THE IMPORTANCE OF THE LATE PENNSYLVANIAN KINNEY BRICK QUARRY LAGERSTÄTTE OF CENTRAL NEW MEXICO FOR THE DEVELOPMENT OF THE STUDY OF VERTEBRATE CONSUMULITES AND OTHER BROMALITES

Adrian P Hunt1 and Spencer G Lucas2

1Flying Heritage and Combat Armor Museum, 3407 109th St. SW, Everett, WA, 98204, adrianhu@flyingheritage.org
2New Mexico Museum of Natural History and Science, 1801 Mountain Road NW, Albuquerque, NM, 87104

In 1992, a review of coprolites from the Kinney Brick Quarry Lagerstätte by APH introduced the term bromalite for trace fossils to refer to fossil food material regurgitated, defecated or maintained within the body cavity. Bromalite has been widely accepted and utilized. The same study coined the term regurgitalite for regurgitated food remains and this has also been widely used. APH and SGL coined the term consumulite in 2012 for food remains preserved within body cavities.

Vertebrate consumulites are bromalites preserved within the body cavity and include oralites (oral cavity), esophagites (GI tract anterior to stomach), gastrolites (stomach), cololites (GI tract posterior to stomach), intestinellites (intestines) and enterospira (spiral valve). Evisceralites are preserved segments of infilled fossilized intestines preserved independent of, or exterior to, a carcass. Vertebrate consumulites have an extensive Devonian-Quaternary fossil record and are principally associated with articulated skeletons. Most articulated skeletons are from aquatic environments, and so are most consumulites. Consumulites are most common in fine-grained deposits of low energy environments. They are also prevalent in Lagerstätten--e.g., Cleveland Shale (Devonian), Holzmaden (Jurassic), Solnhofen (Jurassic), Jehol (Cretaceous), and Messel (Eocene). Most consumulites represent carnivorous animals because plant material is usually finely macerated during digestion and more difficult to recognize as fossils than bone. Large body size favors the recognition of consumulites, so there is an extensive record of consumulites in Mesozoic marine vertebrates, notably ichthyosaurs, plesiosaurs and mosasaurs. Consumulites preserve a wide range of organic elements with a poor fossil record, from lepidopteran wings to hair to embryos. Consumulites, themselves, represent Lagerstätten. Systematic study of consumulites will yield significant records of rare fossils (see, for example, the recent focus on coprolite contents).

The Kinney Brick Quarry Lagerstätte is an important Konservat Lagerstätte in the Manzanita Mountains of central New Mexico. Fossils at Kinney occur in the lower part of the Tinajas Member of the Atrasado Formation of Missourian (Late Pennsylvanian) age. The first three named non-evisceralite consumulites are from this locality - Werneburgichnus kinneyensis, W. varius from branchiosaur-like amphibians and Chondripilula zideki from chondrichthysans. The Lagerstätte also yields the non-consumulite bromalites Huberobromus ovatus, Maculacoprus ateri, Virgacoprus brevis, Kinneybromus jurgenai, Conchobromus kinneyensis and four unnamed morphotypes. Contemporaneous bromalite ichnifaunas from New Mexico yield an ecological transect from lagoonal to shallow marine (Tinajas Lagerstätte, Kinney Brick Quarry Lagerstätte, Erickson site, Sacramento site). The Kinney bromalite ichnifauna is significant because: (1) it contains the most studied bromalites of any Paleozoic ichnifauna and includes the highest number of named ichnotaxa; (2) its study stimulated the development of a synthetic nomenclature, with the introduction of the terms bromalite and regurgitalite; (3) it includes the first named non-evisceralite consumulite taxa; and (4) the Kinney ichnifauna provides a reference for bromalites in lagoonal and estuarine/deltaic environments.

Keywords:

Bromalite, consumulite, Kinney Brick Quarry, Pennsylvanian, vertebrate, coprolite