Is This "The Best of All Possible Worlds?": A Book Review Essay On The Selective Skepticism of Bjorn Lomborg

by

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"[S]ometimes Pangloss would say to Candide, 'All events are connected in the best of all possible worlds . . .' 'That's well said,' replied Candide, 'but we must cultivate our garden.'"

Voltaire**

"True science teaches us to doubt."

Claude Bernard***

"In all things of nature there is something of the marvelous."

Aristotle****

Since its publication in the Fall of 2001, Professor Bjorn Lomborg's The Skeptical Environmentalist: Measuring the Real State of the World[1] has engendered anguished and sharp debate. In its 352 pages of text and 2,930 footnotes, Professor Lomborg contends that nearly all of the pessimistic conclusions and prognostications of environmental scientists, journalists and environmental organizations are misleading or incorrect. Asserting that such "often heard environmental exaggerations" create a climate of fear which interferes with rational decisionmaking as to how best to allocate scarce human resources so as to resolve social problems, Lomberg sets out to challenge the prevailing understanding of "the state of the world." He offers in its stead an assessment of the human condition that provides, as he sees it, "the best possible information about how things have progressed and are likely to develop in the future"[2] and "a rounded feel of the real state of the world."[3] Although seen in some quarters as "a triumph,"[4] "essential reading,"[5] and "a brilliant and powerful work,"[6] Lomborg's volume has been derided by other observers as biased, "rife with careless mistakes,"[7] and "misleading math about the earth."[8] Lomborg has heatedly defended his work against his critics on his own Web site;[9] and one of them, John Rennie, has in turn published a stinging response to the author's

rebuttal.[10]

In this review essay, I will assay the strengths and shortcomings of this intellectually provocative yet significantly flawed work. I will begin by summarizing Professor Lomborg's essential thesis and the nature and principal conclusions of his analysis. Next I will critique his approach, setting forth what I see as both its positive contributions and its intrinsic failings. Finally, I will summarize the conclusions of a more recent and (to me) more plausible and comprehensive analysis of the future of our planet.

I - Lomborg's Thesis and Conclusions: The So-Called "Litany" and His Proferred Antidote

The Skeptical Environmentalist begins with the statement of a most ambitious and worthwhile purpose: "I wish to gauge the most important characteristics of our state of the world - the fundamentals. And there should be assessed not on myths but on the best available facts."[11] Describing himself as "an old left-wing Greenpeace member" who "had for a long time been concerned about environmental questions,"[12] Professor Lomborg states that "[t]he facts and information presented here should give us an opportunity to set free our unproductive worries and allow us to focus on the important issues, so that we may indeed help make an even better world for tomorrow."[13]

Lomborg's principal foil is what he refers to as "the Litany," i.e. the notion that "the environment is in poor shape here on earth."[14] He writes: "We know the Litany and have heard it so often that yet another repetition is, well, almost reassuring. There is just one problem: it does not seem to be backed up by the available evidence."[15]

In Lomborg's view, an unreasonably pessimistic public view of the world's condition is the result of "propaganda" and "blatantly false claims . . . made again and again" which

have been presented by "many environmental organizations . . . and by many individual commentators," and then "readily picked up by the media."[16] He also faults scientific researchers who, motivated by a need and desire for public funding for their research, are unwilling to present information that goes against their institutional self-interests, even though such conduct creates what he terms a "lopsided version of reality."

Unafraid to name names, Professor Lomborg especially criticizes the work of Lester Brown (until recently the leader of the Worldwatch Institute), Paul Ehrlich, David Pimentel, the Worldwide Fund for Nature, Greenpeace, U.S. News and World Report, Newsweek, Al Meyerhoff of the Natural Resources Defense Council, former U.S. Vice President Al Gore, Isaac Asimov, E.O. Wilson, Norman Myers, and Rachel Carson, among others. From his perspective "an entire army of environmental organizations, pundits and politicians"[17] have repeatedly warned us that "doomsday is nigh,"[18] creating in the process a "Great Fable"[19] which has "serious consequences."[20] In Lomborg's opinion, unfounded environmental pessimism has needlessly frightened us into ignoring more pressing problems - the bulk of them non-environmental in nature. As he puts it, our "extreme focus on environmental risks means that other and larger risks are routinely ignored."[21]

In the course of his book, Professor Lomborg, a statistician and political scientist at the University of Aarhus in Denmark, presents a vast number of statistics in an effort to support his contention that the world's "reality" is, on the whole, far better than the prevailing view would suggest. He argues that "mankind's lot has actually improved in terms of practically every measurable indicator;"[22] and he attempts to support that thesis by focusing, in separate chapters which vary considerably in length, on global trends in life

expectancy and health, food supply, prosperity, forests, energy, non-energy resources, water supply, air and water pollution, solid waste, pesticides, biodiversity and global warming.

Mostly (though not exclusively) Lomborg relies upon organizational and institutional compilations of data. These secondary "official sources" (as he terms them) include reports prepared by subsidiary organizations of the United Nations (including UNEP, the WHO, the UNDP, etc.) as well as figures published by the World Bank, the IMF and other institutional repositories of economic indicators. He contends that "[i]t is still possible to be critical of the sources of these data, but one does not need to worry . . . about the extent to which I simply present some selected results which are extremely debatable and which deviate from generally accepted knowledge."[23]

Based on the foregoing, Professor Lomborg concludes the text of his volume on a decidedly cheery note: "Thus, this is the very message of the book: children born today - in both the industrialized world and developing countries - will live longer and be happier, they will get more food, a better education, a higher standard of living, more leisure time and far more possibilities - without the global environment being destroyed. And that is a beautiful world."[24]

II - Does He Have It Right?: A Critique of Lomborg's Work

In assessing the merits of Professor Lomborg's boldly stated arguments, it seems sensible to ask whether his premises are correct. Moreover, is Lomborg's data representative and accurate? And are his conclusions logical and soundly based?

While not devoid of merits and virtues, Professor Lomberg's book has failed to

accomplish its overall objectives. Rather than providing his readers with "the best possible information" regarding "the real state of the world," Lomborg misstates some purported 'facts," and is selective in his uses and interpretations of crucial data. Notwithstanding his claim to be fully objective and unbiased in summarizing and evaluating the conclusions of others, Lomborg relies on skewed assessments of certain environmental problems, totally ignores other such problems (as well as other important human difficulties), and makes what appear to be naive and unsupportable assumptions regarding the nature of both scientific research and public policymaking in Western democracies. Having thus overstated his case, Professor Lomborg's writing regrettably yet inexorably undercuts (and really virtually obscures) what are, at least to me, several quite valid and significant proposals to advance the world's present (and possible future) condition.[25]

Let me set forth at the outset what I believe are The Skeptical Environmentalist's strengths. First, the book is quite well written. Bjorn Lomborg has a gift for explaining certain complicated scientific notions in comprehensible terms. Moreover, his book is very extensively documented. Notwithstanding some occasional footnote reference problems, Lomborg has made what I take to be a good faith effort to be transparent in citing the sources of critical portions of his analysis. He has done a good deal of research; and the physical size of his book attests to and reflects that fact.

In addition, in aspects of The Skeptical Environmentalist which other critics to date have largely overlooked, Professor Lomborg makes several valid, worthy points. One of these concerns the urgency of world poverty. He writes:

> There are still 800 million people who starve. . . . This is still far too many. Equally, there are still 1.2 billion poor people. . . . This is also far too many. We need to set these challenges as top priorities, and this entails helping the

> developing countries with structural changes and committing them to the path of democracy and the rule of law, while fulfilling our UN pledge of donating 0.7 percent of the GP, which currently only Denmark, Norway, the Netherlands and Sweden fulfill.[26]

In this regard, Lomborg seems entirely right. Poverty in developing nations is an enormously serious problem, and one with deeply tragic consequences for its victims. In contrast with the nations that Lomborg identifies, the United States contributes a lamentable 0.1% of its GNP to assists overseas development.[27] That fact can scarcely be a basis for national pride.[28]

Second, Professor Lomborg's criticisms of the theories of Robert Malthus - as well as some neo-Malthusian writers - seem fair and perceptive. World population has indeed expanded more rapidly than Malthus envisioned, and the so-called "green revolution" in agricultural technology has, in fact, allowed for important increases in world food supplies.

Additionally, Lomborg's frequent emphasis on long-term historical data seems instructive and useful. Whether one accepts or rejects the author's pervasive optimism as to where our planet is heading, it does strike me as helpful for us to be reminded that in many aspects (from life expectancy and public health to income levels and number of hours worked) the condition of much of humankind has improved very significantly over the past several centuries.

Finally, Professor Lomberg is quite correct that environmental advocates should be careful not to overstate their case. While I am not convinced that this problem is anywhere near so universal as Lomborg contends, he seems on solid ground in suggesting that environmental exaggerations and poorly supported emotional appeals - even if they may lead to short-term political successes for environmental causes - tend to harm the public

credibility of the environmental movement in the longer term. To the extent that they do in fact function as contemporary "chicken littles," environmental organizations (and their supporters in the media) would do better to be at pains to get their facts straight, to keep what they say in proper context and perspective, and openly to acknowledge environmental successes as well as impending threats.

Had Bjorn Lomborg contended himself with making these (to me) reasonable contentions, The Skeptical Environmentalist would have been a far more balanced and constructive contribution to ongoing public policy discussions. Regrettably, however, in a variety of ways Lomborg's book goes a great deal farther than that. By rejecting the conclusions of thoughtful environmental scientists in numerous important areas of investigation, and by failing to be equally critical and skeptical as he assesses and restates the assumptions and conclusions of certain economists, Lomborg has greatly overreached. As a result, in the main his book seems a profoundly flawed and unpersuasive account of the current and projected condition of humankind and the natural environment. The work is as disappointingly inaccurate, selective and incomplete in its assessment of the facts as it is hyperbolic in its rhetoric and mistaken in a number of its sweeping conclusions.

Professor Lomborg's factual inaccuracies seem particularly problematic in a work that purports to remedy the erroneous statements of others. For example, in discussing air pollution for sulfur dioxide, Lomborg writes: "[h]istorically, a move away from siting power plants in urban arreas and the use of taller smokestacks were two of the primary causes of pollution reduction. At the same time, we no longer use coke ovens...."[29] These statements contain at least two errors. In fact, the use of tall chimneys on power plants did nothing whatsoever to reduce SO_2 pollution. It merely served to further disperse that

harmful pollutant, and to promote its conversion to sulfates, which are capable of being transported long distances before being deposited on the earth's surface as acid rain. Moreover, contrary to Lomborg's claim, coke ovens are still very widely used in the making of iron at iron and steel mills. Unless properly controlled, they emit benzoapyrene, a highly toxic substance that poses a risk to the health of workers and the public at large.[30]

Similarly, Lomborg states that, as a result of the introduction of new materials, automotive vehicles have become "ever lighter, without compromising structural integrity."[31] This observation completely overlooks the aggregate fuel efficiency and auto emissions problems that have resulted from the widespread use of heavy sports utility vehicles (SUV's) in the United States and some other nations - a significant set of difficulties that bears attention and analysis.

Professor Lomborg also misses the mark when he declares that "[s]ome of the most significant recent progress in the area of pollution has been achieved through regulation, but the regulation has been right to the extent that it represented a reasonable prioritization, and not because it was founded on a general worry."[32] This observation fails to take account of the fact that, as they developed historically, many valuable and successful environmental regulations were indeed "founded on a worry." In reality, environmental laws have frequently followed in the wake of perceived environmental disasters - from the Love Canal contamination to the toxic pollution in Bhopal, India, to the Donora, Pennsylvania air pollution emergency - events which have catalyzed a public clamor for regulatory reform.

In addition to misstating certain facts with regard to pollution problems and the regulatory response to them, Lomborg also stumbles when he fails totally to address quite a few widely discussed environmental problems. For example, The Skeptical

Environmentalist ignores the environmental difficulties posed by hazardous waste contamination (particularly as it affects groundwater resources), non-point source water pollution, point source water pollutants other than BOD and fecal coli, the harmful environmental consequences of dams, the effects of non-criteria hazardous air pollutants, the impacts that global warming might have on eco-systems, and the harmful effects of acid rain on lakes, soils, and aquatic life. The book also fails to discuss potential environmental impacts of expanded oil exploration and extraction, the environmental perils of gold mining and haphazard surface coal mining, and the problems of asbestos in school buildings (which led to the enactment of the U.S. Asbestos Hazard and Emergency Response Act). It also ignores leaking underground storage tanks, the continuing environmental impacts of SO_2 and NO air pollution, and the tendency of contaminants to mix and interact in the atmosphere and in soil and groundwater. Surely any fully credible and comprehensive discussion of "the real state of the world" would both acknowledge the existence of these problems and evaluate their significance as real or potential threats to environmental integrity and human health.

Equally troubling is Professor Lomborg's omission of any sustained analysis of the environmental and economic dislocations that may be caused by warfare. This all-too-common human activity frequently creates impacts that are widely acknowledged to be dreadful and long-lasting.

Lomborg's treatment of global population problems is also flawed and incomplete. Although Lomborg may well be correct that it may be technically possible to increase food supplies to feed the world's still expanding population, his discussion of the issue overlooks both the significant role that government subsidies to farmers have thus far played in

keeping food prices at low levels, and the potential environmental difficulties that will result from increased agricultural activity. As John Bongaarts has observed:

> A large expansion of agriculture to provide growing populations with improved diets is likely to lead to further deforestation, loss of species, soil erosion, and pollution from pesticides and fertilizer runoff as farming intensifies and new land is brought into production. Reducing this environmental impact is possible but costly and would obviously be easier if population growth were slower.[33]

Beyond these shortcomings, Professor Lomborg's work is also replete with questionable, unsupported or mistaken assumptions. By way of example, the author neglects to explain his statement that future scarcity of non-renewable, non-energy resources is not likely because people "continuously find new resources, use them more efficiently, and are able to recycle them and to substitute them."[34] His book does not discuss why that is a reliable prediction. It seems instead a speculative wish. Similarly, Lomborg fails to clarify precisely why it is that sea protection will inevitably improve over time,[35] why alternative energy sources (such as wind and solar power) will inexorably develop at a rapid pace,[36] why the Kyoto Protocol will not be changed in future to cover the greenhouse gas emissions of developing nations,[37] why non-human life forms will be inevitably preserved because of human dependence upon them,[38] and why public fear of environmental disaster is so intensive and pervasive that it actually "paralyzes our reasoned judgment."[39]

While highly critical of environmental scientists and organizations, Professor Lomborg seems naive when he accepts, apparently at face value, the approaches, theories and prognostications of certain economists. In his discussion of global warming, for example, he raises no questions as to the accuracy of an economist's estimate of the total

costs that might result from climate change - even though the severity of such climatic changes can still not be predicted with precision. Moreover, he asserts that societies are constantly faced with decisions as to whether to give greater priority to the environment than to hospitals, child day care and other social expenditures[40] - an economic conceptual framework which ignores the fact that, for many private firms which pollute the environment, money not spent on pollution control will typically be retained by them as increased profit rather than expended to assist children, the elderly, hospital patients and others in need.

Undoubtedly, economic analysis can sometimes play a useful role in the establishment of sound public policies. Nonetheless, Professor Lomborg appears to overlook the fact that such analyses may be mistaken or misleading, and that they may be based upon imprecise tools. One recent example of the latter phenomenon is the academic controversy over the role of indexes of consumer confidence in economic forecasting. Although long relied upon by economists and researchers, these indexes have been strongly criticized as attempts to capture states of mind that do not exist.[41] Nor is this the only instance of the imperfection of economic research; while most helpful at times, economic theories and analyses may also be quite fallible and unrealistic.

Lomborg is equally naive in his conception of policy-making in a democracy. He appears to assume that, so long as it is liberated from what he views as the false constraints and distortions of biased information regarding environmental problems, political decision-making will proceed, in an entirely sensible, rational fashion to choose “the best means to the right objectives.”[42] While this may well be a most worthwhile goal and laudable wish, it is indeed very far distant from the entirely-less-perfect political process which prevails in most nations and international organizations. Rather than focus all of his

skeptical fervor on advocates of environmental protection, Professor Lomborg would have done better to reserve at least some of his skepticism for the political policymaking process itself, the invariable rationality of which he never seems to question.

Lomborg's book also reflects misunderstanding as to the nature and social effect of scientific research. As Thomas Lovejoy has written:

> Lomborg seems quite ignorant of how environmental science proceeds: researchers identify a potential problem, scientific examination tests the various hypotheses, understanding of the problem often becomes more complex, researchers suggest remedial policies - and then the situation improves. By choosing to highlight the initial step and skip to the outcome, he implies incorrectly that all environmentalists do is exaggerate.[43]

In fact, scientific study of the earth is still relatively inchoate. Uncertainty pervades many investigative issues; and a complete understanding of how the earth works has by no means been achieved. Professor Lomborg's writing only rarely acknowledges that situation, however. His work seems to reflect an impatient overconfidence, together with an unfortunate penchant for the sweeping overgeneralization.

Finally, while Lomborg does acknowledge that at least some environmental problems (such as inhaleable particulate air pollution and indoor air pollution) merit serious attention, and although he does state (albeit in passing) that "there is no good reason to assume that the number of good and deserving environmental projects will not grow in the future,"[44] the author seems to overlook completely the possibility that publications like his own will create (or reinforce) public apathy and complacency towards environmental matters. Despite occasional qualifications and caveats which appear in various places in The Skeptical Environmentalist, its overall thrust is very clear: For Bjorn Lomborg, environmental problems have been blown way out of proportion in the public mind.

Readers of the book who come away persuaded of that central notion seem hardly likely to pay much mind to any future arguments (no matter how meritorious) that the environment ought to be preserved. Nor are they ever likely to heed Professor Lomborg's own very occasional (if unimpassioned) suggestions that some environmental problems actually do deserve public attention.

As Lomborg himself has stated: "[p]sychologically . . . we handle small risks either by making them significant enough to think about, or by making them so insignificant that there is good reason to ignore them."[45] By his rhetoric, his sometimes intemperate tone, and his harsh and unrelenting criticisms of environmental advocates, journalists and scientific experts, Lomborg's writing carries a none too subtle (even if, perhaps, not intended) message that, in general, environmental problems are bunk. When you really examine them systematically, he seems to say, they create only small risks. As a consequence, The Skeptical Environmentalist appears to suggest that we would do best to ignore such problems with quiet contentment. Don't pay further attention to these ill-informed, self-interested environmental alarmists, Lomborg appears to tell us. Instead let's rest on our collective laurels, refuse to waste our scarce money on needless research in the environmental sciences, and "live happily ever after."

Such collective omphaloskepsis may afford us some measure of comfort in the short-term. Nonetheless, it is folly.

As Sir Francis Bacon once stated "knowledge is power." Moreover, as James Madison observed (in words that appear on the pediment of the Library of Congress building in Washington, D.C. which bears his name) "A people who mean to be their own

governors must arm themselves with the power that knowledge gives." Environmental science may still be in its toddlerhood. Nonetheless, the endeavors of its researchers have already yielded penetrating insights that have improved and safeguarded the human condition in numerous ways. To diminish its collective efforts now, while humankind has so much more to learn about how our planet works and how our activity affects it, would be reckless, unreasonable and unwise.

III - What Does The Earth's Future Hold?: The Approach and Conclusions of Global Environment Outlook 3

If The Skeptical Environmentalist does not provide us with a complete, objective and balanced picture of the state of our world, the question that it raises nonetheless persists: what is the current condition of our planet and what does the future hold for all of the creatures (human and non-human) who live upon it? Stanford University Professor Stephen Schneider has thoughtfully observed that, given the current, incipient state of our knowledge, that question cannot be answered in traditional statistical terms, even though subjective estimates may be responsibly offered.[46]

Perhaps the most reasonable assessment of global trends, however, may be found in Global Environmental Outlook 3 (GEO-3), a report which reflects the work of more than 1,000 scientists and a host of governmental and non-governmental institutions, that was released in May, 2002 by the United Nations Environment Programme (UNEP).[47] This report (the third in a series prepared in response to a May, 1995 request by the UNEP Governing Council for a comprehensive overview of the state of the global environment) attempted to provide an integrated assessment of environmental trends from 1972 to the present and an analysis of problems facing humankind in the next 30 years.

In one respect, although its tone is far more cautious and measured, GEO-3 is consistent, in part, with some of the predictions offered in The Skeptical Environmentalist. Its authors state:

> Despite many setbacks, the past 30 years have provided a strong foundation on which to build sustainable development over the coming decades. The prevailing mood in environmental circles is cautiously optimistic about future progress in general - though this is tempered by several important unknowns, including notably the threat of climate change.[48]

Nonetheless, in its informative synthesis, the report notes that the environment is still "at the periphery of socio-economic development," and that as a result of enormous pressure from poverty and excessive consumption, the global environment is "continuing to deteriorate" and "sustainable development remains largely theoretical for the majority of the world's population of more than 6,000 million people."[49]

GEO-3 observes that human activities, including unsuitable agricultural practices, poor management of soil and water, deforestation, overgrazing and removal of natural vegetation, have caused the abandonment of huge tracts of irrigated land.[50] Forest clearance and degradation is still proceeding at a rapid pace.[51] Global biodiversity is being lost at a rate many times higher than natural extinction.[52] Fresh water consumption is excessive, especially among the world's poorer populations;[53] and coastal and marine environmental degradation "not only continues but has intensified."

With regard to air quality, the report's authors note that air pollutant emissions have declined or stabilized in most industrialized countries, and depletion of the stratospheric ozone layer (which has now reached "record levels") is likely to abate so long as all countries adhere to widely subscribed international agreements.[54] Nonetheless, global

climate change "represents an important additional threat on those ecosystems already affected by increasing resource demands, unsustainable management practices and pollution."[55]

GEO-3's authors found that, particularly in developing countries, rapid urban growth is creating increased unemployment and poverty, inadequate urban services, overburdening of existing infrastructure and environmental degradation.[56] Moreover, inadequate water collection and waste management are a significant cause of health hazards for city dwellers;[57] and people and the environment are increasingly suffering from the effects of natural disasters.[58]

According to the report, human exposure to environmental threats (as well as to environmentally determined health problems) is unevenly distributed. Poor people (especially those in developing nations) are the most at risk, as are those who dwell in high latitudes, along flood plains and riverbanks, and on small islands or in coastal areas.[59]

Turning its attention to the globe's future, the report's authors declare that:

> [T]he next 30 years will be as crucial as the past 30 for shaping the future of the environment. Old troubles will persist and fresh challenges will emerge as increasingly heavy demands are placed upon resources that, in many cases, are already in a fragile state. The increasing pace of change and degree of interaction between regions and issues has made it more difficult than ever to look into the future with confidence.[60]

Rather than making a single prediction as to the environmental trends that will occur from 2002 to 2032 (as Professor Lomborg has attempted to do, albeit for a longer time period), GEO-3 posits four alternative scenarios "to explore what the future could be, depending on different policy approaches."[61] The report's description of those largely plausible scenarios, denoted "markets first," "policy first," "security first" and "sustainability first," are provided in

Appendix A. Under them, as one might expect, the future of the world's environment varies quite considerably.[62]

After exploring the numerous implications of these differing hypothetical scenarios, GEO-3 draws several logic and sound conclusions. It notes that there can be significant delays between human actions, including policy decisions, and environmental impacts. Thus "much of the environmental change that will occur over the next 30 years has already been set in motion by past and current actions [and] many of the effects of environmentally relevant policies put into place over the next 30 years will not be apparent until long afterwards."[63] The report cautions that "the achievement of environmental goals will require decisive action, will encounter unforeseen eventualities and will not happen overnight."[64]

GEO-3 calls for the establishment of "strong institutions for environmental governance."[65] It also stresses the importance of "ensuring timely access to accurate information;"[66] and it concludes by noting that "fortunately or unfortunately, the success or failure of this endeavor is in our hands."[67]

Understandably, none of Bjorn Lomborg's writings to date reflect or respond to this very recent United Nations report - a report that is precisely the type of institutional compilation of information that Lomborg himself has claimed are the most reliable sources of trustworthy information about the world's real state. In light of his book, one might speculate that Professor Lomborg will criticize it in future publications or website postings as highly politicized and/or simply another instance of biased scientists and organizations adding to the "Great Fable" of "the Litany." Nonetheless, the GEO-3 report strikes this observer as being balanced, fair, realistic, and reasonably comprehensive.

IV - Conclusion

In sum, Bjorn Lomborg's The Skeptical Environmentalist is a serious and provocative although significantly flawed book. While it does advance some worthwhile points, the first book length work of this young scholar falls far short of providing the dispassionate overview of global trends that its author claims to provide. In sharp contrast with the United Nation's most recent report on the global environmental outlook, Lomborg's volume is incomplete, inaccurate, imbalanced and needlessly Panglossian. It ignores Aristotle's sage observation, quoted earlier in this review essay, that there is something of the marvelous in all things of nature. Moreover, it is very likely to be construed (or perhaps, in strict fairness, misconstrued) as an invitation to environmental complacency and inattentiveness at a time when a great many highly capable, responsible and independent observers believe that precisely the opposite is called for.

APPENDIX A: SCENARIOS FOR THE GLOBAL FUTURE POSITED BY GEO-3

1. Markets First

Most of the world adopts the values and expectations prevailing in today's industrialized countries. The wealth of nations and the optimal play of market forces dominate social and political agendas. Trust is placed in further globalization and liberalization to enhance corporate wealth, create new enterprises and livelihoods, and so help people and communities to afford to insure against - or pay to fix - social and environmental problems. Ethical investors, together with citizen and consumer groups, try to exercise growing corrective influence but are undermined by economic imperatives. The powers of state officials, planners and lawmakers to regulate society, economy and the environment continue to be overwhelmed by expanding demands.

2. Policy First

Decisive initiatives are taken by governments in an attempt to reach specific social and environmental goals. A coordinated pro-environment and anti-poverty drive balances the momentum for economic development at any cost. Environmental and social costs and gains are factored into policy measures, regulatory frameworks and planning processes. All these are reinforced by fiscal levers or incentives such as carbon taxes and tax breaks. International "soft law" treaties and binding instruments affecting environment and development are integrated into unified blueprints and their status in law is upgraded, though fresh provision is made for open consultation processes to allow for regional and local variants.

3. Security First

This scenario assumes a world of striking disparities where inequality and conflict prevail. Socio-economic and environmental stresses give rise to waves of protest and counteraction. As such troubles become increasingly prevalent, the more powerful and wealthy groups focus on self-protection, creating enclaves akin to the present day "gated communities." Such islands of advantage provide a degree of enhanced security and economic benefits for dependent communities in their immediate surroundings but they exclude the disadvantaged mass of outsiders. Welfare and regulatory services fall into disuse but market forces continue to operate outside the walls.

4. Sustainability First

A new environment and development paradigm emerges in response to the challenge of sustainability, supported by new, more equitable values and institutions. A more visionary state of affairs prevails, where radical shifts in the way people interact with one another and with the world around them stimulate and support sustainable policy measures and accountable corporate behavior. There is much fuller collaboration between governments, citizens and other stakeholder groups in decision-making on issues of close common

concern. A consensus is reached on what needs to be done to satisfy basic needs and realize personal goals without beggaring others or spoiling the outlook for posterity.

NOTES

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**Voltaire, Candide (Dover Books, 1993) at 166-167.

***Claude Bernard, 4 Bulletin of the New York Academy of Medicine 997 (1928), quoted in John Bartlett, Bartlett's Familiar Quotations (15th ed., 1980) at 552.

****Aristotle, Parts of Animals, book 1, chapter 5, quoted in John Bartlett, Bartlett's Familiar Quotations (15th ed., 1980) at 87.

1.Bjorn Lomborg, The Skeptical Environmentalist: Measuring the Real State of the World (Cambridge University Press, 2001).

2.Lomborg, supra note 1 at 6.

3.Lomborg, supra note 1 at 327.

4."Opinion: Defending Science," The Economist, Jan. 31, 2002.

5.Statement of Lewis Wolpert on back cover of Lomborg, supra note 1.

6.Statement of Matt Ridley on front cover of Lomborg, supra note 1.

7.Thomas Lovejoy, "Biodiversity: Dismissing Scientific Process," Scientific American, January, 2002 at 71.

8.This is the title of the introductory note by John Rennie to a series of four brief essays in Scientific American which are critical of Lomborg's work. See Scientific American, January, 2002 at 61.

9.See <www.lomborg.org>.

10.John Rennie, "A Response To Lomborg's Rebuttal," April 9, 2002 (available online at ScientificAmerican.com).

11.Lomborg, supra note 1 at 3.

12.Lomborg, supra note 1 at xix.

13.Lomborg, supra note 1 at xxiii.

14.Lomborg, supra note 1 at 4.

15.Lomborg, supra note 1 at 4.

16.Lomborg, supra note 1 at 12-13.

17.Lomborg, supra note 1 at 327.

18.Lomborg, supra note 1 at 327.

19.Lomborg, supra note 1 at 327.

20.Lomborg, supra note 1 at 5.

21.Lomborg, supra note 1 at 338.

22.Lomborg, supra note 1 at 4.

23.Lomborg, supra note 1 at 31.

24.Lomborg, supra note 1 at 351-52.

25.In the event that Professor Lomborg reads this review essay - as he well may - I hope he will take the criticisms that I advance herein in the constructive spirit in which they are intended. He and I have never met and none of what I say about his written work is in any way meant to be "personal."

26.Lomborg, supra note 1 at 330.

27.John Bongaarts, "Population: Ignoring Its Impact," Scientific American, January 2002 at 69.

28.In saying this, I do not at all wish to act as yet another tiresome U.S. America-basher, only finding fault with my country and seeing no virtue in its ways. Like any other nation - and every individual person - the United States has both weaknesses and strengths. My point here is only that, as a nation, we would do well to be more charitable towards our fellow human beings in developing nations. I hasten to add that, in my view, our national efforts to eradicate domestic poverty are also much in need of greater attention and resources.

29.Lomborg, supra note 1 at 170.

30.In the same chapter of his book, Lomborg also writes that "[t]he regulation of SO_2 emissions was primarily a consequence of the anxiety in the 1980's about acid rain and its effect on forests and lakes in exposed areas." Lomborg, supra note 1 at 172. This too is not correct, at least as it pertains to the United States. Sulfur dioxide was designated a "criteria pollutant" under the Clean Air Act by the U.S. EPA in the early 1970's. Throughout that decade and beyond, the U.S. EPA was engaged in sharp disputes with the electric utility industry respecting the use of SO_2 scrubbers to curb emissions of that pollutant. See Joel A. Mintz, Enforcement At the EPA: High Stakes and Hard Choices (Univ. of Texas Press, 1995) at 26.

31.Lomborg, supra note 1 at 208.

32.Lomborg, supra note 1 at 351.

33.Bongaarts, supra note 26 at 67-68.

34.Lomborg, supra note 1 at 148.

35.Lomborg, supra note 1 at 290.

36.Lomborg, supra note 1 at 287, 329.

37.Lomborg, supra note 1 at 305.

38.Lomborg, supra note 1 at 12.

39.Lomborg, supra note 1 at 333, 351.

40.Lomborg, supra note 1 at 331.

41.Louis Uchitelle, "Consumer Confidence Index Goes From an Aha to a Hmm," New York Times, June 8, 2002 at A1.

42.Lomborg, supra note 1 at 42.

43.Lovejoy, supra note 7 at 11.

44.Lomborg, supra note 1 at 334.

45.Lomborg, supra note 1 at 337.

46.Schneider, Scientific American, January, 2002 at 65.

47.UNEP, Global Environment Outllook 3 (Earthscan Publications, Ltd., 2002) (GEO-3). The report is available online at <www.unep.org/geo/geo3>.

48.GEO-3, supra note 45 at 21.

49.GEO-3, supra note 45 at xx.

50.GEO-3, supra note 45 at xx.

51.GEO-3, supra note 45 at xxi.

52.GEO-3, supra note 45 at xxi.

53.GEO-3, supra note 45 at xxii.

54.GEO-3, supra note 45 at xxiii and xxiv.

55.GEO-3, supra note 45 at xxiii.

56.GEO-3, supra note 45 at xxiv.

57.GEO-3, supra note 45 at xxiv.

58.GEO-3, supra note 45 at xxiv and xxv.

59.GEO-3, supra note 45 at xxv.

60.GEO-3, supra note 45 at xxvi.

61.GEO-3, supra note 45 at xxvi.

62.GEO-3, supra note 45 at xxvi to xxix and 328-93.

63.GEO-3, supra note 45 at 395.

64.GEO-3, supra note 45 at 397.

65.GEO-3, supra note 45 at 396.

66.GEO-3, supra note 45 at 397.

67.GEO-3, supra note 45 at 397.