

Techno-Fix

Why Technology Won't Save Us or the Environment

By Michael Huesemann & Joyce Huesemann

[Techno-Fix](#) (New Society Publishers, 2011) shows that negative unintended consequences of technology are inherently predictable and unavoidable, techno-optimism is completely unjustified, and modern technology, in the presence of continued economic growth, does not promote sustainability, but hastens collapse. The co-authors demonstrate that most technological solutions to social and technology-created problems are ineffective. They explore the reasons for the uncritical acceptance of new technologies, show who really controls the direction of technological change, and then advocate extensive reform.

There are few who are not impressed by the seemingly endless stream of technological innovations: computers, cell-phones, video cameras, the Internet and countless electronic devices. New technologies often have an immediate appeal, with attention being focused on short-term benefits while long-term negative consequences are not anticipated. As Jerry Mander observes,

We are hypnotized by the newness of the machine, dazzled by its flash and impressed with its promise.... Compounding this problem is the fact that every technology presents itself in the best possible light. Each technology is invented for a purpose and it announces itself, as it were, in these terms. It arrives on the scene as a "friend", promising to solve a problem.... What's more, the new machines actually do what they promise to do, which leaves us feeling pleased and impressed. It is not until much later, after a technology has been around for a while — bringing with it other compatible technologies, altering economic arrangements and family and community life, affecting culture, and having unpredictable impact on the land — that societies both familiar and unfamiliar with the machine begin to realize that a Faustian bargain has been made.

As was pointed out earlier, it is inherently impossible to design new technologies that are guaranteed to never have negative effects of any kind (Chapter 1). Certain segments of the population will profit and other segments will not. Those who enjoy the benefits are likely to be techno-optimists. Unfortunately, the mass media exploit the public's ignorance and the inherent fascination with novelty to promote the false view that there will be only positive effects both now and in the future. This is done by presenting the most positive aspects of a new technology while omitting to mention potential negative side effects. As Jerry Mander writes,

That our society would tend to view new technology favorably is understandable. The first waves of news concerning any technical innovation are invariably positive and optimistic. That's because, in our society, the information is purveyed by those who stand to gain from our acceptance of it: corporations and their retainers in the government and scientific communities. None is motivated to report the negative sides of new technologies, so the public gets its first insights and expectations from sources that are clearly biased.

Why do the mass media exhibit such a positive bias toward new technologies? Before attempting to answer this question, we need to understand the function of mass media in industrialized societies. According to the model of propaganda developed by Edward Herman and Noam Chomsky, "The 'societal purpose' of the media is to inculcate and defend the economic, social, and political agenda of privileged groups that dominate the domestic society and the state." The mass media are controlled by those who are able to pay for access to it. This situation is described by Edward Herman's "power law of access" and the "inverse power law of truthfulness," which can be summarized as the greater the economic and political power, the easier it is to gain access to the media and the more freedom is granted to tell complete lies.

Information distributed by the mass media is often greatly biased because it has first to pass through a number of filters, such as inoffensiveness to influential owners of media conglomerates or to corporations that pay for the advertisements. Anything that even indirectly places media profits at risk has a very small chance of being broadcast. The result is that through careful selection of topics, framing of issues, filtering of information, special emphasis and tone, the public debate about controversial topics such as the introduction of new technologies is kept within the bounds of the prevailing paradigm: any technological innovation is “good” and its value is not open to question. As Herman/Chomsky say,

In sum, the mass media of the United States are effective and powerful ideological institutions that carry out a system-supportive propaganda function by reliance on market forces, internalized assumptions, and self-censorship, and without significant overt coercion.

Corporations develop and market new technologies for a very simple reason: to increase their sales volumes and profit margins. Technological innovation is a proven way to increase a company’s market share and competitiveness, but only if the new products can be advertised heavily through the mass media. Since many corporations have large marketing budgets, they have easy access to the mass media by purchasing advertising space and time. Since the goal of all corporations is to increase profits, it is necessary to present new technologies only in the most favorable light. The negative side effects of technological innovations, even when known, are omitted or minimized. The mass media, therefore, convey an unrealistically positive view of new technologies because they are, to a large degree, controlled by the corporations that stand to profit from them.

It would be a mistake, however, to hold corporations and the mass media entirely responsible for the rampant technological optimism in the United States. As Neil Postman observes in *Technopoly*, the belief that a new technology creates only positive effects is much more than a conspiracy of entrepreneurs and corporations against the public. It is, in fact, a deeply embedded cultural phenomenon:

In cultures that have a democratic ethos, relatively weak traditions, and a high receptivity to new technologies, everyone is inclined to be enthusiastic about technological change, believing that its benefits will eventually spread evenly among the entire population. Especially in the United States, where the lust for what is new has no bounds, do we find this childlike conviction most widely held.... This naive optimism is exploited by entrepreneurs, who work hard to infuse the population with a unity of improbable hope, for they know it is economically unwise to reveal the price to be paid for technological change. One might say, then, that if there is a conspiracy of any kind, it is that of a culture conspiring against itself.

The Decline of Techno-Optimism

In order to suppress anything that might threaten social cohesion or challenge the power structure, every society has taboos related to certain kinds of discourse and action. In modern industrialized societies, there is a strong taboo against challenging the faith in science and technology and their supposed contribution to “progress.” Any questioning of that faith is seen as heresy. Those who criticize new technologies are labeled “anti-progress” or, in more derogatory terms, “Luddites,” after the machine-smashers who opposed the mechanization of labor during the Industrial Revolution of 19th-century England. Indeed, the idea of “progress” is used to suppress criticism, to enforce passivity and to avoid debate about the introduction of new technologies. Criticism of technological and industrial development is often stifled by invoking the illusion of inevitability, the “you can’t turn back the clock” argument (see Chapter 10). As Jerry Mander observes,

The operating homilies remain the same: “You can’t stop progress”, “Once the genie is out of the bottle you cannot put it back”, “Technology is here to stay, so we have to find ways to use it better”. In reality, these are all rationalizations to cover up a culture-wide passivity; a failure to take a hard look at technology in all of its dimensions, or to draw the obvious conclusions from the evidence at hand.

In addition to “there is no turning back” arguments, technological developments are often promoted as value neutral. As will be discussed in Chapter 10, the myth of value-neutrality is employed to convince people that technological change occurs in an objective and rational way, thereby presenting it as inevitable and legitimate, and deflecting potential criticism. Finally, even if critical attitudes toward technological development are expressed, most dissenters have insufficient financial means to access the media. Individuals in our society generally lack the freedom of *public* speech, which is effectively reserved, as mentioned above, to those who can pay for it. The general public is, therefore, unlikely to hear about the potential negative aspects of new technologies, thereby promoting the impression that all technological change is good.

Despite the many ways in which criticism of technology is discouraged and even suppressed, there has nevertheless been a decline of faith in science and technology during the past century. The idea of progress being brought about by science and technology was dealt a number of severe blows, first by the technologically facilitated violence and destruction witnessed during World War I and World War II and later by the many serious environmental problems precipitated by synthetic organic chemicals, large-scale industrialization and the adoption of materialistic, resource-intensive lifestyles. As Thomas Parke Hughes describes in *Changing Attitudes Toward American Technology*,

The carnage of World War I and the well-publicized exploitation of technology brought a new ambiguity, the legacy of a century of rarely qualified praise confronted by the obvious horrors of total war. It was further reinforced by the growing belief that technology was not directed by benign providence or inexorable laws of progress towards social objectives believed generally – and vaguely – desirable. The growing conviction that technology and progress were not synonyms and that man needed to assume control of, and make decisions about, the use of technology brought less euphoric prophecies for the future.

The beginning of the environmental movement about half a century ago followed by the atrocities of another high-tech war in Vietnam engendered a highly critical attitude toward technology and the industrialized culture it reflected. As Kenneth Stunkel and Saliba Sarsar wrote in 1994,

The insight that all technological development is not a blessing has emerged in the past 30 years. Suddenly many technologies do not seem benign.... If one means by “progress” improving and dignifying the human condition, its identification with technological development has become problematic and ambiguous.

Similarly, Jerry Mander observes,

Technological society, during the past half-century, has demonstrably not achieved the benefits it advertised for itself. Peace, security, public and planetary health, sanity, happiness, fulfillment are arguably less close at hand than they ever were in the past.

Compared to religions that make grandiose promises that are inherently untestable, thereby protecting themselves against criticism and maintaining their authority and belief systems for thousands of years, the promises made by science and technology can be readily and objectively evaluated. In the early stages of scientific and technological development, when many promises were fulfilled or even exceeded, the countless negative consequences that later appeared have also been objectively quantified and to some

extent publicized, thereby eroding somewhat the earlier optimistic belief in scientific and technological progress. As Jeremy Ravetz observes, “‘Losing faith’ is supposed to be a problem that afflicts the religious; but on reflection we see that belief in progress and science is also vulnerable in its own way.” Indeed, science and technology has come under increasing attack from various quarters: the environmental and counter-culture movements, anti-establishment intellectuals and religious fundamentalists.

These critics point to overwhelming evidence that advances in science and technology have caused not only many unintended negative and often irreversible consequences but also have not fulfilled the earlier promise of greater human happiness and well-being. As discussed in Chapter 2, the number of unintended consequences is large: environmental pollution, ecosystem destruction, species extinction, global climate change, human overpopulation, increased violence and destruction, as well as social and moral dysfunction, which result from the adoption of an overly materialistic lifestyle. As will be discussed in Chapter 9, despite rising material affluence in industrialized nations, people are not happier than before, indicating that much of the “progress” brought about by science and technology has been an utter failure in terms of human psychological well-being.

Georg Friedrich Juenger observed more than 50 years ago in *The Failure of Technology* that “progress is an optical illusion.” It is an illusion embraced with the fervor of a religious faith, and it is promoted and exploited by those who profit most from the development and distribution of technological innovations.

Clearly, a redefinition of progress is needed. Hopefully, our improved understanding of the limitations of science and technology will result in a new paradigm of progress: progress will no longer be seen as the technological control and exploitation of nature and people for the benefit of the few with negative consequences for the many. Instead, progress will consist of increasing our awareness and understanding of how to adapt to our natural environment and live within its limits, and how to improve our well-being and happiness in non-materialistic ways. This paradigm shift and its implications for our lifestyle choices as well as for the practice of science and technology will be discussed in more detail in Part III.

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REVIEW OF TECHNO-FIX BY RICHARD ADRIAN REESE

Welcome to our all-you-can-eat buffet of eco-predicaments, a remarkable achievement brought to you by our old friend, technological innovation. Our friend isn't evil. He's a hilarious charismatic trickster who excels at making comical mistakes. Every brilliant idea blows up in his face, flattens him with a boulder, or rockets him over a cliff. He never gives up. He never learns from his mistakes. He never succeeds.

Like the trickster, Americans are famous for our manic techno-optimism. Economic growth and material progress make us giddy with delight, and seventy-two percent of us believe that the benefits far outweigh the harms. The planet doesn't matter. Technology will certainly enable the kids to have a somewhat life-like experience, riveted to their glowing screens. A sane person can only conclude that we live in a world of illusions.

Techno-Fix, by Michael and Joyce Huesemann, takes us on a voyage through the hall of illusions. It provides readers with magic x-ray glasses that allow us to see right through heavy layers of encrusted bull

excrement and clearly observe our way of life in its bare-naked essence. It delivers a super-sized serving of precious common sense that should be a central part of every youngster's rite of passage, but isn't.

The human species invented techno-addiction, a dangerous habit that seems impossible to quit; we always need bigger doses. This addiction has put quite a kink in our evolutionary journey, repeatedly blowing up in our face. Science and technology are the mommy and daddy of most of our severe problems. No other species has developed a fascination with endless growth. The other critters have remained in balance for millions of years, limited by predators and food supply, nature's brilliant time-proven design.

The Huesemanns note that we took a different path. "Humans have used powerful technologies to escape these natural constraints, first by using weapons to eliminate large predators, then by inventing agriculture to increase food supplies, and finally by employing sanitation and medical technologies to increase their chances for survival."

Our devious experiments at controlling and exploiting nature have created a thousand nightmares. We've zoomed right past seven billion, giving the planet quite a fever. Still, the mainstream mindset is convinced that life is always getting better and better, and that technology will overcome any challenges on our joyride to utopia. We have no doubt economic growth can continue until the sun burns out, and nothing will ever slow us down. According to Huesemann's Law of Techno-Optimism, "Optimism is inversely proportional to knowledge."

The mainstream mindset is so weird — it celebrates the benefits of technology, and steps around the stinky messes, pretending not to see them. Innovation is never a free lunch. Every benefit has costs, and it's impossible to predict every unintended consequence. When serious problems are discovered, we tend to resolve them with additional innovation, which generates additional unintended consequences. We can delay paying the bills for our mistakes, but every debt must and will be paid. It's something like quicksand.

A century ago, the benefits of the automobile were immediately apparent, and the staggering unintended consequences were not. This technology has caused huge damage to our health, our families and communities, the ecosystem, and the unborn. Car problems are still growing, as billions of people in the developing world are eager to live as foolishly as Americans do. The car and the television are our two biggest techno-bloopers, according to the Huesemanns.

Foolish fantasies are the deliberate consequence of the mass media and advertising, which are tremendously successful at persuading folks that the purpose of life is to transfer as much stuff as possible from nature to landfills. "Needs" are what is necessary for survival and health, like food, shelter, and community. "Wants" are things we have no need for, stuff we have sudden impulses to acquire. They are infinite in number, constantly changing, generally frivolous, and often useless.

The path to consumer happiness and high status involves devoting a substantial portion of our lives to doing various sorts of work. For many, the work is less than meaningful or satisfying. The reward is trade tokens, which are used to acquire wants, and each purchase provides a brief consumer orgasm. The thrill is soon gone, the gnawing returns, and we are compelled to go back to the mall and get another fix.

No matter how hard we thrash our credit cards, we never arrive at our destination — wholeness and contentment. "We are chasing a mirage, thereby remaining forever dissatisfied and unhappy." In the last 50 years, rates of depression in the U.S. have increased tenfold, and continue to rise (rates among the Amish are far lower).

Depression is also a result of our mobility and isolation. Until the industrial era, most people spent their entire lives in stable communities, and formed long-term social bonds with the people around them. Before the hell of automobiles, daily life included pleasant face-to-face encounters with others. Before the hell of glowing screens, people spent little time sitting alone.

Luckily, technology has a daffy response for any problem. It's far easier to develop techno solutions than social solutions. Rather than attempting the social challenge of creating a way of life that isn't so lonely and dreary, technology can simply chase away depression and anxiety with happy pills. It's easier to build new road systems than it is to convince people to give up their cars. It's easier to provide life-saving surgeries than it is to encourage people to vacate their couches and eat a healthy diet.

The Huesemanns harbor special loathing for the medical industry. It's extremely expensive, and remarkably ineffective. Intelligent, low cost preventative care is not the focus. New treatments are constantly being developed. The dead generate no profits, so we keep very sick people alive on machines; we transplant organs. Death must be delayed by any means necessary, regardless of cost. "If it can be done, it should be done." We need to remember that old age and death are normal and natural.

The last section of the book provides the theoretical solutions to our predicaments. This plan requires world leaders that will eagerly cooperate in rapidly and radically reconfiguring the way we live and think. It requires a humankind that is spiritually connected to nature, people who abhor pollution and mindless consumption, folks willing to make enormous sacrifices in order to ensure the wellbeing of future generations of all species. Energy will be renewable, non-renewable resources will be shunned, and all wastes will be safely biodegradable. The Huesemanns warn us the transition might not be easy.

QUOTES FROM **TECHNO-FIX** (Culled by Richard Adrian Reese)

Huesemann, Michael and Huesemann, Joyce, *Techno-Fix — Why Technology Won't Save Us or the Environment*, New Society Publishers, Gabriola Island, B.C., Canada, 2011.

Foreward by Paul and Anne Ehrlich — Technology, by itself, can't save us. The Green Revolution did not fix hunger. Contraceptives are cheap, but underutilized. Humankind is in overshoot, yet many believe that growth can continue indefinitely. We understand the problems, and what needs to be done. Solutions lie primarily in the realm of human behavior. Used wisely, technology could help to avoid the collapse of civilization — but wise use is not the norm.

Introduction — Techno-optimism is common but hardly justified. Unintended consequences are inherently unavoidable and unpredictable. Continued growth hastens collapse.

Part One — Technology and Its Limitations

Chapter 1 — The Inherent Unavoidability and Unpredictability of Unintended Consequences

3 Everything is connected to everything else. 4 Enlightenment thinkers did not grasp that humans are a part of nature. They thought that we were apart, and this set the stage for trouble. Modern technology separates us even further. 5 The idea of progress is based on faith that human societies and nature can be perpetually improved through the power of reason. Darwin disproved this.

Nature knows best. 6 Detrimental change does not survive long. Organisms that survive now have been time-proven. 7 Human efforts to optimize nature for human purposes will disturb balances. Evolution is

slow and wasteful, but it is far more reliable than techno-innovation. Technology will produce both positive and negative effects, but optimists only see the positive. 8 There is no free lunch. Every gain has a cost, and payment cannot be avoided, only delayed.

Changes caused by humans are often bigger and faster than nature can adapt to. This can lead to irreversible consequences. Climate change could trigger catastrophe. 9 The resilience of both environment and human societies is limited. 10 Traditional cultures typically evolve slowly, but techno change can be rapid. Social and environmental impacts cannot be assessed as quickly. 11 Animal populations are kept in check by food supply and predators.

“Humans have used powerful technologies to escape these natural constraints, first by using weapons to eliminate large predators, then by inventing agriculture to increase food supplies, and finally by employing sanitation and medical technologies to increase their chances for survival.” So, here we are at seven billion. This “will cause a devastating series of widespread and unparalleled severe and irreversible consequences, such as habitat loss and species extinction as well as the collapse of human civilization.” It is impossible for humans to improve upon nature. Benefits will have costs. Negative consequences can never be avoided. It is impossible to predict all consequences.

12 “René Descartes promoted the idea of scientific reductionism, which assumes that an adequate understanding of a complex system (e.g., nature) can be achieved by investigating the properties of its isolated parts.” Mechanistic reductionism became the basis of modern science. 13 But it is not possible to observe everything. Nature is not orderly. We cannot understand natural systems well enough to manipulate them with out harm. 14 We do not really know what we assume we know.

“Now we face the paradox that while our knowledge continues to increase exponentially, our relevant ignorance does so even more rapidly. And this is ignorance generated by science.” We generate both knowledge and ignorance. 15 Most major modern problems were created by science and technology. “Our collective ignorance about how to address these derivative problems is far greater than the scientific knowledge and related technologies that created them.”

Chapter 2 — When Things Bite Back: Some Unintended Consequences of Modern Technology

18 Industrial and economic activities consist of extracting highly ordered matter from the environment and returning highly disordered wastes. It is impossible to avoid negative environmental impacts of human economic and industrial activities. 20 We manufacture many chemicals, and our ignorance of their eco-effects is enormous. We’re never going to perform safety tests on tens of thousands of chemicals.

21 We have severely altered the planet’s carbon cycle. 22 This may result in such severe weather changes that adaptation by humans and many other species would be extremely difficult. Agriculture might become impossible in Europe, because of lower temps. The worst crime is species extinction. 23 Industrial agriculture is unsustainable. 24 The average depth of topsoil 200 years ago was 21 inches, now it is 6 inches. The use of pesticides and herbicides is skyrocketing.

26 The consequences of genetic engineering are impossible to predict and are potentially catastrophic. 27 Not understanding the hazards should not be considered safety. Wind blown pollen from modified plants will be impossible to contain. Major innovation has never been benign. 28 Prior to autos, the world was designed for foot travel. 29 Thousands are killed in accidents. Cars pollute. Roads destroy nature. 30 People are isolated from each other. 31 The car ruined city life.

New military technology is causing massive suffering. 32 It increases the efficiency of killing. They have a tendency to kill more indiscriminately. In WWI about half the dead were civilians. In WWII, half the

dead were military, and four times as many died. 35 Modern medicine perceives health to be the absence of disease. It strives to eradicate disease via magic bullets. Environmental, economic, social, dietary, and psychological causes of disease are ignored. 36 Causes of disease may not be addressed, and no effort at prevention. Large scale prevention would make far more sense than high-tech individual intervention. Expensive treatment is favored over inexpensive prevention.

37 There are unintended negative consequences, like iatrogenic diseases (causing 225,000 deaths per year), and growing antibiotic resistance. Medical practice is the third leading cause of death in the U.S., after heart disease and cancer. Many are permanently disabled by procedures and therapies. 38 We want powerful chemicals that blast the disease whilst otherwise being harmless. Chemotherapy can be devastating.

41 We now have the ability to save the lives of many head injury victims, but they survive to endure chronic pain and serious disabilities. Problems are common when elderly patients are resuscitated after cardiac arrest. “If it can be done, it should be done” — at any cost. Body functions can now be taken over by machines. 43 Old age and death are natural, not something to be resisted at any cost.

44 Human population has expanded in stages, related to three techno revolutions: tool-making, agriculture, and industrial. More people means more problems. 45 Scarcity leads to poverty, famine, war, and genocide. Quality of life diminishes. The three stages were based on improved access to energy. Fossil energy is finite, so the current population is unsustainable. 46 Massive human suffering lies ahead.

In the past, only the most fit survived to reproductive age. Now, with better nutrition and modern medicine, more than 95% of children in developed nations survive to reproductive age. Serious mutations are no longer eliminated by early death. “Formerly lethal and deleterious mutations accumulated in the population, thereby slowly reducing the population’s ability to survive under more rigorous environmental conditions.”

Chapter 3 — Technology, Exploitation, and Fairness

49 Technology is often used to control and exploit. The exploited will unavoidably suffer negative consequences. 50 Many technologies facilitate exploitation. Early farming practices were sustainable for hundreds or thousands of years, because the people had an intimate relationship with the land. [???] Things fell apart when the Age of Reason arrived, and distanced us from nature.

Almost everything we use is made in places we have never seen, and never will, by people we will never meet. 51 We are unaware of the harms caused by our consumption. Often, the consequences are passed on to future generations, against their will (radiation, depleted fisheries, climate change, etc.). 52 This is exploitive and unethical. The animals we eat are exploited, but we never see how they are raised and processed. 53 Modern weapons allow us to kill from a distance, often without seeing the consequent suffering and death.

Control and exploitation of nature increased with domestication. 54 It shifted into high gear with the Industrial Revolution. The Greeks lived lightly because they possessed the virtue of self control. [???] 56 Humans have come to dominate nature. 57 Our ecological footprint is far too large. We are trashing the atmosphere and climate. We consume far too much fresh water. 58 Nitrogen fertilizers greatly increased food production and population.

60 Workers are controlled and exploited. Automation increases productivity. 63 Today, most workers seem to expect to be controlled, in return for a paycheck. “You can’t stop progress.” It’s futile to

question technology. 64 TV is a tool for control and manipulation. Watching screens separates us from each other and the natural world. It leads to ever-increasing isolation from reality. What is real?

65 Big money advertisers pay big money to manipulate reality for the masses. Mass production requires the mass consumption of stuff we don't need. 66 Folks who are 80 have spent 20 years of their waking life watching TV. About 80% of humankind has access to TV. 67 Electronic media also disseminates political propaganda.

68 Military force is used to maintain access to scarce energy and mineral resources. 69 WWI was a competition for colonies. WWII was a competition for access to oil. Affluent nations depend on exploiting developing nations. They need markets, resources, and cheap labor, and they will fight to have them. 70 "Many modern technologies are employed to control and exploit nature, people, and even future generations, and this is being done on a grand scale." Exploitation is the opposite of reciprocity and fairness. It leads to the destruction of nature and unthinkable human suffering.

Chapter 4 — In Search of Solutions I: Counter-Technologies and Social Fixes

71 Unintended consequences introduce new problems. We are better at creating problems than solving them. Most of our problems are human-caused. We have an intense faith in the effectiveness of techno-fixes. 73 Counter-technologies attempt to resolve the problems created by other technology. Even if they work as intended, they generate another sequence of unintended and unpredictable consequences. 75 Burning oil produces CO₂, which alters the climate. CO₂ can be converted to carbon and stored, but this solution causes the production of even more CO₂. Renewable energy has negative environmental impacts too.

Other technology is used for social fixes — solving social, cultural, economic, and political problems. Instead of addressing overpopulation and overconsumption, we produce cleaner technology. 76 Instead of acknowledging the problem of cars, we build more roads. Instead of dealing with a sick culture, we mask the symptoms of the depressed with psych meds. Instead of addressing our rotten lifestyles and diets, we develop high tech medical treatments. Surgery is easier than exercise. Technology is easier than social engineering. It's easier to build new roads than to get people out of their cars.

77 Using technology to solve environmental problems does not work. 80 DDT is now found in almost every organism. Why not abstain from making harmful products? 81 Instead of burning less fossil fuel, we're going to sequester CO₂, which may acidify groundwater, or the ocean. 82 Geo-engineering to counter global warming is dumb — using counter-technologies rather than prevention. 83 Idiots want to put a mirror in outer space that is bigger than California (to deflect sunlight). Environmental problems will not be resolved if we don't deal with the social issues of overpopulation and overconsumption.

84 Arms races are dumb, as are nuclear weapons. Nobel believed that dynamite would end future war, because nobody would dare to fight. 85 So did the inventor of the machine gun. 88 Techno optimists say that techno fixes buy time. But there are really no techno shortcuts to the problems facing industrial societies. 89 There are more scientists alive today than in all previous generations combined. What do they do? Solve problems. Are they running out of problems? No, we have more and more.

Chapter 5 — In Search of Solutions II: Efficiency Improvements

91 Efficiency improvements are common techno solutions, and everyone loves them. Greater efficiency will solve most problems. 94 We demand more of everything, to an unlimited degree. But there are limits to efficiency gains. Techno innovation and efficiency improvements are key contributors to the

rapid growth of material affluence. 95 In 1865, Stanley Jevons noted that increases in efficiency lead to increases in consumption (the Jevons paradox).

99 When cars are more fuel efficient, we drive more, and buy gas-guzzlers. Plus, the number of cars is expected to double in the next 20 years. 100 Public lighting is now vastly more efficient, but we expanded the use of public lighting and failed to reduce energy use. 105 Labor- and time-saving technological innovations have not been used to reduce the annual work load or increase leisure time for U.S. citizens, but were employed instead to increase material affluence.

107 A hundred years ago, no one thought that someone with heart disease “needed” a heart transplant. 108 There is no end to new treatments. We have an open-ended crusade against death and thus an unlimited demand for medical treatment. We need to accept that old age and death are natural, and not problems that need to be fixed.

111 There are real limits to efficiency improvements. Dreamers have ridiculous fantasies of miraculous advances, unlimited economic growth and affluence — a wonderful life that’s almost harmless. 112 Highly efficient societies are highly vulnerable to resource shortages. Einstein: “Perfection of means and confusion of goals seem to characterize our age.” We accept efficiency as a worthwhile ultimate goal, and often discover (too late) that it was a dumb goal.

113 We focus on materialistic values and goals, and neglect the non-material. This often destroys what is most enjoyable in life. 115 The Ehrlichs warn that it’s dumb to do “efficiently that which should never be done at all.” An efficient Nazi is a horror. What we really need is intelligent goals (a sustainable world). 116 The current goal is the maximal exploitation of both people and the environment.

Chapter 6 — Sustainability or Collapse?

117 Prior to agriculture, humans lived for millennia in almost steady state conditions (affluence & population). With farming, affluence was increased by accumulating property. This society was solar powered. With the Industrial Revolution, our access to new forms of power exploded. Fossil fuel could be used to do work. This led to a population spike. 118 The world is obsessed with the notion that economic growth is the answer to all problems. 119 Economists disregard that resources are finite.

The Brundtland report gave us the vague term “sustainable development.” The business community understood this to mean ongoing economic growth with a few eco-tweaks [business as usual with a spiffy green paintjob]. 120 The goal is “sustainable economic growth.” 122 “Continued economic growth into the indefinite future will result in increased resource use and pollution, a situation that clearly is not sustainable and, in fact, will accelerate global collapse.” Continued use of nonrenewable resources is unsustainable, as is ongoing pollution. “In short, industrial societies are unsustainable.”

123 Industrial agriculture is inherently unsustainable. 124 All we need is just three changes: sustainable energy, sustainable materials, and sustainable pollution. 125 This presents some serious challenges. (1) Serious impacts of large-scale renewable energy generation. All “green” energy has significant environmental impact. It is expensive, which will limit the pace of growth.

133 (2) Replacement of non-renewable materials with renewable substitutes. The potential for substitution is quite limited. 135 (3) Complete recycling of non-renewable materials and wastes. 137 This is virtually impossible. “Long term sustainability can be achieved only if the use of limited non-renewable metals and minerals is discontinued or severely curtailed.” [They are ALL “limited”!]

Infinite economic growth is impossible. 138 Humankind already exceeds carrying capacity. 139 All complex societies crash. Collapse is a bummer for those who cannot produce their own food. 140 Science and technology will not lead us to utopia, but they might offer some useful suggestions. What is absolutely essential is a change in societal values and policies. We need smart goals, so that science and technology will stop striving to fulfill dumb goals (exploit nature, enrich the elites, ignore the long-term). 141 There is little time for making the huge changes needed, and the powerful will resist change, even though collapse will blast them too.

Part II: The Uncritical Acceptance of Technology

Chapter 7 — Technological Optimism and Belief in Progress

145 Techno-optimism and the belief in continual progress are strong in industrial societies. 146 JFK: Science will “help bring into existence the happiest society the world has ever known.” 147 Obviously, the last century has been an era of immense techno innovation. 148 We expect this to continue.

The notion of progress did not exist in stable societies that lived within the rhythms of nature. Judeo-Christians eventually shifted us from cyclical time to linear time. 149 The belief in progress began during the Enlightenment. We’re on a path to a happy world. The theocentric worldview stepped aside for the anthropocentric. Let’s have paradise on Earth! 150 Science was expected to solve all problems. By and by, the belief in universal human progress was narrowed to just material progress (economic growth).

151 “Nowhere is belief in material progress, economic growth, and technological optimism more extreme than in the United States.” Benefits outweigh harms say 72% in the U.S., versus 50% in Europe. 152 Faith in progress is coming to resemble religious faith. We get the benefits in this life, before we die. 153 Mass media highlights techno-successes, not failures. For centuries, Catholic clergy spoke Latin, to discourage understanding and critical thinking among their sheep. Scientists also use obscure jargon so commoners have no idea what they’re talking about.

154 People have a strong need to believe in something. In the past, we believed in religion, no matter what. Today, it’s science. Techno-optimism has its roots in ignorance. “Huesemann’s Law of Techno-Optimism” states that optimism is inversely proportional to knowledge. 155 Even the wizards of science are clueless outside their realm of specialty. Generally, when a new technology is emerging, only 10 to 100 people in the world are capable of expertly evaluating it. Ignorance of history also feeds optimism.

156 Ignorance of anthropology enables us to believe in the misery of the “primitive.” We believe that historical trends will continue forever. 159 The U.S. is a hotbed of techno-optimism in medicine. 160 Life expectancy is far higher now (75-80) than it was in 1840 (41), because of a sharp reduction in childhood mortality. This is less about medical advances, and more about improved nutrition, hygiene, sanitation, water supply, housing, and general social conditions. 161 The primary reason was better hygiene and nutrition, which sharply reduced deaths from infectious diseases, mostly prior to antibiotics and immunization

162 Between 1900 and 1960, U.S. death rates dropped by almost 50% (from 17.2 to 9.5 per 1,000). From 1960 to 2003, medical care spending tripled, whilst reducing the death rate from 9.5 to 8.4 per 1,000. [Life expectancy?] 163 Modern medicine often gets credit for cures resulting from the placebo effect. Placebo can kill you (voodoo curse) or cure cancer. 164 A placebo surgery (nothing but a skin incision) was just as effective as a real surgery in one study. 165 About a third of observed improvements following medical treatments are likely attributable to the placebo effect. We expect medicine to eventually conquer death. Life expectancies have increased, but lifespan has remained at 85 years for at least 100,000 years.

167 It is impossible to design technology that provides only benefits, no negative effects. Mass media emphasizes only the benefits. 169 The mass media are largely controlled by the corporations who stand to profit from biased coverage. But we also have a culture that is obsessed with the new and improved. In industrial societies, there is a taboo against challenging the faith in science, technology, and progress. Questioning is heresy. 170 On the other hand, the blind faith in progress has been weakening in the last century, because of the world wars and the Earth Crisis.

Chapter 8 — The Positive Biases of Technology Assessments and Cost-Benefit Analysis

174 Cost-benefit analysis is usually biased to favor benefits. These can green light projects with little or no real benefit.

Problem #1: defining boundaries. 176 Benefits to the living are focused on, whilst benefits to future generations or the ecosystem are downplayed. 177 The corporate world focuses on profits, whilst environmental and social costs are downplayed for both the present and the future. The future is routinely discounted. 178 Nuclear wastes will be a huge problem for many thousands of years. We're living high today on a fossil fuel binge, and this will cause serious harm for hundreds or thousands of years. Transferring risks to the future violates the ethical principle of intergenerational justice. We are exploiting the unborn. 180 If the living had to pay for externalized costs, many projects would not be pursued. So, the boundaries of an analysis need to extend beyond the living humans.

Problem #2: prediction of impacts. Once boundaries are set, then we need to document potential and negative impacts over the lifetime of the project. 181 When (not if) will the technology fail? Scientific ignorance limits our ability to foresee problems. Today we are experiencing the results of many unintended consequences. 182 Often, the benefits are soon visible, whilst the costs take time to emerge.

Problem #3: institutional biases. 183 Farmers see a dam as a benefit, while salmon cultures see it as a catastrophe. Cost-benefit analyses are usually performed by the stakeholders — major institutions. 184 Corporations focus on technical risks that can threaten profits. Governments focus on social and environmental risks. The eventual outcome is usually determined by power and politics, not reason.

Problem #4: monetization of non-market values. 185 Dollar values are assigned to every projected positive and negative impact. 186 This is based on the notion that economic markets are the appropriate measures of what is valuable. What is the cost of ruined natural beauty, or a human life? 187 Monetization procedures are inherently biased in favor of the development of new technologies.

Problem #5: the ethics of cost-benefit analysis. Analysis is insensitive to the fact that benefits may accrue to some individuals or groups at the expense of others. Issues of equity and justice are pushed to the sidelines. 188 Since the main goal is profit, there are strong incentives to ignore as many environmental and social costs as possible. Cost-benefit analysis creates the illusion that the process is objective and unbiased.

189 The automobile should never have been adapted, but it was widely accepted by the public. The personal and immediate benefits were obvious, and the long-term costs were not. Over time, the costs became more apparent. The direct costs include repairs, insurance, fuel. The indirect costs include roads, parking, congestion, accidents, pollution, the defense of oil producers. If drivers paid all costs, it would cost twice as much to drive. 190 Driving is highly subsidized, which encourages excessive driving, and discourages public transit.

191 In a 1995 study, Americans were typically spending 35% of their net income on driving. The average annual miles travelled were 11,700, and the average hours per year spent earning money to drive was between 1,125 and 1,307. So, the average speed of travel was 9.7 mph — slower than a bicycle.

192 Biofuels like ethanol or biodiesel have high hidden costs. The fuels get big subsidies. Making fuel from field crops has significant environmental costs. Biofuels will drive up the cost of food and feed. 193 The EROI for ethanol is slight or negative. 194 Biofuels do not reduce CO2 emissions, because more land will have to be cleared for raising more corn and soy. They will worsen climate change.

Most medical therapies have never been tested for efficacy. About 75 to 80 percent of all patients seeking medical help have conditions that will clear up anyway or that cannot be improved even by the most potent modern drugs. In 10 percent of cases, treatment works well. 195 The remaining 9 percent are wrongly diagnosed or treated incorrectly.

Without efficacy testing, therapies are likely to be (a) unnecessary, because there are simpler alternatives, (2) unsuccessful, because the patient is too ill, (3) unsafe, because of high risk of complications, (4) unkind, because they diminish quality of life, or (5) unwise, because the resources used could be better used on other patients. One third of U.S. healthcare spending is waste.

197 New technologies are routinely adopted before their usefulness has been demonstrated. There is a strong bias for innovation. The FDA does not require that new drugs be more effective than existing cheap drugs. 198 The approval process for new medical devices is less rigorous than for drugs, and there is no approval process at all for new surgical procedures. It is unclear when medical advances are worth the cost. Hospitals want lots of patients to increase the return on investment in new technology.

199 Many jobs would be lost if garbage medicine was stopped. There would be huge resistance against any type of reforms that require rigorous testing of both the efficacy and usefulness of medical innovations. Patients also play a role in driving up health care costs. There is little evidence whether cancer treatment prolongs life, shortens life, or has no effect at all. 200 Desperate patients are willing to try anything, and doctors are not going to argue. A tiny chance of success is better than doing nothing.

The GDP is a biased indicator of economic progress. GDP replaced the GNP in the '80s. 201 Both were based on WWII war production analysis. Growing GDP does not automatically lead to increased well-being or happiness. It records all economic activity, whether or not it is beneficial. 202 Crime, war, and car accidents drive up GDP. Hiking, cooking, and gardening do not. 204 Some have proposed a Genuine Progress Indicator (GPI), which requires deductions for bad stuff, and positive adjustments for leisure time, extended product durability, etc. Most of the growth in the last 30 years has not increased human well-being.

Chapter 9 — Happiness

207 Abraham Maslow defined three levels of human needs (1) basic needs like food, water, shelter, security, 208 (2) social needs like belonging, self-esteem, and esteem by others, (3) spiritual growth and self-actualization needs. Needs are similar across all cultures, but wants and desires vary a lot — they are unlimited in number and constantly changing. They are superficial and temporary, and sometimes considered false and artificial.

209 The “need” for goods and services is driven by advertising. We can be encouraged to desire even useless or trivial stuff. 210 In our culture, happiness is directly related to material consumption. The Industrial Revolution enabled the mass production of cheap stuff. Mass advertising inspires mass

consumption to consume mass production. 211 American consumer culture is spreading around the world. Consumption is driven by releasing new and improved stuff. Car models are frequently changed.

213 Advertising attempts to increase dissatisfaction, to create wants. They create desires that formerly did not exist — to sell things that people do not need. Advertising is not needed to encourage folks to acquire things they genuinely need. Advertising promises to cure dissatisfaction, add convenience, and increase social status and happiness. It strengthens materialistic values in society, which drives a tremendous waste of resources. Wants can transform into needs, over time, like automobiles. 214 The U.S. could not function without them. Luxuries become necessities: telephone, washing machine, lights, computers, etc.

Many believe that well-being and happiness are linked to affluence. Above a baseline income adequate to meet basic human needs, additional income produces insignificant gains in well-being. The same is true for nations. The “life satisfaction” score of billionaires is about the same as Maasai herders. 215 The people of Bangladesh and Azerbaijan are among the happiest in the world, despite being very poor nations. The happiness level in the U.S., Europe, and Japan has remained stable, despite substantial growth in income.

Economic growth is successful in spurring impressive increases mental illness, especially depression and anxiety. Depression rates in the U.S. increased tenfold in the last 50 years, and continue rising. 216 Amish communities have depression rates that are between a fifth and a tenth of the rates of their mainstream consumer neighbors. Affluence has nothing to do with happiness, but every nation continues to pursue economic growth and expansion. Aristotle said that human desires were insatiable, presenting a major obstacle to achieving the “good life.”

As fast as desires are fulfilled, the thrill soon dissipates, and a fresh batch of desires begins gnawing away at the damaged mind. Wanting is constant in everyone. 217 We are endlessly dissatisfied, forever unhappy. 218 So, consumption keeps rising, and joy does not. The game of displaying your status leads to a “positional treadmill.” In industrial nations, maybe 50 percent or more of household income is devoted to competitive consumption, to nourish illusions of superiority.

219 Thus, status is determined by relative income, not absolute income. We don’t directly address our non-material needs: acceptance, esteem, self-actualization, and spiritual growth. We are swept away by a tsunami of ads. 220 In the face of unfulfilled needs, we try harder and harder to satisfy them, sliding into a pattern of addiction and compulsion. Consumer lifestyles isolate us from nature and other people. Chellis: “These are needs we were born to have satisfied. ... In the absence,... the psyche finds some temporary satisfaction in pursuing secondary sources like drugs, violence, sex, material possessions, and machines.”

Many seem to be addicted to watching TV, which often makes us passive and depressed. It’s a difficult habit to quit. There are withdrawal symptoms. 221 As a culture, we are addicted to using technology to pretend to solve our problems, and denial is the shadow of addiction — we are unwilling to critically question our beliefs. Advertising makes us more materialistic, individualistic, egotistic, self-centered, greedy, and competitive. Most of humankind is now living in winner-take-all economies. Most humans have been mass converted to consumerism and materialism.

222 This leads to the opposite of well-being. Folks are more possessive, abrasive, angry, narcissistic, self-centered, envious, controlling, manipulative, and power-hungry — and less conscientious, agreeable, friendly, empathetic, and generous. We are more prone to psychological disorders — anxiety, stress, neuroticism, depression, behavioral and attention deficit disorders, paranoia, low self-esteem, and antisocial and addictive behaviors.

223 Materialists have shorter, more conflicted or impoverished personal relationships and feel alienated and disconnected from others in society. “Materialists are more likely to feel alienated from nature, have a negative attitude toward the environment and have little appreciation or interest in animals and plants.”

224 What are the sources of happiness? Thoughts have a direct influence on the quality of our feelings. Positive affirmations, optimism, humor, gratitude, forgiveness and detached self-reflection all have been shown to increase happiness and well-being. Freedom is beneficial: political freedom, economic freedom, personal freedom. 225 One of the strongest predictors of happiness is the quality of social relationships. 226 It’s good to have satisfying, engaging and worthwhile work that allows maximum autonomy to exercise skills while providing an adequate income. Finally, it’s good to have a sense of meaning and purpose.

A common unintended consequence of progress is the destruction of traditional sources of happiness. New technology offers new options. 227 This disturbs social structures — traditional cultures. People are respected for what they have achieved, not for who they are. Fast-paced lives leave little time for reflection. Prior to the Industrial Revolution, an entire lifetime was generally spent in close proximity to family members, long-time personal friends, neighbors, and co-workers. Strong social relationships and communal bonds encouraged happiness. 228 But the revolution dashed this. We suffer from social impoverishment, of living without much experience of friends, of belonging, of social cohesion and making worthwhile contribution.

The two most destructive technologies have been the automobile and the television. [computers & internet? Cell phones?] 229 Going outdoors in the old days, we met people. Today we meet machines, piloted by the courtesy-impaired. Watching TV for 4 to 5 hours a day eliminates time for enjoying social relationships. 230 Communicating via technology is a poor substitute for face-to-face interaction — it compensates for the separation of people due to transportation technologies.

231 Most people are alienated by their work, and get no satisfaction from it, except for the check. Boring work rots brains. 232 We have become alienated from nature. Many of us live almost entirely in artificial environments. We don’t know where our food comes from. “This degree of pathological alienation from nature can only have devastating consequences for psychological well-being and happiness as well as for any interest in preserving the life-support systems of our planet.”

233 Alienated people have less concern for morals and ethics. We have the tools to control and exploit others, and many have no qualms about doing this. Technology enables us to do this from a distance, without getting blood on our hands.

Chapter 10 — The Uncritical Acceptance of New Technologies

235 We believe that new tech is inevitable, and we are powerless to say no. We are taught that technology is value-neutral. Machines don’t cause problems, people do. 237 But a cruise missile has one purpose — violent resolution of conflict. Possessing them reduces the need for diplomacy. 239 All technologies are value-laden. 240 When we pass technologies to other cultures, the values go with them. We are drifting toward a global uniformity of cultures, as everyone adapts to techno change. 241 We are conditioned to feel as if we have no voice in whether new technologies are accepted.

There is a myth that technology is autonomous — an independent and uncontrollable force. In reality, it is consciously directed by influential players. 242 Once we have become habituated to a technology, alternatives become less accessible. The growth of the auto industry led to the development of a complex support system. Now, it’s virtually impossible to stop the global automobile juggernaut.

243 The technological imperative says that “Whatever can be done technically, will be done and should be done.” Society must adapt unconditionally. 244 If it is possible to extract oil, we must, even if it pollutes. Ethics go out the window.

245 We are told that technology increases our freedom. 246 We have more choices. Well, yes, we can now work at night, or fly across the continent in hours. But for the most part, technology has provided only greater freedom to choose among an enormous array of competing consumer products and services (20 types of toothpaste!). We don’t see the freedoms we have lost.

247 “Hundreds of millions of people in industrialized societies relinquish their personal freedom by spending most of their life following highly regimented schedules operating machines, computers and automobiles, acting as a mere cog in the technological system, rewarded only by the opportunity to purchase more consumer products.” We are trapped. We can’t live without cars. Our conveniences are interconnected. We have become extremely dependent on high technology for our survival.

248 The control of technology is not democratic. 249 Supreme Court Justice Louis Brandeis: “We can either have democracy in this country, or we can have great wealth concentrated in the hands of a few, but we can’t have both.” 251 The public is excluded from meaningful debate on new tech.

Chapter 11 — Profit Motive: The Main Driver of Technological Development.

253 Profit maximization is the engine of the large-scale adoption of new tech. 254 New tech is selected and constructed by the politically dominant social group to maintain power and control. 255 Profit is income minus production costs. Profit can be increased by using labor-saving automation, or by paying low wages, or underpaying for materials. Profit based on underpayment is exploitation. 259 Profit maximization results in the neglect of fundamental social needs. Management must serve the shareholders, not community welfare.

261 Industrial agriculture is not sustainable. It’s not interested in feeding the world’s poor. 262 It doesn’t care if our diet is really healthy. 263 Medicine has also been industrialized — the medical-industrial complex. Medicine is loaded with opportunities for maximizing profits — unnecessary tests, treatments, drugs, and surgeries. 264 Less effort is directed to preventive care. 265 Nixon’s War on Cancer focused on profitable treatments, not preventing the disease. 266 In 2005, the U.S. spent 48% of the world’s military outlay.

Part III: The Next Scientific and Technological Revolution

Chapter 12 — The Need for a Different Worldview

272 Everyone has a worldview, and it influences where we look and what we see. We disregard what we don’t expect. They are passed, virtually unchanged, from one generation to the next. For a long time, pollution was not seen to be a problem. 273 Worldviews are standards of meaning and purpose to guide decisions about what is believed, said, or done. To shift toward sustainability will generate conflicts between those who want change and those who don’t.

275 Some conflicts cannot be resolved by factual evidence, and these are often resolved by power. Cultural and religious conflicts are resolved by physical might, or economic power. 277 When pursuing a new paradigm, it is best to focus on the youth, and wait for the elderly believers in the old paradigm to die off. Paradigm shifts are irreversible. The perpetual growth paradigm is racing toward disaster. 278 “If we genuinely embrace a worldview that places all life forms and the environment within our circle of

ethical concern, our actions will lead necessarily to more constructive and positive outcomes.” The current worldview of separateness is a failure.

279 A new worldview will need a new economy. Pursuing perpetual economic growth is idiotic. Almost everyone on the planet wants to live a high-waste lifestyle. We need a steady state economy — the norm for almost all of human history. 280 We just need to define a set of rules and limits. 284 Resistance to change will be softened if we eliminate income inequality. 285 Science and technology would be used to promote the values of social and environmental harmony, cooperation, and mutual enhancement. 292 Our goal should be spiritual consciousness — oneness with creation. 293 Our leaders should be the first to live with this consciousness (politicians, business people, teachers, scientists, engineers).

Chapter 13 — The Design of Environmentally Sustainable and Socially Appropriate Technologies

295 We need to design sustainable technology. 296 All energy for industrial and economic activities must come from renewable sources. All raw materials for industrial processes must be supplied from renewable sources. Wastes can only be released at a rate that the ecosystem can absorb them. Power would come from photovoltaic, wind power, hydroelectric, biomass, etc.

297 “The use of non-renewable resources such as metals, minerals, and products derived from petroleum can, in principle, be continued as long as they can be completely recycled.” 298 Ideally, all wastes would be completely biodegradable. 300 Sustainability won’t be easy. Many industries will have to go out of business. This will generate some resistance. 302 We need simpler technologies (bicycles) and a simpler way of life. 303 Work must be satisfying and meaningful.

309 While sustainable technology might seem to be impossible, it actually is possible. 310 “Consider, for example, that almost all technologies prior to the Industrial Revolution were environmentally sustainable and socially appropriate.”

Chapter 14 — Critical Science and Social Responsibility

320 We need a new science that produces technology that is sustainable and socially appropriate. Science needs ethics.

NOTE: Techno-Fix videos, teaching tools, etc can be found here:

<http://www.newtechnologyandsociety.org/>