

Peloidal, Skeletal Packstone Facies

The peloidal, skeletal packstone facies (Fig. 2.11) exhibits a wide range of thicknesses (10 to 210 cm). On outcrop the bedding is thin to medium in scale ranging from 20 to 80 cm. The peloidal, skeletal packstone typically is yellowish to light gray (5Y 8/1-N8) both on fresh outcrops and in cores. The peloidal, skeletal packstone facies typically contains less than 3 percent silt and clay. The main constituents are peloids and skeletal fragments of brachiopods, bivalves, gastropods, bryozoans, crinoids, phylloid algae, and corals. Micrite matrix is present in all occurrences but most are matrix poor (approximately 3 to 5 percent matrix). Grain sizes are variable (100 microns to centimeters) but within each occurrence the constituents tend to be well sorted and show no preserved, physical sedimentary structures. Nearly all grains show some level of micritization from a thin envelope to complete replacement (Figure 2.12).

This facies contains a small percentage of extant interparticle and intraparticle porosity (3 to 5 percent) but most original porosity has been filled with blocky calcite spar or micrite. Early cements are bladed to fibrous spar found mainly in brachiopods and gastropods. The majority of the spar in this facies is equant blocky calcite cement that fills nearly all interparticle and intraparticle porosity. Because nearly all interparticle and intraparticle porosity has been filled with cement, the total percentage of the rock composed of spar is approximately 60 to 75 percent. The average crystal size, however, is small at approximately 0.5 mm.

Environmental Interpretation

The relatively small amount of micrite matrix suggests that energy levels were too high to allow deposition of fine carbonate sediment. Therefore, this facies represents a higher-energy environment than that found in the skeletal wackestone-



Figure 2.11. Hand sample showing fabric of peloidal, skeletal packstone facies (sample BS-19).

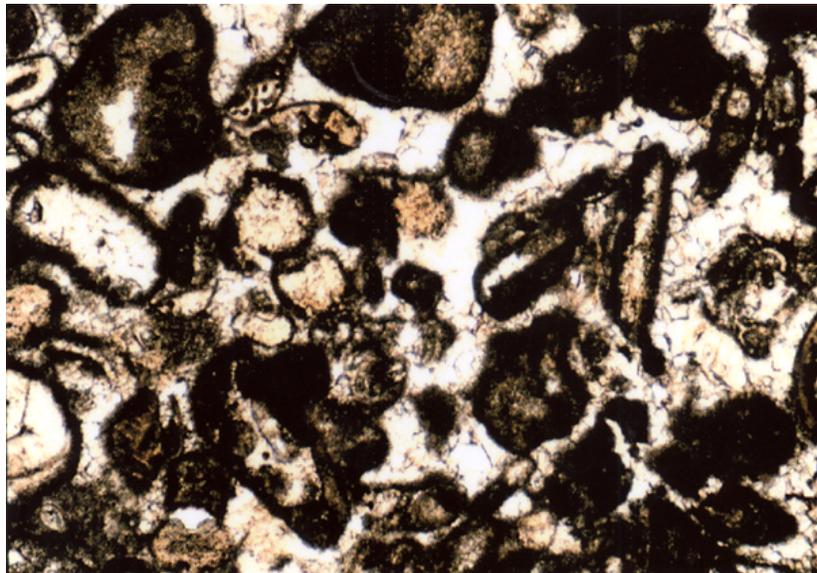


Figure 2.12. Photomicrograph of peloidal, skeletal packstone facies. Note the micritization in various stages of development from thin envelopes to complete replacement. Interparticle porosity is filled with equant, blocky cement (sample BS-19; transmitted light; scale bar = 500 micrometers).

packstone facies or phylloid-algal facies. The presence of abundant, well-developed micrite envelopes on nearly all grains also suggests a shallow-water, protected environment where intensive boring by microorganisms was common (Golubic *et al.*, 1975). The lack of physical sedimentary structures in the peloidal, skeletal packstone facies indicates energy high enough to transport and wash sediment but perhaps not continuous enough to prevent sedimentary structures present from being destroyed by bioturbation.

Sandy, Skeletal Grainstone-Packstone Facies

Found at only a few localities in the study area, the sandy, skeletal grainstone-packstone facies (Fig. 2.13) has several distinctive features. Bedding varies from horizontal beds to medium-scale cross bedding (Figure 2.14). The cross beds (Fig. 2.14a) are typically 15 to 30 cm thick and have variable apparent dips from 8 to 35°. Where the beds are horizontal, they are approximately 30 to 50 cm thick. The sandy, skeletal grainstone-packstone facies typically occurs as medium to medium-dark gray (N5-N4), silty to sandy beds that contain abundant, coarse fossil debris. The cross-beds are concave upward and in places truncate the beds below them. Where bedding is horizontal, there is a higher abundance of micrite and fine sand and silt.

The main skeletal constituents include brachiopod, bivalve, gastropod, algae, bryozoan, and crinoid fragments. Some nonfragmental fossils and whole fossil molds are present and typically are gastropods. In hand samples and in thin sections most elongate skeletal particles, such as brachiopod and bryozoan fragments tend to be oriented parallel (Figure 2.13). Also visible in some hand samples is grading with concentrations of coarser particles near the base of beds (Figure 2.13). In addition to the skeletal fragments, silt- and sand-sized quartz grains, peloids, and plant fragments