

The trace fossil *Schaubcylindrichnus coronus* Frey and Howard, 1981, from the White Limestone Group of northeast Jamaica

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ABSTRACT. The upper Lower-Middle Miocene Pelleu Island Formation of the Middle Eocene to Middle Miocene White Limestone Group, northeast Jamaica, has yielded the trace fossil *Schaubcylindrichnus coronus* Frey and Howard, 1981. The documentation of this bundled trace fossil is important because it is the first report of this ichnotaxon from Jamaica and indeed the Caribbean region. As a corollary it therefore adds to the geographical distribution of the trace fossil, and it is the first record that extends its palaeoenvironmental range to a deep-water setting.

1. INTRODUCTION

ICHOLOGICAL RESEARCH on the Middle Eocene to Middle Miocene White Limestone Group of Jamaica was initiated by us in 1999 despite ichnofossils being well known and documented in detail from other strata on the island (see Pickerill *et al.*, 1998, and references therein). Our preliminary assessment of the White Limestone Group has indicated that it possesses uncommon, but relatively diverse, bioerosional structures (macroborings) (Blissett and Pickerill, in press) along with moderately diverse, poor to moderately preserved, soft-sediment ichnotaxa (Blissett and Pickerill, 2002). This report, the first detailed documentation on the occurrence of a soft-sediment ichnotaxon from the White Limestone Group, highlights the presence of *Schaubcylindrichnus coronus* Frey and Howard, 1981. This ichnotaxon is a rarely reported form that, until now, has not been recorded from Jamaica, nor indeed from the entire Caribbean region. Additionally, this record extends its palaeoenvironmental range, as documented in previous recordings, to deep-water settings.

2. LOCATION AND GEOLOGICAL SETTING

Schaubcylindrichnus coronus Frey and Howard, 1981, as described herein, occurs within a well-exposed section of the upper Lower-Middle Miocene (Steineck, 1974) Pelleu Island Formation (Mitchell, in press), formerly known as the Spring Garden Formation (Robinson, 1969), of the Middle Eocene to Middle Miocene White Limestone Group. The Pelleu Island Formation consists of massive, evenly bedded, bioclastic, white-cream

coloured, chalky limestones without chert layers. It overlies the Montpelier Formation that is lithologically similar, but possesses chert layers (Mitchell, in press). It is overlain by siliciclastics of the Upper Miocene to Pleistocene Coastal Group (Fig. 1). According to Steineck (1974, p. 232), based on foraminiferal criteria, the Pelleu Island Formation was deposited in palaeodepths approaching 1500 m.

The specific exposure is located in the parish of Portland (Fig. 2) on the fringes of the Wagwater Belt and the Blue Mountains Block (see Robinson, 1994, and references therein for details). It is located in Plum Valley, 4.5 km south of the town of Buff Bay, on the western bank of the Buff Bay River that parallels the main road between the towns of Buff Bay and Newcastle (Fig. 2). The section, 6 m in thickness, consists of cream-coloured, compact, mottled, medium-bedded (10-30 cm), fine- to medium-grained, bioclastic, chalky limestone interbedded with thinly bedded (3-10 cm), poorly consolidated, cream-coloured, calcareous mudstone that is devoid of macrofossils. The mottled appearance is interpreted to be the result of bioturbation. Bioturbation is also present on the upper and lower bedding plane surfaces of the chalky limestones and sporadically perpendicular to bedding.

3. SYSTEMATIC ICINOLOGY

Ichnogenus *Schaubcylindrichnus* Frey and Howard, 1981

Type ichnospecies: *Schaubcylindrichnus coronus* Frey and Howard, 1981.

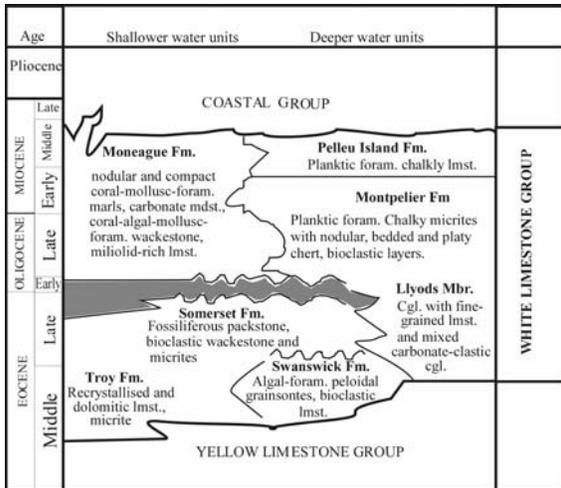


Figure 1. Middle Eocene to Middle Miocene lithostratigraphic units of the White Limestone Group, Jamaica (modified after Mitchell, 2003), also depicting the relationship of the underlying (Yellow Limestone Group) and overlying (Coastal Group) units.

Other ichnospecies: *Schaubcylindrichnus freyi* Miller, 1995.

Diagnosis. (After Frey and Howard, 1981). “Distinct, isolated groups or bundles of congruent, lined tubes that ordinarily do not branch or interconnect. Preserved as endichnia”.

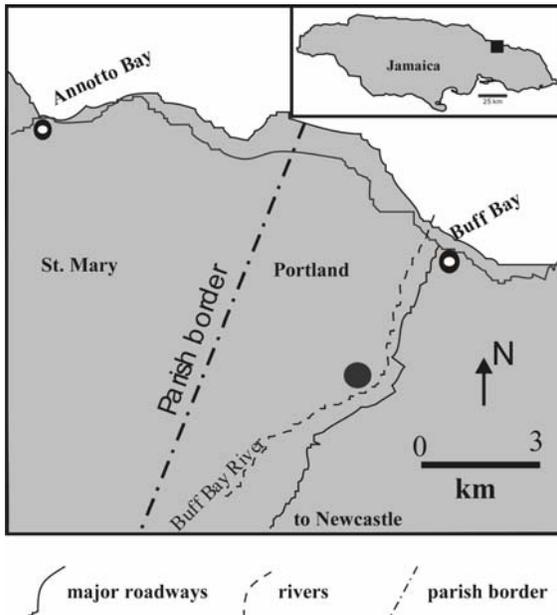


Figure 2. Simplified location map of the area where the sample of *S. coronus* was collected. Inset map shows the location of the exposure in Jamaica.

***Schaubcylindrichnus coronus* Frey and Howard, 1981**
Figure 3

Diagnosis. (After Frey and Howard, 1981). Thickly lined and gently curved ichnospecies with its upper extremities approximately vertical and lower ones approaching the horizontal.

Material. One slab, initially measuring 400 x 270 x 50 mm, subsequently vertically sectioned. A component of the vertical fraction is housed in the Geological museum of the University of the West Indies, Mona, as UWIGM2003.23. The specimen is preserved in association with *Palaeophycus tubularis* Hall, *Planolites beverleyensis* (E. Billings), *P. montanus* Richter, *Scolicia strozzii* Savi and Meneghini, *Scolicia prisca* de Quatrefages, *Taenidium serpentinum* Heer, *Thalassinoides horizontalis* Myrow and *Trichichnus simplex* Fillion and Pickerill.

Description. Lined, ovate to circular tubes in cross-section, bundled collectively in groups of between 4 and 15. The diameter of individual tubes varies from 2 - 7 mm (outer diameter) with the inner diameter from 1 - 5 mm. The tubes do not intersect but because of their tight bundling, especially in groups having a large number, the linings of adjacent tubes intermingle and sporadically, where this occurs, are very faint. The lining of individual tubes consists of well-sorted, black, generally bioclastic grains (predominantly foraminifers) that vary from very thin and faint up to approximately 1 mm in thickness. The linings are thickest basally and laterally. The infill consists of unsorted, cream-coloured micritic grains. Two truncated horizontal tubes, probably a result of random sectioning, were observed and possess lengths of 12 and 18 mm.

Remarks. The ichnogenus *Schaubcylindrichnus* has been interpreted as a communal domicile of suspension or deposit feeders such as sabellarid polychaetes (Pemberton *et al.*, 2001). *Schaubcylindrichnus* ispp. lack connectivity, possess a consistent orientation and are multitubed (Frey and Howard, 1981). Based on these characteristics Frey and Howard (1981) discussed the similarity, or lack thereof, between the ichnotaxa *Phycodes* Richter and *Teichichnus* Seilacher to *S. coronus*. Since then, the diagnosis of *Phycodes* has been emended (Uchman, 1998) and that of *Teichichnus* has been simplified (Schlirf, 2000), so that nomenclatural difficulties between these ichnotaxa are essentially resolved. Two other ichnotaxa, not considered by Frey and Howard (1981), but that also bear close similarity to *Schaubcylindrichnus*, namely *Palaeophycus heberti* de Saporta and *Dactylodites* Hall, can also be reasonably distinguished. *Palaeophycus heberti* is thickly lined and although not oblique- to vertically-

Schaubcylindrichnus coronus from Jamaica

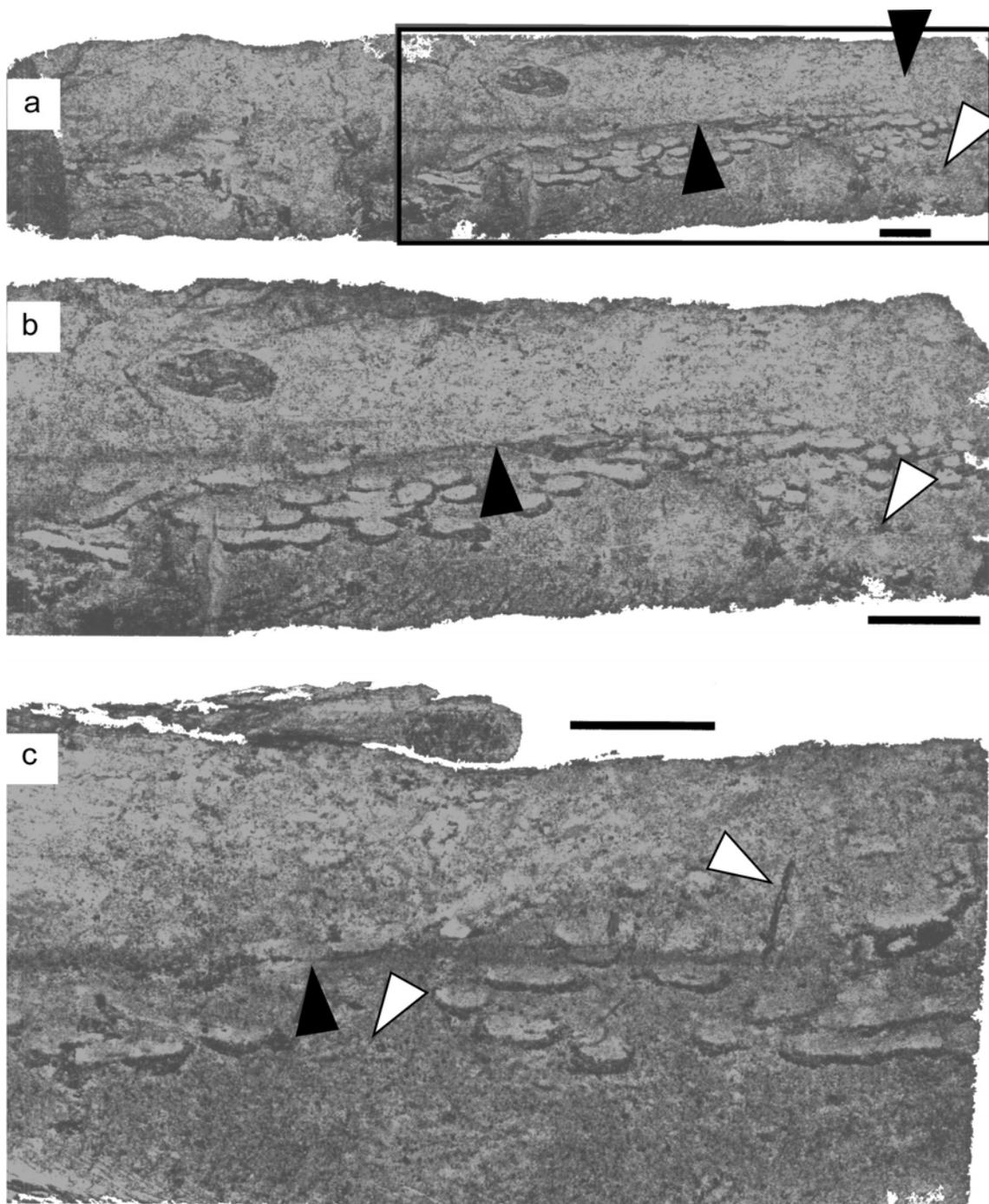


Figure 3. Vertical sections of *Schaubcylindrichnus coronus* Frey and Howard, 1981 from the Pelleu Island Formation, northeastern Jamaica. (A) Black arrows indicate erosional surfaces while white arrow points to *Scolicia* isp. *Schaubcylindrichnus coronus* is apparent in this and the other photographs as closely spaced, elliptical to elongate slightly dumbbell-shaped burrows, infilled with pale matrix, but with a dark lining thickest basally and laterally. (B) Enlarged rectangular section as outlined in A. (C) *Schaubcylindrichnus coronus* in association with *Trichichnus simplex* (plain white arrow, right hand side of photograph). Black arrow indicates the same erosion surface as illustrated in A and B. White arrow points to *Scolicia* isp. Scale bars represent 10 mm.

orientated as with *Schaubcylindrichnus* ispp., it is similar in vertical section. Nevertheless it typically

occurs in isolation or mutual associations that are not bundled (Pemberton and Frey, 1982).

Dactyloidites, in vertical section, does exhibit a very close morphology; however, individual tubes are more thinly lined, commonly intersect and the lining is developed consistently (and with a common thickness) around individual tubes. Furthermore this ichnotaxon can only realistically be identified positively when viewed in horizontal section as a definitively stellate form (Pickerill *et al.*, 1993). Such features have not collectively been previously observed in *Schaubcylichnus* (see Pickerill *et al.*, 1993). Thus, we are confident that the material documented herein can be readily assigned to *Schaubcylichnus*.

To our knowledge, the only two ichnospecies of *Schaubcylichnus*, *S. coronus* and *S. freyi* Miller, 1995, differ on the basis of the tightness of the bundles (*S. coronus* is tightly bundled while *S. freyi* is loosely bundled). Ichnospecific assignment of the material documented herein is also based on this criterion.

The importance of the occurrence of *Schaubcylichnus coronus* as documented herein is threefold. First, this is the first report of this particular ichnotaxon from Jamaica and indeed from the Caribbean region. Second, previously described occurrences of *Schaubcylichnus coronus* are restricted to the Cretaceous of the Western Interior, continental U.S.A. (Frey, 1990; Frey and Howard, 1981, 1982, 1985a, b, 1990) and the Tertiary of Asia (Frey and Pemberton, 1991; Hong and Wang, 1988); therefore, this report serves as an addition to the geographical distribution of this trace fossil. Third, Frey and Pemberton (1991, p. 600) noted that “.....observations are needed to test the environmental and biostratigraphic ramifications of this distribution pattern” (i.e., Cretaceous and Tertiary deposits of North America and Asia). *Schaubcylichnus coronus* has, until now, remained an ichnospecies only previously recorded from generally shallow-water deposits. Its documentation herein thus extends its palaeoenvironmental range to deep water and caution must be exercised in its application as a palaeoenvironmental indicator.

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