

Keralans and anti-globalization activists do: through the extremely long and painstaking process of achieving unanimous consensus. Otto-Zimmerman says, “The no-car-zone idea first came up in 1975, ten years ahead of any other place in Germany. As it moved through all the studies and the committees, the city required every decision to be unanimous. There were visits from all the people affected, the city took every kind of complaint seriously, they talked to the neighbors, they made sure everyone on both sides of the issue understood everything — real participatory planning. It took *so long*, but when the decision to ban cars came, there was a real consensus. Everyone seems to love it now.” He says these things are simple and they’re subtle, but they work, and they work because the officials have the same kind of commitment to the area that the citizens do. “In city government,” he says, “I noticed people from all the different offices talking to each other so carefully; they really understood the will of the developers, they understood both sides. But they would come up with every reason you can imagine *not* to develop. ‘That’s not the best place . . . maybe over here, or over there . . . maybe, you know, not here at all.’ So they’re very slow about it. Many developments came out not at all as the developers had wanted at first, but smaller, more adapted to the area.”

Local, democratic power is the most fundamental and necessary requirement of sustainability; the two, as we have seen, almost always go together. Otto-Zimmerman says, “Globalists don’t mind where they live, where they buy things, where those things come from. Borders, to them, just cause confusion, trouble, inefficiency. They are mentally torn down. But people who care about a certain place, they have real relations with it and with each other. This is the fundamental disconnect between the two approaches. And what we’re learning now is that we really can have the best of both; internationalist populations that can see beyond local borders, and really care about what happens in other countries, but that also take care of their own homes, their *Heim*.”

## **Grading the School**

*If you were a fish, the last thing you would discover is water.*

— OLD SAYING, QUOTED BY PETER BROWN, FORMER HEAD OF THE  
MCGILL SCHOOL OF THE ENVIRONMENT

As we’ve seen in Kerala, empowering people to participate fully in a democratic society requires education, literacy and, especially, access to reliable

therapy.”<sup>20</sup> In a very recent case, a blood-cancer experiment at a prestigious cancer research center in Seattle was allowed to drag on for years, even though patients were dying at a higher rate than with standard therapy. The deaths of at least twenty people were directly attributed to the treatment, the *Seattle Times* reported this year; and again, the cancer center and some of its physicians were found to have had a financial stake in the treatment.<sup>21</sup>

If it weren't for reliable, objective science, much of what we know about medicine and technology, as well as good environmentalism, would collapse. The safety of our machines, drugs and foods is continuously investigated by independent government and academic researchers who have documented the dangers of substances like PCBs, asbestos or DDT. Those of us who track this kind of research know that the studies that have enabled us to separate dangerous practices and products from safe ones have come almost exclusively from these “independent” sources — universities or government bodies — not from groups with vested commercial interests. If the independent studies that have alerted us to the facts of global warming, the dangers of radioactivity and industrial toxins and the alarming loss of species diversity worldwide had not been kept separate from industrial interests, it is doubtful that the information they provide would even exist. When the very foundations of scientific study at the university level are being corrupted by commercial concerns, how can we know that what we're teaching new generations of students isn't in the textbooks simply because some large corporation influenced the research on which the text is based through grants to the institutions that provided the information?

Fortunately, some of our universities and more prestigious publications, to say nothing of students themselves, have begun to deal with this problem. When the University of California at Berkeley struck a deal with Novartis, allowing the company first rights on any plant genetics discoveries in exchange for \$25 million, students demonstrated vociferously, and ethicists got concerned. Sheldon Krinsky, a research watchdog at Tufts University, recommends a system that would require all scientists to acknowledge their corporate affiliations whenever they publish a study, speak at a conference or sit on a review panel. The peer-reviewed publications *Science* and *The New England Journal of Medicine* have just announced new rules that force disclosure of any author's financial ties to any company or institution. But seemingly the best solution comes from Richard Strohman, professor emeritus of microbiology at Berkeley itself. He suggests that professors shouldn't be allowed to have their cake and eat it too. “Tenure was established to enable

information. But even a 100-percent literacy rate cannot empower intelligent, democratic societies if the information people are given — on the effects of toxins, the safety of food additives, the amount of habitat available to plant or animal species, the trustworthiness of a given politician, the legal rights available to a citizen — is in any way unreliable or tainted. Real democracy cannot survive the serious subversion of information. So if people really are concerned about preserving freedom and democracy, the solidity of information and the objectivity of our educational institutions must be prime areas of concern.

There was a time when scientists in Western universities, and David Suzuki was one of them, pursued their research interests in order to add to the global pool of knowledge. Along the way, these researchers might occasionally make discoveries that could be applied commercially, but knowledge for its own sake was the ideal for most academics. Not any more. With enormous profits to be made from private companies interested in medical, biotechnological or other scientific research, governments and industries are pressing for closer and closer links between university research and the private sector. But there is a serious cost involved in such a basic change in the Western educational environment. Allowing corporate interests to “own” information increases occasions for corruption, secrecy and greed in our society. On the research level, the profit motive also fuels the tendency to cut corners, to suppress failures, or to actively deceive the public, not just about the efficacy of this or that product, but about the nature of reality itself. We have referred to such effects earlier in this book — the many years that the oil lobby spent paying scientists to deny or belittle climate change; the continuing behavior of tobacco, chemical and pharmaceutical companies in manipulating studies to downplay the dangers of their products; the confusion of information about the effect our global economic institutions are having on local democratic rights.

Medical research is particularly liable to manipulation by scientists funded by profit-making bodies. Cases of corruption are costing people not just money, but their lives. In 1997, for example, the University of California at Irvine shut down a cancer research lab “after finding that scientists there had invested in a company that hoped to sell the drugs they were testing — and then failed to report side-effects.”<sup>19</sup> The FDA recently reprimanded a Tufts University researcher for improperly treating a cancer patient with a gene therapy that may have doubled the size of his tumor. “Both the scientist and a Boston medical center held a large stake in the company developing the

academic researchers to speak the truth about their specialties without fear of reprisals, without being subject to any pressure commercial interests, governments or other outside interests could bring to bear on the university, that might damage their careers. If these people want to be free to work for private companies, they should have to give up tenure; it can be reserved for those who wish to remain relatively poor, but secure in their academic position. And it will be easy for interested parties to ascertain who is who.”<sup>23</sup>

So far it's mostly students and NGOs who are pressing for disclosure and demanding that their schools get private money out of public research and private corporations, like Coke and Pepsi, out of their classrooms. But a growing number of mainstream institutions are trying to revamp themselves and are attempting to apply the kind of systemic changes to their accredited courses that we've been talking about throughout this book. McGill University in Montreal took a step in 1998 by founding the McGill School of the Environment, which offers both bachelor of science and arts degrees that cut across traditional disciplines. The School of Public Affairs of the University of Maryland has been offering a new view of economics through the famous ecological economists Herman Daly and Bob Constanza, and the Vermont Law School is trying to fit its values of defending social systems and the environment with its physical practices, including its buildings.

The former director of the McGill School, Peter Brown, says he tries to make it clear to his students that the first step people have to take in understanding the world around them is to get outside the unconscious assumptions of their own culture. These assumptions are so deeply embedded in our lives we aren't even aware they exist. “Just take some apparently simple ideas, like: What do we mean by ‘development?’ By ‘cause and effect?’ By ‘the law of nature?’ When you dissect such terms, you see how really complex these ideas are; when you go after them, they sort of disintegrate or get hard to formulate. So the point is to get people to think systematically about the structure of their own thinking so that they're not prisoners of their own history. And when they do, when they begin studying our culture from the outside, it doesn't take long before they realize that it's wildly dysfunctional.”

The University of Texas at Austin has a similar school that extends to the graduate level and is even more committed. The Environmental Science Institute of the university comes right out and states that it was founded in direct response to the World Scientists' Warning to Humanity mentioned many times by David Suzuki in books, programs and lectures over the past

ten years. In order to respond to these serious warnings, the institute (known as the ESI) has set up complex and impressive research efforts that crisscross traditional academic boundaries. Eight colleges, including law, pharmacy, mathematics, natural sciences, engineering and liberal arts, have united a score of departments, institutes, museums and bureaus to create a rapidly growing form of alternative professional training. One of ESI's founders, Dick Richardson, professor of integrative biology (what used to be termed zoology and botany), says of the program's success and growing reputation: "I think it's safe to say that we have established an academic beach head and are moving across the campus."

These courses are breaking away from the usual tunnel vision that accompanies isolated disciplines attempting to study whole systems. But they intend to go farther than their already revolutionary stated goals of teaching botanists to consider hydrology and history or making city planners look at toxicology and biology. They are also attempting to teach the students to understand the larger, interlocked systems in which their specialties are embedded, by forcing them to withdraw from all their pre-suppositions and to think for themselves. This move towards complexity and independence extends to the teachers themselves, who are learning as intensively as the students.

Dick Richardson and his wife, Pat, a laboratory chemist who works closely with him, described one of their summer courses. The students are taken out to a wetland and riverbank ecosystem that borders the desert outside Austin. The course's underlying goal is to enable the students to appreciate wholes instead of parts so that they can become more capable of understanding and protecting the natural systems that sustain ecosystems. But that goal isn't stated overtly; in fact, the first thing that happens is that they, not the teacher, have to divide into groups and determine what's worthy of study in the various ecosystems. All by themselves they have to come up with ideas like rates of biodiversity, water retention in the soils, hydrology, forest-edge ecology or level of pollutants. And then they have to decide how to construct such a study in the field.

In other words, they're not assigned methodologies or technologies or told what they're aiming for. Most undergraduate science courses state the desired outcome and use assigned equipment to duplicate a previous experiment. The students' grades depend on how perfectly what they do matches the predetermined template their professors have set up. These students, however, have to think up the right questions themselves; they even have to

invent and develop their measurement technologies. The professor only assists by asking questions like: “Why did you choose a drip instead of an absorption method of measurement? Why did you divide your research area into quadrants instead of something else?” Such questions only alert the students to the choices that are available and to the many diverse avenues available to them when approaching a natural system; but they don’t help them choose.

The results, of course, often do reproduce experiments done hundreds of times in the past, but the students don’t know that. They’ve discovered how to construct an experiment and how to create the technologies of measurement — all on their own. The process is often frustrating. “Some of the students are outraged that the professor isn’t telling them what to do. They don’t know what’s expected of them,” says Dick Richardson.

“A certain number drop out,” Pat Richardson agrees, “but the ones that are left gain intense confidence in their ability to work out problems on the spot.” In short, they learn how to think in the context of the complicated and changing physical reality of the planet.

“All kinds of unexpected things happen that quicken their understanding of physics and the environment,” says Dick. “One group this summer chose a xeric [desertified] area for their study. Then we had heavy rains, and their sandy spot with cacti and a few desert succulents suddenly became lush with greenery, all kinds of plants and flowers they had never seen before. That’s when they realized that what they were dealing with isn’t static! That’s when they started to have fun.”

Even grading is revolutionary. The students work in a system termed OLR (Online Learning Record) in which they evaluate their own progress. The thing is, they have to do this very closely with the professor, who’s not impressed if they constantly evaluate themselves positively as “learning well” and doing things “right.” “It’s only when people make mistakes and start looking at how they’re wrong that they begin to learn,” say the Richardsons. Even the syllabus for this course prepares the student for a life observing natural systems when it warns: “A project rarely ends exactly as planned. Unexpected things happen, and...the earlier in the project the need for modification of activities is recognized, the better the chance for the project to be satisfactory.” The emphasis is therefore on variability and complexity in the subject of study, humility and readiness to learn on the part of the students. They are being taught to look at the world not as reductionist scientists, but holistically, like the ranchers following the precepts of Allan

Savory's Holistic Management back in chapter three. And ironically, this apparently convoluted and imprecise approach often results in students volunteering to work even harder than they would in normal courses.

"Two of the groups asked to be allowed to go on monitoring their sites after the course was over," Dick says. "They were learning so much they didn't want to stop, even if they were no longer getting grades or credit, so they kept at it right into the fall. And, in fact, that's what's happening with these courses in general; we have a growing number of key faculty here noticing that the students coming out of our classes are not only knowledgeable, but enthusiastic." Dick thinks this is so because in his method of grading the students start with zero, so the teacher is an ally who helps them build their knowledge. Normal grading, he says, "starts with an A and then there's a race to erode it; the teacher has to try to catch you out, make you see you're wrong. If he doesn't, you won't learn. But in this system, I'm not trying to catch and punish them; I'm a resource and an ally."

Just like the old apprentice methods, and the way humans used to learn a long time ago. Patience, humility and observation have always been the keys to understanding nature and protecting its resilience, and these tools of the master hunter or amateur naturalist are now being offered to 21st-century scientists.

## Tracking Happiness

*Schools as we know them are not the only way to become educated. They were invented by the Industrial Revolution, so that people in the countryside would learn to be obedient factory workers. That's the model we now force upon our children, and we wonder why so many of them are unhappy there.*

— JON YOUNG, WILDERNESS AWARENESS SCHOOLS

An enormous amount of what young people learn about life comes not from the schools they go to, but from the values they're taught at home by parents and grandparents, friends and neighbors. These values had a lot of impact even just a generation ago, but these days a great deal of a child's time is spent at school, in what amounts to the same little box-like rooms with a limited number of buttons that Mander's chimpanzees experienced. School-age, middle-class children also typically spend several hours every day in places that are marginally more pleasant, but still a long way away from what might be called their natural habitat — in neon-lit, fossil