

THE FOSSIL SERPULIDAE AND SABELLIDAE FROM THE ISLE OF WIGHT: PART 2 THE CHALK SUPERGROUP

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Abstract: This second part of the review of fossil serpulid worms and their allies from the Isle of Wight describes species found in the Upper Cretaceous Chalk Supergroup. Attached forms from the White Chalk Subgroup are commonly found on echinoid tests, inoceramid shells, and belemnite guards. Serpulids are particularly common in the Glauconitic Marl and are commonly attached to clasts.

Keywords: Serpulidae, Chalk Group, Upper Cretaceous, Isle of Wight.

Introduction

This second part encompasses Annelids, principally serpulids from the Upper Cretaceous Chalk Supergroup of the Isle of Wight. 'The Chalk' is one of the richest sources of worm fossils in the United Kingdom, with both attached and unattached forms found throughout. The Chalk Group is divided into the Grey Chalk and the White Chalk subgroups, where the former equates to the Lower Chalk, and the latter to the Middle and Upper Chalk. The biozones found (and often still used) in older literature are prevalent in the data associated with specimens, and in this paper I have, where possible used both biozones and lithostratigraphy for occurrences. For a synthesis of Chalk stratigraphy see Gale and Kennedy (2002).

Most British Upper Cretaceous forms were first named and/or described in the early nineteenth century by Samuel Woodward (1833) or either J. Sowerby or J. de C. Sowerby in the *Mineral Conchology* (1812-1845). Since then, despite being both abundant and well preserved, they have received scant attention in the UK. However, the significance of the group has not gone overlooked elsewhere. The key references are Brünnich Nielsen (1931), Regenhardt (1961), Lommerzheim (1979) and Jäger (1983). The common UK material is well illustrated by Gale (2002). More recently Kočí and Jäger (2015) and Jäger and Krupp (2023) have provided invaluable updates on forms also found in the UK.

From the White Chalk Subgroup, cemented calcareous tubes are commonly found on the tests of echinoids, inoceramids, and the guards of belemnites, along with other epibionts such as bryozoans. In the Grey Chalk Subgroup, steinkerns and clasts in the Glauconitic Marl are common substrates for attached forms. Rowe (1908) listed the many quarries that dotted the Chalk Downland, listing sixteen species from the Island. Thirteen of these were named species, eight of which are recorded here. Today, with most of these quarries lost, coastal exposures are the remaining places from which to collect. Essentially, collecting is restricted to the Culver Chalk and Portsdown Chalk members at Whitecliff Bay. It is possible to collect from lower parts of the White Chalk Subgroup both sides of Culver Cliff, with extreme care. However, it is impossible to transit the full section from either direction at Alum Bay.

The Grey Chalk is Subgroup is accessible at Culver Cliff and between Bonchurch and west of St Catherine's Point. Other polychaete worms are found in association with sponges and are best known from flint pebbles, whilst the trace fossil *Terebella* (*Lepidenteron lewesiensis*) is found throughout the Chalk Supergroup. Worm tunnels in belemnite guards from the Isle of Wight were described by Munt (2022). Most of the specimens in the Isle of Wight Heritage Service Collection were collected in the 1920's by J. F. Jackson, former curator of the Museum of Isle of Wight Geology.

The descriptive terminology of the tube is simple: *tube shape* describes the cross-section shape, which may be different from the exterior to the interior of the tube; *growth lines* are hiatuses in growth, which may be faint to strong; *ridges* or *carinae* are raised lines running along the tube in the direction of growth; *ribs* are localised swellings of the tube.

Proximal and *distal* are directional terms, with distal being furthest away from the earliest part of the tube.

Growth shape can be *glomerate*, meaning aggregated often into knots, whereas the early whorls can be *trochiform* which is coiled like a snail shell, or conical which is cone shaped; *loops* and *coils* are curves with loops being looser. *Flanges* are flattened extensions to the tube, located at the point of attachment to the substrate.

Institutional abbreviations: IWCMS = Isle of Wight Council Museum Service. MIWG = Museum of Isle of Wight Geology.

Species Descriptions

Phylum ANNELIDA Lamarck, 1809

Class POLYCHAETA Grube, 1850

Subclass SEDENTARIA Lamarck, 1818

Infraclass CANALIPALPATA Rouse and Fauchald, 1997

Order SABELLIDA Dales, 1962

Family SABELLIDAE Latreille, 1825

Subfamily SABELLINAE Latreille, 1825

Genus GLOMERULA Brünnich Nielsen, 1931

Glomerula gordialis (Schlotheim, 1820) Fig. 1

Description. Solitary or forming small colonies. The initial coil is attached to a substrate and may be tight or loose. Planispiral or eccentrically coiled tubes become uncoiled, gently curved, or semiregular

loops. Tube diameter c. 3mm, up to 25 mm long, the tube is thick and smooth, though slightly uneven.

Remarks. Following Hove and Kupriyanova (2009), *Glomerula* is included in the Sabellidae.

Occurrence. Lower Jurassic to Eocene. Cenomanian, Grey Chalk Subgroup, West Melbury Chalk Formation (Glaucanitic Marl), Rocken End, Isle of Wight.

Material. Grey Chalk Subgroup, West Melbury Chalk Formation (Glaucanitic Marl): MIWG. 2222.



Fig. 1: *Glomerula gordialis* (Schlotheim, 1820). West Melbury Chalk Formation, Rocken End, Isle of Wight. MIWG. 252.



Fig. 2: *Glomerula lombricus* (Defrance, 1827). Portsdown Chalk Formation, Alum Bay, Isle of Wight. MIWG. 2468.

Glomerula lombricus (Defrance, 1827)

('Serpula ilium' Goldfuss, 1831) Fig. 2

Description. Typically, small, up to 10mm in length with tube diameter less than 1mm, comprising interlacing knots. The tube surface is smooth.

Remarks. Tubes assigned to *Serpula ilium* (Goldfuss 1831) are common in the White Chalk Subgroup. Jäger (1983) assigned these to *Glomerula gordialis*. Subsequently, Jäger (2012) reviewed these small glomerate tubes found in offshore chalks, such as the White Chalk Subgroup and placed them into the separate species.

Occurrence. Cretaceous Valanginian to Maastrichtian. Turonian White Chalk Subgroup, New Pit Chalk Formation (*Terebratulina lata* Zone), Downend Quarry, Isle of Wight. Coniacian, White Chalk Subgroup, Lewes Chalk Formation (*Sternotaxis plana* Zone), Downend Quarry, Isle of Wight. Coniacian to Santonian, White Chalk Subgroup,

Seaford Chalk Formation (*Micraster coranguinum* Zone), Freshwater Bay, Isle of Wight. Campanian, Culver Chalk Formation (*Goniatoteuthis quadrata* Zone); Culver Cliff, Isle of Wight; Portsdown Chalk Formation (*Belemnitella mucronata* Zone), Alum Bay, Isle of Wight.

Material. New Pit Chalk Formation: MIWG. 380. Lewes Chalk Formation: MIWG. 447. Seaford Chalk Formation: MIWG. 1834. Culver Chalk Formation: MIWG. 3086. Portsdown Chalk Formation: MIWG. 2468.

Glomerula plexus (J. de C. Sowerby, 1829) Fig. 3

Description. Irregular, straight, curved, and coiled tubes forming cemented interlocking masses. Up to 100 mm long and wide, though more typically longer than wide. The tubes are circular in cross section, smooth on the outer surface, and of medium thickness.

Occurrence. Middle Jurassic to Late Cretaceous. Cenomanian, Grey Chalk Subgroup, West Melbury Chalk Formation (Glaucanitic Marl), Rocken End, Isle of Wight.

Material. Grey Chalk Subgroup, West Melbury Chalk Formation (Glaucanitic Marl): MIWG. 252.



Fig. 3: *Glomerula plexus* (J. de C. Sowerby, 1829). West Melbury Chalk Formation, Watershoot Bay, Isle of Wight. MIWG.1523.

Family SERPULIDAE Rafinesque, 1815

Subfamily SERPULINAE Rafinesque, 1815

Genus SERPULA s.l

'Serpula' cf. *vortex* Woodward, 1833 Fig. 4

Description. Small, up to 8mm in diameter, slightly turbiniform attached coil. The surface is highly irregular.

Remarks. This species is based upon a line drawing by Woodward (1833) from either the Campanian or Maastrichtian of Norfolk. It seems never to have been reviewed. The material studied herein could represent a different taxon and resembles juvenile *Neovermilia ampullacea*.

Occurrence. Cretaceous, Cenomanian, Grey Chalk Subgroup, West Melbury Chalk Formation (Glaucanitic Marl), Binnel Point, Isle of Wight.

Material. Grey Chalk Subgroup, West Melbury Chalk Formation (Glaucanitic Marl): MIWG.1524.

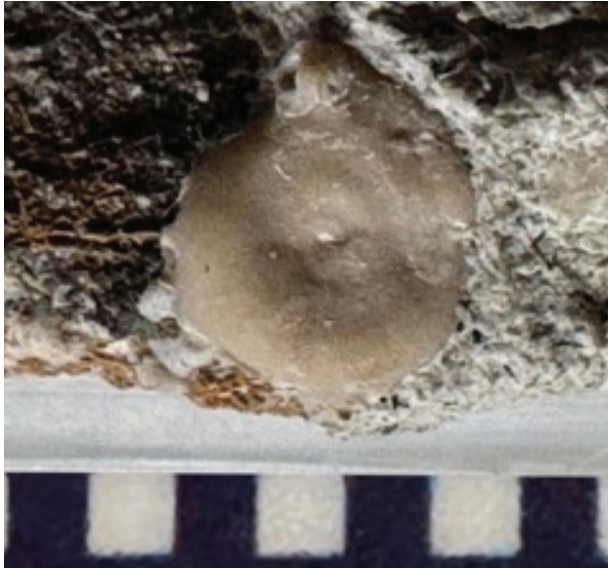


Fig. 4: '*Serpula*' vortex Woodward, 1833. West Melbury Chalk Formation, Binnel Point, Isle of Wight. MIWG. 1524.

Genus FILOGRANULA Langerhans, 1884

Filogranula cf. *cincta* (Goldfuss, 1831) Fig. 5

Description. Short undulating or straight tube around 10mm in length, 1.5mm in diameter. Tube surface with crenulated irregular longitudinal ridges. In section, the outer tube is star shaped, and the inner round. The attachment flange is narrow and the edge denticulate.

Remarks. Found attached to steinkerns in the Glaucanitic Marl.

Occurrence. Jurassic (Oxfordian) to Cretaceous (Maastrichtian). Cretaceous, Cenomanian, Grey Chalk Subgroup, West Melbury Chalk Formation (Glaucanitic Marl), Compton Bay and Ventnor, Isle of Wight.

Material. Grey Chalk Subgroup, West Melbury Chalk Formation (Glaucanitic Marl): MIWG.2689, MIWG. 3422.

Genus NEOVERMILIA Day, 1961

Neovermilia ampullacea (J. de C. Sowerby, 1829) Fig. 6

Description. Medium sized, up to 25 mm in diameter. Variable in shape from slightly trochiform to gently curving. Usually with marked constrictions. The surface with numerous, closely spaced growth lines which vary from fine to coarse. These give the tube a fibrous appearance. Some individuals have a narrow, irregular longitudinal carina.

Remarks. This is a quite variable species, however, the fibrous texture of the shell caused by the growth line is distinctive.

Occurrence. Cretaceous, Cenomanian to Maastrichtian. Cenomanian, Grey Chalk Subgroup, West Melbury Chalk Formation (Glaucanitic Marl), Ventnor and Compton Bay Isle of Wight. ? Zig Zag Chalk Formation (Chalk Marl), Compton Bay, Isle of Wight. Turonian, White Chalk Subgroup, New Pit Chalk



Fig. 5: *Filogranula* cf. *cincta* (Goldfuss, 1831). West Melbury Chalk Formation, Rocken End, Isle of Wight. MIWG.253.



Fig. 6: *Neovermilia ampullacea* (J. de C. Sowerby, 1829). New Pit Chalk Formation, Culver Cliff, Isle of Wight. MIWG. 2718.

Formation (*Terebratulina lata* Zone), Culver Cliff, Isle of Wight.

Material. Grey Chalk Subgroup, West Melbury Chalk Formation MIWG. 3420, 3423, and 5080.

? Zig Zag Chalk Formation (Chalk Marl) MIWG. 3420. White Chalk Subgroup, New Pit Chalk Formation: MIWG. 2718.

Genus PROLISERPULA Regenhardt, 1961

Proliserpula avita (J. de C. Sowerby, 1844) Fig. 7

Description. Colonies of attached curved or looped tubes closely adjacent to one another, sometimes crossing over each other. Colonies can exceed 50 mm in area, with individual tubes up to 3mm in diameter. Irregular growth line with occasional swellings, and a faint longitudinal carina.

Remarks. Can be readily distinguished from other colonial forms as the tubes don't intertwine. Restricted to the Lower Turonian.

Occurrence. Cretaceous, Lower Turonian. Turonian, White Chalk Subgroup, Holywell Chalk Formation (*Mytiloides labiatus* Zone), Culver Cliff, Isle of Wight.

Material. White Chalk Subgroup, Holywell Chalk Formation MIWG. 2715.

Genus ORTHOCONORCA Jäger, 1983

Orthoconorca turbinella (J. de C. Sowerby, 1844) Fig. 8

Description. Small, typically between 5 and 10mm in height. Tightly coiled often almost conical in shape but may vary with less tight coiling. The tube is narrow and circular, smooth.

Remarks. Common almost throughout the White Chalk Subgroup.

Occurrence. Cretaceous, Coniacian to Maastrichtian. Coniacian, White Chalk Subgroup, Seaford Chalk Formation (*Micraster coranguinum* Zone), Watcombe Bay, Isle of Wight. Campanian, Newhaven Chalk Formation (*Marsupites testudinarius* Zone) Freshwater Bay, Isle of Wight; Culver Chalk Formation (*Goniot euthis quadrata* Zone); Downend Quarry, Isle of Wight; Portsdown Chalk Formation (*Belemnitella mucronata* Zone), Whitecliff Bay and Alum Bay, Isle of Wight.

Material. White Chalk Subgroup, Seaford Chalk Formation: MIWG. 1839. Newhaven Chalk Formation: MIWG. 3193. Culver Chalk Formation: MIWG. 465. Portsdown Chalk Formation: MIWG. 1870, MIWG. 3080.

Genus PYRGOOLON De Montfort, 1808

Subgenus SEPTENARIA Regenhardt, 1961

Pyrgopolon (Septenaria) macropus (J. de C. Sowerby, 1829) Fig. 9

Description. Typically, short horn-shaped tubes up to 10mm in length. However, these are parts of longer tubes up to 140mm in length. The outer surface has seven strong longitudinal carinae, the inner tube shape is circular. The sides have many irregularly spaced, variable strength growth lines. At the aperture the carinae are markedly rounded.

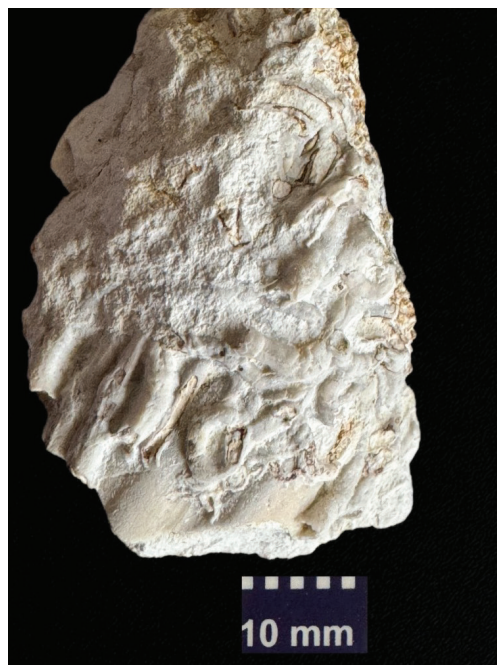


Fig. 7: *Proliserpula avita* (J. de C. Sowerby, 1844). Holywell Chalk Formation, Culver Cliff, Isle of Wight. MIWG.2715



Fig. 8: *Orthoconorca turbinella* (J. de C. Sowerby, 1844). Portsdown Chalk Formation, Whitecliff Bay, Isle of Wight. MIWG. 1870.



Fig. 9: *Pyrgopolon (Septenaria) macropus* (J. de C. Sowerby). West Melbury Chalk Formation, St Catherine's Point, Isle of Wight. MIWG. 2645.



Fig. 9a: *Pyrgopolon (Septenaria) macropus* (J. de C. Sowerby). New Pit Chalk Formation, Culver Cliff, Isle of Wight, MIWG.2717. View of the aperture.

Remarks. Attached to hard substrates such as echinoid tests, but often found as loose broken fragments.

Occurrence. Cretaceous, Upper Turonian to Maastrichtian. Turonian, White Chalk Subgroup, New Pit Formation (*Terebratulina lata* Zone), Culver Cliff, Isle of Wight.

Material. White Chalk Subgroup, New Pit Formation MIWG. 2717.

Family SPIRORBIDAE Chamberlin, 1919

Subfamily SPIRORBINAE Chamberlin, 1919

Genus NEOMICRORBIS Rovereto, 1903

Neomicrorbis crenastriatus (Münster in Goldfuss, 1831) Fig. 10

Description. Small, up to 5mm in diameter planispiral tubes attached to a hard substrate, commonly on echinoid tests.

Remarks. Regenhardt (1961) synonymised *S. granulatus* Sowerby, 1829 with *Serpula crenastriatus*. Herein we include specimens previously assigned to *S. granulatus*. *Neomicrorbis crenastriatus subrugosa* (Münster in Goldfuss, 1831) is a subspecies recognised by Kočí and Jäger (2015) p.40, following Jäger (1983) p. 172 who assigned *S. subrugosa* to *Neomicrorbis*. Recorded from the Isle of Wight by Rowe (1908) as *S. plana*.

Occurrence. Cretaceous, Cenomanian to Campanian. Turonian, White Chalk Subgroup, Holywell Chalk Formation (*Mytiloides labiatus* Zone), Culver Cliff; Campanian, Culver Chalk Formation (*Goniot euthis quadrata* Zone); Culver Cliff, Isle of Wight.

Material. White Chalk Subgroup, Holywell Chalk Formation MIWG. 2716, Culver Chalk Formation: MIWG.3469.



Fig. 10: *Neomicrorbis crenastriatus* (Münster in Goldfuss, 1831). Culver Chalk Formation, Culver Cliff, Isle of Wight. MIWG. 3469.

Genus ROTULARIA Defrance, 1827

Subgenus PRAEROTULARIA Lommerzheim, 1979

Rotularia (Praerotularia) umbonata (J. Sowerby, 1814) Fig. 11

Description. The early whorls are trochiform, then as a short gentle curve. The tube is thick, with an inner diameter of 8 mm and outer of 15mm, it is very irregular with swellings and constrictions. The growth line is faint.

Occurrence. Cretaceous, Albian to Cenomanian. Cenomanian, Grey Chalk Subgroup, West Melbury Chalk Formation (Glaucconitic Marl), Binnel Point, Isle of Wight.

Material. Grey Chalk Subgroup, West Melbury Chalk Formation: MIWG. 4295.



Fig.11: *Rotularia (Praerotularia) umbonata* (J. Sowerby, 1814). West Melbury Chalk Formation, Isle of Wight. MIWG. 4295.

Trace Fossil: LEPIDENTERON Frič, 1878

Lepidenteron lewesiensis (Mantell, 1822) Fig. 12

Description. Up to 300 mm in length, 30 mm in width. Unbounded tube-shaped structure tapering distally, filled with bioclasts of fish scales and bones.

Remarks. The genus *Terebella* probably ranges from the Middle Jurassic to the end of the Cretaceous. *Terebella lewesiensis* is restricted to the Upper Cretaceous of northern Europe Jurkowska and Uchman (2013).

Occurrence. Cretaceous, Cenomanian to Maastrichtian **Material.** White Chalk Subgroup, Brightstone Down, Isle of Wight. IWCMS 1997.301

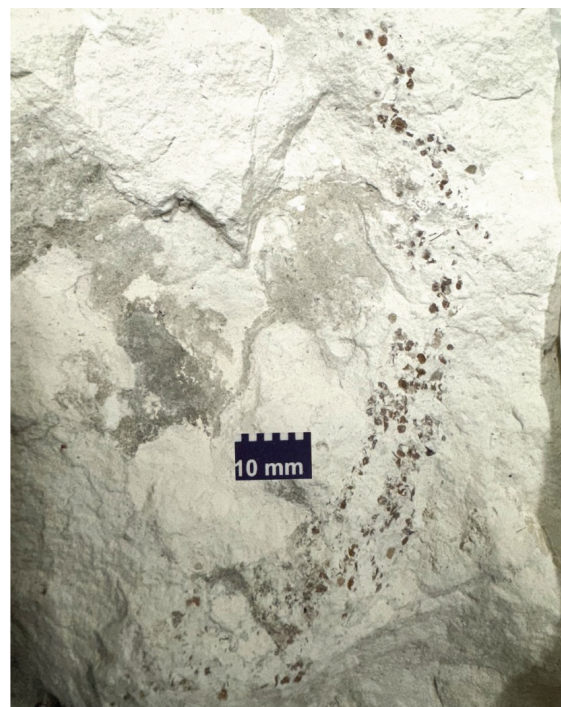


Fig. 12: *Lepidenteron lewesiensis* (Mantell, 1822). White Chalk Group, Brightstone Down, Isle of Wight. IWCMS 1997.301

Notes on additional taxa recorded by Rowe (1908) from the White Chalk of the Isle of Wight.

Serpula pusilla J. de C. Sowerby 1844 recorded as rare in the *Belemnitella mucronata* Zone, now known as *Eoplacostegus pusillus* (J. de C. Sowerby 1844). One or two stacked spirals give rise to a gently twisted tube at almost 90° to the previous whorls, both the inner and outer tubes are circular in cross section. See Jäger (1983).

Serpula canteriata Hagenow, 1840 recorded as rare in the *Belemnitella mucronata* Zone, now known as *Nogrobs (Tetraserpula) canteriata* (Hagenow, 1840). Considered by Jäger (1983) to be restricted to the Maastrichtian. This is a gently curving tube with four broad, rounded longitudinal carinae, the outer cross section being almost square. See Jäger (2012).

Serpula pentagulata S. Woodward, 1833 recorded as rare in the *Sternotaxis plana* Zone, is a junior synonym of *Pentaditrupe subtorquata* (Münster in Goldfuss, 1831). A simple gently curved tube with the outer cross section star shaped. See Jäger (1983).

Serpula fluctuata J. de C. Sowerby, 1829, recorded from *Sternotaxis plana*, *Micraster cortestudinarium* and *Belemnitella mucronata* zones, now known as *Vermiliopsis fluctuata* (J. de C. Sowerby, 1829). A looped tube with a very irregular shaped outer cross section produced by rugose longitudinal carinae. See Jäger (2012).

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