



Figure 14. Mosaic of target Kettlestone from the rock Manitoba, taken on sol 152 with illumination from upper right. Note lens-shaped feature at left center. Possible origins of this feature and the surrounding texture include cross-bedding, pinch and swell features, and lithified ripple features.

individual laminae are seen only as small ridges because they stand out from an underlying rock surface that is mantled by darker, finer-grained material (e.g., “Wanganui,” shown in Figure 10, and “Kahu” on the rock “Whatanga,” shown in Figure 11). In the latter examples, most ridge edges are irregular, but end in small bulbous features, likely representing individual or small clusters of cemented sand grains. Some ridges are disrupted by spherules, supporting the interpretation of the spherules as concretions formed by diagenetic fluid flow (Figure 9). Flakes and ridges curve around spherules in many cases, consistent with their being cemented by secondary minerals. Examples of such structures can be seen in Figures 10–14.

[29] Well-sorted sandstones typically have abundant intergranular porosity, but those found in the Meridiani outcrops appear to have much of the primary porosity occluded by the formation of later cements. On the other hand, MI images revealed the common presence of secondary poros-

ity [Choquette and Pray, 1970] in the form of crystal molds (termed “vugs” by Squyres *et al.* [2004b]) and elongate to sheet-like vugs that in places have been greatly enlarged by later diagenetic processes [McLennan *et al.*, 2005; Perl *et al.*, 2007]. Moldic porosity, formed by the diagenetic precipitation and subsequent dissolution of an unidentified soluble mineral phase (such as sulfates or chlorides), occurs in some but not all sedimentary rock targets (e.g., “Diogenes,” shown in Figure 12). No preferred orientation is evident to first order for these pores [McLennan *et al.*, 2005].

4.1.1.2. Texture

[30] Individual or possibly aggregated grains within the laminae are poorly resolved in many targets because of diagenesis [McLennan *et al.*, 2005; Metz *et al.*, 2008]. In some cases (see section 4.1.1.3), however, grain shape, roundness, and size distribution can be measured. Grains are too small to resolve pitting, frosting, or fracture patterns.