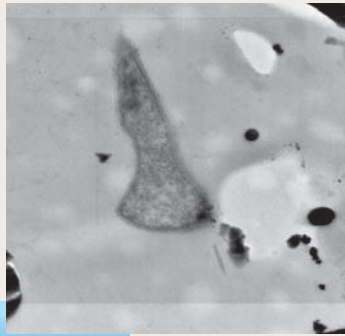
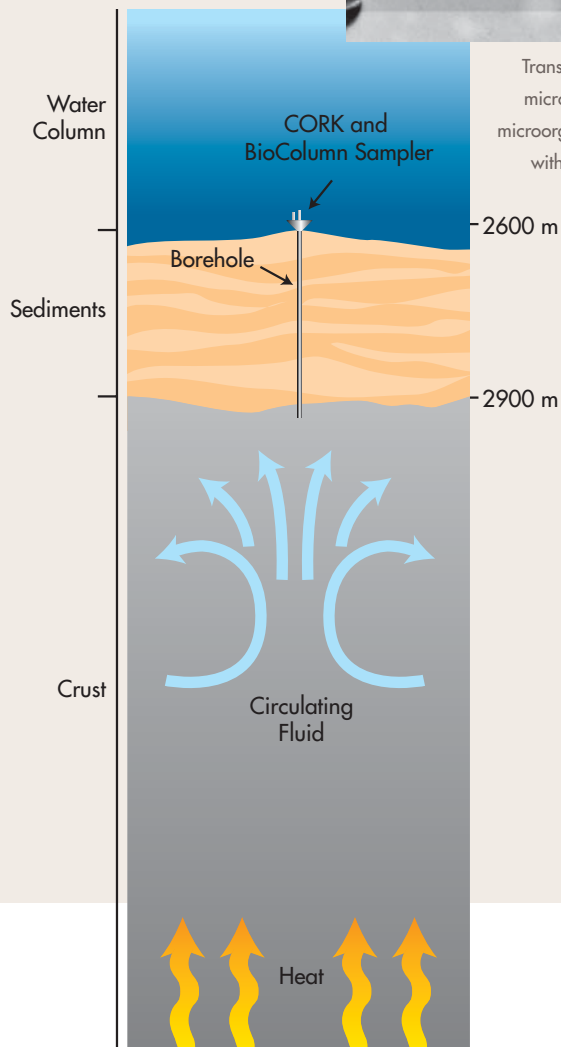


BioColumn sampler sitting atop a borehole seal, or CORK, which prevents ocean water from flowing into the hole. CORKs enable a variety of hydrogeology experiments to be conducted in holes drilled by the Ocean Drilling Program.



Transmission electron microscope image of microorganism collected with the BioColumn.



MICROBIAL LIFE IN AGING OCEAN CRUSTS

The discovery of rich biotic communities at seeps, thermal vents, and hot springs on the deep seafloor has fueled speculation that life could, in fact, flourish throughout the deep oceanic crust. This “deep biosphere hypothesis” has been difficult to test because the technology to obtain adequate fluid samples from deep within the oceanic crust has been lacking. This has been especially problematic for aging, sediment-covered basaltic crusts of the mid-ocean ridge flanks and ocean basins. Recently, scientists have developed techniques to obtain large-volume samples of undiluted crustal fluids from deep sedimented ridge flank environments, and have also combined environmental physical and chemical observations with biochemical and molecular genetic methods to search for evidence of life within these fluid samples.

Using the submersible *Alvin* and the remotely operated vehicle *Jason I*, scientists deployed new BioColumn samplers at an over-pressured crustal bore-hole drilled by the Ocean Drilling Program on the Juan de Fuca Ridge flank in the Northeast Pacific Ocean (top, left). The BioColumn sampled fluids circulating within sediment-buried, 3.5-million-year-old oceanic crust, which were then retrieved with those same deep submergence vehicles after 300 to 400 days. New laboratory techniques used to analyze the fluid samples showed that diverse and exotic microbial life is present in these aging crustal fluids.

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