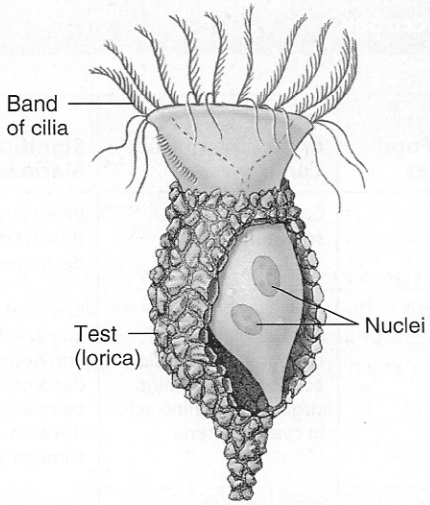

FIGURE 5.13
Tintinnopsis is a marine tintinnid that forms a vase-like lorica made of sand grains. Specialized cilia on one end are used in feeding.

Some fungi live in symbiotic associations, mostly with green algae or cyanobacteria, to form unique entities, the **lichens.** In lichens the long hyphae of the fungi provide support, whereas the algae or cyanobacteria provide food from photosynthesis. Marine lichens can be typically found as thick, dark brown or black patches in the wave-splashed zone of exposed rocky shores (Fig. 5.14). They are tolerant to exposure to air for long periods of time.

By comparison with the multitude of lichens on land, there are very few types of marine lichens. Their role on the ecology of rocky shores is largely unknown. The cyanobacteria of some marine lichens are known to be nitrogen-fixers. Some lichens are able to loosen bits of the rocks where they live by growing into the rock. A few types live on the shells of rocky shore barnacles and limpets.

FIGURE 5.14 Encrusting marine lichens, cyanobacteria, and some microscopic algae are often visible as a black band on wave-splashed rocky shores, as in this exposed rocky point south of Monterey Bay, California.