

A REVISION OF E.A.STRONG'S TYPES
FROM THE MISSISSIPPIAN POINT AU
GRES LIMESTONE AT GRAND RAPIDS,
MICHIGAN.

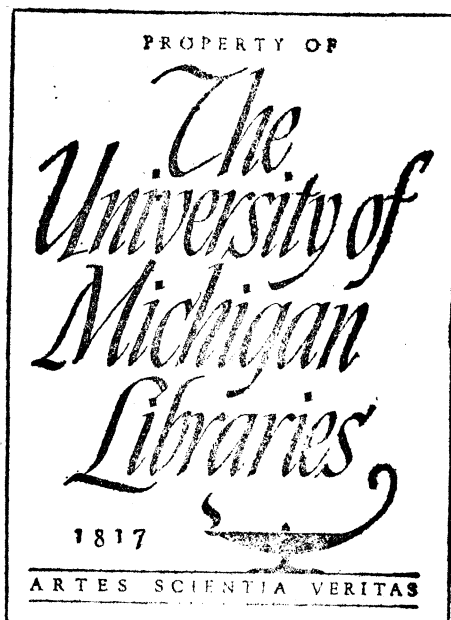
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INTRODUCTION

It is the purpose of this paper to redescribe E. A. Strong's types of fossils from the Mississippian Point au Gres limestone of Grand Rapids, Michigan. In 1872 the late Professor Strong, at that time a member of the Grand Rapids public school system, wrote a paper, now rare, entitled, "Notes upon the fossil remains of the Lower Carboniferous limestone exposed at Grand Rapids, Michigan," which was published as No. 3 of the Miscellaneous Papers of the Kent Scientific Institute. In this paper he described, but did not illustrate, six new species of fossils: Allorisma elongata, Allorisma quadrata, Nautilus ellipticus, Nautilus kentensis, Phillipsia longispina, and Cladodus irregularis.

Through the efforts of Dr. G. M. Ehlers, Strong's types were obtained for the University of Michigan and it was at Dr. Ehlers' suggestion that the writer undertook the revision of Professor Strong's species. All of the above mentioned types are re-described in the following pages with the exception of Cladodus irregularis which, unfortunately, has been lost.

The writer wishes to express thanks to Dr. G. M. Ehlers for his very helpful suggestions and aid and to Professor A. K. Miller of the University of Iowa, and Doctor J. Marvin Weller of the Illinois Geological Survey for their kind assistance.

DESCRIPTION OF SPECIES

Allorisma quadrata Strong

(Pl. I , figs. 8, 9)

1872. Allorisma quadrata Strong, Kent Sci. Instit., Misc. Papers, no. 3, p. 5.

Original description.- "Like the above (Allorisma elongata Strong = A. strongi), except smaller, relatively broader, with posterior end, more quadrate. A specimen of full size, and undistorted, gives the following admeasurements: Length, 31; height, 15.8; of beaks, 16.3; height at 5 mm. from posterior end, 15.; thirty-nine concentric ridges in fasciculi of two, three, or four, which often unite upon the posterior end."

Revised description.- Shell of small size, subquadrate, equivalve, very inequilateral, anterior end flattened in front of beaks, more convex at antero-ventral margin, projecting in front of beaks about one-fifth total length of shell; anterior margin broadly rounded to subquadrate; dorsal and ventral margins subparallel posterior to beaks; posterior margin bluntly rounded, more quadrate than anterior edge, curving forward dorsally, meeting the hinge line at an obtuse angle; beaks prosogyrate; umbones small and flattened; lunule shallow, separated from umbonal slopes in some specimens by a well defined preumbonal ridge; escutcheon shallow, narrow, not separated from dorsal and lateral slopes by a well defined ridge.

Valves convex, greatest gibbosity in the umbonal areas delineated by pre- and post-umbonal ridges extending from the beak to the antero- and postero-ventral angles respectively.

Hinge characters and interior of shell unknown.

Surface marked by groups of three to five striae alternating with relatively thicker ridges, paralleling the contour of the shell; surface markings curve abruptly toward the dorsal margin at the post-umbonal ridge, accentuating the quadrate appearance of the shell.

Dimensions of syntypes:

	Length	Height	Width
Syntype (No. 21421).....	28.4 mm.	14.2 mm.	7.4 mm.
Syntype (No. 21422)	29.	13	7.2
Syntype (No. 21423)	30.5	14.9	8
Syntype (No. 21424)	31.8	17	9

(Some of the above measurements, particularly those for width, are approximate, being based on distorted specimens.)

Remarks.- The species differs from Allorisma strongi in having a considerably smaller shell, much finer surface markings and a relatively greater prolongation of the shell in front of the beaks.

Strong, in a paragraph following his description of the species, stated that almost every degree of variation existed between Allorisma quadrata and A. elongata (= A. strongi) and specimens from the old quarries at Grand Rapids which he thought resembled Allorisma clavatum McChesney, A. sinuatum McChesney and A. regularis Owen (= A. subcuneatum Meek and Hayden). At the end of the same paragraph he said that "it is questionable whether we have more than one species of this genus."

The present writer has compared Allorisma quadrata and A. strongi with the three species mentioned above and is convinced that the former are different from the latter and that A. quadrata

and A. strongi are distinct species. Although there is considerable variation in the shells of Allorisma found in the Point au Gres limestone of Grand Rapids, this variation is not of such character as to show that only one species may be present as indicated by Strong.

Allorisma quadrata is very abundant in the Point au Gres limestone and like A. strongi is an excellent index fossil for the formation.

Syntypes.- Nos. 21421-21424.

Occurrence.- Point au Gres limestone at Grand Rapids (Taylor's and probably other quarries noted by Strong), Bellevue, and along Johnstone Creek in southwestern Iosco County. It probably will be found at Bayport and at Point au Gres and other places in Arenac County.

Allorisma strongi, sp. nov.

(Pl. I , Figs. 1-7)

1872. Allorisma elongata Strong, Kent Sci. Instit., Misc. Papers, no. 3, p. 5. (Not Pholadomya elongata Morton, Amer. Jour. Sci., ser. 1, vol. 29, p. 153, pl. 26, fig. 37, 1836 = Allorisma elongatum (Morton); not Allorisma elongata Worthen, Bull. Illinois St. Mus. Nat. Hist., no. 2, p. 12, 1884 = A. worthenanum Miller)

Original description.- "Like the above (Allorisma sinuata McChesney), except more elongated posteriorly, wholly without sinus upon the ventral margin or depression upon the valves, and beak nearer the anterior end. An undistorted specimen of medium size gives the following measurements: Length, 64.; height to hinge line, 23.5; height to summit of beaks, 25.4; greatest thickness, 20. Beaks one-ninth the length of the shell from the anterior end (varying in different specimens from one-seventh to

to one-tenth); twenty-eight concentric ridges - which in this case, are pretty persistent - can be counted upon each valve. A specimen one and one-half inches long gave analogous results."

Revised description.- Shell of medium size, elongate-subquadrate, slightly gaping posteriorly, equivalve, and very inequilateral; anterior end short and gibbous, projecting a relatively short distance in front of beaks; anterior margin almost continuous with anterior edge of umbones, slightly compressed and bluntly rounded; ventral margin gently convex, increasingly so posteriorly; posterior margin bluntly curved, meeting the hinge line at an obtuse angle; dorsal margin straight, raised above lateral slopes in a well defined ridge posterior to escutcheon; beaks prosogyrate; umbones small and tumid; lunule shallow, depressed, not separated from umbonal slopes by well-defined ridge; escutcheon shallow, narrow, extending posteriorly from beaks about one-third distance to posterior extremity of shell and not separated from the dorsal and lateral slopes by a well-defined ridge.

Valves convex and gibbous in the umbonal region, becoming less convex towards the ventral margin; markedly flattened between a poorly-defined, rounded ridge extending from umbone to postero-ventral angle and low ridge adjacent to dorsal margin; ventral edge of valves of some shells with a slight sinuosity produced by a very wide, shallow depression trending postero-ventrally from the umbone to the ventral margin.

Hinge characters and interior of shell unknown.

Surface marked by strong grooves and ridges of equal width, paralleling the contour of the valve and becoming finer and

crowded toward the margins; grooves and ridges less prominent on postero-dorsal area of shell; above poorly-defined, rounded ridge extending from umbone to postero-ventral angle they curve abruptly forward, meeting the hinge line at an obtuse angle.

Dimensions of syntypes and hypotypes:

	Length	Height	Width
Syntype (No. 21415).....	57 mm.	22 mm.	20 mm.
Syntype (No. 21416)	64	24	20
Hypotype (No. 21418)	67	27	22.5
Syntype (No. 21417)	72	27	24
Hypotype (No. 21419).....	85	28.5	23

(Some of the length measurements are approximate, being based on reconstructions of imperfectly preserved specimens.)

Remarks.- As indicated by the dimensions and illustrations of the types, the shells of this species increase in size chiefly in a direction parallel to their length. Most of this increase is at the posterior edge, relatively little taking place at the anterior margin; the growth in height and width is much less than that along the length.

The species is exceedingly abundant, being found in most exposures; it is an excellent index fossil for the formation.

Syntypes.- Nos. 21415, 21416 and 21417; hypotypes Nos. 21418 and 21419.

Occurrence.- Point au Gres limestone at Grand Rapids, Bellevue, Point au Gres and several other localities in Arenac County, along Johnstone Creek in southwestern Iosco County and at Bayport, Huron County, Michigan.

Endolobus? kentensis (Strong)

(Pl. II , Fig. 2)

1872. Nautilus Kentensis Strong, Kent Sci. Instit., Misc. Papers, No. 3, p. 4.

Original description.- "The form locally known by this name cannot be referred to any species known to me. The last whorl is much like N. Niotensis, M. and W., but as the shell expands the dorsal region becomes more prominent and sharply curved, which, with the flattened ventral side gives a triangular appearance to the section; transverse and dorso-ventral diameters subequal; breadth of chambers, one-fourth to one-fifth the diameter. Same locality as above (Nautilus ellipticus Strong = Vestinautilus? ellipticus (Strong)) and possibly a distorted form of the preceding."

Revised description.- Shell tarphyceraconic, rapidly expanding, mature whorls sub-trigonal in cross-section, narrowly rounded ventrally and laterally, flattened and somewhat impressed dorsally; living chamber unknown; phragmocone consisting of about one and one-third whorls; umbilicus apparently perforate.

Sutures straight; siphuncle relatively large, sub-central in position, nearer the venter, structure unknown; ornamentation consisting of obscure, low, lateral nodes.

Maximum diameter of imperfect holotype, measured from adoral end of phragmocone across umbilicus 54.3 mm.; diameter at right angles to maximum diameter 41.7; maximum width of outer whorl 27.8 mm., maximum height 26.8 mm., maximum width of umbilicus 17.7 mm., about one-third maximum diameter of conch.

Remarks.- This species is based on one specimen, the holotype,

which consists of a phragmocone with lime-mud-filled camerae. Neither the living chamber nor the wall of the phragmocone is preserved.

The species is referred to Endolobus with question because of its imperfect condition. The writer, on the advice of Dr. A. K. Miller, is describing and illustrating this form because of the paucity of information regarding Mississippian nautiloids in this country.

Holotype.— No. 21327.

Occurrence.— Point au Gres limestone of abandoned Taylor's quarry at Grand Rapids.

Vestinautilus? ellipticus (Strong)

(Pl. II , Figs. 1)

1872. Nautilus ellipticus Strong, Kent Sci. Instit., Misc. Papers, No. 2, p. 4.

Original description.— "Much resembling N. Forbesianus, McChesney, and N. Spectabilis M. & W., but having an aperture almost truly elliptical, one and a half times as high as wide, the section becoming more circular as the diameter decreases and expanding very rapidly as it passes from the septate to the non-septate portion, which latter is not nodose. This species is not rare at Taylor's quarry; is associated with zaphrentis spinulifera."

Revised description.— Conch tarphyceraconic although evolute adorally, expanding rapidly, consisting of about two volutions; mature whorls depressed, elliptical in cross section, broadly rounded ventrally, narrowly rounded laterally, flattened dorsally; younger whorls sub-circular in cross section; living

chamber incomplete, comprising one-quarter of a volution, about one-half again as wide as high; phragmocone consisting of about one and one-half whorls; umbilicus perforate and relatively wide.

Sutures with broadly rounded ventral lobes; siphuncle small, sub-central in position, structure unknown; ornamentation consisting of a single row of low lateral nodes connected by an indistinct rounded ridge; nodes and connecting ridge become obscure adorally, surface of living chamber apparently being smooth.

Maximum diameter of imperfect holotype, measured from adoral end of conch across umbilicus, 67 mm.; diameter measured at right angles to maximum diameter 51 mm.; maximum width of outer whorl 42 mm., maximum height 29 mm.; maximum width of umbilicus 22 mm., approximately one-third greatest diameter of shell.

Remarks.- The holotype, the only specimen known to the writer, consists of a limestone mold of the living chamber and a cast of the outer surface of the phragmocone impressed on coarsely crystalline calcite. The preservation of the type is such that the siphuncle and septa behind the living chamber are missing, only the trace of the suture of the septum at the rear of the living chamber being recognizable.

The species is referred to Vestinautilus with question; it possibly belongs to a new genus. In making the generic assignment the writer is following the advice of Dr. A. K. Miller who has informed them of the lack of a thorough knowledge of Mississippian and related European Carboniferous genera of cephalopods. Until a critical study of these genera is made,

it would be unwise to place the species, represented by a single imperfect individual, in a new genus.

Holotype.— No. 21328

Occurrence.— Point au Gres limestone of abandoned Taylor's quarry at Grand Rapids.

Kaskia longispina (Strong)

(Pl. II , Figs. 3-5)

1872. Phillipsia longispina Strong, Kent Sci. Instit., Misc. Papers, no. 3, p. 3.

Original description.— "Outline elongated elliptical, sides nearly straight, ends evenly rounded; head, thorax and pygidium nearly equal in breadth.

"Glabella with posterior lobes small, anterior moderately large, evenly convex, without margin; facial suture nearly as in P. Portlockii; neck segment about as wide as the thoracic, and continued backward in a narrow spine which extends beyond the thorax and is applied so closely to it as not to interfere with the elliptical outline; neck furrow shallow, curving backward strongly and terminating at the lateral furrows of the cheeks. Thorax and pygidium much as in P. Portlockii except that the border of the latter is very broad, equaling in breadth the lateral lobes. One specimen from Scribner's quarry yields the following measurements: Length, 44.4; of head, 15.3; of thorax, 12.1; breadth of head, 21.2; of thorax, 21.9; of pygidium, 26.4."

Revised description.— Species based on one specimen, the holotype.

Cephalon broadly rounded in front, without margin anterior to glabella; length 14.7 mm., width 21.3 mm.; genal spines long,

acute, extending to second pleural segment of pygidium; glabella moderately inflated, expanded in front, with a slight constriction midway between eye and anterior margin; greatest width 10.9 mm.; occipital ring wide; occipital furrow shallow adjacent to axial furrow, angular and impressed behind basal lobe and curved forward in the medial part of the glabella; basal lobes large, unelevated; basal furrows broad and shallow laterally, well impressed toward the middle, originating at point opposite center of eye and curving posteriorly; two, possibly three, short, indistinct, anterior furrows: fixed cheeks widen anteriorly from second anterior furrow with a faint pre-glabellar furrow; small pit on fixed cheek approximately midway between eye and anterior margin, and close to slight constriction in glabella; eyes twice as long as wide and nearly one-third as long as glabella; cornea and palpebral lobes not shown; a broad shallow furrow, bounded below by a moderately sharp ridge, parallels base of eye; lateral slope of cheek steep below suborbital ridge, separated from gentle slope of lateral border or cephalic flange by broad, moderately impressed lateral marginal furrow; posterior cheek slope gentle, separately from lateral cheek slope by a broad, rounded ridge; posterior marginal furrow angular, moderately impressed; part of glabella anterior to basal lobes and axially adjacent to anterior furrows, coarsely granulose; glabella finely granulose to smooth towards front, becoming punctate on anterior border; basal lobes smooth but minutely punctate; sides and possibly missing medial part of occipital ring granulose; triangular area enclosed by suborbital ridge, lateral and posterior marginal furrows, coarsely pitted; posterior and lateral

borders and suborbital furrow smooth but punctate.

Thorax of 9 segments; length 12.3 mm., width 19.2 mm.; axial lobe little more than one-third width of thorax, narrowing slightly posteriorly; four anterior axial segments granulose; fifth and sixth and possibly the remaining imperfectly preserved segments, ornamented with a single row of coarse granules on posterior edges; pleural lobes flattened on median half, depressed sharply on outer or lateral half; articulating furrows of pleural segments horizontal near axial lobe, bent forward at midwidth and directed backward laterally; pleural furrows approximately horizontal, shallowing and disappearing before intersecting axial lobe and lateral margin of thorax; posterior margin of sharply depressed lateral part of each unworn pleural segment marked by a single row of minute granules.

Pygidium incomplete, broadly rounded behind; length about 16 mm., width at first pygidial segment 19.2 mm.; axial lobe composed of 15 to 17 (?) segments, about one-third width of pygidium; segments moderately elevated, crests in unworn condition probably ornamented with low granules; pleural lobes composed of 12 (?) segments, marked by row of granules on posterior edge of posterior pleural band; rib furrows narrow, those of two anterior pleurae extending across wide, slightly convex, marginal flange of pygidium; pleural furrows broadly angular, shallowing and disappearing posteriorly; marginal flange smooth, punctate, marked by lirae.

Remarks.— Another specimen in the Strong collection (No. 21222, U.M.) appears to be conspecific with Kaskia longispina (Strong) but it possesses a margin anterior to the glabella and

is therefore referred to Strong's species with question. It is possible that this specimen represents a new genus.

Holotype.— No. 21223, Figured specimen No. 21222.

Occurrence.— Point au Gres limestone of abandoned Scribner's Quarry at Grand Rapids, Michigan.

EXPLANATION OF PLATE I

Allorisma strongi n. sp.

- Figure 1. Right valve of hypotype (No. 21418, U.M.).
- Figure 2. Left valve of hypotype (No. 21418, U.M.).
- Figure 3. Dorsal view of hypotype (No. 21418, U.M.).
- Figure 4. Anterior view of hypotype (No. 21418, U.M.).
- Figure 5. Anterior view of syntype (No. 21415, U.M.).
- Figure 6. Dorsal view of syntype (No. 21415, U.M.).
- Figure 7. Right valve of syntype (No. 21415, U.M.).

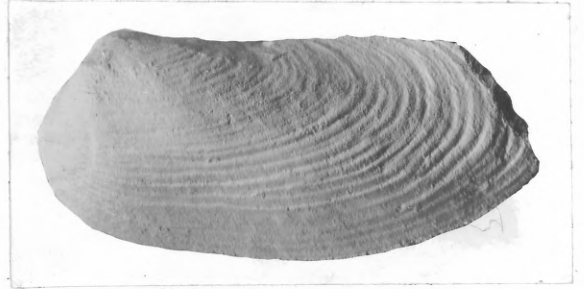
Allorisma quadrata Strong

- Figure 8. Left valve of syntype (No. 21421, U.M.).
- Figure 9. Right valve of syntype (No. 21422, U.M.).

PLATE I



1



2



6



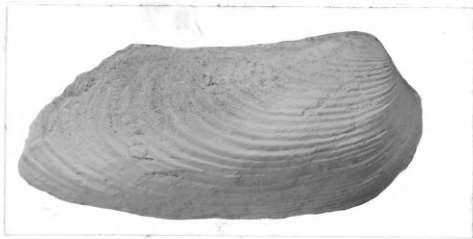
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4



3



7



8



9

EXPLANATION OF PLATE II

Vestinautilus? ellipticus (Strong)

Figure 1. Lateral view of holotype (No. 21328, U.M.).

Endolobus? kentensis (Strong)

Figure 2. Lateral view of holotype (No. 21327, U.M.).

Kaskia longispina (Strong)

Figure 3. Dorsal view of holotype (No. 21223, U.M.). X2.

?Kaskia longispina (Strong)

Figure 4. Dorsal view of cephalon (No. 21222, U.M.). X2.

Figure 5. Dorsal view of pygidium (No. 21222, U.M.). X2.

All views natural size unless otherwise indicated.

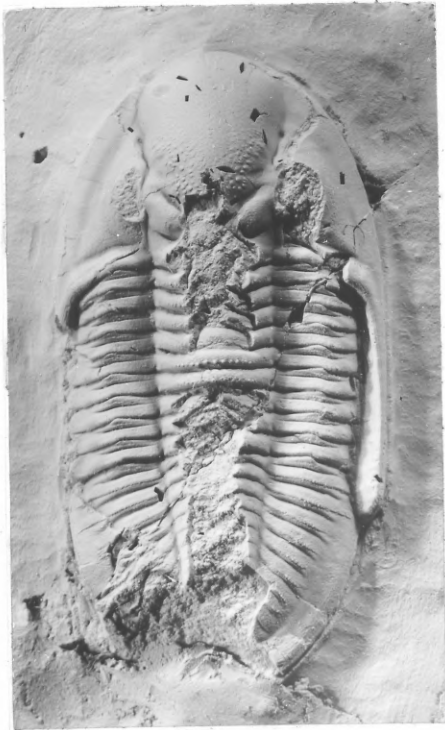
PLATE II



1



2



3



4



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