

ROYLANCE, MICHAEL H., Marathon Oil Co.

The Significance of Botryoidal Aragonite in the Early Diagenetic History of Phylloid Algal Mounds in Bug and Papoose Canyon Fields, Southeastern Utah and Southwestern Colorado

Abundant altered botryoidal aragonite cement is recognized both in core slabs and in thin sections from phylloid algal mound facies in the Desert Creek interval of the Paradox Formation in the Papoose Canyon - Bug field area. This subsequently dolomitized cement occurs as individual to coalescing botryoids, which appear in cross section as fans composed of radiating crystals with a rounded, feather edge. Botryoids locally comprise up to 90% of any given section of core. The botryoids are similar in appearance to Holocene botryoidal aragonite cement. It is deduced that, unlike modern counterparts, these botryoids grew both on the sea floor as well as within open cavities within the mound framework.

The diagenetic history of the mounds in the Papoose Canyon - Bug field area begins with precipitation of botryoidal aragonite cement penecontemporaneously with deposition of phylloid algal plates, creating rigid anastomosing frameworks containing abundant primary porosity. When compacted, these mounds brecciated, thus opening up more porosity. Portions of this porosity were subsequently infilled by internal sediment and calcite and gypsum cements. Finally, these mounds were extensively dolomitized, and some secondary porosity was created by leaching.

The fundamental significance of botryoidal aragonite at Papoose Canyon and Bug fields is that it helped to create and preserve very porous and permeable phylloid algal mounds, first by contributing to a rigid framework containing primary porosity, and secondly, by cementing the mounds early on so that they brecciated upon compaction. These mounds were ultimately filled with oil.