A variety of trace fossils in the subtidal deposits of the Muddy and Frontier Formations of Wyoming and Montana can be assigned to several well-known Cretaceous ichnogenera; however, the amount of subgeneric variation may differ considerably among ichnogenera. Within a sequence of strata representing deposition in gradually increasing water depth, an overlapping sequence of ichnogenera is present. General ichnogenera sequence, from shallowest to deepest, is: *Ophiomorpha, Asterosoma, Rosselia, Rhizocorallium, Thallassinoides,* and "donut-shaped" burrows (silt rimmed burrow structures in silty shale). Local regression and transgression are present in both formations using this sequence in conjunction with a diagnostic sequence of intratidal to supratidal trace fossils. The following sequence of trace fossils is typical in a sandstone interval and can be interpreted in terms of local variation in depth of deposition. From top (7) to base (1) the sequence is (7) *Ophiomorpha,* (6) *Asterosoma, Rosselia,* (5) *Thallassinoides,* (4) Intertidal trace fossils, (3) *Ophiomorpha* (only), (2) *Asterosoma, Ophiomorpha,* (1) *Asterosoma* (only).

The sequence 1 to 4 indicates normal shallowing and is followed by a sudden deepening to the relatively deeper water trace fossil *Thallassinoides* (interval 5); sequence 5 to 7 indicates another normal shallowing.

In addition to recognizing the general sequence of ichnogenera, recognition of variants within an ichnogenus in the vertical sequence also is required to establish the vertical sequence of sedimentation depth. When used in conjunction with physical sedimentary structures, as observed in cores and outcrops, establishment of these trace-fossil sequences aids in predicting the areal distribution of nearshore-marine sandstones.

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Computerized Modeling in Reconstruction of Objects From Serial Sections

The use of sets of serial sections in the study of three-dimensional objects is important in many geologic applications because it can enable precise reconstructions of the sectioned objects. There are major drawbacks to the three reconstruction techniques which previously have been used. Optical visualization (simply making a mental picture of the object) does not enable the shape information from the sections to be handled in any objective manner. Graphic reconstructions produced by overlaying drawings of successive sections, each one geometrically transformed to give a perspective effect, appear realistic from only a limited range of viewpoints, and are time-consuming to produce unless the method is implemented on an interactive graphics system. Physical modeling in wax or transparent plastic is an inflexible and laborious process, and is not suitable if internal structures of the object are to be studied. A new system, termed "computerized modeling," has been developed. Although relatively more expensive, it is fast and suited to routine applications.

The theory of section reconstruction initially is developed for two-phase systems, and a two-stage reconstruction process can be used. When an object is sectioned, the intersection of its bounding surfaces with any section trace out on the section a set of closed loops. The first (feature recognition) stage compares loop patterns on adjacent sections to locate features which match between them, and which thus define the topologic nature of the bounding surfaces of the object. If the sections are sufficiently similar, this stage can be implemented in a totally automated manner; for less-similar sections the feature-recognition stage is carried out manually. The following interpolation stage determines the geometrically best-fitting surfaces to connect the matching features in an optimum manner. The object finally is described by its bounding surfaces, each of which is represented as a network of quadrilateral and triangular patches. This abstract model of the object is in a form in which it can be manipulated objectively and at will. Processes such as measurement, rotation, dissection, and secondary resectioning can be carried out easily by suitable computer programs, and the reconstruction is suited ideally to graphic display.

Three examples are given of its application. Two of these are pairs of test patterns of varying complexity; the third is a set of sections through a rhynchonellid brachiopod.

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Geology of Salton Sea Geothermal Field

The Salton Sea field in Imperial County, California, covers 46.6 sq km (18 sq mi) south of the Salton Sea. Drilling indicates the presence of 2×10^{18} J (2×10^{15} Btu) of heat contained in 1.3×10^{9} M.T. of hot salty water at temperatures above 230°C that could in principle be used to generate 400 MW of electric power for 20 years.

Brines with temperatures of more than 300°C and salinities of more than 30 percent are in fractured sandstone sections of the nonmarine Palm Springs Formation. These lie under a 260-650 m (840-2,130 ft) layer of Pleistocene and Pliocene (?) shale and clay that traps the water and minimizes conductive heat loss. Source of heat is young rhyolitic intrusive rocks in the subsurface and at the surface near the shore of the Salton Sea. Reservoir-fluid temperatures increase with increasing thickness of overlying clay and are modified by variations in permeability caused by original sedimentation and by faulting. Delta, stream, beach, and lacustrine environments can be recognized in the reservoir section.

Measured well flows of 5×10^{-2} to 8×10^{-2} cu m/s (800-1,300 gpm) indicate flow through fractures at an effective reservoir permeability as high as 10^{-12} sq m (1 darcy).

Structure is dominated by a series of northwest-southeast strike-slip faults with several hundred feet of apparent vertical separation. Variations in thickness and sandstone distribution indicate that these faults were active during deposition, and some are seismically active today.

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Miocene Transgressions and Regressions of Delaware Coastal Plain

The undifferentiated Chesapeake Group (middle? Miocene) of the Delaware coastal plain shows a pattern of shifting loci of deposition indicating a lateral and

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