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CRAIG S. MARXSEN

The Limits to Growth, by Donella H. Meadows and three coauthors (1972), sold nine million copies in twenty-nine languages (Suter 1999, 2). The book awakened anticipation of a cataclysmic end of the world by allegedly seeing that possibility through a new kind of lens. Its prophecy sprang not from an individual claiming divine inspiration, but from the wizardry of the silicone chip processing precise mathematical expressions that defined the “predicament of mankind.” The authors claimed that a computer analysis revealed that the final, short countdown had begun and that the apocalypse would occur during the first half of the twenty-first century. Without drastic action, a huge decline in world population would inevitably result from depletion of natural resources, accumulation of pollution, and various effects of overpopulation. The only possible means of prevention was an abrupt halt to global growth—both economic growth and population growth. A 1992 sequel, *Beyond the Limits*, essentially reiterated the claims of the 1972 book. These books have influenced a large following of enthusiasts who remain convinced that growth as we have known it is inherently unsustainable and must give way to a radical imperative to protect the earth.

Robert Higgs (1987, 247–53) has emphasized the political rise of environmentalism in the 1960s and the “energy crisis” of the 1970s as important episodes in a never-ending succession of crises that ratcheted the size of big government ever upward.

Commenting on the Waco massacre that resulted in part from David Koresh’s apocalypticism, Charles Krauthammer (1993, 82) argues that the end of the Cold War

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left a vacuum subsequently filled by the secular eschatology of the ecocatastrophists. Quoting from Al Gore's best-selling book *Earth in the Balance*, he characterizes Gore's crisis mongering as follows: "if environmentalism does not become 'our new organizing principle,' then 'the very survival of our civilization will be in doubt'" (82). Notwithstanding such expressions of environmental extremism, Gore managed to win a popular majority in the presidential election of 2000.

The expectation of an impending environmental calamity incites political actions that slow global economic growth in a system that preserves itself only by moving forward. In this article, I argue that the process of economic growth remains vulnerable to the political fruits of widespread popular belief in the collapse hypothesis set forth in *The Limits to Growth*. Ecocatastrophism dangerously weakens economic performance in several ways and therefore might bring about a persistently declining global standard of living that would create a debacle not unlike the very one the catastrophists fear.

Since the early 1970s, the U.S. economy has suffered a marked slowdown in the growth of multifactor productivity, at least until the mid-1990s. I discuss this stagnation elsewhere (Marxsen 1999); it remains somewhat mysterious, but ecocatastrophism, I contend, has been one of its significant causes.

The Calamity Is Not Theoretically Inevitable

In 1973, William D. Nordhaus carefully assessed the model underlying the *Limits to Growth* forecasts, a "world dynamics" model developed by Jay Forrester, an MIT engineering professor. This model employed a technique already well known in economics, *systems dynamics* (the use of simultaneous difference or differential equations), but without establishing a data-based connection between reality and the model's equation system (Nordhaus 1973, 1182). To validate his model, Forrester relied on his personal judgment of its plausibility rather than on empirical verification or comparison with established growth theory (Nordhaus 1973, 1182–83). Emphasizing this shortcoming, Nordhaus titled his 1973 critique "World Dynamics: Measurement Without Data."

Forrester enhanced popular acceptance of his findings by presenting them as computer output, the then-still-mysterious computer serving as a sort of room-filling talisman. When Robert Solow reviewed *The Limits to Growth*, however, he scornfully charged that its conclusions were logically so close to its assumptions that one hardly needed a computer to obtain them (1973, 43). The 1972 model (and its 1992 successor, too) postulates the depletion of vital exhaustible stocks, such as natural resources and the environment's waste-disposal capacity, at increasing rates, with no moderating mechanism as exhaustion approaches. Hence, Solow explained, anyone can see that the system will bounce off its ceiling and collapse. Later, Peter Huber was kinder to Forrester, judging him to be an excellent "systems dynamics" modeler (1999, 8) but nonetheless emphasizing Forrester's mistake of grossly underestimating

the available stocks of energy and other resources, which he constrained by virtually freezing human ingenuity (9–10).

Both *The Limits to Growth* and its 1992 sequel focus on computer-generated simulations of the time path of world population, industrial output, food production, natural-resource exhaustion, and pollution. In both renderings, an inevitable decline in industrial capacity and population dominates the twenty-first century. The models take the form of a system of simultaneous nonlinear difference equations, most of which are of first order (Nordhaus 1992, 5). In other words, the value of a variable such as population at time $t + 1$ is given by an equation containing the values of several variables at time t . As Nordhaus reiterated in 1992, the equations and the definitions of variables in both the 1972 and 1992 versions of the book were invented de novo rather than taken from established relationships in relevant fields of study; worse, they were not justified by any attempt to verify statistically the behavioral equations involved (14). The *Limits* models thus ignored the relevant economic theory refined since Charles Cobb and Paul Douglas published their famous mathematical rendition of the “theory of production” in the *American Economic Review* in 1928. In fact, Cobb and Douglas themselves explicitly proposed “including the third factor of natural resources” in their equations (165). Growth theory as a field of economics culminated in the Nobel Prize-winning efforts of Robert Solow, who carefully incorporated the traditional Cobb-Douglas production function into his analysis. Modern growth accounting, as represented by the work of Edward Denison, John Kendrick, and others, has expanded and elaborated the Cobb-Douglas production function at the heart of its methodology. Forrester completely ignored all this scholarship.

In response to the shortcomings of *The Limits to Growth*, Nordhaus considers the issues in the context of established economic theory and growth accounting (1992, 15), using a Cobb-Douglas growth model similar to the following illustration:

$$\text{Output} = (\text{technology}) (\text{labor})^{0.6} (\text{resources})^{0.1} (\text{land})^{0.1} (\text{capital})^{0.2}$$

As Nordhaus explains, both labor and capital can keep up with, for example, annual population growth of 1 percent. However, output will grow by only 0.8 percent as a result. The following expressions give an idea of the calculus involved: labor grows 1 percent if we multiply it by 1.01; output grows by 0.6 percent when labor grows by 1 percent because $1.01^{0.6}$ is approximately equal to 1.006. Likewise, 1 percent capital growth has an effect illustrated by $1.01^{0.2}$ (equal to approximately 1.002). Finally, 1.006 times 1.002 is approximately equal to 1.008, which illustrates the combined effect that makes output grow by 0.8 percent. Furthermore, resources (natural resources and environmental waste-disposal capacity) are decreasing by approximately 0.5 percent per year, tending to reduce output at a 0.0005 annual rate. The technology term therefore must increase at a rate of 0.0025 per year in order to boost output growth up to 1 percent per year and make it keep up with population growth (Nord-

haus 1992, 15–16). Historically, in fact, technology has increased at a rate between 0.01 and 0.02 per year, which is why mankind has enjoyed material progress rather than the onset, many years ago, of Malthus’s version of what *The Limits to Growth* portrays (Nordhaus 1992, 16).

Nordhaus’s modern growth accounting illustration shows output rising as natural-resource inputs are falling. Growth comes from the increase of “multifactor productivity,” the economist’s way of describing the effect of technological progress. With a little more than a quarter of a percent per year of technological progress, income per capita rises unendingly so that tribulations bring no economic collapse. If multifactor productivity grows slower, income per capita sinks persistently. A growing world population with a declining income per capita indeed might become increasingly vulnerable to massive loss of life, much as people in poor countries prove more vulnerable to natural disasters. The violent outcomes of the *Limits* models, however, require that well-established growth-accounting models abruptly cease to fit reality or technological progress suddenly turn negative and fall precipitously. A great political debacle seems implicit in the *Limits* model, such as might erupt from some future crisis of intense ecological anxiety more than from any real environmental causes.

Continued Growth Remains Possible

Mark Sagoff (1995) writes that some of the foremost mainstream economic thinkers dismiss the idea of limits to growth because knowledge (technology) effectively substitutes for natural resources and services of the natural environment. According to Sagoff, Solow found that past growth depended “simply on the rate of (labor-augmenting) technological change” and that “most of the growth of the economy over the last century had been due to technological progress” (1995, 611). Sagoff notes that ecological specialists such as Herman Daly, on the other hand, argue that further growth will soon prove impossible because of limits imposed by sources of raw materials and sinks for wastes. Paul and Anne Ehrlich, Daly, Robert Costanza, and Donella Meadows (1992) have mounted arguments against the growth model of neoclassical economics, but Sagoff shows that these arguments fail. He cites impartial assessments of the sufficiency of exploitable energy resource reserves, and he explains how price signals have shifted forestry and fishing from extractive to farming approaches. Potential food supplies seem more than adequate and are amenable to technological augmentation. Even the seemingly most serious chemical threats to the environment, such as chlorofluorocarbons (CFCs), demand little more than shifting out of activities that create risks out of proportion to their benefits. Sagoff concludes that ecological economics fails at every turn to show that growth is unsustainable.

Carlos Davidson (2000), a biologist with an economics background, takes issue with what he perceives as Sagoff’s agnosticism concerning the existence of significant

environmental destruction relevant to humankind's well-being. He perceives that Sagoff risks overstatement of the environment's robustness, and he argues that human activities clearly damage the environment, but not in a way that is likely to lead to catastrophe. According to Davidson, environmental damage is not so much like pulling rivets out of an airplane as it is like pulling threads out of a tapestry. The tapestry becomes more and more threadbare and damaged looking, but it never reaches some critical threshold of cataclysmic failure. The ecosystem is brimming with redundancy, and problems such as reductions in biodiversity do not threaten the viability of the simpler system that results. Like an old carpet, an increasingly damaged and dirty environment would show no tendency to resolve the deterioration trend catastrophically.

Herman Daly takes issue with a theory he imputes to economists, the theory that man-made capital is a substitute for natural capital (land and natural resources) (Sagoff 1995). Daly regards the idea of substitutability between natural and man-made capital as akin to substituting sawmills for diminishing forests. Daly, however, does not appear to understand economic growth theory fully. In the context of "limits to growth," neoclassical growth theory focuses on the inability of capital accumulation to advance economywide real income per capita perpetually in the absence of technological progress. The law of diminishing returns dominates capital accumulation. Holding constant the percentage of total output or income saved, no matter how high the level, causes an increase in the burden of depreciation until it absorbs all the savings that otherwise would have increased the capital stock per worker still further. This phenomenon brings us to steady-state growth in the kind of two-factor production function models with which Solow pioneered neoclassical growth theory (see Solow 1970). The law of diminishing returns means that the boost to output, and therefore to savings, that comes from accumulating more capital diminishes. Capital becomes a decreasingly suitable substitute for land, natural resources, or labor, much as Daly insists. The boost to total depreciation cost (which increases linearly), however, does not diminish as we accumulate more and more capital per worker. In the long run, it is simply impossible to sustain a rate of capital accumulation that exceeds the rate of growth of the labor force, if the technology variable remains constant. Without technological progress, the eventual and inexorable decline of income per capita must occur if land and natural resources enter the production function as Nordhaus suggests, in spite of even the highest imaginable saving rates. The widening of capital becomes as futile a strategy as a hunter-gatherer tribe's trying to grow forever by continually enlarging their stock of bows and arrows. Nor is human capital exempt from this effect because it, too, is subject to depreciation, just as tangible, physical capital is. Daly exalts the law of diminishing returns as the ultimate and insurmountable constraint that, because of technological progress, it never actually became in the past.

Richard Brinkman and June Brinkman (2001) distinguish growth and development, where development is the technological progress component and has enjoyed the attention of institutional economists. They focus on the "new"

endogenous growth models—the so-called “aK” growth models associated with Paul Romer and Robert Lucas—that reject Solow’s treatment of technology as an exogenous variable (507). If, in an “aK” model, capital accumulation itself breeds enough technological progress to offset diminishing returns to capital, then convergence to steady-state growth never happens in a sufficiently frugal society. One basic message of “aK” growth models is that copious saving can help perpetuate growth. The Brinkmans insist, however, that technological progress is actually a cultural variable. They argue that because technological progress is culturally determined, the United States now may be suffering from a long-term malaise or economic decline that endogenous growth models cannot illuminate (2001, 520–22). The Brinkmans surely must gain encouragement, however, from considering Japan’s extremely high saving rate that continued through the 1990s despite the country’s economic stagnation.

We need not enter the controversy over exogenous versus endogenous growth models to benefit from the Brinkmans’ reflections. Endogenous growth models were not intended to rule out stagnation originating from cultural constraints such as overzealous environmentalism. Endogenous growth theory focuses on the power of capital accumulation, human capital investment, and other outcomes of private and public choice to stimulate technological progress (Romer 1994, 3–22). One can accept most tenets of endogenous growth theory without rejecting the idea that technological progress also is determined culturally. Endogenous growth theory hardly seems in conflict with the thesis of this article.

Neoclassical growth theorists seem inclined to preserve a greater aura of mystery around the technological progress variable. Substituting a simple function of capital for the technology variable obscures the profound role that the law of diminishing returns plays, and exogenous growth theorists resist that as well as what they perceive as too easy explanations of technological progress, even including theories that emphasize facets of freedom. Solow himself, presumably insisting on rigor, expresses skepticism toward correlations that explain growth by using dependent variables such as openness to trade and “political and social and legal things,” arguing that these correlations might be getting matters backward (“Three Nobel Laureates” 2000). He reasons that because countries are growing satisfactorily, they might be more tolerant of free trade, for example, so that free trade is more the effect than the cause of growth. For Solow, theoretical efforts to “endogenize” technological progress remain unproved, and policies to educate workers, encourage innovation, and get out of the way are the best founded we have identified thus far (“Three Nobel Laureates” 2000). A meticulous continuation and expansion of work done by Edward Denison and John Kendrick might better satisfy Solow’s apparent desire for rigor in identifying growth’s causes.

In this article, however, I focus on a narrower issue: the corrosive effect of ecocatastrophism that appears capable of overwhelming the processes working in growth’s favor, whether those processes are well understood or not.

Mancur Olson Recognized Growth's True Enemy

Without explaining what causes growth, Mancur Olson had much to say about what gets in growth's way, and this was the theme of his 1982 book, *The Rise and Decline of Nations: Economic Growth, Stagflation, and Social Rigidities*. Collective action by numerous coalitions results in a variety of restrictions—laws, regulations, and so forth—that come about as each group tries to further the interests of its particular members without concern for the common good of society. Examples range from protectionist trade barriers to the Jim Crow laws of the southern United States before passage of the Civil Rights Act. In Olson's view, in any dynamic society it is just a matter of time before stagnation sets in. Great upheavals such as wars or natural disasters sometimes break the grip of special interests, and a new "golden age" of growth results. A few years or decades later, however, stagnation returns.

Ironically, the very people who fear that environmental limits will bring about a catastrophic collapse are among the most successful in forming coalitions and instigating restrictions that retard growth. In particular, environmental organizations have played a very prominent role in creating and propelling a vast body of environmental regulations that perhaps have been the most costly and productivity sapping of all the regulations in effect in the United States in the last thirty years. James Robinson (1995) found convincing evidence that environmental regulations account for the bulk of the slowdown in productivity growth that plagued the U.S. manufacturing sector between 1974 and 1986. He concluded that because of the burden of environmental regulations, productivity was 11.4 percent lower than it could have been by 1986 (411, 414). His figures imply that in the absence of environmental regulations, manufacturing output would have grown between 1974 and 1986 by an annual factor of 1.01 percent faster than its actual growth (Marxsen 2000, 76). Had the manufacturing sector enjoyed such a boost to annual growth from 1970 to 1990, manufacturing output would have been 22.35 percent higher than it actually was by 1990 (Marxsen 2000, 76).

Michael Hazilla and Raymond Kopp found that by 1990, environmental regulation had reduced real gross national product (GNP) by 92.41 percent as much as it had reduced manufacturing output alone, largely through ripple effects (Marxsen 2000, 76). They thus established a ratio of proportionality between effects on the economywide GNP (or on gross domestic product [GDP]) and effects on the manufacturing sector alone, and this ratio points toward a shocking inference from Robinson's findings. If manufacturing output would have been 22.35 percent higher in 1990 without Environmental Protection Agency (EPA) regulation, then real GDP probably could have been 20.65 percent higher than it actually was in 1990, *ceteris paribus* (Marxsen 2000, 76). Continued growth of GDP per capita caused by the entry of females into the labor force and the influx of huge amounts of foreign capital obscured an economywide stagnation of U.S. multifactor productivity from 1973 to 1995. Thus, the environmental movement unwittingly stifled technological progress in an effort to save us from its computer-spawned prophecy.

A jump in productivity growth is prominent in aggregate data for the period from 1995 to 2000. However, just six sectors accounted for almost all of this jump—computer manufacturing, semiconductors, telecommunications, retail, wholesale, and securities. The other fifty-three economic sectors, taken as a group, had almost no productivity growth from 1995 to 2000 (McKinsey Global Institute 2001, 1). A recent study conducted by a team that included an advisory board chaired by Robert Solow reported a decline of U.S. total factor productivity for the period from 1995 to 1999 in the 70 percent of the economy that lies outside the six “jumping” sectors (McKinsey Global Institute 2001, 5). Multifactor productivity contracted in that segment at a compound annual rate of -0.3 percent, compared with a growth rate of $+0.4$ percent in the previous period, between 1987 and 1995. Stagnation apparently continued for those trying to produce almost anything other than computers, their parts, or the networks of wires that link them together.

Rent Seeking in the “New Economy”

The process Mancur Olson described remains largely invisible to most people. The restrictions instituted by special-interest groups are roundabout. For example, petroleum refiners cannot expect to prevent new competitors from entering the petroleum refining industry by advocating legislation based on the rationale that they would enjoy monopoly profits. However, incumbent petroleum producers might just cease resisting and, instead, support passage of laws such as the Clean Air Act of 1970. That legislation treats existing producers differently from new entrants, who must conform to “new source” emission standards. An apparent expression of corporate environmental responsibility, such advocacy even has public relations value. The environmental law actually constitutes a stout barrier to entry for new competitors. The benefits incumbent producers get in the form of secure monopoly power are more than worth whatever hardships the law imposes on existing firms. Moreover, the petroleum producers have no need for moral remorse. In their hearts, they know that all they really did was deflect and capture a political thrust originally designed without regard for the harm it was going to do them.

Bruce Yandle (1999b) explains such behavior by means of his 1983 “bootleggers and Baptists” model of regulation. Bootleggers, always under attack from Baptists, found it expedient to promote secretly the Baptists’ efforts to outlaw the sale of alcoholic beverages on Sunday. The law would affect only the vendors who legally sold such beverages and would increase the demand for their illegal substitutes. The *Limits to Growth* vision of environmental collapse fosters public demand for environmental carnivals. Yandle (1999a, 36), reflecting on the 1997 Kyoto Protocol, argues that Kyoto was a rent seeker’s festival of cartelization more than an effort to reduce carbon emissions. The agreement would produce differential effects across countries, industries, and firms, and the opportunities for gaining markets or sheltering existing ones were sufficiently valuable to make participants’ strategic efforts worthwhile (20). At

Kyoto, the environmentalists played the role of the Baptists, adding a moral dimension for the rent seekers, the equivalent of the bootleggers, feebly to exploit in a political direction (Yandle 1999a, 29). The old adage that “politics makes strange bedfellows” is thus illustrated, but the result is hardly good for society as a whole. Yandle concludes that if global warming is a genuine threat, the Kyoto Protocol is not a useful mechanism for allaying it (1999a, 36). Compared with “business as usual,” full Kyoto compliance would reduce atmospheric carbon dioxide levels by an almost undetectable 0.39 percent by 2010 (Yandle 1999a, 23). Unfortunately, likely future reductions of GDP would be more readily detectable and substantially larger in percentage terms, according to several studies Yandle cites (1999a, 25–29). The apparent influence of environmental idealists in efforts such as Kyoto becomes enormous because computerized telecommunications equipment brings to bear, in real time, the tremendous power of a multitude of multinational rent seekers.

The information technology revolution provides a mechanism somewhat analogous to the Krell machines furtively underlying the mysterious monster of the *Forbidden Planet*. In that 1956 Warner Studios sci-fi classic, Dr. Morbius (Walter Pidgeon) is unaware that his subconscious whims are directing an invisible creature powered by hundreds of networked nuclear reactors and that the creature inexplicably has destroyed all of his former space colony companions (except his wife and daughter). Likewise, the misguided environmentalist today directs the power of countless rent seekers, collected by computer/telecommunications technology, to form a monster that destroys productivity growth.

The computer revolution has given rise to electronic networks with the potential to serve as the nervous system of a great global leviathan we only can begin to imagine today. Productivity growth, however, is not the only threatened victim of such a monster. It easily can single out individual humans as, for example, ecological offenders.

Catastrophist Severity

David Koresh and his followers, guided by their own fatidic perspective, seemingly distinguished themselves from ordinary Bible-study groups by developing a propensity for violence. Likewise, the ecocatastrophists’ apocalyptic vision promotes an emphasis on the use of force and state-sponsored brutality for persecuting people, most of whom are guilty only of trying to use resources efficiently. Pietro S. Nivola and Jon A. Shields (2001) emphasize the economic hurtfulness of the manifold excesses of America’s “zero tolerance” and “adversarial legalism” about environmental matters, describing an ongoing environmental-protection campaign that too often has defied common sense. Let us consider, then, the intolerance emanating from America’s apocalyptic green Machiavellianism.

Rancorous enforcement has come to distinguish the U.S. criminal justice system, suggesting some fundamental change in American attitudes. In May 2001, *The Economist* reported that the United States had more people in prison than any other coun-

try in the world, recently passing Russia to become the world's leading jailer ("Coming to a Neighbourhood near You" 2001). Patrick McCormick, a Christian ethics professor, notes that the United States has a national incarceration rate five to eight times as great as other industrial democracies (2000, 509). He marvels that in 2000 the United States had half a million more prisoners than China and held one-quarter of the entire world's prison population (509). The numbers suggest that Americans feel more vengeful now. McCormick's purpose is to portray the U.S. "war on drugs" as an unjust war. Statistically at least, Americans used to seem more tolerant of one another and less tolerant of such vindictiveness on the part of government.

Since the publication of the original *Limits to Growth* in 1972, the U.S. government has begun to use prison sentences to force those in business to obey environmental laws. The nation appears desperate to stop what polluters are doing to the earth. The EPA initiated 75 percent of its 1993 cases against individuals, not corporations (Litvan 1994, 30). Environmental crime cases from 1991 through 1993 led to the conviction of 353 people, who were sentenced to an average of 8.5 months in prison (30). From 1983 to June 1995, the Department of Justice indicted 406 corporate defendants and 1,052 individual defendants, obtained 732 convictions of individuals and 331 of organizations, collected more than \$298 million in criminal penalties, imposed 558 man-years of sentenced imprisonment, and actually obtained 351 man-years of confinement—all for environmental crimes (Millner 1995, 37). With a 400 percent increase in the EPA's budget for its environmental crimes section over the first five years of the 1990s, the scheduled number of gun-carrying EPA environmental police reached 200 in 1996 (Litvan 1994, 29). In 1994, Congress debated bills to increase prison sentences from three years to five years for knowing violations of environmental laws.

On the surface, at least, some of the cases lamented in the print media seem absurdly unfair. For example, Dennis Marchuk, a lawyer involved in real-estate development, received a two-year prison sentence for storing a large number of bags of asbestos at his Marcus Hook industrial center, after removing them from old buildings on the site, stashing them in basement foundations, steam tunnels, and cavities under roads (Roberts 1993, 3–4). Marchuk reportedly never suspected his actions exposed him to such criminal prosecution (3). As he discovered, however, small businesses make easy targets because they lack the money to fight or the upscale lawyers on retainer. The Pollution Prosecutions Act of 1990 drove most of the EPA's rising effort to put businessmen into prison (4). One cannot but feel sorry for two Dallas-area businessmen who thought discharging untreated wastewater into the Irving, Texas, water system would subject their companies merely to a fine. Judge Jerry Buchmeyer sentenced the owner of one company to twenty months in prison plus a year of probation. The vice president of a second company received two years in prison plus three years on probation (Hemphill 1993, 30).

Mariani and Weitzenhoff, plant managers of an eastern Honolulu wastewater treatment plant (Cohn-Lee 1994, 1351–52), violated the Clean Water Act and were found guilty of exceeding the plant's EPA discharge permit by "allowing discharge of

waste-activated sludge directly into the ocean” (Kole and Lefebber 1994, 38). Over a fourteen-month period, they exceeded the permit limit by just 6 percent (Cooney 1996b). On August 8, 1994, the Ninth Circuit of Appeals declared that the government needed only to prove that Mariani and Weitzenhoff knew that they were discharging; the government did not have to prove the men knew they had exceeded their permit’s limit (Cohn-Lee 1994, 1356). Moreover, the court refused even to allow the men to defend themselves on the basis that they did not know they were violating their permit (Cooney 1996a). The court would not let the men present in their defense the claim that they mistakenly believed “their actions were authorized under their EPA permit, in order to prevent a catastrophic failure of their sewage treatment plant” (Cooney 1996a). One of the men received twenty-one months in prison, the other thirty-three months; then both were given “upward adjustments of six months on their sentences for ‘obstruction of justice’” (Kole and Lefebber 1994, 38). In January 1995, the U.S. Supreme Court, without comment, refused to overturn their convictions (513 U.S. 1128). The courts completely ignored the fact that farmers now spread between one-third and two-thirds of North American and European sewer sludge on farmland as fertilizer (MacKenzie 1998, 26).

Keith A. Onsdorff, an attorney specializing in the defense of individuals and corporations charged with criminal environmental offenses, expresses serious misgivings about the direction U.S. environmental regulation has taken in recent years: (1996, 14). Whereas legal debates have focused on the issue of defendant knowledge that a crime was committed, Onsdorff argues that federal environmental law has “lost its moral compass” (14). Radical departure from our nation’s commitment to just and proportionate criminal law is obvious, especially in light of the absence of proof of significant harm to the environment in our present statutory scheme (14).

The exact definition of “obstruction of justice” seems confusing to someone not trained as a lawyer. Folk wisdom prohibits defending a spill on Aunt Bertha’s carpet by making light of the harm done. But the Mariani and Weitzenhoff case calls to mind another case, *United States v. Goldfaden*, in which the defendant pleaded guilty to unlawful industrial waste discharge and was sentenced to thirty-three months in prison. Hoping to receive a reduced sentence for cooperation, he tried to show that he had not committed a severe offense. Rather than reducing the defendant’s sentence, the court added months to it, finding him guilty of “obstruction of justice” by testifying untruthfully (Kole and Lefebber 1994, 38). Perhaps the judge had read *The Limits to Growth* and regarded Goldfaden as a man contributing to the destruction of the earth.

A two-year sentence tormented a man who had contaminated his garbage with ordinary dry-cleaning fluid (“Dry Cleaner Gets Fine” 1996, 2C). Eric A. Bradley, thirty-eight, of Decatur, Georgia, improperly disposed of filters and chemicals in an exterior trash bin in November and December 1994 at the dry-cleaning business he owned in Columbus, Ohio, at the time. Judge David W. Fais of the Franklin County Common Pleas Court said he had no alternatives, although everyone thought Bradley would be sentenced only to probation in addition to his \$10,000 fine. Alexander

Volokh and Roger Marzulla (1996) have explained how the Comprehensive Crime Control Act of 1984 included strict mandatory sentencing guidelines for environmental offenders. In an effort to narrow disparities in sentences, the U.S. Sentencing Commission created a “Sentencing Table” that adjusted for knowledge of the vulnerability of victims, abuse of a position of trust, use of special skill to facilitate the crime, acceptance of responsibility, criminal history, and so forth. Volokh and Marzulla emphasize that the environmental sentencing guidelines are so tough that they often produce sentences longer than the maximums prescribed by the actual laws enforced. Guidelines evidently force judges commonly to impose prison time in cases such as Bradley’s (Volokh and Marzulla 1996). Jonathan Adler (1993) has discussed the absurdity of the EPA’s classification of perchloroethylene (common dry-cleaning fluid) as “hazardous waste” in light of the relative safety and low toxicity that originally led to its acceptance as the dry-cleaning agent of choice.

Startled by the severity of environmental enforcement, the business community scrambled to comply with pollution laws. Public Employees for Environmental Responsibility (PEER) reported in 1998 that the Clinton administration allegedly had undertaken 52 percent fewer environmental-infracture prosecutions and obtained 60 percent fewer convictions during the 1994–96 period, compared with the 1989–91 days of wrath (“Soft on Enviro Crime” 1998, 4). President Clinton, however, escalated government enforcement efforts among those who, in the eyes of ecocatastrophists, were destroying the earth. PEER subsequently found 1996–98 pollution prosecutions only 27 percent lower than in 1989–91, convictions 38 percent lower, and the conviction rate 10 percent lower, with a mere 25 percent shortfall in the number of defendants sentenced to prison (Mokhiber 1999, 7)—a 52 percent *increase* in Clinton’s pollution prosecutions in the 1996–98 period compared with the 1994–96 interval. Russell Mokhiber characterizes this increase as “some improvement” (1999, 7) in Clinton’s toughness on environmental crime. Groups fearful of our imagined ecocatastrophe, impelling Clinton, helped boost America to its premier position among gulag nations.

America’s Taste for Insidious Movies

Richard Stroup and Roger Meiners (2000, 1–22) have emphasized that the U.S. liability system has gone wrong. Not only do Stroup and Meiners observe that liabilities currently existing under hazardous-waste laws exceed \$1 trillion (2000, 6–7), but they contend that such “calculated costs greatly understate the liability problem” (12). They find that the underlying perverse changes in the U.S. legal system have resulted from “the electorate’s susceptibility to thinly supported claims of environmental crisis” (17). Bruce Benson has discussed the destabilization of property rights that bizarre changes in America’s tort law have produced—changes such as the 1980 Superfund legislation (2000, 129–50). Tort frenzy perforates modern corporations as if they were public lands when oil rights went to anyone who could stake a claim (137). Passionate lynch mob juries persuaded by the ecocatastrophist argument or a

judge fully convinced that pollution is destroying the earth seem poorly qualified to referee the optimal internalization of environmental externalities that Ronald Coase is acclaimed for proposing. Instead, they become promoters of “junk science in the courtroom,” as Peter Huber (1991) describes it.

Americans' misguided zeal for punishing environmental offenders appears in their acclaim for several recent motion pictures. Two are worthy of attention because they are likely to be more familiar than the details of less-dramatized real-world trials. The movies *Erin Brockovich* (2000) and *A Civil Action* (1998) stand out especially. For Erin Brockovich (played by Julia Roberts), the villain is Pacific Gas and Electric, which leaked water containing chromium 6 into the groundwater. In *A Civil Action*, John Travolta plays a lawyer who sues Beatrice Foods and W. R. Grace, bringing “a civil action” against them for pouring solvents on the ground and allegedly polluting the groundwater. Both Pacific Gas and Electric and W. R. Grace paid millions in out-of-court settlements. Pacific Gas and Electric paid out the largest individual-action settlement in history (\$333 million). Yet, according to a lengthy EPA report available on the Internet (Grevatt 1998), chromium 6, or hexavalent chromium, a common rust inhibitor, turns out to be harmless when people ingest it orally in small quantities. The solvents disposed of by W. R. Grace were not likely even to have been present in the water consumed by its alleged victims. Michael Fumento (1998, 2000) has analyzed these two groundwater contamination cases, and he argues convincingly that both lack merit. Chromium 6, though suspected of being carcinogenic when inhaled, does not prove to be carcinogenic at all when ingested orally (Grevatt 1998, 48). The human body converts it to a chemical commonly found in vitamin supplements. Referring to an EPA report, Fumento (2000) summarizes a profile that makes it almost certain that hexavalent chromium did not cause a single one of the symptoms prompting the lawsuit in Erin Brockovich's case. Likewise, he (1998) explains that W. R. Grace's pollutants could not have reached the plaintiffs' wells in time to cause their diseases, and research fails to show that the pollutants are even capable of causing such diseases.

Shortly before his death, Mancur Olson (1996) delivered a famous speech about why some nations are rich and others poor. Poor nations lack institutions that make property rights secure over the long run, so the gains from capital-intensive production elude them. Olson adds, “Production and trade in these societies is [*sic*] further handicapped by misguided economic policies and by private and public predation.” (22). According to Tillinghast-Towers Perrin (a management consultant for insurance issues), the annual cost of the U.S. tort system, including payments to injured people, legal fees, and administrative expenses, was no less than \$165 billion in 1999, a figure equal to approximately 2 percent of GDP or double the percentage in most other industrial countries (France 2001, 115).

The information technology revolution is advancing the art of selecting targets and strategies that effectively will manipulate a jury to make an apparently frivolous and emotionally driven decision that often defies science. Like doctors perfecting some

new medical treatment, lawyers collaborate over the Internet. A successful courtroom presentation creates a marketable script that other lawyers play repeatedly to many audiences, just as a door-to-door cookware vendor repeatedly makes a set sales pitch. The public's resistance to tort reform is perhaps promoted by the widespread belief that damage to the environment is pushing mankind toward the calamity foretold in *The Limits to Growth*. The public had little sympathy for Hooker Chemical (later a subsidiary of Occidental) when it suffered its Love Canal legal crisis. Exxon fared little better when it spilled oil in Prince William Sound. Michelle Malkin (1996, 34) later reported, however, that the chemicals in Love Canal actually did not appear to have caused any health effects at all. And when Gregg Easterbrook (1995) visited Prince William Sound several years after the great oil spill, he found that the only lasting damage seemed to be that caused by the mandated cleanup actions.

Jan Schlichtmann, the real-world lawyer who inspired the movie *A Civil Action*, having recovered only \$8 million in expenses in his 1986 first attempt, returned to sue W. R. Grace a second time. Affiliated with a large San Francisco law firm, he pressed a class-action product-liability suit alleging that Zonolite Attic Insulation contains hazardous amounts of asbestos (Breslau and Welch 2001, 48). Defending against more than 58,000 asbestos-related lawsuits had weakened W. R. Grace before Schlichtmann's second attack (48). On December 31, 2000, there were 124,907 bodily injury claims, 7 property damage lawsuits, and 9 class-action attic insulation lawsuits pending against Grace (W.R. Grace & Co. Takes Asbestos Charge and Warns of Bankruptcy 2001, 16). Grace declared bankruptcy on April 2, 2001. It followed into Chapter 11 more than two dozen other companies including Babcock & Wilcox, Armstrong World Industries, Owens Corning, and Burns & Roe Enterprises—companies that produced or used similar products (16). Technological progress toward energy efficiency seems also to be a wounded victim.

Spectators probably felt remote from the W. R. Grace bankruptcy, as a general bear market preceded it. The investor in an index fund most likely never noticed that the S&P 500 dropped W. R. Grace out of the index itself in December 2000. Likewise, shortly after Julia Roberts received her Oscar and while Erin Brockovich was enjoying what remained of her \$2 million in loot, Pacific Gas and Electric declared bankruptcy under Chapter 11 on April 6, 2001. Maybe the average investor thought that in part the stock market was foreseeing the cataclysm foretold in *The Limits to Growth* and thus never suspected that our tort system was playing a significant causal role. We almost certainly can attribute to widespread acceptance of ecocatastrophism some of the public acclaim for such destructive and unjust predation.

Destroying long-respected corporations and inhibiting innovation are not the only effects of this ill-conceived and pervasive attitude. Veneration of the excesses of environmental tort suits and overblown concern for insignificant traces of contaminants in the groundwater greatly hinder rational waste-disposal efforts in the United States. Landfill standards and regulations seem excessively rigorous and unnecessarily costly inasmuch as the maintenance of waterproof covers is probably adequate for

aquifer protection. Joint-and-several liability deters greater use of landfilling as a waste-disposal method. Much manure and sewer sludge is disposed of presently in ways that contribute to surface-water pollution, whereas regulations make its burial prohibitively expensive. Paradoxically, landfilling of garbage, sewer sludge, manure, and other kinds of waste might offer a realistic solution to the problem of increased anthropogenic carbon dioxide in the atmosphere. In the United States, yard waste is commonly banned from landfills even though landfilling of the totality of our carbonaceous waste potentially might provide an artificial carbon sink that might halt the rise in atmospheric carbon dioxide altogether (Marxsen 2001). Government, hysterically pressed to harass by overregulation every reasonable waste-disposal activity, actually is an unintentional promoter of some of our most serious pollution problems.

Conclusion

The American propensity to demonize polluters and punish them severely derives to an extent from an ill-founded conviction that all manner of environmental offenses are bringing us closer to the apocalypse foretold in *The Limits to Growth*. The ecocatastrophists' predictions lack sound theoretical foundations. Demagogic prophecy has encouraged excesses and extremism on the part of environmental catastrophists. *The Limits to Growth* seems to epitomize the belief that drives misguided Americans to pervert justice and suspend mercy in order to subdue polluters.

Environmental catastrophism has driven a massive expansion of the regulatory state, and environmental regulations may have proved sufficient to wipe out almost fully the U.S. multifactor productivity growth that comes from technological progress. Unfortunately, our now stunted productivity growth was theoretically all that stood between modern civilization and the inexorable decline and deterioration that population growth and natural-resource depletion themselves might theoretically bring about. Paradoxically, the otherwise dubious prophetic vision of *The Limits to Growth* remains potentially akin to a self-fulfilling prophecy, threatening to help usher in a slow-motion version of the very scenarios of collapsing modern society that its models portray.

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