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A large Mississippian (Early Carboniferous) solitary coral (subclass Rugosa) in the wall of a museum at Cruquius, the Netherlands

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Abstract

There are no surface exposures of Mississippian (Lower Carboniferous) rocks anywhere in the Netherlands, but imported limestones of this age have been used extensively as building stones. These rocks contain a typical biota of Mississippian shelly invertebrates. Corals are common, but their diversity is limited. The first record of a large, solitary rugose coral, *Clisiophyllum*? sp., is discussed herein, based on a single specimen in a wall of the Cruquius Museum, province of Noord-Holland. The specimen is an oblique section of a solitary rugose coral of circular section, with numerous thin, radial septa; dissepiments are poorly seen, but concentric(?), thin and convex towards the circumference; and the axial structure is moderately broad, but poorly visible.

Key words: building stones, *Clisiophyllum*, *Michelinia*

Introduction

In the Netherlands, Mississippian (Early Carboniferous) invertebrates are collected mostly by camera. There are no natural exposures of these rocks (Geluk et al., 2007), but there are abundant, imported, Mississippian building stones rich in fossils; these have been etched over periods of hundreds of years (Van Ruiten and Donovan, 2018, p. 41–42). The taxa that have been identified are varied (Verhofstad and Van den Koppel, 2006; Reumer, 2016), but include molluscs such as rostroconchs (Donovan and Madern, 2016) and nautiloids (Dubelaar et al., 2014), crinoids (Donovan et al., 2017), brachiopods such as productids and spiriferids (Dubelaar et al., 2014; Donovan and Harper, 2018), fenestrate bryozoans (Donovan and Wyse Jackson, 2018), and trace fossils (Donovan, 2019). Among the commonest identifiable fossils are tabulate and rugose corals.

Corals occur as a recurrent association, suggesting that these limestones were derived from a stratigraphically and/or geographically limited suite of limestone beds (in southern and southeastern Belgium; Van Ruiten and Donovan, 2018, p. 41–42). Common rugose corals are solitary and small; seen in random sections from transverse to longitudinal, and, where identifiable, assigned to *Zaphrentites delanouei* Milne-Edwards and Haime, 1851. Large, solitary rugose corals are rare, but include *Siphonophyllia* Scouler in M'Coy, 1844 (Reumer, 2016, p. 72, figs. 67, 68). The only other nominal rugose coral identified hitherto is in a doorstep in Leiden containing a colony, the lithostrotionid *Siphonodendron martini* Milne-Edwards and Haime, 1850, and likely derived from a different site and horizon (Van Ruiten and Donovan, 2018, p. 46; see also Reumer, 2016, figs. 72–74).

Herein is a record of a further rugose coral taxon from the Mississippian building stones of the Netherlands. It is recognised only from a single specimen

and site, so far, but experience suggests that further members of this taxon may be identified eventually, in a similar way that rostroconchs, once identified in Leiden (Donovan and Madern, 2016), are now known from Middelburg (Reumer, 2016), Hoofddorp (Donovan, 2017), Den Haag (Donovan, 2019), Amsterdam and Haarlem.

Locality, material and methods

The figured specimen (Fig. 1B) is preserved in a wall of limestone building blocks at the Cruquius Museum, province of Noord-Holland, the Netherlands, situated between the city of Haarlem and town of Hoofddorp. The latter is one stop by train from Amsterdam Schiphol International Airport. The 340 bus from Hoofddorp station to Haarlem stops outside the museum.

The Cruquius Museum has a superficial appearance of an old castle, but is a former pumping station. It was one of three such stations which used steam engines to drain a major body of water, the Haarlemmermeer (= Haarlem lake), during the mid-nineteenth century. The drained area is now devoted to agriculture, leisure, towns such as Hoofddorp and Amsterdam Schiphol International Airport, all of which are below sea level (H. C. Hill, 1994, p. 164).

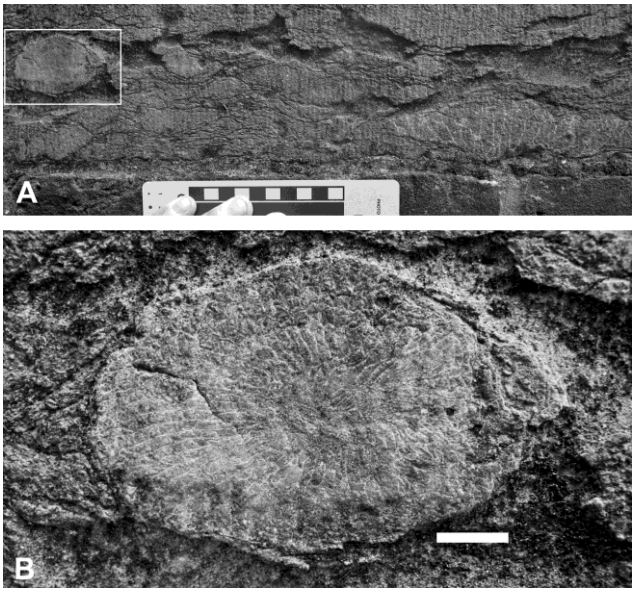

Fig. 1. Mississippian corals in building stones of the Cruquius Museum, province of Noord-Holland, the Netherlands. (A) ***Clisiophyllum*? sp.** (upper left) and *Michelinia* sp. (right centre); section presumed perpendicular to bedding. Scale in cm. (B) ***Clisiophyllum*? sp.**, oblique transverse section. Scale bar represents 10 mm.

Enter the museum and buy a visitor's ticket. Walk ahead towards the main museum, through a doorway, but turn immediately left through the door in a glass wall. Take the aluminium staircase to the left, adjacent to a limestone wall. The coral described below is exposed in this wall and will be apparent once you have ascended a few steps (Fig. 1A).

The section through the coral (Fig. 1B) was photographed both dry and wet (tap water). All photographs were taken with a Canon Powershot G11 digital camera. The description is based on an enlargement of Fig. 1B. The use of open nomenclature follows Bengtson (1988).

Systematic palaeontology

Class Anthozoa Ehrenberg, 1834
Subclass Rugosa Milne-Edwards and Haime, 1850
Order Stauriida Verrill, 1865
Suborder Aulophyllina D. Hill, 1981
Family Clisiophyllidae Nicholson, 1889

Genus *Clisiophyllum* Dana, 1846

Type species: *Clisiophyllum keyserlingi* M'Coy, 1849, p. 2, by the subsequent designation of Dingwall (1926, p. 14), from the Mississippian (Lower Carboniferous) of Derbyshire, England (D. Hill, 1981, p. F358, F360; Poty, 1981, p. 39; Ogar et al., 2013, p. 384).

Diagnosis: (Translated herein after Poty, 1981, p. 39; see also D. Hill, 1981, p. F360). Solitary, well-developed, simple septate polyps. Wide axial structure, comprising an axial blade surrounded by numerous radial lamellae and axial tabellae. Regular dissepimentarium, consisting of simple dissepiments. Fibrous septa, sporadically covered with secondary fibrous deposits.

Range: Lower Carboniferous (Mississippian), worldwide (D. Hill, 1981, p. F360).

Clisiophyllum? sp.

(Fig. 1)

Material: Transverse section located in a wall at the

Cruquius Museum, province of Noord-Holland, the Netherlands (Fig. 1).

Brief description: Preserved parallel to bedding (Fig. 1A). Section irregularly oval in outline (Fig. 1B), presumably representing an oblique cut of a solitary rugose coral of circular section. Epitheca not apparent. Septa radial, thin and numerous. Dissepiments less obvious, but best seen towards left (Fig. 1B), concentric(?), thin and convex towards circumference. Axial structure moderately broad, but poorly seen.

Remarks: That this specimen is a rarity, rather than representing an exotic limestone, is suggested by the co-occurrence of a colony of the tabulate *Michelinia* sp. in the same block (Fig. 1A, right), a taxon well known in Dutch building limestones (Verhofstad and Van den Koppel, 2006; Dubelaar et al., 2014; Reumer, 2016; Van Ruiten and Donovan, 2018; Donovan, 2019).

Discussion

In view of the fact that this specimen occurs in the wall of a museum, it was not possible to prepare it further by, for example, polishing the surface to emphasise the internal features. Referring to various works, including D. Hill (1981), Poty (1981) and Mitchell (2003), the closest generic identification is *Clisiophyllum* and the specimen is therefore referred to *Clisiophyllum*? sp. herein.

The significance of this specimen lies in its rarity in Dutch building stones. Common Mississippian corals include tabulate colonies such as *Syringopora* and *Michelinia*, and small, solitary rugose corals (Van Ruiten and Donovan, 2018; Donovan, 2019). As already mentioned, similar associations have been observed in several Dutch cities (such as Den Haag, Leiden and Maastricht), suggesting that the limestones derive from a limited area or similar horizon(s). Other taxa are rare. The present report determines yet another rarity in the rugose coral diversity and alerts us to the possibility of more uncommon, yet distinctive, taxa.

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