

SWEDISH CAMBRIAN-SIBERIAN HYOLITHIDÆ AND  
CONULARIIDÆ.<sup>1</sup>

This memoir marks an era in the study of these conical shells of the older Palæozoic rocks. The author, Dr. Gerard Holm has had unusual facilities for the examination of these fossils, having had before him the large collections of the Swedish Geological Survey, amounting to over 1100 examples, and 45 operculæ, as well as numerous specimens from the museums of Stockholm, Upsala, Christiania, Copenhagen, &c.

Dr. Holm discusses the zoological position of *Hyolithes* at considerable length, of which the following is a summary :

This type of shell was at first taken to be a Pteropod, and has been so described in all the earlier, and best known works on Palæontology, but of late years serious objections have been made to this view.

Among the objectors are Neumayr and Pelseneer ; the former of these writers (1879-89) considers that the *Hyolithidæ* belong to an entirely independent extinct group of animals, which never had a place near the Pteropods, but were nearly related to the Gasteropods ; he thinks there can be scarcely any doubt that they are molluscs.

Neumayr undoubtedly makes a mistake when he, following the old custom, unites the genera *Hyolithus* and *Conularia* in the one family or division. Between these genera there are surely great differences—as the following :

In *Hyolithes* the shell is solid, rigid, thick, and consists of at least three layers ; it is composed of calcium-carbonate. In *Conularia* it is thin, flexible, and formed of calcium-phosphate, united with a horny substance.

In *Hyolithes* the shell is bilaterally symmetrical with dorsal and ventral sides plainly marked. In *Conularia* it is quadrately or rhombically prismatic, without any distinct dorsal and ventral side, etc.

The mouth of the shell in *Hyolithes* is not drawn together, but is always furnished with an operculum. In *Conularia*, on the contrary, the mouth has its four sides bent inward, and never has an operculum.

*Hyolithes* appeared earlier than *Conularia*, and there is no indication that the latter spring from any form of the former, or from any common ancestor.

Lindström has examined the zoological status of *Conulariidæ* and concludes that they ought to be referred permanently to the

<sup>1</sup> Sveriges Kambrisk-Siluriska *Hyolithidæ* och *Conulariidæ*, Series C., No. 112 af Gerhard Holm, Stockholm, 1893.