We can save the planet by turning it into a computer

It's the year 2200, and you've just arrived at Yellowstone National Park.

Well, what *used* to be Yellowstone National Park. National parks and forests have become obsolete since nature merged with machines. Such places made sense when we could only preserve nature by quarantining it from industry, but now the two are inextricably entangled. Each benefits from the other to such an extent that destroying any natural place for its raw materials is as absurd as destroying a luxury car for its bumper sticker. Ever since the forest became more economically valuable than the lumber, humanity stopped putting protective fences around the forest. All that remains now is the old "Welcome to Yellowstone!" sign, left in place as a historical oddity. You take a quick picture of the sign, grab a compass, and walk into the wilderness.

As you walk, you encounter a very familiar placard, like thousands of others that you've seen in cities and towns across the globe. "Please remain on the path, this natural environment is engaged in computation." These placards used to amuse you, but they're so commonplace anymore that you barely even glance at this one. It just leaves you with a subconscious gratitude. It is a small reminder of the epiphany which saved the natural world from human destruction only a century ago. Humanity finally realized that these natural systems offer a different (and more valuable) set of "natural resources" intact than they do disassembled. When disassembled, natural places only offer raw materials. But when intact, they offer computers, repositories for data, and mechanisms for moving data. Humanity became symbiotic with nature by finding and using these "natural computers." As you walk, the wild around you includes naturally and artificially engineered systems so intertwined that you pity the future archeologist who may try to disambiguate them.

The trail carries you up a volcano which only recently stopped leaking molten material. Trudging along the hard, igneous ground, you glance at your compass and notice that its twitching back and forth. Of course! You've stumbled upon Repository Mountain. 50 years ago, engineers built a bridge which stretched across the river of lava that has become the trail

beneath your feat. As it flowed underneath, this bridge generated large magnetic fields which toggled one direction and then the other, reorienting the tiny magnetic materials in the lava like so many little compass needles. As the lava cooled, these needles became locked in place. Your twitching compass retrieves this data one bit at a time. You chuckle as you wonder how much time it would take for you to recover every bit and decode it into the text which it represents: the entirety of Wikipedia as of the year 2150. Concerned about another solar flare which might destroy electronically-stored data, humanity created Repository Mountain as a resource from which it could recover knowledge. There are no legal protections for this mountain, because it doesn't need them. Everyone values the data that it holds much more than the raw materials that it offers, and thus it will remain pristine for generations.

Glancing into the gorge off your right, you see a strange looking boulder just underneath the surface of a sparkling blue river. Only its right angles betray it as being the product of human engineering. This strange monolith is *covered* with life, as it has become an artificial reef in and on which fish, plants, and crustaceans proliferate. You've read about these! It's a reef computer, powered by the water which flows through it and affected by the life which inhabits it. Liquid computers existed long before the digital electronic computers which dominated the previous century, and engineers resurrected them as special-purpose devices for performing Monte Carlo analyses. Humanity realized that it needn't spend energy on generating random numbers in digital electronic computers if it instead engineered computers which allowed for the intrusion of nature's randomness. As tiny apertures open and close in the reef computer, the water itself becomes the computational medium.

You round a bend to encounter a small detour which takes you around a section of trail. A plaque explains the reason for the diversion:

> *Computational naturalists have discovered that the crack patterns on this section of trail approximate the street patterns in lower Manhattan. A slime mold is currently running an optimization over these cracks, which will be used to inform a redesign of the city subway system. Please do not disturb.*

You chuckle. How many millions of dollars would have been spent in previous centuries on optimizations and calculations of this variety? Why did it take so long for people to realize that nature offers computers that will solve problems of such complexity and value? Nobody dares destroy any natural places anymore, for fear of the unrealized computational wealth that they may be destroying in the process.

At the rim of the sleeping caldera, you're met with an astonishing view of what appears to be an unbroken wilderness out to a distant horizon. These vistas still confuse you, because you *know* that the city from which you drove exists in your field of view, but it's so intertwined with nature that it's difficult to discern. You see large herds of migratory megafauna on their thousands-of-kilometers march. In previous centuries, people nearly hunted these animals to extinction for their furs. Now, they've become mechanisms for moving data. They carry tiny memory cards on their fur, like the seeds stuck to your own jacket, along with them on their journey. In the process, a single herd will move petabytes of information in a fraction of the time that it would take to move that information via the Internet. They're far more valuable as an information transport network than they are as jackets and blankets. The same is true for rivers, ocean currents, and the trade winds. Nature's incredible ability to move *matter*, long used only as a source of energy, is now used to move information. In a few more years, engineers anticipate storing that information in the matter itself. The rivers won't carry memory cards, the water molecules themselves will hold the information.

The world around you has become a computer. Storing information, moving information, and processing information. It always was this way, of course, but you thank God and the universe that humanity started using it as such. Machines that exploited and abused nature generated the environmental crisis of the previous century, and machines for which healthy natural systems are critical components solved it in this one. When humanity unlocked the latent computational potential in nature, it unlocked the incredible economic potential of healthy, intact natural systems. The explosive growth of the economy improved everyone's quality of life, and guaranteed nature's preservation for generations to come.