuous.

Pedicle valve with deep subangular sulcus having a median depression which is prominent in most large valves. Beak slightly incurved; some valves with twisted beaks. Interarea wider than high, flat to slightly concave. Interarea indistinctly divided into a wide inner perideltidial area and two narrow outer areas by lines diverging from beak. Delthyrium covered with a convex pseudodeltidium bearing a relatively large oval foramen near apex. Inner and outer areas and pseudodeltidium crossed by very fine horizontal lines of growth; inner area showing also thin vertical ridges. Edge of tichorhinum visible in foramen of some specimens.

Brachial valve subrectangular in outline, very gently convex. Fold rounded and broad, in some shells subangular at anterior commissure; shallow median depression in posterior part. Beak small, scarcely rising above hinge line. Interarea reduced, linear.

Remarks. -- *Cyrtina angularis* is without doubt the *Cyrtina* James Hall had in mind when, in his amended description of *C. hamiltonensis* (1867, p. 269), he said it occurred "abundantly at Widder Station in Canada West"; Widder at that time was a prosperous village about one mile southeast of the present village of Thedford, Ontario. This brachiopod is found today in abun-

Measurements of *Cyrtina angularis* (in mm)

Type	Greatest Width	Length of Brachial Valve	Thickness
Holotype UMMP 61509	18	11	11
Paratype UMMP 61510	19.5	11.5	10.5
Paratype UMMP 61511	21	11	12
Paratype UMMP 61512	17	10	9.5
Paratype UMMP 61513	15	9	10
Paratype UMMP 61514	20	12	12
Paratype UMMP 61515	15	9	10

A growth series of 14 specimens with widths ranging from 4 mm to 20 mm was found at the "*Cyrtina* bed." (See plate 4.)

dance in the Widder shale at that place, one locality being known to collectors as the "*Cyrtina* bed."

Hall stated on the same page: "In some Canadian specimens, the length and width are about 7/8 of an inch." Specimens of *Cyrtina angularis* having a width of 20 to 21 millimeters, equal approximately to 7/8 of an inch, are not uncommon.

Figures 41 and 42 of plate 44 (Hall, 1867) showing "a large individual from the Hamilton shales of Canada West" might well be drawings of *Cyrtina angularis*.

This species differs from the lectotype of *Cyrtina hamiltonensis* in these respects: it is larger, with fewer costae in proportion to the size, has a deep subangular sulcus, and a fold with only a shallow median depression at most.

The deep subangular sulcus of *Cyrtina angularis* readily distinguishes this species from *C. arkonensis* sp. nov., which occurs in the Arkona Shale in the Thedford-Arkona region; the latter has a shallow rounded sulcus and a greater number of costae. *Cyrtina angularis* bears some resemblance to a species of *Cyrtina* found at or near Darien, New York, where as near Thedford, the Ludlowville occurs. However, the deep subangular sulcus of the Ontario specimens again differentiates them from *C. darienensis* Ehlers (1963, p. 200-201, pl. I, figs. 13-24); the latter's sulcus is broad and shallow, its fold wide and low.

Occurrence. -- Middle Devonian Hamilton Group, Unit 11 of the Widder Formation (see Wright & Wright, 1961, p. 295); Thedford-Arkona region of southwestern Ontario. Localities 1, 2, and 3.

Types. -- Holotype UMMP 61509; paratypes UMMP 61510-61515.

CYRTINA SOUTHWORTHII sp. nov.

Pl. 2, figs. 11-25

Description. -- Shell of small size (larger specimens around 9 mm wide), majority of specimens examined being 8 or 9 mm wide; triangular-subpyramidal; cardinal extremities usually a right angle or slightly obtuse, seldom extended. Hinge line straight; greatest width in some specimens about

Measurements of *Cyrtina southworthi* (in mm)

Type	Greatest Width	Length of Brachial Valve	Thickness
Holotype UMMP 61516	8.5	6.5	6.5
Paratype UMMP 61517	8	6	6
Paratype UMMP 61518	9.5	7	7.5
Paratype UMMP 61519	8.5	6.5	6.5
Paratype UMMP 61520	9	6	5.5
Paratype UMMP 61521	8	6	7.5
Paratype UMMP 61522	9	7	7

midway between anterior and posterior extremities of shell, little greater than width along hinge line. Surface of shell lateral to fold and sulcus marked by rounded costae, 4 or 5 on each side of fold in the majority of mature shells. Costae separated by rounded furrows. Surfaces of costae, furrows, fold, and sulcus covered with very fine spinules. Most growth lamellae inconspicuous but a few prominent on some specimens.

Pedicle valve with deep rounded sulcus having no median depression. Beak straight to incurved, sometimes twisted. Interarea in most specimens wider than high, straight to concave. Perideltidial area of interarea not discernible on most specimens; interarea showing thin vertical interrupted ridges. Delthyrium covered with a convex pseudodeltidium bearing a relatively large elongate, oval foramen near apex. Edge of tichorhinum visible in foramen of some specimens.

Brachial valve subrectangular in outline, very gently convex. Fold broad, rounded, with no median depression. Beak small, scarcely rising above hinge line. Interarea linear.

Remarks. -- *Cyrtina southworthi* differs from *C. angularis*, found also in the Widder Formation, by being consistently small and by having no median depression in either the fold or sulcus. In size it most nearly resembles *Cyrtina coultisorum* from the Hungry Hollow Formation, about 28 feet below; its fold, however, is broad and low, not prominently high, and its spinules are very fine, not relatively coarse.

Cyrtina southworthi is named in honor of the late well-known collector, Charles Southworth of Thedford, whose birthplace stands across the road from the former "Jim Bell's quarry" where this small brachiopod was often abundant before the conversion of the place to a lumberyard.

Occurrence. -- Middle Devonian Hamilton Group, lower part of Unit 14 of the Widder Formation (see Wright & Wright, 1961, p. 295), Thedford-

EXPLANATION OF PLATE 3

All figures x 3

Cyrtina arkonensis sp. nov. 1-5, holotype UMMP 31283, posterior, dorsal, anterior, lateral, and ventral views; Arkona Shale, Crinoid hill. 6-20, paratypes 31278, 31277B, and 31277A, posterior, dorsal, anterior, lateral, and ventral views; Arkona Shale, all three from Fraser's farm.

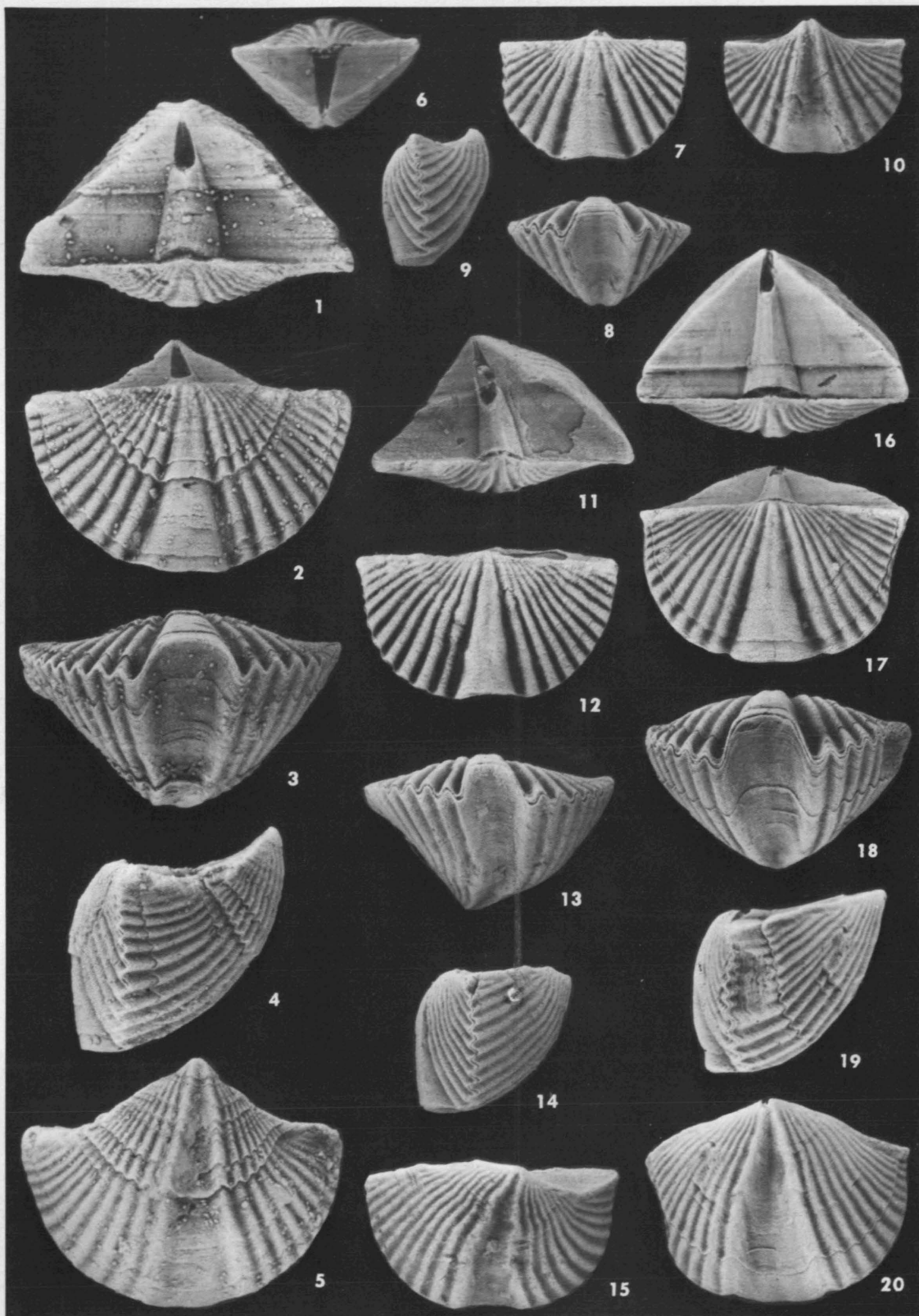


PLATE 3

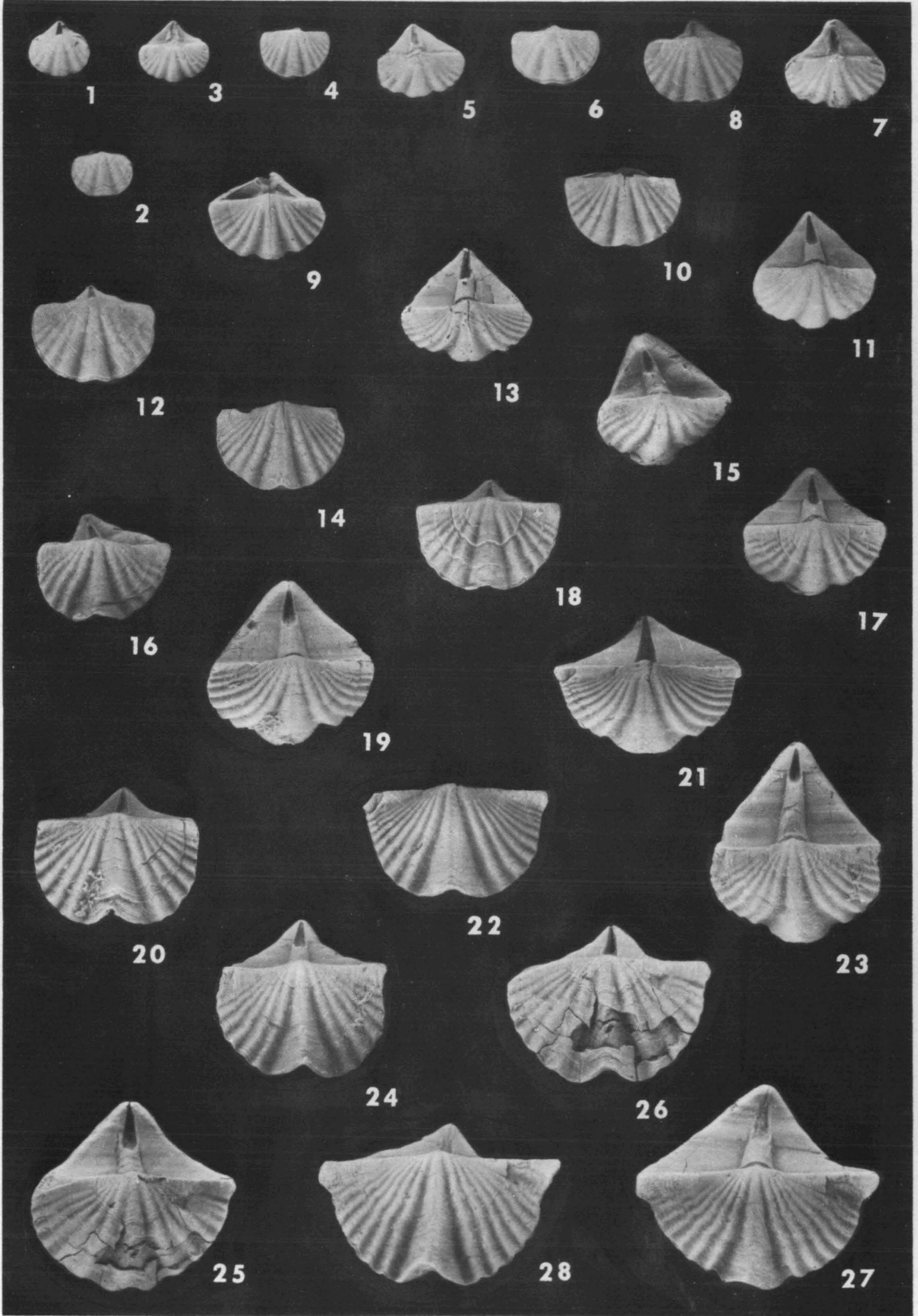


PLATE 4

Measurements of *Cyrtina coultisorum* (in mm)

Type	Greatest Width	Length of Brachial Valve	Thickness
Holotype UMMP 61523	11	6.5	5.5
Paratype UMMP 61524	9	7.5	8
Paratype UMMP 61525	7.5	5	8
Paratype UMMP 61526	6.5	5	5.5
Paratype UMMP 61527	7	5	5
Paratype UMMP 61528	8.5	7	9.5
Paratype UMMP 61529	6.5	4	5
Paratype UMMP 61530	6	4	3.5
Paratype UMMP 61531	6	4.5	5

Arkona region of southwestern Ontario. Locality 4.

Types. -- Holotype UMMP 61516, paratypes UMMP 61517-61522.

CYRTINA COULTISORUM sp. nov.

Pl. 1, figs. 14-21; pl. 2, figs. 26-28

Description. -- Small, the majority of 273 specimens being 6 to 7 millimeters wide; triangular-subpyramidal; cardinal extremities not extended. Hinge line straight; greatest width anterior to hinge line. Surface of shell lateral to fold and sulcus marked by rounded costae, 2 to 6 on each side of fold and sulcus, 3 in the majority of specimens. Most costae separated by narrow furrows; furrows adjacent to fold much wider and deeper than those between costae. Surfaces of costae, furrows, fold, and sulcus covered with moderately coarse spinules. Growth lamellae prominent.

Pedicle valve with prominent deep, rounded sulcus having no median depression. Beak small, flat to very slightly incurved. Interarea wider than high in some specimens, higher than wide in others; flat to gently concave. Interarea indistinctly divided into a wide inner perideltidial area and two narrow outer areas by lines diverging from the beak. Delthyrium covered with a convex pseudodeltidium bearing a relatively large oval foramen near apex. Inner and outer areas and pseudodeltidium crossed by prominent horizontal growth lines; inner area showing also thin vertical ridges. Edge of tichorhinum visible in foramen of some specimens.

Brachial valve subrectangular in outline, very gently convex. Fold prominent, high and rounded, having no median depression. Beak small, scarcely rising above hinge line. Interarea linear.

EXPLANATION OF PLATE 4

All figures x 2

Cyrtina angularis sp. nov. Paratypes UMMP 61532, growth series of 14 specimens shown in posterodorsal and dorsal views; Widder Formation, *Cyrtina* bed. In posterodorsal views, specimens photographed in position at which they came to rest on pedicle (ventral) valve.

Remarks. -- *Cyrtina coultisorum* differs from the small *Cyrtina southworthi* in the overlying Widder Formation in these respects: its fold is prominent and high, not broad and low; its growth lamellae are generally prominent, not inconspicuous; and its spinules are more coarse.

Cyrtina coultisorum is named in honor of both the late Eric Coultis and his son George, former and present owners of the tile yard of Thedford, Ontario, whose generous permission to collect there has long been appreciated.

Occurrence. -- Middle Devonian Hamilton Group, the "Coral zone" of the Hungry Hollow Formation; Thedford-Arkona region, southwestern Ontario. Localities 3 and 7.

Types. -- Holotype UMMP 61523, paratypes UMMP 61524-61531.

CYRTINA ARKONENSIS sp. nov.

Pl. 2, figs. 1-10; pl. 3, figs. 1-20

Description. -- Medium size, largest specimen examined 20 mm wide, the majority being 12 to 15 millimeters; triangular-subpyramidal; cardinal extremities slightly extended in some specimens. Hinge line straight; greatest width along hinge line. Surface of shell lateral to fold and sulcus marked by 6 to 13 costae, the majority having 8. Costae separated by rounded furrows. Surfaces of costae, furrows, fold, and sulcus covered with minute spinules. Growth lamellae fine.

Pedicle valve with shallow rounded sulcus having a faint median depression in some specimens. Lateral slopes gently curved. Beak pointed, slightly twisted in some specimens. Interarea wider than high, flat to slightly concave. Interarea indistinctly divided into a wide inner perideltidial area and two narrow outer areas by lines diverging from beak. Delthyrium covered with a convex pseudodeltidium bearing a large oval foramen near apex. Inner and outer areas and pseudodeltidium crossed by growth lines. Edge of tichorhinum visible in foramen of many specimens.

Brachial valve subrectangular in outline, gently convex. Fold low, with a shallow median depression in many specimens. Beak small, scarcely rising above hinge line. Interarea linear.

Remarks. -- *Cyrtina arkonensis* can be easily distinguished from *C. angularis*, the only other species of this genus comparable in size that is found in the area, by its shallow rounded sulcus and greater number of costae, which are narrower and more delicate than those of the latter.

Occurrence. -- Middle Devonian Hamilton Group, Arkona Shale, Thedford-Arkona region of southwestern Ontario. Localities 3, 5, and 6; also other outcrops of the Arkona Shale along the Ausable River.

Types. -- Holotype UMMP 31283, paratypes UMMP 31277A, 31277B, and 31278-31282.

Measurements of *Cyrtina arkonensis* (in mm)

Type	Greatest Width	Length of Brachial Valve	Thickness
Holotype UMMP 31283	17.5	11	11.5
Paratype UMMP 31277A	14.5	9	10
Paratype UMMP 31277B	14	8.5	8.5
Paratype UMMP 31278	10	7	5.5
Paratype UMMP 31279	11.5	7.5	7
Paratype UMMP 31280	15	9	9.5
Paratype UMMP 31281	15	10.5	11
Paratype UMMP 31282	16	10	9

LITERATURE CITED

- DALL, W. H., 1877, Index to the names which have been applied to the subdivisions of the class Brachiopoda: Bull. U. S. Natl. Mus., no. 8, 88 p.
- DAVIDSON, THOMAS, 1858, A monograph of the British fossil Brachiopoda, pt. 5, 2d part: Palaeontogr. Soc., v. 11, p. 49-80, pls. 9-16.
- 1884, A monograph of the British fossil Brachiopoda, v. 5, pt. 3: Ibid., v. 38, p. 241-476, pls. 18-21.
- DEFRANCE, M. J. L., 1824, Dictionnaire des sciences naturelles, v. 32, p. 306, pl. 80, figs. 3, 3a, 3b.
- EHLERS, G. M., 1963, *Cyrtina hamiltonensis* (Hall) and a new species of this brachiopod genus from New York: Contrib. Mus. Paleontology Univ. Mich., v. 18, no. 12, p. 197-204, 1 pl.
- FREDERICKS, G., 1916, The palaeontological notes, 2, On some Upper Palaeozoic Brachiopoda of Eurasia: Comité géol. mém., n. ser., livr. 156, 87 p., 5 pls., Petrograd. [In Russian.]
- 1926, Classification table of the genera of the family Spiriferidae King: Bull. Acad. Sci. U. R. S. S., 6th ser., v. 20, p. 393-422, 1 table, Petrograd. [In Russian.]
- HALL, JAMES, 1857, Descriptions of Palaeozoic fossils: Tenth Ann. Rept. of the Regents of the University of the State of New York, on the Condition of the State Cabinet of Natural History, p. 39-186, illus.
- 1867, Descriptions and figures of the fossil Brachiopoda of the Upper Helderberg, Hamilton, Portage, and Chemung Groups: Geol. Surv. New York, Palaeontology, v. 4, pt. 1, 428 p., 69 pls., Albany, N. Y.
- & CLARKE, J. M., 1894, An introduction to the study of the genera of Palaeozoic Brachiopoda: Geol. Surv. New York, Palaeontology, v. 8, pt. 2, 394 p., 64 pls., Albany, N. Y., Charles Van Benthuysen & Sons.
- SCHUCHERT, C., & LE VENE, CLARA M., 1929, Brachiopoda (Generum et Genotyporum Index et Bibliographia): Fossilium Catalogus, 1: Animalia, pars 42, p. 1-140, ed. J. F. Pompeckj, W. Junk, Berlin.
- WAAGEN, W., 1882-1885, Salt Range fossils, Productus Limestone fossils, Brachiopoda: Palaeont. Indica, Mem. Geol. Surv. India, ser. 13, pt. 4, fasc. 2 (1883), p. 391-546, pls. 29-49.
- WHIDBORNE, G. F., 1893, A monograph of the Devonian fauna of the south of England, v. 2, pt. 3: Palaeontogr. Soc., v. 47, p. 87-160, pls. 11-17.

WRIGHT, J. D., & WRIGHT, E. P., 1961, A study of the Middle Devonian Widder Formation of southwestern Ontario: *Contrib. Mus. Paleontology Univ. Mich.*, v. 16, no. 5, p. 287-300, 1 pl.

----- & ----- 1963, The Middle Devonian Ipperwash Limestone of southwestern Ontario and two new brachiopods therefrom: *Contrib. Mus. Paleontology Univ. Mich.*, v. 18, no. 7, p. 117-134, 3 pls., 1 fig.