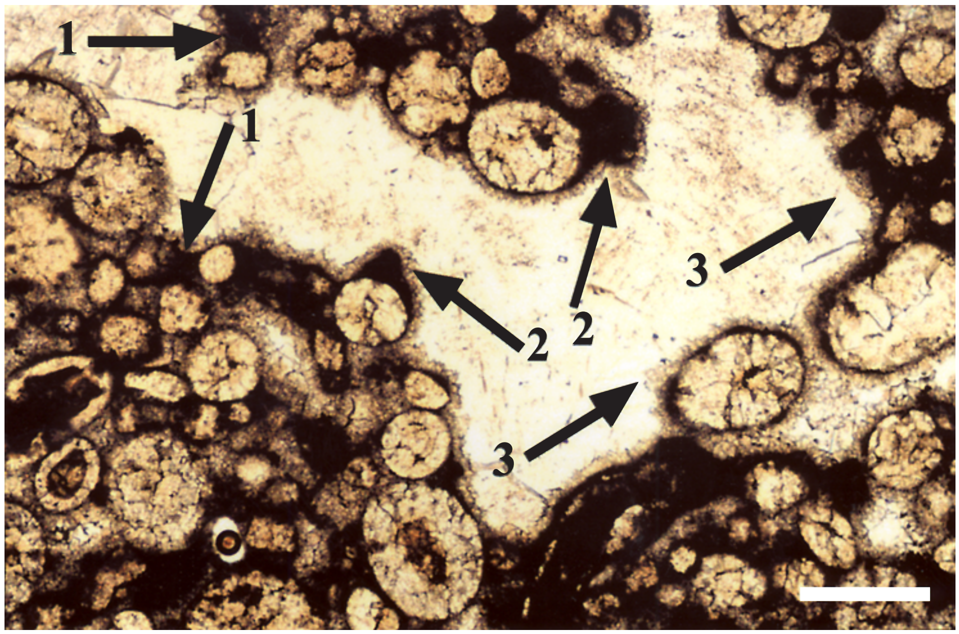

Figure 2.19. Photomicrograph of ooid, peloid packstone with large keystone vug. Note the micritic cement showing meniscus (1) and an asymmetric fabric similar to pendant cement (2). Also note the later isopachous fringe of bladed calcite cement (3). Final pore fill is coarse baroque dolomite and calcite spar (transmitted light; sample BS-3; scale bar = 500 micrometers).

Environmental Interpretation

Harris (1984) described modern accumulations of several oolite facies around Joulters Cay on the Great Bahama Bank, including oolite grainstone and fine-peloid packstone that contains peloids, micritized ooids, and skeletal fragments. These two modern facies are similar to the oolite subfacies described from the Farley Limestone. Harris (1984) reported that fine-peloid packstones containing ooids accumulated in protected lows and that ooid grainstones formed on bedrock highs where bottom agitation was focused.

Although slight differences exist, an analogy between these modern oolites and oolites in the Farley Limestone is supportable. The micrite-free oolite grainstones are cross-bedded and represent deposition in the highest energy waters. Alternatively, the ooid, peloid packstones represent deposition in protected areas or deeper-water areas that had lower energy levels. Diagnostic indications of shallow water for the ooid, peloid packstone subfacies include the presence of keystone vugs and meniscus fabrics as well as, asymmetric pendant-like fabrics. These fabrics indicate cementation in the presence of water and air such as occurs in the marine or phreatic vadose zones (Tucker, 1991).

***Osagia*-Brachiopod Packstone Facies**

Located within a single bed (30 to 95 cm thick) at the base of the upper Farley, the *Osagia*-brachiopod packstone facies (Fig. 2.20) is a marker bed and is useful for correlation. It is medium to medium-light gray (N5-N6) at the base and commonly has a color change to lighter gray toward the top (N7). This facies is distinguished by a zone of skeletal material and whole brachiopods, typically *Composita*. Other than the *Composita* there is little to no other coarse skeletal material. The brachiopods are typically encrusted by *Osagia* (Figure 2.20, 2.21). Johnson (1963) described *Osagia* as colonies that consist of twisted tubes of varying sizes that form a laminated encrustation around a nucleus of fossil fragment or other foreign substance. The smaller tubes have dark walls and, in some examples, cross partitions. *Osagia* has been found to consist of an intergrowth of small tubular algae, similar to *Girvanella*, and the encrusting foraminifer *Nubecularia* (Johnson, 1963).

In the Farley, these encrusting masses completely or partially encrust grains of all types but seem to be most commonly found on whole brachiopods, brachiopod fragments, and phylloid-algal fragments. The coatings have a wide range of morphologies. In some samples they are irregular, thick, asymmetrical coatings, whereas in other occurrences they are symmetrical, thinly laminated coatings. The *Osagia* coated grains can be found throughout the bed but typically occur in the middle to upper half of the bed.

Environmental Interpretation

The wide distribution and consistent stratigraphic location and facies character of the *Osagia*-brachiopod packstone facies suggests that at the time of its deposition the environment was similar throughout the study area. Ginsburg (1960) reported that modern oncolites are formed in low intertidal and shallow subtidal zones and interpreted a similar environment for *Osagia*. Wilson (1975) indicated that oncolitic coatings commonly form in restricted marine bays and lagoons. Asymmetrical coatings of *Osagia* develop when the nucleus on which the coating is growing is occasionally overturned by wave action allowing growth to continue on a new surface (Ginsburg, 1960).

In the current study, the presence of *Osagia* coatings on all sides of a skeletal grain indicates an energy level just strong enough to overturn occasionally the grains