

Had [bacterial] been discovered on Mars, their description would have been much more dramatic and the bizarre quality of their natural history, which often seems like science fiction, would not have been missed.

SORIN SONEA AND MAURICE PANISSET

Perhaps some of my readers will respond with a smile to my doctrine of living contagions.

AGOSTINO BASSI

FEAR OF A BACTERIAL PLANET

Microorganisms were a curiosity, a kind of natural history sideshow, before it was realized that some cause disease. Antoni van Leeuwenhoek, inventor of an early version of the microscope in the 1670s, described these beings as “animalcules”—tiny animals. He was struck by their rapid movement, odd shapes, and sheer quantity. In 1831 the half-blind Italian law student Agostino Bassi (1773–1856) proved the existence of infection by spreading muscardine (silkworm disease) from one fungus-infected worm to another. Nonetheless, a generation after Bassi showed that disease did not arise spontaneously, even Pasteur thought of bacteria only as agents of decay.

A turning point occurred when Robert Koch (1843–1910) found bacteria in blood of cows stricken by anthrax. These little rods (“bacilli”) grew from hardy bacterial spores. Feeding them blood serum, Koch, a German medical officer, learned to grow the bacteria in a liquid broth. He developed a stain for them, photograph-

ing the culprits by mounting a camera on a microscope. Yet the now-common notion that bacteria caused infectious disease was slow to be accepted. English nurse and philanthropist Florence Nightingale (1820–1910) denied the existence of germs to her death.

When the germ theory of contagion finally caught on, it did so with a vengeance. Different types of bacteria were implicated in anthrax, gonorrhea, typhoid, and leprosy. Microbes, once amusing little anomalies, became demonized. Pasteur, like Howard Hughes after him, had a phobia about dirt and germs. He avoided handshakes. Wiping down his crockery, he meticulously sought evidence of wood, wool, and other detritus in his food. No longer an amusing scandal for parlor conversation, microbes became a virulent “other” to be destroyed. The metaphor of tenacious, infectious bacteria was used in Nazi rhetoric of genocide. Today the low regard for bacteria as Lilliputian “agents of disease” still obscures their enormous importance to the well-being of all the rest of life.

Until the 1950s the oldest unambiguous fossils were 520-million-year-old trilobites and other extinct marine animals. The oldest rocks on Earth, by contrast, dated to nearly 4,000 million years. Fossils of microorganisms have now been confirmed in the oldest sedimentary rocks, suggesting that life took root soon after the Earth-Moon system formed.

In 1977 paleobiologists Elso Barghoorn and Andrew Knoll of Harvard University found some two hundred fossil bacteria (some even in stages of cell division) in sedimentary rock 3,400 million years old. Because Barghoorn had earlier discovered microbial life in the Gunflint Iron Formation of western Ontario and states bordering Lake Superior, he was well prepared to detect the fossil remains of bacteria in these vastly older African and Australian rocks. In 1990 geologist Maud Walsh went to the Barberton Mountain Land in southern Africa and collected ancient black rocks called cherts, silica-rich rocks petrified from mud flats and volcanic pools. Back in the Baton Rouge, Louisiana, laboratory, the cherts were sliced and polished into thin sections for examination under a mi-