Geology

Evidence for Cnidaria-like behavior in ca. 560 Ma Ediacaran *Aspidella*: COMMENT

Gregory J. Retallack

Geology 2014;42;e323
doi: 10.1130/G34895C.1

Notes

doi:10.1130/G34895C.1

Forum Comment

Evidence for Cnidaria-like behavior in ca. 560 Ma Ediacaran *Aspidella*

Gregory J. Retallack
Department of Geological Sciences, University of Oregon, Eugene, Oregon 97403, USA

Menon et al. (2013) regard wrinkles at the base of discoid fossils (*Aspidella terranovica*) and deformation of laminae in cut slabs as evidence for upward migration of a cnidarian polyp in marine shales, but their observations are better explained by a sessile-growing organism with growth rugae and downward-tapering rhizomorphs in shallow marine to intertidal environments. The observations of Menon et al. are not evidence of mid-Ediacaran (560 Ma) animals, and neither are the supposed trails of Liu et al. (2010), which are more likely tilting traces with characteristic overlapping loops and intermittent sliding (Retallack, 2010).

Several of the observations of Menon et al. falsify their interpretation of upward migration, notably the deformation of laminae both upward and downward, and marked narrowing of the deformed zone downward (Menon et al., 2013, their figure 3). These features are also seen in other thin sections of *A. terranovica* from Ferryland, Newfoundland (Fig. 1A), here shown with laminae deformed both upward and downward around sandstone casts of *Aspidella*, and below that, tubular rhizomorphic structures (Fig. 1C). These observations are incompatible with the broad base of cnidarian polyps or any consistent direction of movement. Crescentic wrinkles interpreted by Menon et al. as trail backfills can instead be interpreted as growth rugae (Fig. 1D), as in slightly exhumed but firmly attached organisms (Fig. 1D). Downward-deflected laminae can be explained by rhizomorph growth, and upward-deflected laminae as onlapping or bowed up by growth increments.

The strongly tapering bases of "equilibration trails" of Menon et al. were more likely rhizomorphs at the base of *A. terranovica*. Comparable tubular features attached to presumably uprooted *Aspidella* were illustrated by Gehling et al. (2000, and their figure 14), and are also figured here (Figs. 1A and 1B). My observations of gray color, dominantly clayey grain size, pyritic nodules, flaser bedding, and isolated ripple trains at two sites at Ferryland support the interpretation that the *Aspidella* facies was deposited in a very shallow marine bay or lagoon protected from wave action. The surfaces colonized densely by rhizomorphic *Aspidella* may have been an Ediacaran equivalent of pyritic intertidal paleosols (Sulfaquents of Soil Survey Staff, 2010), like those of modern salt marshes (Nelson et al., 1996). Menon et al. are correct that the *Aspidella* facies bears little resemblance to sequences of red, formerly well-drained, calcic and gypsic paleosols supporting more complex Ediacaran fossils (Retallack, 2013), but that does not rule out waterlogged intertidal paleosols for *Aspidella* and interpretation as a rhizomorphic button lichen with growth rugae (Fig. 1D).

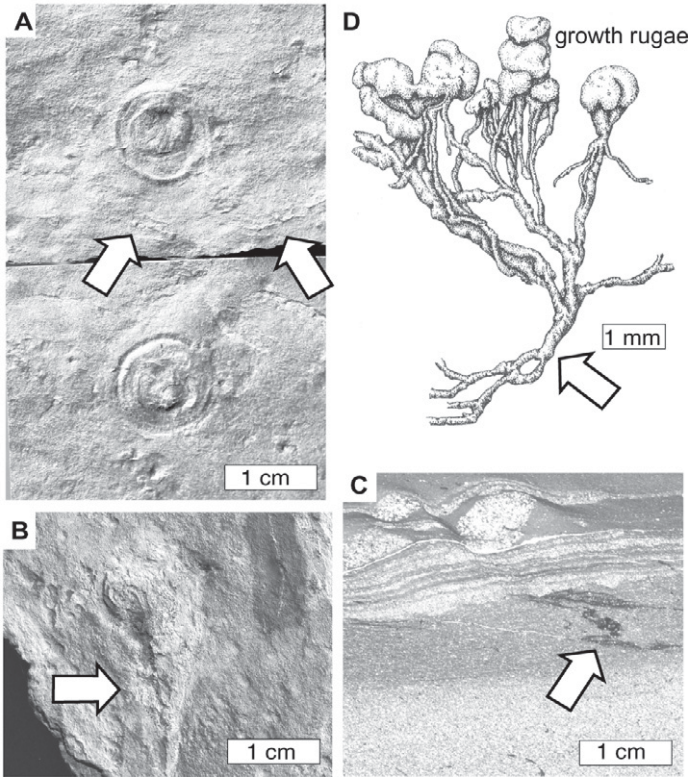

Figure 1. Fossils of *Aspidella terranovica* from the Fermeuse Formation at Ferryland, Newfoundland, 47.01439°N 52.89151°W, (A; with cover bed above and original surface below), with rhizomorphs in a presumed uprooted specimen (B) and in vertically oriented thin section (C), compared with a living button lichen (*Toninia sedifolia*) and its rhizomorphic hyphae (D). Arrows indicate tubular rhizomorphic structures. Image D is from Poelt and Baumgärtner (1964). Specimens in Museum of Natural and Cultural History of the University of Oregon are F116742A (A, upper), F116742B (A, lower), F116744 (B) and F116754A (C). Menon et al. (2013) did not specify the exact location of their fossils, which show orange weathering as in the highway road cut site (47.02766°N 52.88331°W), 1.61 km north along strike (as correlated by Gehling et al., 2000) from the rock platform site of the unweathered specimens illustrated here. Non-commercial collection of *Aspidella* is permitted and neither Ferryland site is protected under Newfoundland and Labrador regulation 67/11 of the Historic Resources Act (O.C. 2011–198).

REFERENCES CITED

Gehling, J.G., Narbonne, G.M., and Anderson, M.M., 2000, The first named Ediacaran body fossil; *Aspidella terranovica*: Palaeontology, v. 43, p. 427–456, doi:10.1111/j.0031-0239.2000.00134.x.

Liu, A.G., McIlroy, D., and Brasier, M.D., 2010, First evidence for locomotion in the Ediacara biota from the 565 Ma Mistaken Point Formation, Newfoundland: Geology, v. 38, p. 123–126, doi:10.1130/G30368.1.

Menon, L.R., McIlroy, D., and Brasier, M.D., 2013, Evidence of Cnidaria-like behavior in ca. 560 Ma Ediacaran *Aspidella*: Geology, v. 41, p. 895–898, doi:10.1130/G34424.1.

Nelson, A.R., Jennings, A.E., and Kashima, K., 1996, An earthquake history derived from stratigraphic and microfossil evidence of relative sea-level change at Coos Bay, southern coastal Oregon: Geological Society of America Bulletin, v. 108, p. 141–154, doi:10.1130/0016-7606(1996)108<0141:AEHDFS>2.3.CO;2.

Poelt, J., and Baumgärtner, H., 1964, Über Rhizinenstränge bei placodialen Flechten: Österreich Botanische Zeitschrift, v. 111, p. 1–18.

Retallack, G.J., 2010, First evidence for locomotion in the Ediacara biota from the 565 Ma Mistaken Point Formation, Newfoundland: Comment: Geology, e223, doi:10.1130/G31137C.1.

Retallack, G.J., 2013, Ediacaran life on land: Nature, v. 493, p. 89–92, doi:10.1038/nature11777.

Soil Survey Staff, 2010, Keys to Soil Taxonomy: Washington, D.C., USDA-Natural Resources Conservation Service, 338 p.