Worlds of IIF

The facts in the case of doomed, frozen Shankara 3.

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Water is essential for life. Some natural philosophers suggest that life first arose in water, although it is difficult to see how a sufficiently large body of water could ever have existed in our home world's climate to allow the blind clocksmith of evolution to do its work. None exists there now. Perhaps our Sun once shone less harshly, so that lakes could have dotted the planet, forming life's cradle.

Others invoke exotic chemistries to produce life in the polar clouds now trapped and condensed by the few religious fundamentalists who remain after the Diaspora. But it is more likely that primitive life arrived from damper places, on meteorites or other stellar voyagers.

All this makes Shankara 3 the more horrific. That a world should be so profligate with such a precious resource, allowing it to coat 78% of its surface, albeit as ice, seems as near heresy as any rational atheist can devise.

Of course, planets rich in ice are nothing new. Indeed, the Harding drives that powered the early years of the Diaspora were fuelled almost exclusively by water mined from the satellites of gas giants. Equally, Shankara 3 was not the first extrasolar planet found to harbour life. As with our other encounters with alien life, it is mainly unicellular and based on biochemistry similar to our own, although not identical. Shankaran

life is based on nucleic acids, although the actual bases and their pairings are different. This genetic material encodes polypeptides whose amino acids have a little less sulphur and more nitrogen than ours, as well as the curiosity of an imino acid in the minimal alphabet.

But Shankara 3 also supports multicellular organisms. They populate the equatorial regions where temperatures can occasionally creep up close to freezing point. We have named the dominant forms 'blister-bugs' for their curious use of the ice when breeding. Where the male excretes its sperm onto the ice a small 'blister' of liquid water is formed and remains for several days. Into this the females lay their eggs to be fertilized, and here the young grow to adulthood.

The survival of these blisters at sub-freezing temperatures is due to a single polypeptide, Ice-Inhibiting-Factor(IIF)-56, which makes up nearly 40% of the bugs' seminal fluid. IIF-56 binds the encroaching crystals of ice, buying the immature bugs time to grow. But IIF-56 is not indefinite proof against the ice. There always comes a point when the temperature drops sufficiently to allow the ice to prevail, trapping any laggardly bugs in permanent youth.

When water mining began, we found that these were but the last vestiges of a rich fauna that had once swarmed on Shankara 3. Perfectly preserved in the ice is a wealth of exotic beasts, all long dead. All these creatures produced IIFs: the planet's ice is not so much

made of frozen salty water as of IIFs excreted by the animals that lived in it: the vast tracts of ice must once have been open water, a global ocean.

Despite the prevalence of IIFs, phylogenies of Shankaran life based on these polypeptides bear no relation to those based on other characters. Even estimates of the age of life on the planet are different. It is as if the IIFs have spread like an infection so recently that mere hundreds of generations can have passed before the creatures' catastrophic demise.

And then the mining rigs found the cities. Vast domes on the rock floor beneath the ice enclosed entire advanced communities: buildings and transport, energy distribution systems and waste disposal routes. Some are shattered but a few intact domes remain, still holding back the tyranny of ice. Inside lie the dome-builders — hundreds of thousands of them in some of the larger domes — frozen in the instant of their deaths going about their normal lives. Fragile bipedal creatures, they are the only life on Shankara 3 that appear to lack IIFs: creatures who could never have survived outside the artificial bubbles they had built.

How they came to live beneath an expanse of water we cannot tell. Perhaps at one time more of Shankara 3 was dry, until a rise in sea level forced these creatures to adopt a subaquarian existence. All we know is how they were living when the ice literally froze them in their ultimate activities. But what if the disaster was of their own making?

When we became aware that our home world would soon fail to support us, we left. Perhaps the Shankarans could not bear to desert the aqueous riches that bathed their planet. When they learned of the imminent coming of the cold did they use their technologies to forestall it? Perhaps the rapid appearance of IIFs in the biosphere was engineered. At first they would have only altered crops to bear IIFs and so better survive colder conditions, but then more and more creatures were modified, subjugating their planet's ecology to build a bulwark against the ice.

Did they realize that the longer they held apart the jaws of this trap, the swifter its eventual closure would be? Finally the ice could no longer be repelled: like the blister-bug's young they were caught for ever in its deadly grip, leaving the planet's uniquely large and solitary satellite to orbit their tombs.

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