WHAT EVERY PAGAN SHOULD KNOW ABOUT EVOLUTION

I MANAGED TO SLIDE THROUGH SOMETHING like 19 years of formal education learning remarkably little science. In part, I was discouraged by a ninth grade physics teacher whose experiments never worked. If she tried to demonstrate gravity, toy cars would refuse to roll down ramps and objects would float up. In later years, I majored in art, then film and psychology which is science of a sort but didn't demand much grounding in biology or chemistry.

Now that I'm a Witch, I regret my ignorance and take steps to remedy it, mostly through reading and observation. The Goddess is embodied in the natural world, and science in its truest sense is about knowing nature. Our thealogy needs to be empirical as well as mystical.

In earlier columns, I've discussed ways of developing and strengthening our personal relationship with nature. Our understanding of our origins—cosmic and human—shapes that relationship in subtle and profound ways. So hang onto your hats as we take a journey through the wonderful world of evolution, a topic that always has had profound religious and spiritual implications.

Most of us were raised on either the Biblical creation myth or on Darwin's theory—perhaps on both. From the Pagan perspective, neither of these stories is wholly satisfying or "true" in the sense of best describing the reality around us.

The Biblical creation story has a (presumed) male God making the world essentially by fiat, by word alone. The process is disembodied, and entirely removed from the sweaty, bloody processes by which females create life. God's law is something imposed on nature, and God's rules are imposed on us to follow. Humans are made in God's image, and a great spiritual and existential gulf separates us from the animals.

Evolution, of course, was in Darwin's day a shattering and heretical challenge to this view. First, the theory of evolution holds that the world is much, much older than the Bible says. Second, humans, animals, plants, and bacteria are all one continuum of life. Humans are not something set apart. We are animals, and we emerged from the same natural processes by which other life forms evolved.

From the perspective of earth-based spirituality, those insights were a vast improvement over literalist interpretations of the Bible. But Darwinian evolution, especially in its simplistic popular version, supported other values that are less benign.

In evolutionary theory, change is driven by natural selection, by competition for food and resources. The best adapted—those individuals who are smarter, faster, or who simply have a trait that best fits a particular environment—win. The most successful have more offspring, and their traits are passed on.

This aspect of Darwin's theory was a perfect rationale for cutthroat capitalism, both the 19th Century industrialized variety and the Reagan/Bush era. Competition is the driving force of progress in nature and, by extension, human society. The more worthy will win out, and this, in the long run, is good for the species and the whole. Success is its own justification, and what's good for Charles Hurwitz is good for the U.S.A.

There is a different view of evolution, one that better serves the worldview of earth-based spirituality. We might call it Gaian evolution, after the Gaia theory developed by James Lovelock and Lynn Margulis. Gaian evolution is not so much a counter to Darwin as a shift in focus from the individual to the ecosystem. It is not just the redwood tree that evolves, but the forest, the interwoven lives of redwood and tanoak, huckleberry and salal, the micorrhizal fungi in the soil below and the lichens in the canopy where the marbled murrelets nest. None of these creatures evolve alone, in isolation from each other—they coevolve as Forest/Being, in an interdependent dance that balances competition and co-operation. Individuals and species survive when their activities benefit the whole as well as the parts. Evolution becomes the story of how the planet herself comes alive.

Here (with thanks to Elisabet Sahtouris' "EarthDance: Living Systems in Evolution") is my version of how that story might go:

The first bacteria were basically clumps of big molecules who discovered that, by drawing a boundary around themselves, they became organisms. They lived by breaking down other big molecules to release energy, a process we call fermentation, which is truly the oldest profession. Sahtouris names them "bubblers".

Floating about in those primal seas for a couple of billion years, grazing on free-floating sugars, bumping up against each other, they discovered that they could exchange information by recombining their genes. "Heh, heh, hey, baby, the thought of trading genes with you drives me cr-r-razy!" Basically, this meant that these early bacteria had a planetary genetic information pool, a biochemical worldwide web, making them resilient and innovative, laying the basis for future change. Eventually, as the eons passed, the bubblers began to run out of food. In an amazing instance of biochemical creativity that dwarfs the greatest of human inventions, some of these simple organisms

discovered a way to make food directly from sunlight. Imagine it—without brains, nervous systems, thought, memory, computers or the Internet, they essentially invented the process that sustains all life on the planet. Photosynthesis, the second oldest profession, was born.

Sahtouris calls these photosynthesizers "blue-greens". They were widely successful, spreading through the oceans in such numbers that they had a profound effect on the very atmosphere itself, which until then had been basically carbon dioxide, a gas which the blue-greens used in their foodmaking. They offgassed a poisonous byproduct—oxygen.

Oxygen, although we have a bias toward it, is dangerous stuff. It breaks things apart, burns them up. Had the earth's original atmosphere been high in the stuff, life could not have evolved. And now, as it built up, bubblers and blue-greens began to die off in a big way. Many life forms went extinct, possibly those that had been so successful for hundreds of millions of years. Some creatures developed ways to protect themselves, by for example diving into deep mud and living at the bottom of swamps, where they still can be found today releasing that inimitable anaerobic perfume that announces the presence of the Eldest Ancestors.

Others were spurred into a new leap of biological creativity. Instead of hiding from oxygen, these "breathers" learned to use it to burn food for energy, a process we call respiration, the third oldest profession. Fermentation, photosynthesis and respiration still remain the only basic life-processes by which living beings get the energy they need to live.

Photosynthesis gives off oxygen. Respiration produces carbon dioxide as a waste product. And so the dance began, the blue-greens and breathers passing the air back and forth, like two great lungs breathing in and out. Gaia's breath is constantly recycled between them, and the atmosphere itself is still created and sustained by life at just the right balance: 21 percent oxygen. Any less, and we couldn't live; any more, and the atmosphere would be so volatile that one lit match would ignite the planet.

So far, we've been talking about simple creatures—one-celled, undifferentiated, with no nucleus. Eventually, these creatures began feeding on one another, gobbling each other up, or invading and devouring from within. A strange thing happened. Some of the invading breathers, instead of either eating their hosts or dissolving inside them, remained intact and continued to burn fuel, eventually serving their host cells by making energy. These were the ancestors of the mitochondria that exist in each of our cells today, providing the energy we need to function. Other organisms with other useful functions were incorporated. A new kind of creature was born, a sort of giant cell collective, a thousand times larger and more complex than the original bacteria. These cells with nuclei, called eukaryotes (you-carry-oats), make up our bodies and the bodies of all larger creatures. The very cells of our bodies are co-operative systems.

What does this mean for Pagans? The core of our thealogy is that the earth is alive, an organism. Gaian theory lends this belief the credibility of science. (Not that religions have ever really needed external verification—but most of us are children of the modern age and while we may, with one part of our brains, believe in astrology and magic, we were raised to believe in Science.) Not only that, but this story implies that Gaia herself is pretty darn smart, that creativity is one of the ground conditions of being, and that evolution involves co-operation as much as competition.

If Social Darwinism supported ruthless capitalism, Social Gaianism would support a model we don't yet see functioning anywhere around us—one that acknowledges individual needs and self-interest but sees them best served in systems of co-operation and mutual aid. Come to think of it, that's the model we strive for in Reclaiming, in our teaching, our rituals and our organizational structure.

The Gaian story of evolution shifts our focus when we look at nature. We open our eyes and look beyond each individual tree to the pattern of the whole. We honor the unseen creatures below and above as well as what we can see. We begin to look for patterns and relationships, not just isolated individuals. We know that diverse, resilient, complex systems are most likely to survive. And only what's good for the biosphere is truly good for the U.S.A.

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This story also gives us hope. Enormous creativity is embedded in our very cells. Resilience is the nature of living beings. We, with our complex brains, have the inherent ability to evolve in ways that can nurture and sustain the life patterns that surround us.

And if we don't, there's always those gene-swapping bacteria to sip the cocktails of our wastes and, in another billion years or so, come up again with something new.