For Carl Schuster,
with thanks and best wishes
Kenneth Caster

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BY

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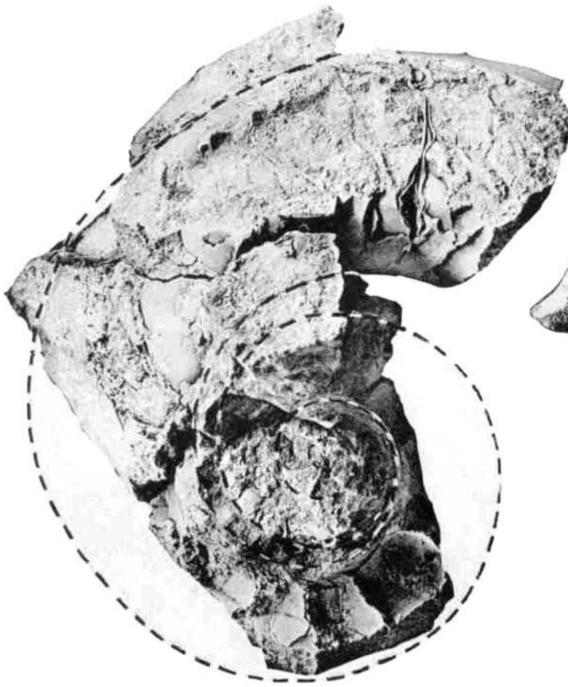

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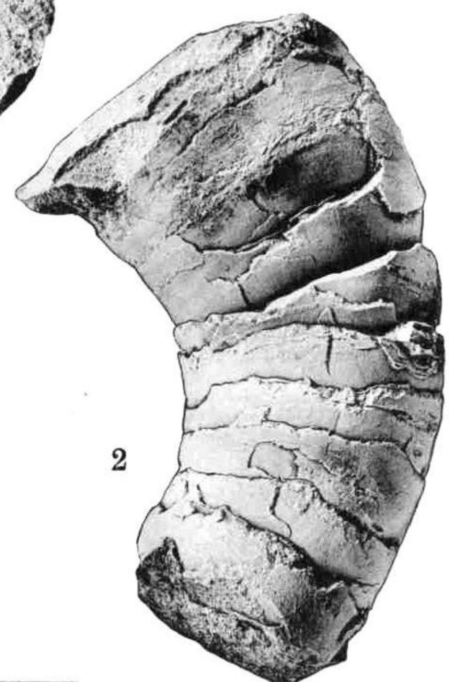

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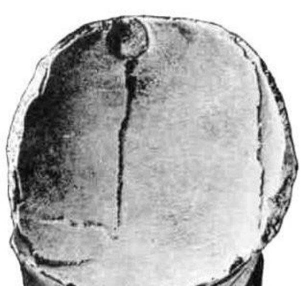

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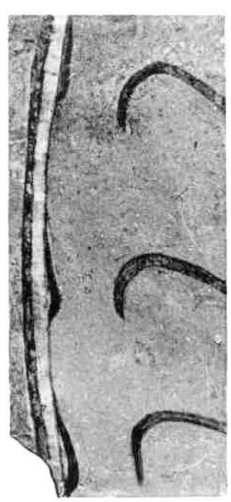

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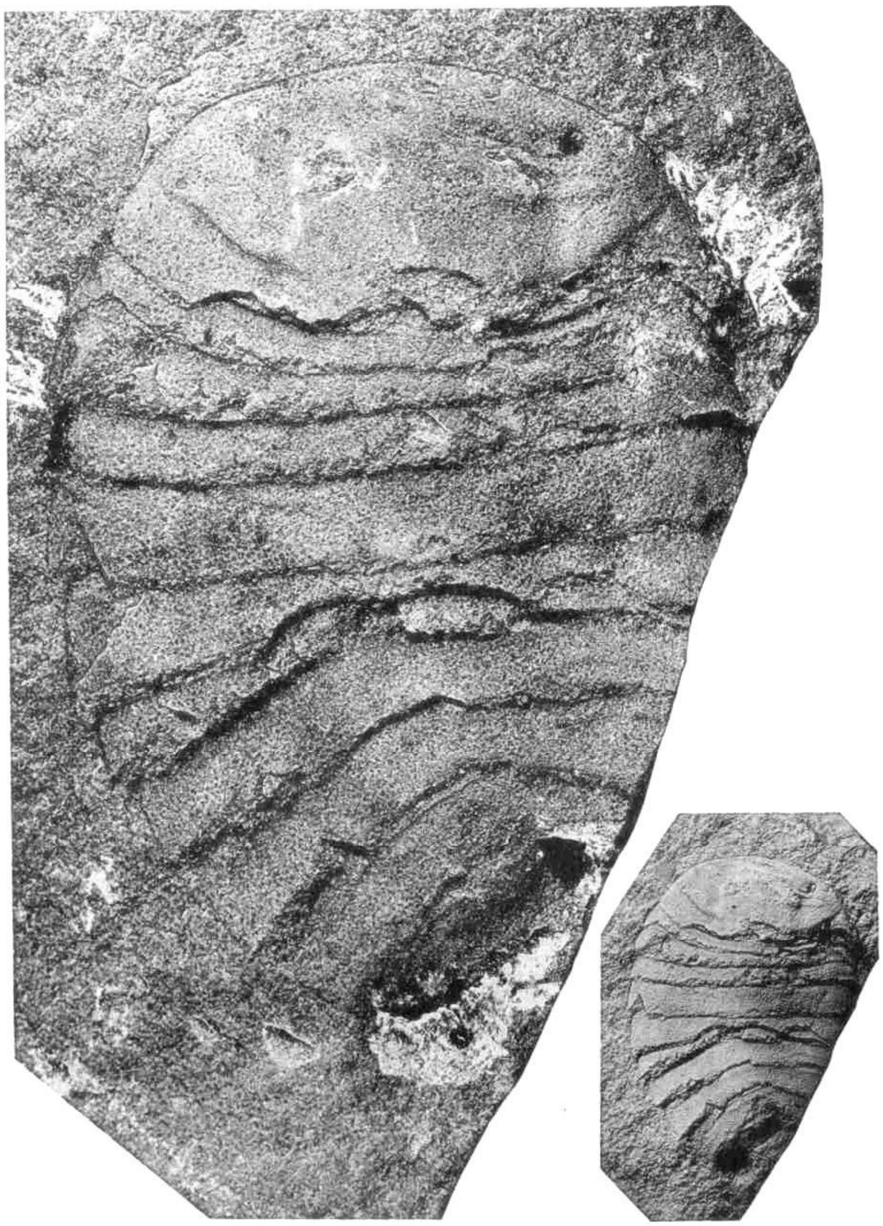
Teichert and Glenister, Australian nautiloids



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Caster and Macke, Ohio Ordovician aglaspid merostome

Carl N. Shuster, Jr.

JOURNAL OF PALEONTOLOGY, VOL. 26, NO. 5, PP. 753–757, PL. 109, 1 TEXT FIG., SEPTEMBER 1952

AN AGLASPID MEROSTOME FROM THE UPPER ORDOVICIAN OF OHIO

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ABSTRACT—A new genus and species of Aglaspida, *Neostrabops martini* Caster and Macke, is the first post-Cambrian record of the class. It comes from the Upper Ordovician near Cincinnati, Ohio. The closest resemblance in form is to the enigmatic *Strabops* of the Upper Cambrian of Missouri.

INTRODUCTION

THE Aglaspida have been considered one of the most reliable index-fossil groups for the recognition of the North American Middle and Upper Cambrian; however, the recent discovery of a representative of the class in the Upper Ordovician of Ohio illustrates how little we know about the real versus the apparent ancient ranges of organisms. What are the probabilities involved in the rare accident of fossilization anyway? What size population of any species, endowed with the usual prerequisites for preservation, must there be in any setting that geologically useful representatives may be fossilized? Of immediate interest in connection with this maverick merostome, which was still living in the Cincinnati seas tens of millions of years after the supposed extinction of all its kind, is the question: how terminally definitive were the various geological "extinctions"? Obviously, hosts of lineages of organisms have become unquestionably genetically extinct throughout geologic time; they left no descendants, in contrast with those lineages which were taxonomically "exterminated" by evolution into new species and genera. But such anachronisms as this aglaspid—and geologic literature contains many comparable records—suggest the probability that the apparent extinctions of the geologic record anteceded by many millions of years the actual biological extinction of which the fossil record was prenuncial.

May not geological extinction reflect only a critical population point? When populations dropped below that critical level, probability would seem to make the odds against fossilization so high that when these are added to the odds involved in the probability of survival of the fossil until the present, plus those factors related to the probability of human discovery of this fossil during the last century and a half (the maximum age of organized fossil-hunting), the "geologic extinction" of most ancient organisms would constitute their terminal record. Yet the fact that survivors do occasionally turn up, and millions of years late, would tend to support the thesis that the nature of the geologic record itself tends to magnify the element of catastrophism in biologic history.

Moreover, the so-called "explosiveness" in the (geologically) sudden appearance of faunas may be in part due to the same critical numerical factor in populations.

It might at first seem strange that this new organism only now turns up in a fauna so well-known and so long collected as the Maysville of the Cincinnati Uplift. As a matter of fact, it comes from one of the most richly fossiliferous and most ardently collected members of that formation. Yet it is this very member, and at the site of the present discovery, that has yielded most genuine novelties in recent years.

The new findings in this traditional terrane have been of two origins: first come the new

EXPLANATION OF PLATE 109

FIG. 1—*Neostrabops martini* Caster and Macke, n. gen., n. sp. From the Upper Ordovician, Clermont County, Ohio. ×1. (p. 754)

2—The same, enlarged to show the details of the eye-lobes and mold of the ventral surface of the dorsal shield which was apparently pustulose. (p. 754) genera and species which result from the winnowing process of modern taxonomy; old categories were too broadly conceived, and fractionation results. But like every other classic fossil-collecting area, and especially those where the preservation of the fossils is superb, and they occur in great abundance, those horizons which yield such spoils—the so-called "butter layers"—have received almost all the attention. From such the main mass of the classic fauna has been derived. Those layers less abundantly endowed, or less satisfactory in preservation, have been neglected. Probably more than half the Cincinnatian stratigraphic column falls into this category of neglected, "barren beds." Even in the extravagantly richly fossiliferous Corryville, member, whence comes the present fossil, this would be the case. In recent years the systematic examination of these neglected beds has been paying off in novelties, of which the present example is one.

The Corryville exposure on Stonelick Creek, Clermont County, Ohio, is near the crest of the Cincinnati arch. There may be some connection between this structural fact and the unusually silty nature of the formation there. At any rate, on Stonelick the upper Corryville contains many discontinuous greenish-weathering calcareous siltstone bands, which contain up to 10% quartz silt-size particles. The abundantly fossiliferous beds are intercalated limy muds and calcarenites. The silty layers carry only sparse faunas, and fall into the neglected category. The particular bed[1] from which the present organism came is about two to three inches in thickness, and lenticular. It overlies a fine calcarenite of fossil fragments and underlies blue calcareous mudstone. The commonest fossils in the band are burrowing pelecypods and *Byssonychia;* orthoceroid cephalopods are also present; the silts show much evidence of subsurface burrowing by marine worms.

The present specimen was collected during a paleontology class excursion to Stonelick in the fall of 1950. Mr. Wayne Martin, one of the students, espied a "mighty curious trilobite," which, with less than the usual pedagogic persuasion, became the basis for this paper. Martin's reward, if such it may be called, lies in the specific name appended to his holotype, now in the University of Cincinnati Museum collection. Despite enthusiastic searching of the layer then and several times since, no additional examples of the curious fossil have turned up.

Genus NEOSTRABOPS Caster & Macke, n. gen.

Genotype: Neostrabops martini Caster and Macke, n. sp. Upper Ordovician (Cincinnatian series, Maysville subseries, Corryville member), Clermont County, Ohio.

Among the specific traits to be described below, the characteristics of generic significance are: elliptical body; lens-shaped carapace (possibly emarginate behind), with subquadrate glabellar area in low relief; eye-lobes anteromedian and apparently indications of anteriorly converging reniform eyes which were narrowest toward the front; a deep occipital furrow is extended across the bases of the cheeks; the furrow swings forward on the glabellar area, possibly indicating a corresponding emargination of the posterior boundary of the carapace; thoracic segments unequal in length and distance of overlap; without pleural spines; 11 in number, apparently. Telson unknown.

Comparisons with other genera are given under "remarks," below.

NEOSTRABOPS MARTINI Caster & Macke, n. sp.

Figure 1; plate 109, figures 1, 2

Known from the holotype only (University of Cincinnati Museum No. 25569).—This consists of the ventral mold surface of an articulated dorsal shield made up of a

[1] Stonelick Creek is on the Batavia topographic quadrangle; the Corryville crops out at the crossing of Ohio State Highway 131, both above and below the bridge. The aglaspid site is about 250 yards downstream from the highway, on the southwest side of the stream. This is at the first ford of the wagon trail which follows the creek. The precise horizon is about 3 feet above low water of the creek in mid-summer. This greenish band can be traced in the vertical cut-bank downstream and opposite the discovery site. The same facies of silty beds reoccurs through quite a thickness of the local expression of the Corryville.

cephalon (carapace) and most of 10 segments.

As seen in the illustrations, the body is oval in outline, without any lateral projections. It tapers slightly posteriorly. There is a broad rachis which creates obscure trilobation; the axis is more sharply delimited on the cephalon than elsewhere. The general aspect is one of smoothness and lack of "ornament." However, the whole surface of the mold is delicately punctose, which presumably reflects a finely granular or pustulose inner surface to the presumably phosphatic integument, none of which is preserved. The outer mold was not recovered, thus the nature of the outer surface is unknown.

Carapace.—The cephalon or carapace is lens-shaped and very short and transverse, being considerably less in width than the adjacent thoracic segment. There is no suggestion of genal spines. The posterior margin is not preserved; it may possibly have been medially emarginate, to correspond to the trend of a deep furrow which crosses both rachis and cheeks and sets off a broad posterior "occipital" band of the cephalon.

The medial area, or glabellar region, is broadly elevated and set off from the cheeks by relatively steep slopes. Prominent reniform bosses protrude anterolaterally from the glabellar area. These are assumed to be the eye-lobes. No signs of the actual eyes are preserved, however. The lobes extend to within 2 mm. of the anterior margin and are separated by a little less than the length of one lobe. No evidence of ocelli observed. No furrows or other markings are seen on the glabella. Cheeks smooth and unfurrowed. Anterior margin smoothly rounded.

Abdomen.—The abdomen consists of 10 known freely articulating segments. The fourth and fifth segments represent the greatest width of the organism. Lateral margins of all segments are smoothly arcuate, the posterior corners being only slightly acute, and in no sense produced as pleural spines. Although the specimen shows some torsion, especially toward the rear, it is apparently possible to judge life relations between the first eight segments very accurately. The third and fourth abdominal segments are essentially transverse, and their margins are essentially rectilinear and parallel. The anterior two segments grow progessively more arcuate toward the head-shield, whereas the posterior five segments are ever more arcuate posteriorly. The last segment is so crumpled that the posterior margin is not observable. On the assumption that our specimen was organized like other Aglaspida, the 11th segment and telson are missing.

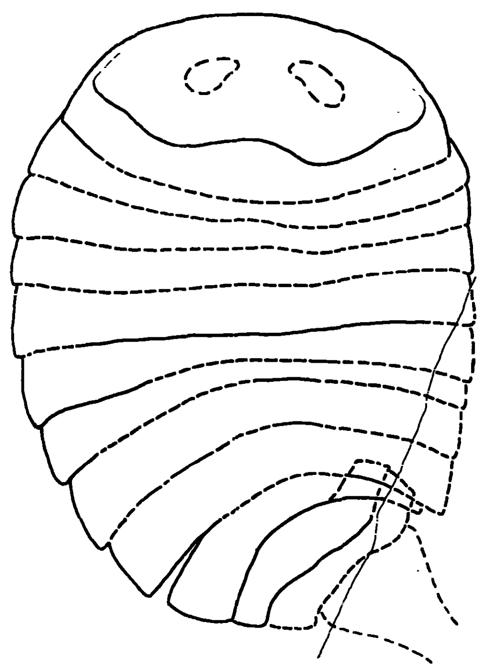

FIG. *1*—Outline tracing and restoration of exfoliated portions of the holotype of *Neostrabops martini* Caster & Macke. See plate 109 for actual dimensions.

The overlap of the segments is greatest along the rachis in segments 1, 2, 5 and 6. In the other segments it is essentially uniform along the width of the segments. The first segment underlies the carapace by about one-third the length of the segment. The articulating mechanism consists of a transverse ridge near the front margin of each segment which engages a corresponding groove in the inferior surface of the overlapping segment. In the photograph it will be noted that most of the segments are broken off along the articulation, hence the broken lines in the text figure for restoring the margins of the segments.

Dimensions

Median length of specimen (to end of 10th segment), 35 mm.
Maximum width (4th and 5th abdominal segments), 28 mm.
Carapace width, 24 mm.
Carapace length (approx.), 16 mm.

Occurrence.—In the upper part of the Corryville member, McMillan formation, Maysville subseries, Cincinnatian series, Upper Ordovician, on Stonelick Creek, Clermont County, Ohio. The matrix is a greenish-weathering calcareous and silty bed, 2–3 inches thick. Approximately 10% quartz silt is present in the layer.

Remarks.—Closer similarity in organization exists between *Neostrabops martini* and *Strabops thacheri* Beecher (1901) of the Missouri Upper Cambrian than elsewhere. The assignment of *Neostrabops* to the Aglaspida is based on this similarity. This means, of course, acceptance of Raasch's (1939) interpretation of the enigmatic Cambrian genus, of which only the holotype is known. Although Beecher interpreted his genus as an eurypterid, Raasch points out that at the turn of the century this was really the only comparison possible due to the largely erroneous and quite incomplete knowledge of the genus *Aglaspis*. This remained the state of affairs until Raasch's classic restudy of the genus and its relatives. The interpretation of *Strabops* as an eurypterid had been fortified by the work of Clarke and Ruedemann (1913). In their great eurypterid monograph they stressed its supposed eurypterid traits. Raasch, however, carefully reexamined the holotype material, and found the Clarke and Ruedemann modifications of Beecher's original analysis unwarranted; this entailed a restoration of the eyes to the position Beecher had indicated, and a reaffirmation of his segment count. In both respects, Beecher's description fitted the modern characterization of the Aglaspida, rather than the Eurypterida. Størmer (1944), in his broad survey of the merostomes, accepts Raasch's classification of the genus.

Strabops and *Neostrabops* are unique among the aglaspids in having a short elliptical head which is conspicuously less than the greatest width of the dorsal shield; likewise in their lack of lateral spines on both the carapace and abdominal pleurae. The two genera appear to have essentially similarly placed and shaped eyelobes, of the aglaspid type. (Clarke and Ruedemann were mistaken, according to Raasch, in their relocation of the eyes of *Strabops* to the pleural area of the carapace.) The division of the abdomen into an anterior and posterior region in *Neostrabops*, which may not be true of *Strabops*, is not aglaspid, however; nor is the externally smooth integument in both genera.

The two genera differ in the character of the glabellar area: quadrate glabellar elevation of *Neostrabops* versus the apparently undefined glabellar region in *Strabops*. The conspicuous occipital furrow which reaches across the whole posterior width of the carapace of *Neostrabops* is unknown in the Cambrian genus. (The line drawn on the posterior carapace by Clarke and Ruedemann in their figure to represent the anterior margin of the supposed first abdominal segment Raasch failed to discover. Such a line might be interpreted from the Clarke and Ruedemann drawing to represent the analogue of the *Neostrabops* furrow.) Ocelli are apparently absent in both genera, although Beecher thought he detected two in the median area of his genus; an interpretation Raasch could not support. Beecher described surface scales on the posterior edges of the *Strabops* abdominal segments; no evidence of such ornament is known on the Ordovician specimen. Nor are the pustules on the ventral surface of the dorsal shield of *Neostrabops* reported from the Cambrian form. *Neostrabops* is considerably more ovate in body form, and shows more closely appressed tergites. However, this may be in part due to the larger size (older?) of *Strabops*, and to somewhat greater distortion.

The aglaspids proper are laterally more spinose than either of these genera, both at the genal angles and on the pleural terminations of the abdomen. Moreover, the aglaspid pleurae are generally trilobitoid in their possession of anterior gliding surfaces which neither *Strabops* nor *Neostrabops* possesses. In all probability these two genera should have separate family assignment in the Aglaspida, if, indeed, they are genuine members of this class. If they are not aglaspids, however, there is no class of Arachnomorpha now available to them.

BIBLIOGRAPHY

BEECHER, C. E., 1901, Discovery of eurypterid remains in the Cambrian of Missouri: Amer. Journ. Sci., vol. 12(4), pp. 364–366, pl. 7.

MANUSCRIPT RECEIVED AUGUST 2, 1951

CLARKE, J. M. and RUEDEMANN, R., 1913, The Eurypterida of New York: N. Y. State Mus. Mem. 14, 2 vols.

RAASCH, G. O., 1939, Cambrian Merostomata: Geol. Soc. Amer., Spec. Paper 19, 146 pp. 21 pls.

STØRMER, L., 1944, On the relationships and phylogeny of fossil and recent Arachnomorpha: Skrift. ut. av Det Norsk Vidensk.-Akad. i Oslo, I Math.-Naturv. Kl. 5, 158 pp., ill.