

## SPHÆRODOMA: A GENUS OF FOSSIL GASTEROPODS.

BY CHARLES R. KEYES.

It has long been known that under *Macrochilus* of Phillips there have been described a number of gasteropodous shells which differ very essentially from the typical forms of the genus. And it has even been intimated that this genus, as generally understood, may comprise, in reality, several more or less well-marked divisions of perhaps more than subgeneric value. In a recent note the differences between the various groups were briefly considered and two well-defined sections made out. At the same time it was shown that the typical forms of Phillips' genus were generically identical with those of *Soleniscus* of Meek and Worthen. The two genera being co-extensive were therefore synonymous. The first of the two terms was, however, pre-occupied and inasmuch as the several other titles, proposed at various times, for shells of the same group were unavailable, the generic term suggested by Meek and Worthen must necessarily be substituted.

In separating the genus from *Macrochilus* the authors of *Soleniscus* emphasized certain structural features as being distinctive in their group, but these characters are now known to be present in the typical species of the genus first established. On account of being more or less obscured by the adhering matrix, the peculiarities in question appear to have been overlooked by most writers. The assumed absence, in the members of Phillips' genus, of these characters, and their existence in the shells that were under immediate consideration were regarded as sufficiently good reasons for the generic separation of the two groups, and for the establishment of a new genus. A single species only was originally assigned to *Soleniscus*. Miller<sup>1</sup> subsequently referred *Macrochilus hallanum* Geinitz to this genus. Shortly afterward White<sup>2</sup> described two congeneric forms from New Mexico and also<sup>3</sup> included several of the *Macrochili*. More recently some additional species of *Macrochilus* were transferred to *Soleniscus*.

With two possible exceptions the described species hereafter enumerated are confined to the Carbonic, the majority occurring in the Coal Measures. Some of the forms are widely distributed

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<sup>1</sup> Cat. Am. Palæ. Foss., p. 162.

<sup>2</sup> Expl. and Sur. w. 100 Merid., Supp., Vol. III, p. xxviii.

<sup>3</sup> Geol. Sur. Indiana, 13th Ann. Rept., p. 153, *et seq.*



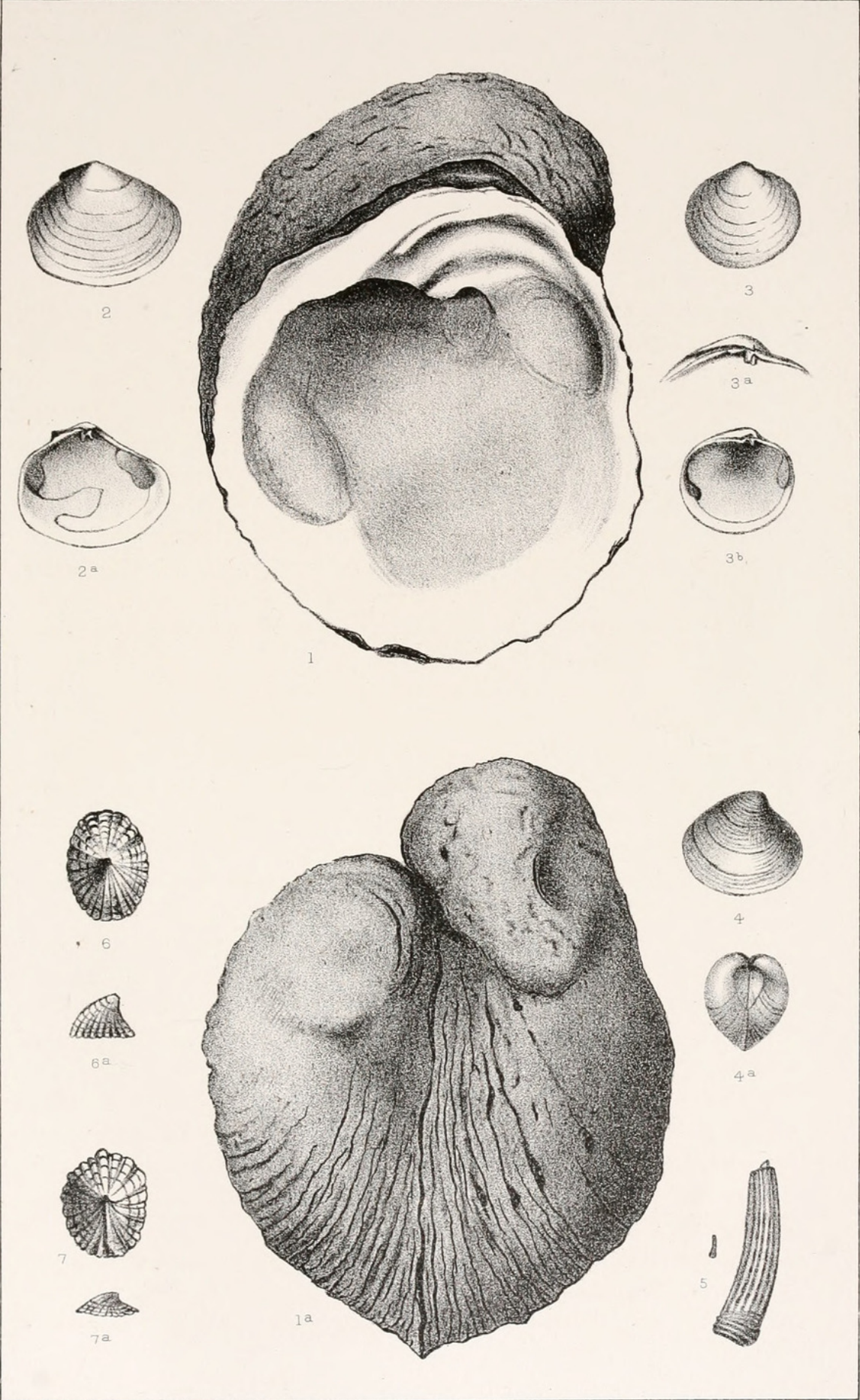
geographically, and a few have also a very considerable geologic range. A number of the now recognized species will probably prove to be identical with forms previously known, but these cannot be, with certainty, determined except by a direct comparison of the type specimens. The synonymy, however, of a portion of the *Macrochili* has been made out as indicated beyond.

As already suggested the forms of this group appear to be easily separable into two sections: the first typified by *Macrochilus acutum* (Sowerby) and *Soleniscus typicus* Meek and Worthen; and the second having for its typical representative *Macrochilus ponderosum* Swallow. The shells of the first group are characterized by being more or less elongate or fusiform, with the spire elevated, acute; body whorl forming about half the length of the shell; aperture subelliptic, or oval, acutely angular posteriorly; columella imperforate, provided with a conspicuous revolving fold or ridge, which, however, in the perfect specimen is often scarcely discernible exteriorly, but as it passes inward becomes more and more pronounced and is often accompanied by a second, though much less prominent, fold of similar character; test thick.

The columellar ridge is in most examples usually hidden more or less completely by the imbedding matrix filling the aperture. By the removal of the outer lip the twisted fold becomes more apparent. In a perfect specimen of *Soleniscus newberryi* (Stevens) this ridge is scarcely defined at the aperture, but towards the interior of the shell it gradually assumes greater prominence, becoming very much elevated, very sharp, and bordered on each side by a broad rounded canal, the outer of which is narrower and considerably deeper than the other. On the inner margin of the second furrow there is often developed an obtuse prominence much less conspicuous than the first and best defined a short distance from the apertural margin. From this point it soon becomes obsolete inwardly and finally disappears altogether. In the majority of the forms referred to *Soleniscus* the fold on the columella presents essentially the same characters, and is generally well disclosed by breaking away the outer lip of the shell slightly. When the exterior wall of the last whorl is entirely removed the interior features of the columella are still better exhibited and for a much greater distance.

As generally recognized the *Macrochilus* group has a wide range in time, beginning, according to the species described, in the Silurian and continuing to the present time. Some of the forms



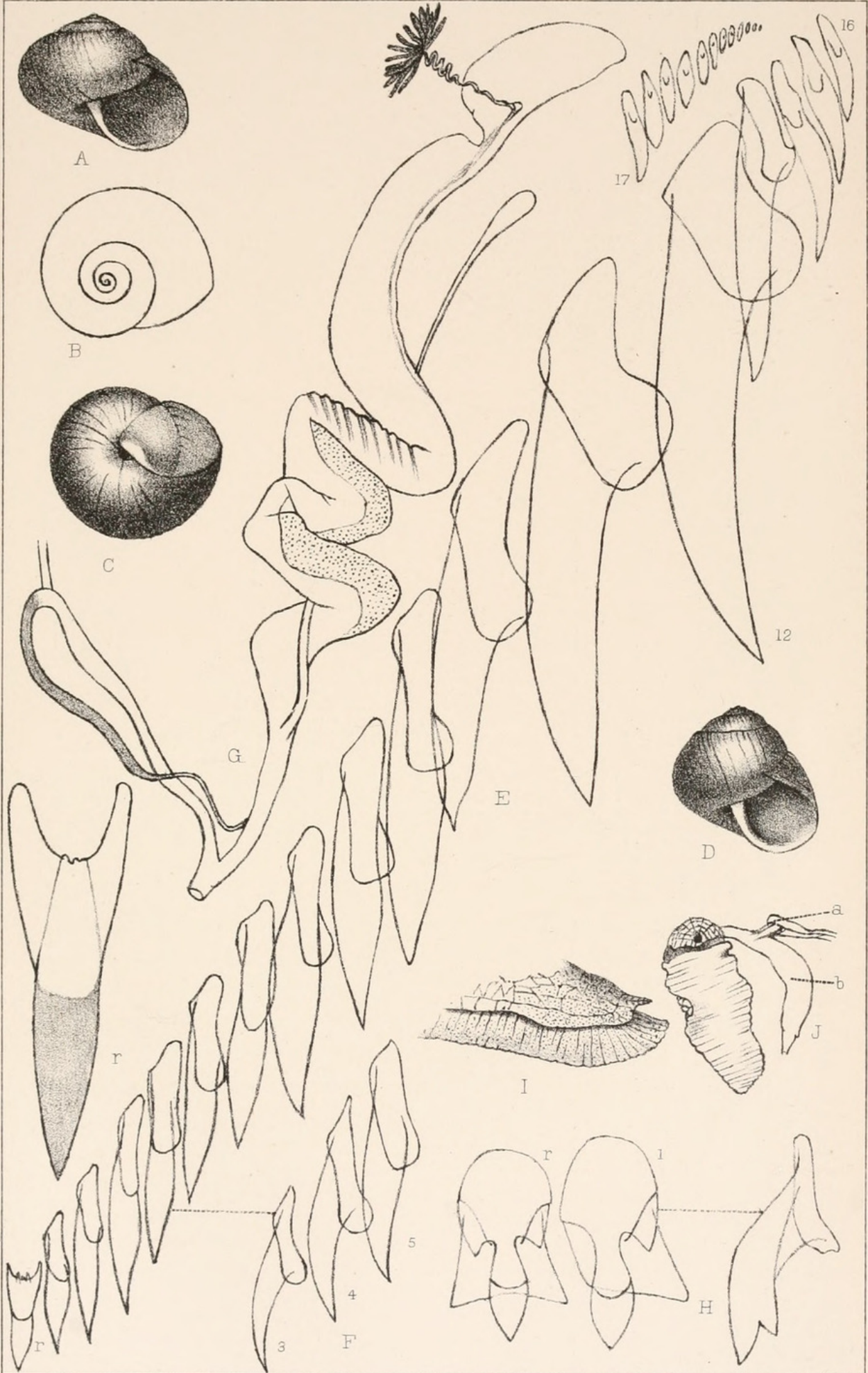


A. H. del.

Geo. S. Harris & Sons Lith. Phila.







Pilsbry, del.

Geo. S. Harris & Sons Lith. Phila.

PILSBRY ON AEROPE AND ZINGIS.





have unquestionably been erroneously assigned to the genus. The typical examples are for the most part from the Devonian and Carbonian, and, although the group probably continued to flourish after the close of the Paleozoic, it is very doubtful whether the majority of the later forms can properly be regarded as congeneric. In Europe the group became greatly expanded during the later Devonian and Carbonian, but in America it is almost wholly confined to the latter age, the other forms referred to the genus being, with perhaps two or three exceptions, referable to other groups.

*Polyphemopsis* of Portlock has commonly been considered synonymous with *Macrochilus*, but whether it can be regarded as identical with the group as now defined cannot, at present, be satisfactorily determined. Portlock's genus was founded upon such imperfect material as to hardly deserve recognition in any case, and it would probably simplify matters greatly to ignore the term altogether. There appear to be no good grounds for assigning any American gasteropods to *Polyphemopsis*. The species so referred have, in reality, other generic affinities.

The shells of the second section are subglobose, with the spire relatively very small, short; the whorls convex, very rapidly expanding, the last ventricose, and forming, by far, the greater part of the shell; aperture oval; columella thickened, sometimes exhibiting obsolete traces of an obtuse angularity; test comparatively much thinner than in *Soleniscus*. Typified by *Macrochilus ponderosum* Swallow and *M. texanum* Shumard.

The enormous size of the body-whorl compared with the spire, and the undeveloped columellar fold readily distinguish this form from that of *Soleniscus*. In America the genus ranges from the Upper Helderberg to the close of the Carbonian. From the evidence at hand it appears that the species of this group were more strictly marine in their habitat than the members of the first genus.

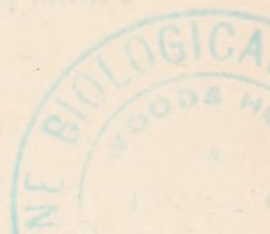
For this group, as here defined, the term *Sphærodoma* is proposed. It is thought to embrace the following forms:—

***Sphærodoma cooperensis*** (Swallow).

*Macrochilus cooperense* Swallow, 1863. Trans. St. Louis Acad. Sci., vol. II, p. 100. Kaskaskia limestone.

***Sphærodoma littonana*** (Hall).

*Natica littonana* Hall, 1858. Trans. Albany Inst., vol. IV, p. 30; *Naticopsis littonana* Meek and Worthen, 1866. Proc. Acad. Nat. Sci. Phila., p. 268; *Macrochilus littonanum* Whitfield, 1882. Bul. Am. Mus. Nat. Hist., vol. I, p. 73. Warsaw limestone.





**Sphærodoma medialis** (Meek and Worthen).

*Macrochilus mediale* Meek and Worthen, 1860. Proc. Acad. Nat. Sci. Phila., p. 466; *M. mediale* M. and W., 1866. Geol. Sur. Illinois, vol. II, p. 270; *Soleniscus medialis* White, 1884. Geol. Indiana, 13th Ann. Rept., pt. ii, p. 156; *M. pulchellum* M. and W., 1860. Proc. Acad. Nat. Sci. Phila., p. 467; *M. intercalare* M. and W., 1860, Proc. Acad. Nat. Sci. Phila., p. 467; *M. intercalare* M. and W., 1866, Geol. Sur. Ill., vol. II, p. 371. Upper Coal Measures.

**Sphærodoma pinguis** (Winchell).

*Macrochilus pingue* Winchell, 1863. Proc. Acad. Nat. Sci. Phila., p. 21. Kinderhook beds.

**Sphærodoma ponderosa** (Swallow).

*Macrochilus ponderosum* Swallow, 1858. Trans. St. Louis Acad. Sci., vol. I, p. 202; *Soleniscus ? ponderosus* White, 1884. Geol. Indiana, 13th Ann. Report., pt. ii, p. 156. Upper Coal Measures.

**Sphærodoma primogenia** (Conrad).

*Stylifer primogenia* Conrad, 1835. Trans. Geol. Soc. Penn., vol. I, p. 267; *Macrochilus primogenium* Hall, 1858. Geol. Iowa, vol. I, p. 720; *Soleniscus primogenius* White, 1884. Geol. Indiana, 13th Ann. Rept., pt. ii, p. 157; *Fusus inhabilis* Morton, 1836, Am. Jour. Sci., vol. XXIX, p. 160. Lower Coal Measures.

**Sphærodoma ? prisca** (Whitfield).

*Macrochilus priscum* Whitfield, 1882. Annals N. Y. Acad. Sci., vol. II, p. 204. Upper Helderberg.

**Sphærodoma subcorpulenta** (Whitfield).

*Macrochilus subcorpulentum* Whitfield, 1882. Annals N. Y. Acad. Sci., vol. II, p. 224. Kaskaskia limestone. This form is perhaps identical with *S. cooperensis* of Swallow.

**Sphærodoma texana** (Shumard).

*Macrochilus texanum* Shumard, 1859. Trans. St. Louis Acad. Sci., vol. I, p. 402; *Soleniscus texanus* White, 1884. Geol. Indiana, 13th Ann. Rept., pt. ii, p. 157. Coal Measures.

The various terms proposed at different times for members of the group defined by Phillips have been fully considered elsewhere. It is only necessary to repeat here the synonymy:

*Buccinum* Sowerby and others (In part) [Non Linné].

*Buccinites* Schlotheim, 1820. Petrefactenkunde, p. 127 (in part).

*Macrochilus* Phillips, 1841. Palæ. Foss., p. 103 (non Hope, 1838, Coleoptera).

*Plectostylus* Conrad, 1842. Jour. Acad. Nat. Sci. Phila., vol. VIII, p. 275. (Non Beck, 1837.)

*Soleniscus* Meek and Worthen, 1860. Proc. Acad. Nat. Sci. Phila., p. 467.



*Duncania* Boyle, 1879. Jour. de Conchyliologie (3), vol. XIX, p. 35. (Proposed for Phillips' genus.)

*Macrochilina* Boyle, 1880. Ibid., vol. XX, p. 241.

*Soleniscus* embraces the following American forms:

***Soleniscus acutus* (Sowerby).**

Reported, but probably not American.

***Soleniscus altonensis* (Worthen).**

*Macrochilus altonense*, Worthen, 1873. Geol. Sur. Illinois, vol. V, p. 593; *S. altonensis* Keyes, 1889. Am. Naturalist, vol. XXIII, p. 423. Lower Coal Measures.

***Soleniscus* ?? *anguliferus* (White).**

*Macrochilus anguliferum* White, 1874. Prelim. Rept. Expl. and Sur., W. 100 Merid., p. 22. Coal Measures. Probably does not belong to this group.

***Soleniscus brevis* (White).**

*S. brevis* White, 1881. Expl. and Sur., W. 100 Merid., Supp. vol. III, p. XXVIII; *Macrochilus ventricosum* Hall, 1858. Geol. Iowa, vol. I, p. 718 [preoccupied by Goldfuss]; *S. ventricosus* White, 1884. Geol. Indiana, 13th Ann. Report., pt. ii, p. 155. *S. brevis* Keyes, 1889. Am. Naturalist, vol. XXIII, p. 423. Coal Measures. It is quite evident that the young shells of several other species have been repeatedly mistaken for this species.

***Soleniscus carinatus* (Stevens).**

*Loxonema carinatum* Stevens, 1858. Am. Jour. Sci. (2), vol. XXV, p. 259; *Macrochilus carinatum* Miller, 1877. Cat. Am. Palæ. Foss., p. 151; *S. carinatus* Keyes, 1889. Am. Naturalist, vol. XXIII, p. 423. Lower Coal Measures.

***Soleniscus* ? *attenuatus* (Hall).**

*Macrochilus fusiforme* Hall, 1858. Geol. Iowa, vol. I, pt. ii, p. 718; *Loxonema nitidulum* ? Meek and Worthen, 1860. Proc. Phila., Acad. Nat. Sci., p. 465; *Polyphemopsis nitidula* ?? M. and W., 1866. Geol. Illinois, vol. II, p. 374; *Macrochilus attenuatum* Hall, 1877. Miller's Cat. Am. Palæ. Foss., p. 244 [M. fusiforme was preoccupied]; *Polyphemopsis fusiformis* White, 1880. Geol. Indiana, p. 519; *Soleniscus fusiformis* White, 1884. Geol. Indiana, 13th Ann. Rep., pt. 11, p. 154. *S. ? attenuatus* Keyes, 1889. Am. Naturalist, vol. XXIII, p. 423. Lower Coal Measures.

***Soleniscus gracilis* (Cox).**

*Macrochilus gracile* Cox, 1857. Geol. Sur. Kentucky, vol. III, p. 570; *M. gracile* Keyes, 1888. Proc. Acad. Nat. Sci. Phila., p. 239. *S. gracilis* Keyes, 1889, Am. Naturalist, vol. XXIII, p. 423. Lower Coal Measures.





Keyes, Charles Rollin. 1889. "Sphærodoma: A Genus of Fossil Gasteropods." *Proceedings of the Academy of Natural Sciences of Philadelphia* 41, 303–311.

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