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Blending Rudists with Technology; Non-destructive Examination of the Internal and External Structures of Rudists Using High Quality Scanning and Digital Imagery

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Abstract: Certain formations within the Cretaceous of Texas include zones of silicified rudists. Such diagenetic alteration, combined with the timing of alteration, has preserved many structural features of the rudist suitable for computed tomography (CT scanning). The excellent density differences between those skeletal structures (silica) and the internal sediment (calclitic mud) or later crystallization (calcite), fulfill a fundamental requirement for such analysis. The Jackson School of Geosciences at The University of Texas provides access to a high resolution computed tomography scanning system. This equipment, not identical to medical scanners, provides higher resolution and sophisticated software to analyze the imagery. Several rudist specimens have been scanned, including *Caprinuloidea perfecta*, from the Lower Cretaceous Edwards Formation (Albian) and *Bayeloidea clivi* from the Albian (formerly considered Turonian) of Mexico. Other rudist specimens are preserved in a different manner. For example, structures may be replaced with single crystal calcite with external skeletal intricacies especially well preserved. Elsewhere the record is one of internal molds or casts, with a reduction of available detail. Cost, diagenesis, and size determine the mode of specimen imagery used in an NSF sponsored project to image and conserve the type and figured specimens in the collection of the Texas Natural Science Center, Non-vertebrate Paleontology. This paper describes how such imagery can be used to further many aspects of rudist research. CT scanning produces serial sections of minute thickness without destroying a valuable specimen, in contrast to preparing physical serial sections, a more traditional method of analytical study. High resolution digital imagery (35 mm) provides images of great clarity which can be analyzed further and can be used as a surrogate for physical peels of rare or fragile specimens. Both these methods of imagery can be made available on-line and can be studied by scientists throughout the world.

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