

Toktok Talkie

by Joh Henschel



The Uranium Eaters

Biodiversity is exhilarating not only for its wonderful variety, but also for its immense range of capabilities, some of them quite fantastic. We have only barely touched the tip of the iceberg as far as discovering what services living beings can render. The recent discovery of a creature that taps energy from uranium is electrifying, particularly since this has the potential to clean uranium-contaminated water.

As every Namib toktokkie knows, there are many things people can learn about problem solving by examining nature. After all, nature has had all the time in the world to evolve solutions to certain problems. Biomimicry or “bionics” is the imitation in technology or application of some natural biological structures, functions, processes or principles that do not need to be re-invented. One such function could be the ability to live with toxic radioactive uranium. Right on our doorstep there are potential examples: Namib toktokkies have for ages naturally coped with or benefited from living in uranium-bearing soil and feeding among uranium-dusted detritus. But scientists have not yet studied how they cope.

What scientists in America have been looking at are bacteria called *Geobacter sulfurreducens*, or Sulphur-Reducing Earth Bacteria. It was recently discovered that these creatures get their energy from uranium. The bacteria do this by attaching to the uranium metal with extremely fine hair-like filaments made of proteins, called pili. The pili become “nanowires” which conduct electricity from the uranium into the bacterial cell, thus energising the bacteria. In the process uranium is reduced. This causes dissolved uranium to settle out of solution and attach to substrate. Water polluted with uranium can thus be cleared. Now, who would have thought that such a puny creature could detox such a toxic heavy-weight? Imagine how useful this service could be at Fukushima-like cataclysmic events, let alone normal operational or safety-enhancing applications in the nuclear-energy cycle from mining to nuclear burial grounds.

Trust nature to save the day. But can humankind be trusted to save nature? Imagine if current and future scientists did not have the millions of different species to examine for bionic clues? If currently growing rates of extinction cause the library of biodiversity to shrivel, so will our potential shrivel of learning to solve the ever-more complex problems related to our ever-more complex expectations from technology. If an impact today undermines our ability to fix impacts in future, we are driving development in reverse, facilitating that future generations no longer have a world to live in. This is why impacts must be managed with utmost precaution. Although there are quite a number of examples of bionic application, the vast information contained in the library of biodiversity is largely an unexplored archive. While celebrating the new branch of science concerning nanowires, pioneered by the Uranium Eaters, we are humbled by the thought of future discoveries in nature.

Zophosis moralesi ruminates that there is more wisdom in nature than people may think (sic). To prosper, humankind needs to ensure that nature prospers.

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