

BIOMIMICRY

In her “Biomimicry: Innovation Inspired by Nature” (1997) Janine M. Benyus says we need to wake from our dream of controlling nature -- fast turning into a nightmare -- and again become nature’s students, as we were for millennia when we lived intimately with our surroundings.

She addresses basic human needs -- feeding and healing ourselves, harnessing energy, making things, storing information, and conducting business, contrasting how we do these now, unsustainably, with how we might do them, sustainably, by imitating nature.

We can now see, Benyus says, that nature has already created all our inventions, more elegantly and with much less environmental cost.

She suggests we ask ourselves, “How long do you plan to be around?” Business as usual appears aimed for an early closing; nature is in for the long haul – and for all of life.

How will we feed ourselves? Today, 1% of the U.S. population grows our food; non-farmers, (including 7 companies) own half of all farmland. The result? Loss of local knowledge and of commitment to the land’s health.

Since 1945 pesticide use has risen 3,300 percent, and crop losses have increased by 20 percent. It takes 10 kilocalories of

fossil fuels to produce one kilocalorie of food. We each eat the equivalent of 13 barrels of oil yearly.

To change, we need to mirror “the natural tendency to succession,” and learn what the land looked like before the plow.

Growing annuals – wheat, corn, soy – imitates nature’s most immature stage. Doing so means we must disturb the soil every year, pour water on it, feed it expensive fertilizers, and watch priceless topsoil wash away.

Prairies, forests, jungles and other mature habitats consist almost entirely of perennials. These soften rainfall, soak up runoff, self-fertilize, self-weed, and remain insect disaster proof.

Researchers are replicating these “perennial polycultures” in diverse environments, worldwide, substituting edible perennials for wild plants. Their results show perennials can yield big, human friendly crops of grain and other foods that match annual crops, yet improve the soil, require minimal inputs, and generate almost no waste.

By imitating the mature stages of natural succession we can feed ourselves sustainably into the indefinite future.

How will we harvest energy? Photosynthesis produces 300 billion tons of sugars a year, the world’s most massive chemical

operation. By learning to imitate this process (artificial photosynthesis) we can split water (H_2O) to get hydrogen (H) for a non-polluting, renewable fuel, as a power pack for solar manufacturing, or as a switch for light-speed computing.

How will we make things? Nature manufactures its components, often in water, without high temperatures, high pressure or toxic waste. Nature self-assembles, using genes to direct proteins, and DNA templates. We've begun to imitate this, harnessing bacteria to make materials tougher than fiberglass or Kevlar.

How will we heal ourselves? Because wild animals consistently choose high protein, low toxin, mineral-rich foods, and seek medicinal plants when they're ailing, we need to study and imitate them. And because the leaf of one plant makes 500-600 different compounds, each with 50 or 60 different biological activities, and since many plants are going extinct, we need to do it now.

How will we store what we learn? By creating carbon and silicon-based computers. Each of the body's molecules is a tiny computer, and the brain puts together 100 billion of these in one massive network, with shape-based, lock-and-key interactions. It's this we need to imitate.

How will we conduct business? Our current model is like an immature ecosystem, characterized by weeds and scavengers;

we need to move it to a mature model – self-renewing in place, diversified, without waste, with no inputs but water and sunlight. Benyus includes several practical steps businesses can take to achieve this maturity.

She ends with a Mohawk birth blessing: “Thank you, Earth. You know the way.”