7. "WORM TUBES"

LOCATION

The "worm tubes" being considered here are located on the west side of a little north-south directed canyon that opens onto the south side of US Highway 6, just a little east of the highway truck weighing station at Castle Gate, Utah. This is east of the junction of US Highways 191 and 6 west of Helper, Utah. The worm tubes can be easily seen at the entrance of the canyon in blocks that have fallen down from the layers of the well bedded Panther Sandstone Member of the Cretaceous Star Point Formation (Figure 1) that is exposed on the west side of the canyon.

FIGURE 1. The parallel layers of sediment to the left and middle of the upper part of the figure are the Panther Tongue of the Cretaceous Star Point Formation. Some of the upper layers have abundant "worm tubes," especially in their top portions.

DESCRIPTION

The Book Cliffs area around Price, Utah, is a Mecca for trace fossils (tracks, tubes, etc., left by organisms). In the sandstones of this region numerous tube-like structures ("worm tubes") left by organisms are found. These have been thoroughly studied (e.g., Frey and Howard 1985, 1990). It is strange that though the tubular structures are abundant, little is known about the kinds of organisms that produced them: "Body fossils are virtually non-existent" (Frey and Howard 1990.) Over a score of different kinds of trace fossils ("tubes") have been identified in this area.

A CREATION-FLOOD PERSPECTIVE

The presence of "worm tubes" is considered to be a problem for a flood model. In a worldwide flood, one would not expect organisms to be producing "tubes." This is considered to require time.

One suggestion as an answer to this objection is that these tubes really do not represent structures made by organisms. After all, organisms are essentially absent. This may be the case for some; however, for others a biological origin seems almost certain, since a regular pattern of biological activity is reflected in the wall and sometimes the content of the tubes. This is especially conspicuous in the *Ophiomorpha* group, which has a pellet-wall pattern.

An alternative answer lies in the question of the amount of time required by these organisms to produce these tubes. The flood described in Genesis took over a year for its various phases. Could organisms build these tubes within the constraints of that time? During the year of the flood, many things could happen, including tube burrowing. In order to disprove the flood, only events that take longer than the time available should be considered valid. Since the known rate of formation of these tubes can be quite rapid, they may not represent a firm challenge to a flood model after all.

Studies by Kranz (1974) indicate that bivalves burrow between 0.16 and 153.15 cm/hr under an increasing overburden of sediments (anastrophic events). Under normal conditions, rates between 1.84 and 1000 cm/hr are reported by Stanley (1970; also see Table 4 in Kranz 1974). Investigations by Howard and Elders (1970) on small (1 mm diameter burrow) crustacea from Sapelo Island, Georgia, indicate burrowing rates of 0.7 to 4.6 cm/hr.

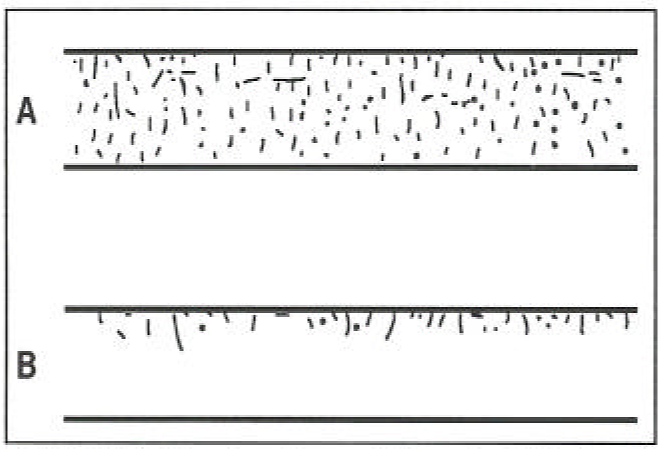

FIGURE 2. Sedimentary layer with trace fossils illustrated as vertical-oblique lines. A = pattern expected under a slow process of accumulation; B = pattern expected under rapid deposition.

Interestingly, Signor (1982) found that fat turritelliform (elongated, pointed) snails buried themselves much faster in sand (about 100 sec.) than thinner ones (about 600 sec.). The faster ones were assumed to have a more efficient burrowing apparatus. The substrate also affects the rate of burrowing (Alexander 1988).

The Blackhawk and related formations of the Price, Utah region are interpreted as a shoreline-type location. The sea was to the east, coarse sediments came from the west. Lagoons, deltas, flood plains, bars, and rivers are assumed to have formed a complex in which "rafted organic material" (Marley 1978) served as the source for coal. Trace fossils ("worm tubes") are found at many levels in this complex. Some sediments are assumed to have accumulated slowly (Frey and Howard 1985), while storm deposits are the interpretation for slightly hummocky beds (Frey 1990). The picture is generally similar around the Cretaceous Cliff House Formation sediments of Horse Gulch in Durango, Colorado.

Another suggestion within a flood model is that these "worm tubes" represent escape burrows as sediments accumulated episodically and trapped organisms during the later stages of the flood. Some of the same organisms might even be responsible for escape burrows at various levels as they were repeatedly trapped and escaped. This might help explain the virtual absence of body fossils in these tubes. Brandt (1980) proposes the same kind of process for successions of burrows in the Upper Ordovician around Cincinnati, Ohio.

Many of the units in the region show a preponderance of both horizontal and vertical trace fossils (burrows?) near the tops of the units. Such a pattern is interpreted as instantaneous deposition (Seilacher 1962; Frey and Pemberton 1984). Rapidly deposited turbidites are specifically suggested by Seilacher. This kind of evidence is an argument for rapid action.

FIGURE 3. Block of Panther Tongue showing a top surface with many pits that represent "worm tube" fossils. Red pen for scale is 135 mm long.

The argument is that if the layers accumulated slowly, one would expect a more-or-less even distribution of "worm tubes" throughout a rock unit, as shown in Figure 2A. If accumulation was rapid, tubes would be formed mainly in the tops of the units, as illustrated in Figure 2B. There would not be enough time for the formation of worm tubes throughout the unit during "instantaneous" deposition.

The presence of these "worm tubes" (bioturbation) in the tops of the sedimentary units is also reported by Pattison (2005, p 485) in the Cretaceous Blackhawk Formation north of Green River Utah, and in the Cretaceous Point Lookout Sandstone in the Horse Gulch area near Durango, Utah (Lucas et al. 1997, p 28).

The question of rate of formation of sedimentary units also raises the question of preservation of sedimentary surfaces in the presence of organisms which can destroy such surfaces by "stirring" them up. The term "bioturbation" is used for this process. The main organisms involved in bioturbation in marine environments are fish, crabs, clams, snails, and worms that persistently forage on the bottom of ocean and lakes. Clifton and Hunter (1973) have reported on this process in the US Virgin Islands. They found that sand ripples are totally destroyed in 2-4 weeks. Layering in the upper 2 cm is largely obliterated in the same period of time. These data suggest that in the presence of bioturbating organisms, burial of layers has to be rapid if their structure is to be preserved at all, and the presence of these layers may signify rapid burial. I have noted myself, while living underwater in the ocean for several days, that the ripple marks left in the sediments produced by a storm completely disappeared after three days as a result of the action of foraging organisms.

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