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Field Studies Report

Introduction

On September 11, 2016, the Invertebrate Paleontology class of The College of Wooster took a trip to the Caesar Creek Emergency Spillway near Waynesville, Ohio (84° 3’ 33” W, 39° 29’ 30” N). This location’s locality number is C/W-128. The spillway itself was formed to prevent overfilling of the dam in the event of a flood. It is rich in a great variety of notably well-preserved fossils, particularly those from the Upper Ordovician, and thus is an ideal location to collect fossils. These fossils can tell us much about the environment of this location during the Ordovician and about the organisms that lived there which, in turn, can help us understand the evolutionary history of this area.

Stratigraphy

The fossils collected from Caesar Creek originate solely from the Bull Fork Formation of the Richmondian stage. The three formations present here are the Waynesville, Liberty, and Whitewater Formations; we sampled from the Wayneswille. The rock layers in this area are primarily alternating units of shale and limestone, both of which are usually fossiliferous. The shale is mostly calcareous, while the limestone consists of wackestones and packstones with a few micrites in the lower section. Sedimentary hardgrounds form a large part of the limestone units. Additionally, many of the Caesar Creek rock layers form parts of distinct graded storm sequences. The wackestones at the base are covered by laminated calcareous siltstones, which are then covered by shale.

Systematic Paleontology

Phylum CNIDARIA
Class Anthozoa
Subclass Zoantharia
Order Rugosa
Grewingkia canadensis
5

Phylum BRACHIOPODA
Subphylum Craniiformea
Class Craniata
Order Craniida
Petrocrania scabiosa
9

Subphylum Rhynchonelliformea
Class Strophomenata
Order Strophomenida
Strophomena planumbona
18

Leptaena richmondensis
19

Rafinesquina ponderosa
20

Rafinesquina alternata
21

Class Rhynchonellata
Order Orthida
Plaesiomys subquadratus
22

Austinella scovillei
23

Order Rhynchonellida
Lepidocyclus perlamellosum
16

Hiscobeccus capax
17

Order Atrypida
Zygospira kentuckiensis
6

Zygospira modesta
7

Phylum BRYOZOA
Class Stenolaemata
Order Cystoporata
Constellaria polystomella
1

Order Trepostomata 1
15

Order Trepostomata 2
14

Phylum MOLLUSCA
Subphylum Cyrtosoma
Class Gastropoda
11

Paupospira bowdeni
2

Subclass Eogastropoda
Cyclonema humerosum
10

Subphylum Diasoma
Class Bivalvia
Subclass Pteriomorpha
Order Pterioidea
Ambonychia robusta
24

Phylum ARTHROPODA
Subphylum Trilobitomorpha
Class Trilobita
13

Order Asaphida
Isotelus maximus
12

Order Phacopida
Flexicalymene meeki
8

Phylum ECHINODERMATA
Subphylum Crinozoa
Class Crinoidea
Cincinnaticrinus pentagonus
4

ICHNOFOSSIL
3

Peels

The transverse acetate peel (peel number 1) of the rugose coral *Grewingkia canadensis* (number 5) reveals small protrusions on a section of the periphery of the coral. The septa are visible to even the naked eye and, when examined more closely, seem to curve slightly inward toward the center. The very middle of the peel is a light-colored space filled with mountain-like spines reaching toward the center. Also present are what seem to be small grains filling what

look to be tears on the edge of the coral along the septa. In the tangential rugose peel (peel number 3), vertical lines are visible, running almost the entire length of the coral. Presumably, these are the septa dividing the coral horizontally. The longitudinal rugose peel (peel number 5) is less remarkable than the other peels, excepting small pockets filled with cracks and possibly grains. These pockets are similar to the center of the transverse peel.

Acetate peel number 2, the transverse peel of an Order Trepostomata 1 bryozoan (number 15), displays a multitude of grains, both dark and light colored and of varying sizes, occupying much of the center of the bryozoan. Small clear spaces, without any grains, are present throughout this area as well. On the periphery are what seem to be cells, generally decreasing in size as they approach the edge. Skirting the edge in some spots are layers that are more continuous and uniform than the cells in the interior. Similar to *Grewingkia canadensis*, small protrusions are also present in certain parts of the perimeter. Present on the tangential peel (peel number 4) are two large pockets containing slightly larger and darker grains than were visible in the transverse peel. Somewhat larger cells are found on this peel, but organized in much the same fashion as were in the transverse peel. Peel number 6, the longitudinal bryozoan peel, finds the same two pockets as before, but instead filled with more lightly-colored grains. Small hair-like structures reach into one hole, although I am unsure if these are a part of the bryozoan itself or simply a result of the peel-making process. Cells are again present in the same manner as were in peel number 4.

Taphonomy

A large amount of my fossils appear to have been broken or worn down, indicating they were transported after death. Many brachiopod shells, but not all, are broken and/or are missing the other valve. A not insignificant portion of the shells seems to have been eroded away. All of

the gastropods I found (numbers 2, 10, and 11) are internal molds, which is not surprising as most gastropods have aragonitic shells that are liable to have dissolved since the Ordovician. The trilobites (numbers 8, 12, and 13) tend to be in pieces, most of which I believe to be molt fragments. The bryozoans and crinoids (numbers 1, 14, and 15 and number 4 respectively) are usually broken in at least one place, as both are fairly spread and, in the case of bryozoans, branched out. Most fossils appear to have been deposited after death, as many are found scattered with others in a sort of jumble with unlike organisms in addition to having been broken or fragmented (see slabs, especially the small slab containing numbers 2, 4, 7, and 13).

Paleoecology

The most common organisms found in the collections from Caesar Creek seem to be Strophomenid brachiopods and Trepostome bryozoans (see numbers 18, 19, 20, and 21 and numbers 14 and 15 of my collection respectively). This points to a tendency towards filter feeding, which may indicate an environment of clearer waters with soft sediment, also shown by the trace fossils found (see number 3 of my collection and numbers 11, 13, and 14 of Josh Charlton's collection). A large number of pieces of *Isotelus maximus* (number 12 of my collection) were also found, but I would suppose that this is because the large size of the organism causes it to break into many smaller pieces, especially after death, in addition to the fragments formed due to ecdysis. These were likely deposited in fine-grained sediment on the ocean floor, as the rock surrounding the fossils tends to be fairly fine-grained. The Waynesville is largely an offshore facies, as is demonstrated by fossils like *Austinella scovillei* (see number 23 of my collection), which live only in an offshore environment. The rock units these fossils were found in alternate, indicating a cyclical changing of conditions as the rocks were formed, such as might be formed by occasional storm sequences.