

# Natural Systems Living

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I first met Wes Jackson when I was putting together Rensselaer Polytechnic Institute's environmental science program in 1992. I wanted to learn about The Land Institute and to see what Jackson had to say about our new program. He heard me out and then asked, "Is the administration behind you? Are they committed to environmental education?" I described the support being provided—several committed colleagues, a grant of about \$200,000 for course and faculty development, and the keen interest of the dean of the School of Science. Jackson's assessment was to the point: "You will fail."

After about four years of 70-hour work weeks, a few colleagues and I had created a dynamic, holistic, inter-disciplinary program that built on the classic wisdom of Rachel Carson, Aldo Leopold and E.F. Schumacher, and on the more recent perceptions of Jackson, Thomas Berry, Wendell Berry, David Orr and E.O. Wilson. The next few years, however, revealed that Rensselaer lacked what Jackson said we needed. The administration did not believe environmental education was important. Neither did the faculty, except for a few outliers like me. The president apparently thought environmentalism was a fad, and that things like population and consumption were not relevant to the school. Our already modest resources and support dwindled. I resigned in 2000, and the environmental science program we assembled is now defunct.

But the program did not fail. Rensselaer failed, as our culture is failing.

The eight years I devoted to environmental education, however, were personally transformative. Soon after I became director of environmental science, my path crossed that of an economist, John Gowdy. We wrote a paper on how the self-organizing principles of markets that have emerged in human cultures over the past 10,000 years inherently conflict with the self-organizing principles of ecosystems that have evolved over the past 3.5 billion years. The dynamics of ecosystems, within which all human activity takes place, follow the laws of biology, not those of human-created economic systems. The conflict between these systems is apparent: During the past century economic indicators have grown vigorously while environmental indicators have been negative. Ultimately, the growth of human economies faces the constraints that limit all biological systems.

This paper was a consensus statement that summarized the work of myriad others. It is their work and writings that have enabled me to grasp just how fragile our accomplishments, "the good life" and civilization are.

My first book, *Paradise For Sale: A Parable of Nature*, co-authored with Gowdy, describes what happened on the central Pacific island of Nauru. In 1900 a rock from Nauru proved the richest phosphate ore ever assayed. Essentially the whole island was a phosphate mine. Over the next 100 years, the Australians and then the Nauruans extracted and exported the ore.

The Nauruans mimicked our market economics, and provide a microcosm of what is happening on a global scale: overpopulation, over-consumption, loss of biodi-

versity and the life support it provides, confused and dysfunctional society, reliance on fossil fuels, poor health and financial collapse. If isolated from the outside, most of the population will have to leave Nauru or there will be a massive die-off. What I came to understand from writing *Paradise for Sale* can be summed up simply: Global civilization is in very treacherous waters and, on its current path, unlikely to survive into the 22nd century.

My second book was *Wisdom for a Livable Planet: The Visionary Work of Terri Swearingen, Dave Foreman, Wes Jackson, Helena Norberg-Hodge, Werner For- nos, Herman Daly, Stephen Schneider and David Orr*. Writing it solidified and brought into sharp focus for me the following.

Evolution can only select for those behaviors that are successful in the present. The hominid brain evolved over several million years to give us a human nature fitted to hunter-gatherer societies. This behavioral repertoire is that of a small-group, place-based, social animal that is territorial and hierarchical. Morphologically modern *Homo sapiens* migrated out of Africa some 100,000 years ago. These hunter-gatherer ancestors walked into the vast ecosystems of Earth that appeared never ending, without limit. Our species' behaviors evolved in compliance with a boundless frontier.

*Kansas Wheatfarm*, by Birger Sandzen. Lithograph, 20 by 15 inches, from The Birger Sandzen Memorial Gallery.



But our hunter-gatherer ancestors could know only what their evolved senses permitted them to know. They knew vanishingly little of how and why the biological-physical world works as it does. With only your senses and the unaided power of your brain without resorting to the scientific insights of the past several hundred years venture an explanation, or a dozen explanations, of how a plant's fundamental elements make stems, leaves and then flowers. You will realize that

you just can't figure it out. And any answer will always be wrong, because the microworld of cells, genes and chemical signaling is hidden from us. Our native abilities are inadequate to discern a world so removed from experience.

As a substitute for this lack of knowledge about how the biological-physical world works, our ancestors made up stories and believed them so strongly that they would die for those beliefs. At times, perhaps often, this world of imagined relationships proved to be adaptive and successful—it gave sufficient selective advantage to be fixed in the human gene pool and became part of human nature. Believing so strongly is a fundamental capacity of our evolved brains and a dominant element of humanity's nature.

Myriad hunter-gatherer cultures gave rise to a handful of agricultural societies beginning some 10,000 years ago. Over the past 2,000 years Middle Eastern agriculture birthed European culture, which in the past 200 years, boosted by fossil fuels, became global. This Western political-economic system combined the in-the-present perspective of human nature with our evolved capacity to transfigure “accepted reality” into beliefs deeply held without credible evidence. Thus emerged a culture that denied limits. Inherent in this no-limits perspective is a belief in growth that ignores biological and physical reality. This core belief of Western culture makes resolution of our multitude of environmental challenges essentially impossible. This is the mega-understanding I gained in writing *Paradise* and *Wisdom*.

A few months ago, my wife, Mary, handed me a Cathy cartoon and said, “This is your problem.”

Panel 1: A few people gather around as one woman says, “I quit dieting and lost 25 pounds!”

Panel 2: More women gather as another woman says, “I quit dieting and lost 35 pounds!”

Panel 3: Then Cathy says, “I quit dieting, gained 15 pounds and went up three jean sizes.”

Panel 4: Cathy stands alone and says, “Hope attracts a crowd. Truth makes it disappear.”

We certainly do have a problem keeping people's attention. The solution to staying focused on our fundamental environmental problems is far from clear. And the earth is replete with groups undone by hope for the essentially impossible. To make the impossible possible, we need true hopefulness.

True hopefulness is first recognizing the odds are heavily against us, believing those odds, and then doing everything possible to beat them.

What we are up against is that the important environmental trends are almost entirely negative. Human population size and consumption are beyond what Earth can durably support. Human industry has forced climate change—which has undone many local cultures that had impoverished their surroundings. Ninety percent of top ocean predators are gone. Half of the world's forests have been cut down. If current rates of erosion and fertility loss persist, most arable land will be

gone in several centuries. And biodiversity loss is reaching the level of past mass extinctions.

To assess the meaning and then to act on the distant consequences of these data is extremely hard for an animal that evolved to act in the present.

I believe it comes down to this question: Is it possible to change an economically centered culture into an ecologically centered one on a worldwide scale and in a way that accommodates human nature and behavior? Maybe, if a substantial fraction of us express true hopefulness.

Let's not kid ourselves. The shift to an ecologically centered pattern of living requires monumental changes in cultural beliefs. And fundamental cultural beliefs usually change glacially slow, if at all.

Consider this: Darwin published *The Origin of Species by Means of Natural Selection* in 1859. By 1900 we had scientific consensus on evolution being the major process that produced the diversity of life on Earth. Pope John Paul II endorsed evolution in 1996; however, the church hierarchy is now questioning his decree. In 2005 most of the people in the United States did not consider evolution a valid explanation for biodiversity, and a mere 26 percent of adults accept evolution occurs by the process of natural selection. Time is not on our side.

*Wisdom for a Livable Planet* is about people who express true hopefulness. Each of the eight people I wrote about is dedicated to a major environmental issue that appears impossible to resolve. I will tell two stories from the book.

If we are honest, each of us must acknowledge that most of our assessments and beliefs are based on incomplete knowledge. In fact, too often we take positions with minimal or no relevant data.

In one of his [University of] North Carolina courses, Orr [director of environmental studies at Oberlin College] had the students read E.F. Schumacher and Herman Daly. The scholarship of these economists is based on holistic analyses that establish the pervasive flaws in contemporary economic theory and practice and recommend in their place a human-scale and natural science-based economics. The faculty in the economics department at Chapel Hill openly dismissed this scholarship but did not explicitly criticize it. Orr recalled, "Standing on the sidelines of the soccer field while the kids were playing soccer, I turned to the chairman of the economics department, whose kid was out there, and I said, 'Jim, I know you don't like the work of Herman Daly and E.F. Schumacher, so how about coming into my class and giving a critique?'"

"'No, I'm too busy, can't do it.'"

"'Well, could we change the time?'"

"'No, I'm too busy.'"

"'Could we come to your office?'"

"'Too busy.'"

"'Could you just record some things for us and I'll play it in class?'"

“ ‘No. No time for it.’

“So I said, ‘Well, Jim,’ I took out a piece of paper and pencil ‘could you just write out something you think is wrong with Daly and Schumacher?’

“ ‘Oh, God damn it, David. I haven’t even read those people!’ ”

If we are going to make the impossible possible, each of us must strive to be honest and base our beliefs on reality, as best as we can verifiably know it. In addition, the challenges before us require systems thinking. For a long time, Wes Jackson has advocated this.

I attended my first Prairie Festival in 1998. On an excursion around The Land Institute with Jackson, we drove by an alfalfa field heavily infested with weevils. He pulled into the shade of a grove of trees next to the field, turned off the engine, and said, “Alfalfa looks pretty bad. We allowed a local farmer to use this field. Part of the deal was no insecticides. Now that he’s got a bad weevil problem, he wants to spray. Look, that’s the problem. Say we let him spray. It seeps into the groundwater, travels to our neighbor’s well, and nine years from now she has breast cancer.” Jackson drew a circle in the thick dust on the dashboard and continued: “This is the boundary of consideration.” He then drew a second circle around the first: “This is the boundary of consequences. As it stands now, that breast cancer is here” he pointed to the space between the two circles—“outside the boundary of consideration. So, where do you draw the boundaries? We told him he couldn’t spray.”

Jackson wants people to think hard about the boundary of consequences that we have accepted with industrial agriculture. His institute has taken on the daunting task of expanding boundaries of consideration in agriculture beyond mere efficiency and short-term profit, to include and respect ecological and evolutionary principles.

Unfortunately, our economics-based culture finds it exceedingly difficult to set boundaries that accommodate such principles. Taking a long sweep of history, Jackson sums it up this way: “[W]e of Western civilization have moved from the church, to the nation-state, to economics as the primary organizing structure for our lives. We have been through the hypocrisy of the church, the atrocity of the nation-state that peaked with Hitler, and now we are devotees of economics, the encoded language of human behavior that directs us toward ecological bankruptcy. It is time to move more aggressively on to the fourth phase, already under way, ecology.”

Thinking ecologically is not a passing fad or the venue of a special interest group. It is an emerging pattern of thought leading to a durable way of living that all may share and that benefits everyone. This belief in the correctness of an ecologically grounded way of living, held by other peoples under different circumstances, places us in appropriate relation with the rest of life. It is the next big idea in Western culture and has been in the making for more than a century. Religious, political and economic freedom were the big ideas that liberated Western culture, propelling it to become the dominant civilizing force of the past several centuries,

but the successes of these big ideas have met the limits imposed by biological principles on a finite planet.

Jackson, The Land Institute, and many other people and organizations have embraced this ecological revolution. The institute's objective is to abandon dead-end, industrial agriculture and replace it with a natural systems agriculture. The larger vision is to create a natural systems living, grounded in and abiding by the principles of ecology and evolution. Making global culture consilient with the principles of biology would be to make the impossible possible—what Thomas Berry calls “The Great Work.” The visionaries in *Wisdom* have challenged us to roll up our sleeves and get to it.

I'll close with an illustration of the success possible by what I call true hopefulness.

On the afternoon of May 27, 1942, the aircraft carrier *Yorktown* returned to Pearl Harbor with severe damage from the Battle of Coral Sea. One of the admirals estimated that repairs would take three months. A second figured that a Herculean effort could make absolutely necessary repairs in two weeks.

The *Yorktown* went into dry dock at dawn the next morning. Adm. Chester Nimitz, commander in chief U.S. Pacific Fleet, knew the Japanese planned to attack Midway Atoll in eight days. He inspected the *Yorktown*, then calmly said, “We must have this ship back in three days.” No one spoke. Finally hull-repair specialist Lt. Cmdr. Herbert Pflingstad responded, “Yes, sir.” Established procedure went out the window. Every electrician, carpenter, welder, fitter, machinist and mechanic that could be found went to work on *Yorktown*.

At 11 a.m. May 29 the *Yorktown* was floated and towed into the harbor with workers still swarming on her like hornets at a molested nest. Early the next afternoon, some 55 hours after Pflingstad had said, “Yes, sir,” the *Yorktown* steamed out of Pearl Harbor to join other ships at a position northeast of Midway hopefully designated Point Luck. She was by no means like new, but could launch and land aircraft. The ship was sunk in the battle, but played a critical role in turning back the Japanese fleet and in sinking all four of the Japanese attack carriers.

In fixing the *Yorktown*, the impossible was made possible by true hopefulness. The story is a metaphor for our task. We must metamorphose our economically centered culture into an ecologically centered one on a worldwide scale and in a way that accommodates human nature and behavior, if we are to achieve a humane and durable future for humanity within Earth's glorious diversity of life.