FOREWORD

A Time for Wizardry

A little more than three decades ago, as a geeky kid from an ordinarily troubled American family, I began my freshman year of college at a midsized state university. I had, as eighteen-year-olds usually have, a laundry list of things I wanted to do with my life, spread out along the spectrum from the plausible to the preposterous. Novels by J.R.R. Tolkien and Hermann Hesse, books of environmental philosophy by Theodore Roszak and E. F. Schumacher, and a well-thumbed copy of the *Tao Te Ching* were the intellectual compasses by which I hoped to find my way. At the time, I was considering a career in what was then the booming field of appropriate technology.

Those of my readers who were not around in the 1970s may never have encountered the phrase "appropriate technology," and plenty of people who were around then seem to have done their level best to forget it. Still, in a time of energy crises and gas lines, when a great many people all over the industrial world recognized the absurdity of pursuing limitless growth on a finite planet, it was a label that anchored a great many hopeful visions of the future.

E. F. Schumacher, the maverick economist whose book *Small is Beautiful* was one of my guiding lights in those days, launched the appropriate technology movement back in the 1950s in response to the needs and possibilities of the nonindustrialized world. He called it "intermediate technology"—intermediate, that is, between the traditional folk technologies of the global South and the energy- and capital-intensive technologies of the industrial nations. As the energy crises of the 1970s made it clear that those same energy- and

capital-intensive technologies were no more sustainable in rich nations than in poor ones, a generation of green innovators adapted the phrase, and the concept, to the demands of the approaching Age of Limits.

In the world of the twenty-first century, appropriate-tech mavens argued, the cheap abundant energy and resources that supported the extravagant machinery of twentieth-century industrial nations would inevitably run short. Before that happened, a new breed of technology had to be invented and put into production. The new technologies they hoped to pioneer would use energy and resources sparingly; they would work with the cycles of nature rather than against them; they would meet human needs without placing unsustainable burdens on the biosphere. All over the world in those days, you could find little nonprofits on shoestring budgets and small companies run by basement entrepreneurs, hard at work making that dream a reality.

To a remarkable extent, they succeeded. This is the fact that most often gets left out of the story on those rare occasions when the appropriate-tech project is remembered at all. By the time I started college in 1980, the core technologies had been invented, the most challenging problems solved. In dozens of different ways, varying with local conditions and resources, people in the appropriate tech movement proved that it was possible to live sustainably, and even comfortably, on a small fraction of the energy and resources most middle-class people in the industrial world thought they needed to sustain their lives. As the new technologies moved toward maturity, a great many of us recognized that with hard work and a willingness to make modest sacrifices in order to build a better world for our grandchildren, the world could manage a relatively smooth transition into the Age of Limits.

That wasn't what happened. Instead, the world's industrial nations threw away the promise of a relatively easy transition into the future and committed themselves to a trajectory that guaranteed they would face a head-on collision with the hard limits of a finite

planet. Here in the United States, the tipping point was Ronald Reagan's election as president, which gave a radical faction within the Republican party the chance to dismantle the environmental policies and green initiatives of the previous decade. The same thing happened elsewhere in the world about the same time, as "conservative" parties (the word belongs in quotes, since buying short-term prosperity at the price of long-term calamity is not a conservative policy in any meaningful sense of the term) discovered that they could win elections and reshape the political dialogue by insisting that the world could keep using up irreplaceable resources at unsustainable rates and never have to suffer the consequences.

The conservatives' claim never rested on anything more solid than partisan rhetoric, but it allowed millions of people to justify their abandonment of the steps toward sustainability that had been taken in the previous decade, and it also provided an excuse for pumping newly drilled oil fields in the North Sea and the Alaskan North Slope as fast as geology would permit, flooding world markets with oil and sending the price plummeting to the neighborhood of US$10 a barrel—its lowest level, corrected for inflation, in all of human history. The flood of cheap oil launched a lavish if temporary economic boom across the industrial world, sweeping aside the nascent culture of conservation just as it was beginning to bear fruit.

There were some people, to be sure, who stayed with the appropriate-technology project even after the Reagan era's temporary glut of cheap energy made it unfashionable. I was one of them. I left college without a degree when it became clear that my hopes of making a career in appropriate tech were headed nowhere; even so, I was awarded a Master Conserver certificate from the Washington State Energy Extension Program in 1985 (just before it lost its funding) and I kept growing organic gardens and conserving energy and resources straight through the years of extravagance that followed. I wasn't the only person who held onto the dream, though

it sometimes felt that way. Still, our ideas were often treated as an embarrassment, even among those people who claimed they were concerned about the environment and the future of the planet.

The irony of that response grew even more pointed as the twenty-first century neared, and the Age of Limits began to show up on schedule. The global peak of petroleum production found a new name—Peak Oil—and began its long journey from the fringes to the front pages of the daily paper; hard limits to other resources, ranging from the phosphorus feedstocks for industrial agriculture to the water that makes it possible for crops to grow at all, came into sight; climate change driven by industrial society's unhelpful habit of treating the atmosphere as an aerial sewer stopped being a theoretical issue and started sending the global climate spinning out of control worldwide. The list could go on a great deal further, but I trust my readers will have gotten the point, which is that the concerns that drove the appropriate tech movement in the 1970s are deeply relevant to our lives today and the easy dismissal of those concerns by the pseudo-conservatives of the 1980s and 1990s were hopelessly naive.

Yet this belated discovery didn't send people back, as it should have, to the practical discoveries and philosophical insights that emerged from the last sustained effort to deal with the predicament we're now facing. Quite the contrary: most of the generation that turned its back on the appropriate tech movement at the time of the Reagan counterrevolution still gets visibly uncomfortable if the subject gets brought up in their presence, and the subject of appropriate tech has been pushed so far down the hole where our culture keeps its unwelcome memories that the generations coming of age since then don't know the least thing about it. Instead, the one kind of recycling that caught on in the Reagan years—the recycling of failed ideological responses to the ecological crisis of industrial civilization—has become standard practice at all points along the political spectrum. As each year passes and the Age of Limits closes in, one party talks about the free market and all the oil that

would be out there if only government regulation would get out of the way. The other party talks about marvelous new innovations that never quite go into production, or they propose grand radical agendas that only attract the usual activists. Both sides try not to notice that none of these things is doing anything to divert the trajectory of our age from a messy end.

Many people today know this, or at least sense it. Especially, but not only, in North America, an awareness is spreading through the crawlspaces of our culture that the current round of troubles isn't just a speedbump on the road to the shiny future our society's myths promise us. The sense that something has gone desperately wrong, right down at the core of the world we've created for ourselves, forms the background to most of our culture these days. The popularity of soothing narratives about the future is a marker for just how pervasive that background has become; it's only when fears are inescapable that efforts at mass reassurance find a market.

Still, those reassurances are becoming very thin these days. These days, when I give a talk on the future, I begin it this way: "Remember all those scientists a few decades back who warned that if we didn't make drastic changes in the very near future, we'd be in deep trouble in the early twenty-first century? Well, guess what." Much more often than not, nobody argues. Some of them, to judge by the comments and questions I field, are already trying to fit their minds around a future in which we will all have to get by on much less energy and fewer resources than we use today, but many more simply hope they'll be lucky enough to die before it hits—I've had people, not all of them elderly, express this latter hope to me in so many words.

Even among those who insist that everything will work out—those who claim that the center of the Earth really is full of limitless oceans of oil, or that we can all move into lifeboat ecovillages and embrace an abundant new lifestyle, or that the Rapture, the Singularity, or some other *deus ex machina* will save them from the

future—I have to question how many people actually believe what they claim to believe. I know far too many people who insist the world will end soon, for example, who are still putting money into their retirement accounts, and it's been an open secret for the last decade that the vast majority of people who like to imagine living in a lifeboat ecovillage haven't been willing to lift a finger or spend a dime to bring such a project into being.

I'd like to suggest that this mismatch between what people claim to believe and what they believe enough to put into action arises because daydreams about lifeboat ecovillages and planet-ending catastrophes share a common purpose, one that's also shared by the assortment of unproven but heavily-promoted technologies that claim to be able to solve our energy crisis without requiring anyone to give up the extravagant energy and resource-wasting lifestyles that pass for normal in the industrial world these days. That common purpose has nothing to do with addressing the crises these things claim to address; instead, it's a matter of giving people something more pleasant to think about than the future that's breathing down our necks. Even planet-ending catastrophes, after all, are more pleasant to think about than the couple of centuries of ragged decline, impoverishment, and population loss that define the usual fate of a failed civilization. If we all get blown to kingdom come in one vast fireball, at least it's over quickly, and we can get some consolation in the few seconds before we're vaporized by telling ourselves that it wasn't our fault.

That state of denial is among the dominant forces in the collective psychology of the industrial world today. Its roots go down into some of the most tangled and murky corners of the modern mind. The issue that I want to explore here is whether there are options for constructive action at a time when most people think that hiding under the mattress is a useful response to the near future. I believe there are such options, and one of them may best be understood by borrowing a metaphor from history.

A few years ago, as part of the other side of my career as a writer,

I helped translate a very strange book from the Middle Ages. Its title is *Picatrix*, and it's one of the very few surviving examples of that absolute rarity of medieval literature, a textbook for apprentice wizards.[1] Those of my readers who grew up on stories about Merlin, Gandalf et al. may be startled to learn that those characters, legendary or fictional as they are, were modeled on an actual profession that flourished in the early Middle Ages and remained common until the bottom fell out of the market at the end of the Renaissance.

By "wizard," I don't mean your common or garden variety fortune teller or ritual practitioner; we have those in abundance today. The wizard of the early Middle Ages was a freelance intellectual whose main stock in trade was good advice, though that came well frosted with incantation and prophecy as needed. He had a working knowledge of astrology, which filled the same role in medieval thought that physics does today, and an equally solid knowledge of ritual magic, but his training didn't begin or end there. According to *Picatrix*, a wizard needed to have a thorough education in agriculture; navigation; political science; military science; grammar, languages, and rhetoric; commerce; all the mathematics known at the time, including arithmetic, geometry, music theory, and astronomy; logic; medicine, including herbal medicines and poisons; the natural sciences, including meteorology, mineralogy, botany, and zoology; and metaphysics—in effect, the sum total of scientific learning that had survived from the classical world.

This might not sound like the sort of education you would expect to get at Hogwarts, the school for young wizards in J. K. Rowling's *Harry Potter* novels, and that's exactly my point. Whether you believe that the movements of the planets foretell events on Earth, as almost everyone did in the Middle Ages, or whether you think astrology is simply a clever anticipation of game theory that gets its results by inserting random factors into strategic decisions to make them unpredictable, you'll likely recognize that a soothsayer with the sort of background I've just sketched

out would be well prepared to offer sound advice on most of the questions that might have perplexed a medieval peasant, merchant, baron, or king. Equally, of course, someone so trained would hardly be restricted in his choice of active measures to incantations alone. This is arguably why so many medieval kings and barons had professional sorcerers and soothsayers on staff despite the fulminations of all the major religions of the age. It also explains why wizards less adept at social climbing found a bumper crop of customers lower down the social ladder.

The origins of this profession are, if anything, even more interesting. A useful study by historian Pierre Riché has explored in detail how the educational system of the late Roman world imploded as its economic and social support systems crumpled beneath it.[2] In Europe (matters were a little more complex in the Muslim world), that system was replaced by a monastic system of education that, in its early days, fixated almost entirely on scriptural and theological studies. Methods of training young aristocrats fixated even more tightly on the skills of warfare and government. Only among families that held onto a tradition of classical learning did something like the old curriculum stay in use. Riché notes that while this custom continued, those who learned philosophy, one of the core studies in that curriculum, were widely suspected of dabbling in magic. It's not too hard to connect the dots and see how a subculture of freelance intellectuals, equipped with unusual knowledge and a willingness to wander well outside the boundaries set by the culture of their time, could have emerged from that context.

All this may seem worlds away from the issues raised a few paragraphs ago, but there's a direct connection. The wizards of the early Middle Ages were individuals who recognized the value of certain branches of knowledge that were profoundly unpopular in their time, and they took it on themselves to preserve the knowledge and make connections with those who shared their interests—or at least wanted to make practical use of the skills that the

knowledge made possible. No government support was available for the transmission of classical knowledge in the sixth and seventh centuries CE, and the popular movements of the time—when they weren't simply stampeding mobs trying to get out of the way of the latest round of barbarian invasions—were no more likely to help. How much of a role wizards might have played in the transmission of classical learning to the future is anyone's guess; records of their activities are very sparse. It's clear, however, that they were an intellectual resource much used during an age when few other resources of the kind were available.

I've come to think that something like the wizards of the early Middle Ages, focused on a somewhat different body of skills, may be one of the best options we have available today. Certain branches of practical knowledge, thoroughly learned and thoroughly practiced by a relatively modest number of people, could be deployed in a hurry to help mitigate the impact of the energy shortages, economic dislocations, and systems breakdowns that await us in the years ahead. I'm sure my readers have their own ideas about the kind of knowledge that might be best suited to that challenge, but the appropriate technology movement of the 1970s makes a particularly good focus for such a project.

That movement, as already suggested, differed in important ways from the efforts toward sustainability that get most of the media coverage today. The kind of high-cost, high-profile eco-chic projects that receive the lion's share of attention were of little interest back then. Instead, effort focused on simple technologies that could be put to work by ordinary people—people without six-figure incomes, doing the work themselves, and using readily available tools and resources. Most of the technologies were evolved by basement-shop craftspeople and small nonprofits working on shoestring budgets. These technologies were field-tested by thousands of people, many of whom built their own backyard versions and then wrote about the results in the letters column of *Mother Earth News*.

The toolkit that evolved out of this process was a remarkably well-integrated, effective, and cost-effective set of approaches that individuals, families, and communities can use to sharply reduce their dependence on fossil fuels and the industrial system. It was not, I should probably point out, particularly esthetic, unless you happen to like a lively fusion of down home funk, late twentieth-century garage-workshop modern, and hand-dyed back-to-the-land hippie paisley. Those of my readers who own houses and are still fretting about resale value and haven't yet figured out that this figure will be denominated in imaginary numbers for the next several decades at least, will likely run screaming from it. Those who were incautious enough to buy homes in suburban developments with restrictive covenants will have to step carefully, at least until their neighbors panic. Apartment dwellers will have to pick and choose a bit; on the other hand, those of my readers who will spend time living in tarpaper shacks before the current Great Recession ends—and I suspect that many people will have that experience, as many people did the last time the economy lost touch with reality and imploded—will find that very nearly everything the appropriate-tech people did will be well within their reach.

What's included in the package we're going to explore? Intensive organic gardening, with its support technologies of composting, season extenders, and low-tech food preservation and storage methods; small-scale chicken and rabbit raising, and home aquaculture of fish; simple solar greenhouses, which make the transition from food to energy by providing heat for homes as well as food for the table; other retrofitted passive solar heating technologies; solar water heating; a baker's dozen or more methods for conserving hot or cool air with little or no energy input; and a good deal more along the same lines, all of it geared toward backyard gardens, basement workshops, easily available resources, and modest budgets. None of these things, it's only fair to say, will save the world, if that hackneyed phrase means maintaining business as usual on some supposedly sustainable basis. What the toolkit can

do is make human life a good deal less traumatic and more livable in an age of serious energy shortages and economic troubles.

Given that serious energy shortages and economic troubles are everyday phenomena in much of the world right now, and are far from unheard of right here in the industrial world, it's bizarre that the alternative approaches I've just listed remain entirely off our collective radar screen. Among the things that make it difficult for many people to factor these alternatives into their future is that they aren't, so to speak, plug-and-play components for existing lifestyles; they presuppose radically different relationships among land, resources, farmers, crops, and consumers. As they expand into the spaces left blank by today's faltering industrial society, the new social forms defined by these relationships differ so starkly from existing ways of doing things that many people have trouble making sense of them.

This same pattern pervades nearly all current debates about the future. Consider the endless bickering over the potential of renewable energy in the media and the internet. Most of that bickering assumes that the only way a society can or should use energy is the way today's industrial nations use energy. Thus you see one side insisting that windpower, say, can provide the same sort of instantly accessible and abundant energy supply we're used to having, using some equivalent of the same distribution systems and technologies we're used to using, while the other side—generally with better evidence—insists that it cannot.

What inevitably gets missed in these debates is the fact that it's entirely possible to have a technologically advanced and humane society without having electricity on demand from sockets on every wall across the length and breadth of a continent, or mortgaging our future to allow individuals to zoom around in hopelessly inefficient personal vehicles on an extravagant system of highways. The sooner we start thinking about what kinds and forms of energy wind turbines are actually best suited to produce, rather than trying to force them onto the Procrustean bed of an electrical grid

that was designed to exploit the very idiosyncratic kinds of energy we get from fossil fuel supplies, the sooner windpower can be put to use building an energy system for the future—instead of being wasted in a futile attempt to prop up the obsolete one we've inherited from the recent past. What stands in the way of this recognition is the emotional power of today's ideology of progress, with its implicit assumption that the way we happen to do things must be the best, or even the only, possible way to do them.

Seeing past that assumption was among the core achievements of the backyard gardeners and basement inventors of the appropriate tech movement of the 1970s. Their capacity to glimpse other possibilities gave the toolkit they evolved a creative edge that too many current proposals lack. For this reason, among others, there's a point to revisiting the skills of a time in which the limits to growth were recognized as an imminent reality. It's even possible that those who are willing to do so, and learn these unfashionable but potentially vital skills, might follow the very old example mentioned earlier, and become the green wizards of the age to come.

For that, I have come to think, is one of the things that a world on the brink of a long descent into a deindustrial age most needs: green wizards. By this, I mean individuals who embrace the task of learning, practicing, and thoroughly mastering a set of mostly forgotten skills to use and to share with others. This isn't a subject where armchair theorizing counts for much—as every wizard's apprentice learns, what you really know is measured by what you've actually done—and it's not going to earn anyone a living any time soon, either—though it can help almost anyone make whatever living they earn go much further. Nor, again, will it prevent the unraveling of the industrial age and the coming of a new era of hard material limits. What it can do, if enough people seize the opportunity, is make the road to that new era much more bearable than it will otherwise be.

This same principle can be applied to many things besides the suite of green technologies I studied as a budding appropriate-tech

geek during the late 1970s and early 1980s. Still, a set of skills evolved during the last round of energy crises and economic contraction is likely to be particularly useful in this round. It seems to me, however, that there are deeper lessons to be learned in the hard contrast between the eager hopes of the appropriate-tech movement I studied as a young man, and the brittle cynicism that clamped down over much of the industrial world in the decade that followed. A look at those deeper lessons belongs to a later section of this book, but it may be helpful for readers to keep the contrast in mind as we glance back across the decades to a time when it seemed as though we might actually find the courage to make a better future for ourselves and our world.