do other types of bacteria and even higher life forms, notes Aristides Yayanos of the Scripps Institution of Oceanography in La Jolla, California. In laboratory experiments, bacteria have been shown to grow at pressures of 1300 to 1400 atmospheres, which corresponds to ocean depths of 13 to 14 kilometers—deeper than the deepest point in the ocean, which is only about 11 kilometers. Some of these bacteria actually require such extreme pressure, Yayanos says. Certain barophilic species will not grow at pressures of less than 300 atmospheres, for instance.

And it's a good thing that the archaebacteria and other deep-sea organisms are able to resist such extreme pressures. Without their activities all the dead plant and animal matter that falls to the ocean floor would fail to decay. The activities of the barophilic bacteria thus help recycle organic matter in the ocean.

Nobody really knows what changes these organisms make in their molecular structures to adapt to such high pressures, Yayanos says, but scientists are slowly assembling clues. Yayanos and Ed Delong of Woods Hole have shown that deep-sea bacteria make less saturated membrane lipids as the pressure increases, an effect that could help maintain normal membrane fluidity in the face of the high pressures.

In addition, Stetter has found that certain archaebacteria modify the rate of production of several proteins at high pressure. The protein changes may reflect changes in gene expression. Recently, for example, a team including Yayanos cloned a gene from a deep-sea eubacteria that is regulated by pressure. The gene, which codes for a protein that seems to play a role in forming channels through the cell's membrane, is expressed at 280 atmospheres but not at 1 atmosphere. The researchers speculate that the bacterium modifies the membrane channels in response to increasing pressure, which would alter the diffusion of sugar nutrients and other molecules through the cell wall.

Perhaps the most important lesson that the archaebacteria offer is a more general one, however. They demonstrate just how robust life is. From the cold ocean depths to the heat of the solfatara fields—the closest thing to hell on Earth—life is everywhere.

■ ROBERT POOL

ADDITIONAL READING

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Fossils and British Pride

What is the difference between the most important paleontological discovery made in Britain during this century and a lump of coal? None whatever—at least according to Britain's Department of Trade and Industry. And that is why the oldest known fossil reptile may be on its way from Scotland to a German museum.

The specimen was found in a farmyard wall about 15 miles west of Edinburgh. The stones of the wall were quarried nearby in the 1830s, and there they remained, attracting little attention, until a professional fossil hunter named Stan Wood happened by in 1988. Wood noticed an intriguing fossil on the face of a 6 by 8 inch slab, and proceeded to buy the wall, thereby gaining title to the fossil, which he dubbed "Lizzie the Lizard."

Wood was being somewhat fanciful, because Lizzie is definitely not a lizard. More precise identification must await microdissection, but it is clear that the creature is a reptile. The fossil has been dated to 340 million years ago, which would put it at the beginning of the Carboniferous Era.

If that date is correct, it would push the origin of the reptiles back 40 million years, right into the so-called Age of Amphibians. Because the fossil is much better preserved than most early reptile specimens, it may give paleontologists a clearer picture of what the first members of that group were like.

On account of these considerable paleontological virtues, some folks in Britain feel that Lizzie ought to enjoy pride of place in a British museum. Alas, the price tag Wood has put on the fossil is just as considerable as its scientific significance: £180,000 ($290,000). At the moment it seems that no British museum can afford it. The Museum für Naturkunde in Stuttgart, with a full grant from the regional government, can.

In early December Britain's only hope seemed to lie with the Department of Trade and Industry (DTI). In some cases (such as those of Old Master paintings) the DTI has been persuaded to refuse an export license, keeping priceless bits of British heritage in the country.

On 8 December, the DTI heard expert witnesses describe Lizzie's importance and decided to delay granting an export license until April in order to give the National Museum of Scotland time to launch an appeal and come up with the needed cash.

Then, just before Christmas, the DTI's lawyers announced that the fossil didn't actually need an export license anyway. The existing legislation, they explained, covers only man-made artifacts, and although the fossil is very expensive, it isn't man made. If the legislation covered natural objects, one DTI man said, every export of British coal would have to be referred—and that would never do. (What the men from the DTI didn't explain is why the agency had held the hearing and ordered the delay in the first place.)

What happens now? Wood has an agreement with the museum in Stuttgart to deliver Lizzie, and he told *Science* he's sticking by that agreement "until I have an instruction from my client in Germany that they wish to do otherwise." Yet on the German side feelings are mixed. Rupert Wild, curator of vertebrate paleontology at Stuttgart, says, "I would rather that the specimen is kept in Britain because it is a British fossil."

The chances of Lizzie's remaining in the land of her birth (and death) now seem to rest on the National Museum of Scotland's raising the necessary wherewithal fairly quickly. Ian Rolfe, that museum's Keeper of Geology, says he is "still hopeful" about the prospects.

Lizzie herself is making a contribution to the cause. In March the Scottish museum is mounting an exhibition called "Dinosaurs Past and Present," which comes from the Los Angeles County Museum of Natural History. With permission from Stan Wood and from the museum in Stuttgart, Lizzie will be the star of the show—in the hope that she can earn enough to enable her to stay in Scotland.

Although the whole affair has raised some national hackles, British paleontologists don't seem too bothered by it, partly because the Stuttgart museum has promised that the fossil will be available for study. Indeed, some British academics, who would rather their names were not used, told *Science* that Lizzie might actually be better cared for in Germany.

■ JEREMY CHERFAS