Special Feature

On the Opposition Against the Book *The Skeptical Environmentalist* by B. Lomborg

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Introduction

Controversial ideas in science

Modern science proceeds through theories that are tested by observations. If these do not fit the assumptions, new theories are developed to replace the former ones (see Carl Popper and Thomas Kuhn)([1]). In the history of science there have been several long periods where two conflicting theories were proposed, and because no decisive observations could be made, the alternative concepts stayed subject to debate among scientists. These were very interesting periods in the fields concerned. The debate stimulated the development of new ideas with the result that these periods were among the more productive in the history of science. However, the "law" that science advances particularly well through conflict cannot be generalized. In several historical cases we see that the debate went beyond the logic of scientific argumentation and became emotional. New ideas, conflicting with reigning views, affected the authority of the ruling class of scientists in the field ([2]).

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The "Lomborg case"

Bjorn Lomborg wrote a controversial book in which he opposes the pessimistic view of a number of scientists and environmental organizations on the state of our physical, chemical, and biological environment.([3]) Throughout the work, he propagated the thesis that "things are going better instead of worse." The study is essentially a literature search primarily based on the official documents of UN agencies. Some environmental researchers raised opposition against many issues in the book in reviews and on web sites ([4],[5],[6],[7]). Some others who praised the book (Ridley, Gleditsch, Wolpert, Hirshleifer)(3), however, are less directly involved in environmental research than the opponents. After an unsettled debate (mostly outside the official scientific journals) several opponents lodged a complaint of scientific misconduct with a disciplinary body (DCSD) in the author's home country of Denmark. In January 2003, this body evaluated the book as "dishonest," which raised a second wave of controversial statements from all over the world ([8],[9]).

Lomborg asked for an "appeal" at the Danish Ministry of Science, Technology, and Innovation. In January 2004, it dismissed the ruling by the DCSD on procedural grounds and requested in a 60 page report (only available in Danish) a reinvestigation of the case. In March 2004 the DCSD produced a press release in which it considered this reinvestigation useless. Consequently Lomborg felt himself exonerated.

Science and politics

The environmental sciences have a strong impact on politics, and the reverse is also true. Observed unfavorable developments in the environment require measures and investments from governmental authorities and some of these investments are made in further environmental research. Almost all scientists in the field, and not least Lomborg, who is a political scientist, show outspoken opinion on the desired political consequences of the interpretation of their scientific research. As a result, scientific and political conceptions are easily mixed up, which makes the debate on the scientific aspects of environmental issues confusing to the outsider.

The scope of this paper

In the opinion of the authors of this paper, the opposition raised against the book contains some legitimate scientific criticism. Here we chiefly review, however, the nature and in particular the quality of the opposition in the light of the importance of this issue for the progress of science.

Behind our paper are a number of unpublished but more detailed reports from us, which we will reference, and which are available at www.stichting-han.nl/lomborg.htm

Abbreviations

CUP, Cambridge University Press
DCSD, Danish Committee on Scientific Dishonesty, (in Danish UVVU) a disciplinary body under Danish Law
DEC, the Danish Ecological Council
DFG, Deutsche Forschungsgemeinschaft
DRA, Danish Research Agency
ESF, European Science Foundation
FAO, UN Food and Agriculture Organization
GSP, Good Scientific Practice
IPCC, International Program for Climate Change
ORI, Office of Research Integrity of the US Department for Health
SA, the journal *Scientific American*
TSE, the book *The Skeptical Environmentalist: Measuring the Real State of the World*, by B. Lomborg (CUP, 2001)
UNDP, United Nation's Development Program
UNEP, United Nation's Environmental Program
WWI, Worldwatch Institute, which annually publishes the report, *The State of the World*
WWF, World Wildlife Fund
WWW-HAN, the website www.stichting-han.nl/lomborg.htm

Observations

The motivation of Lomborg and his research instruments

The author of *The Skeptical Environmentalist* (*TSE*) attempted to prove that detrimental environmental developments have been exaggerated by many scientists and environmental (lobby) organizations (e.g., WWI, WWF). He presents some hundred quotes in the book to support his position. The set as a whole was named the "litany of the catastrophists." The author did not deny that environmental problems exist but suggested that priorities for measures in society and investments in research should be set in other directions than in the past.

Lomborg's arguments are largely based on analyses of the (statistical) data of official institutions such as the World Bank, FAO, UNDP, UNEP, and the IPCC. The author emphasizes that the statistical material he uses is usually identical to that used by WWF, WWI, and Greenpeace. In this way he criticizes the conclusions (the exaggerations) drawn by these parties from the same data.

The motivation of the opponents and their instruments

The expected motivation of the opponents is a defense against this criticism. We observed, however, that none of Lomborg's criticisms on the quoted major exaggerations were directly and effectively challenged. The reply of the opponents is largely restricted to areas where Lomborg presented, in their opinion, a too optimistic view of future environmental developments, in other words, to examples where Lomborg made suspected exaggerations himself on the opposite side. Herewith, the opponents developed a secondary motivation, which is presented clearly in the complaint lodged to the DCSD by one of the major accusers (K. Fog) ([10]) as the danger that politicians may become induced to take environmental problems insufficiently seriously.

In the previous debate on the issues, Lomborg met the criticisms of his opponents in elaborate notes (5) but he yielded few points. A major instrument of the opponents became the public disqualification of Lomborg as an expert in the environmental sciences (see the sections below). When this approach seemed not to work out and the sale of the book continued to rise, the step was taken to lodge the complaint of scientific dishonesty with DCSD.

Misquotations and misreadings

Both parties addressed to each other reproaches on misquotations and the use of selective quotation. In his replies to the opponents Lomborg was able to refute most of these accusations, but not all. For example, Lovejoy (*SA*) discovered on page 254 of TSE the sentence "Colinvaux admits in *Scientific American* that the (extinction) rate is incalculable." The reference, however, states "an incalculable and unprecedented number of species are rapidly becoming extinct," which expresses an opposite opinion (4). In return, Lomborg collected from the accusations against him numerous misquotations from his book ([11], [12]).

The most frequently observed misleading interpretation is that the book promotes a "don't worry" message; see e.g., Grubb ([13]). But, on page 5 of *TSE* Lomborg states: "However, pointing out that our most publicized fears are incorrect does not mean that we should make no effort towards improving the environment. Far from it. What this information should tell us is not to abandon action entirely, but to focus our attention on the most important problems and only to the extent warranted by the facts" (www.lomborg.com).

In his accusation, Fog reads in a series of estimated forest declines for the period from 1980 to 1990 of 0.8–0.7 percent annually (*TSE* page 113), a decrease over the years. It is clear however from the context in the book that this is not presented as an annual decline but as a lowered estimate by FAO as a result of changing the determination method to satellite imaging over these years ([14],[15]). Lomborg pointed this out very clearly in his defense but Fog would not accept the refutation.

Fog also criticized Lomborg's use of a small decline in the percentage of starving people for the 1971–1999 period from the FAO's 2000 report as support for his thesis "that things are getting better" without giving the absolute numbers. He was implying that although the percentage might have declined, more people are in fact starving. However, the absolute numbers presented in the FAO report read 956 and 777 million respectively. Fog failed to mention these absolute numbers in his accusation which would have refuted his own complaint* (15, [16]). We emphasize that these are by no means single and isolated examples of misquotations and misreadings. Many more are documented in both Lomborg's own replies to his opponents at www.lomborg.com and at the HAN-website (11,12).

Misuse of statistics

The starving people issue and other particular numbers used by Lomborg were considered by several of his opponents to be misuse of statistical methods. Some eight accusations were identified but none of these appeared to hold up([17]). This was an important accusation to raise against somebody who is lecturing in statistics at a university ([18]). Moreover, the opponents did not concede that there is actually very little statistical work in the book done by the author himself. Where statistics or figures are mentioned, they are almost always derived from the references to the official reports.

*The most recent FAO report, March 2003 indicates a further decline of starvation in the developing world and a prospect is presented that it may come down to 462 million in 2015. This, of course, could not be known by the discussing parties in 2001. But it confirms Lomborg's forecast that "things are going better instead of worse." It will be interesting to see how other forecasts in the book will work out in the future.

Use of methodology

Several opponents contested Lomborg's methodologies, in particular J. Jespersen in "Science, method and ethics; Lomborg's 'journalistic' method" (6). Jespersen states that Lomborg's method is atheoretical and has selective empiricism as a pervading trait by using an edited dataset as a foundation for his discussion.

We observe throughout the book the following setup. The author starts each subject by listing some suspected exaggerations and tries to prove with existing datasets from his references that these conclusions are not justified. As mentioned before, the datasets are mostly from official institutions such as UN agencies. If an argument is presented for an exaggeration, he criticizes the reasoning and presents an alternative conclusion that can be drawn from the same datasets.

One criticism Lomborg makes is that the environmental "scaremongers" frequently use carefully selected short term recent trends as a basis for making long term forecasts, while ignoring the long term trends which would lead to a quite different conclusion. In some cases he also criticizes the kind of indicator used to illustrate an unfavorable trend, e.g., the inability to meet current and future demands for food. In this case, he considers world grain production and price in the recent past to be a poor indicator, and replaces it with trends in caloric intake per capita per day (the method used by FAO) (15,16).

Another important difference in approach between Lomborg and his opponents concerns the estimation of the "limits of growth," especially with respect to the availability of natural resources (e.g., fuel, minerals, and land use) which in principle is limited on the planet. If such a limitation of a particular resource is foreseen, he argues that an alternative resource will be used to meet the future demand. Lastly, an important non-scientific but cultural difference between the author and his opponents is the choice for a stronger anthropocentric rather than ecocentric approach to meet future demands.

The weight given to peer review and scientific authority

One of the reproaches of the opponents is that Lomborg gives insufficient or insufficiently balanced attention in *TSE* to information from peer-reviewed journals. As well, they state that in their opinion the book itself was not properly refereed by sufficiently-esteemed scientists. The publisher (CUP) denies this ([19]). The reviewers of the book prior to its publication were probably not chosen from the circle of the opponents on purpose. For example, it is unlikely that Pimm, who had been a referee for CUP and later became one of the major accusers who lodged the complaint of scientific dishonesty with

DCSD, would have given his approval. One may wonder why not a single critic was invited by CUP to express his opinion on *TSE*, since a scientist usually learns more from the critique of opponents than from approval of supporters. Negative advice from a reviewer such as Pimm might have prevented the publication of the book, but only if the editor had accepted Pimm's view. Much of Pimm's criticisms would have been refuted by the author, as he did with the *Nature* review and with Pimm's complaint, which was lodged with DCSD after publication of *TSE*.

Apparently the opponents were of the opinion that "authority" should suffice. When the author had refuted the primary complaints, the complainants lodged secondary complaints stating that the author accepted none of their criticism, herewith giving the impression that this should be considered as bad scientific practice.

The referee system contributes to maintaining standards for GSP and to the prevention of obvious mistakes, but if the expert's subjective opinion on the value of a contribution prevails over matter-of-fact criticism this becomes detrimental to the dissemination of new ideas in science. Too much weight given to authority in the peer-review system of journals (and also in the master-student relationship and the judgments of applications for grants) has been characterized as one of the drawbacks of the system. Gold ([20]) presented several examples from the past and concluded that in some disciplines, if the leading scientists have a strong influence in which direction research should move, their whole community is going to behave socially like a herd, with little chance for the individual who digresses, to survive.

Another observation concerns the fact that not only do the opponents frequently refer to "esteemed" scientists in their writings, but that Lomborg also regularly uses adjectives such as "the famous" or "well known." If this is followed by some criticism, several of Lomborg's opponents have read this as an attempt to belittle the celebrity. This is not necessarily the intention of the author. However, it is unusual in a real scientific paper to use this type of adjective. One simply refers to, e.g., Gold, 1989, or Einstein, 1905. The book is, however, not only addressing the scientific community but a larger public of laymen and it is not surprising that the author uses some adjectives to differentiate among the well- and less-known.

The ad hominem approach of the opponents

In a variety of writings, publications (e.g., Harvey), and on web pages, even in the decision of DCSD, derogatory remarks were addressed to Lomborg on his scientific integrity. In the first chapter in the counter publication of the DEC by J. Jespersen, his incompetence is stressed several times. This criticism is wrapped up in critical remarks which may not be beside the point but are seldom made specific (6). In one of the few cases where Jespersen makes his critique specific, he states that "Figures on global food production (e.g. Figure 2, p. 9) used to evaluate sustainable development are therefore misleading." Figure 2, p. 9 in *TSE* does not however show global food production but the global grain yield per hectare, and in the accompanying text Lomborg criticizes the use of this global figure to evaluate sustainable development. Damian Penny ([21]) identified in two e-mail exchanges with Harvey, e.g., the descriptions of Lomborg as *"ignorant," his knowledge of science was at "about the level of a high school student," he was "pre-programmed like a non-rewritable CD-ROM," "intellectually dishonest," a "preacher," a "snake-oil salesman," a "con artist," and "people are getting fed up with his self-righteous egotism."* Penny continues, *"Interestingly, nowhere in your two messages have you actually given me a clear example of where he's being ignorant or dishonest."*

The ruling of DCSD

The arguments on which DCSD decided on "subjective dishonesty" were investigated in detail [17]. The reviewers reached the conclusion that the DCSD members did not themselves investigate the accusations. Had they done so they would have found that those mentioned in their report did not hold. The reviewers circulated their review in the international scientific community and brought it to the attention of two major accusers of Lomborg (Harvey and Fog). The reviewers' conclusions were not challenged ([22]).

Apart from that, the decision of DCSD raised protests in Denmark. It led to the establishment of a working party, chaired by M. Pedersen, to evaluate the rules of procedures of DCSD ([23]). The working party recommended revision of the rules of procedures in light of recommendations by the ESF ([24]) and redefined "scientific dishonesty" for use in Denmark. This definition is wider than that used in the US by ORI and in Germany by the DFG ([25]). A concern is that this can lead to world-wide inequality when judging scientific misconduct. For example the yearbook of the WWI, *The State of the World*, cannot be subjected to judgment on GSP in the US but *TSE* can be in Denmark.

No recommendations were made for rules on appeal of a person convicted of "scientific dishonesty." The consequences of the critique and the recommendations for the ruling in the Lomborg case (if there are any) are still uncertain. So far Danish authorities have not responded to the critique.

Challenge of the opponents

Besides the challenges mentioned above, a limited number of others heavily criticized the style and content of the opposition against the book pointing out that it did not lead to a fruitful discussion of facts, figures and methodology ([26] [27]).

Conclusions

From the scholarly point of view, the exchange of criticism and opinions between Lomborg and his opponents has been unsatisfactory. The criticism of Lomborg on the exaggerations of existing environmental problems has been read by his opponents as a reproach to the producers of these statements. In Gold's terminology (20), the opponents behaved emotionally like a herd (with their strong emphasis on the authority of the "esteemed" scientists in the circle that publish in peer-reviewed journals) and used all possible instruments to disqualify a dissident, among these the ad hominem attacks.

Especially in personal writings or oral presentations of opponents, lacunas of expert knowledge of Lomborg, e.g., in the field of ecology, were detected, e.g., the meaning of clutch size (the number of eggs in a bird's nest). The relevance of this kind of ignorance in an interdisciplinary discussion between an ecologist and a political scientist is, however, questionable if of little or no importance to the major issues raised.

Some criticisms of the opponents on the use of figures hold in cases where Lomborg probably presented too optimistic a view on environmental problems. But misquotations from the book are numerous. The critiques and the accusations are written in an emotional style and in a — for scientists — very unprofessional, insufficient, matter-of-fact way. It appears that the opponents just refused to open their minds for alternative views than their own or to grasp the scope of the book as a whole.

Discussion

The contribution to the progress of the environmental sciences

Lomborg is described by his opponents as incompetent and arrogant. They refer, for example, to the subtitle of the book, "measuring the real state of the world," where they interpret the use of the term "real" as a claim by the author that only he is able to proclaim the truth. The title is not appreciated in the playful way it is meant, namely as an alternative to the annual report of the WWI, *The State of the World*. They also claim that Lomborg cannot be considered a real scientist since he throws too little doubt on his own interpretations.

If we put the emphasis on the term "measuring" in the subtitle, a very different aspect of the book comes into the picture. This implies a whole range of systematically-applied methods to interpret figures and to use indicators to draw conclusions. These methods are apparently unknown to the opponents who have not appropriately challenged these methods as such. It would seem that the opponents are unaware of the difficulties of measuring social, biological, or economic entities statistically as is clearly appreciated by Lomborg.

Sustainable development requires new ways of thinking across the borders of the many disciplines involved. Not only must we consider chemistry, physics, biology, medicine, and ecology, but also sociology and economics. Sustainable development as such is not a science but a political concept, as phrased by the "Brundtland committee" ([28]). From each of the underlying disciplines, scientifically-based contributions are expected. It is rather amazing that the opponents refused the contribution from a political scientist to integrate the results from other sciences to consider sustainable development and forwarded the attitude that only "experts" in these sciences should be allowed to judge measures to reach sustainable development.

As we stated in the introduction, the handling of conflicting views in a situation like the Lomborg case has in the past been detrimental to the progress of science in other fields. In this case, this drawback is unlikely to occur because the publisher (CUP) obviated the interference of the herd and through the attention focused by the opponents on their problems with the book, it received extra wide distribution.

The Lomborg book was published in a period when very pessimistic views on environmental developments were presented again, e.g., by the UN committee on climate changes ([29]), but more optimistic forecasts are also presented, e.g., by the FAO in March 2003 (16). It is clear that in striving for sustainable development, the discussion on environmental issues has to continue among scientists as well as politicians. A reasonable criticism of the book could have been that Lomborg deduced from long term trends reasons for optimism, but that is not a guarantee for the future. Those who are familiar with the behavior of complex systems* ([30]) are well aware of the fact that initially small forces can later result in great effects and vigilance is necessary. Moreover, we note that some of the criticism of the opponents is justified, although unfortunately wrapped up in rhetoric. And although we are of the opinion that Lomborg met the criticism largely in a scholarly way in his defenses, the voluminous book itself is also not free of rhetoric. Therefore, we thought the

*For a general and popular treatise see [30] in which some attention is also given to environmental problems.

time to be ripe to produce a "shortened and annotated Lomborg." These annotations not only take note of the criticism of his current opponents, but also of the methodologies that were introduced by Lomborg, and which deserve to be further developed.* The nature of the annotations is very different from the criticism of his current opponents.

Misconduct

In our opinion, even when Lomborg had it all wrong, the opponents are guilty of (a) false, at least imprudent, accusations, (b) misquotations and selective quotations, and (c) ad hominem attacks. Under current rules in Denmark, (b) can result in a complaint of scientific dishonesty and this will remain the case if the recommendations of the "Pedersen" working party are followed; these read that any writing of a scientist can be the subject of a judgment on GSP. Non-Danish citizens would escape from such a complaint, because it is unlikely the writings of these opponents would be considered as falling under violation of GSP in any other country.

If the rules are changed in a way that this judgment can only apply to true scientific papers, the judgment in the Lomborg book should be retracted. If, nevertheless, a book like *TSE* is considered a true scientific paper, which in our opinion it is not, then the case should have been reinvestigated taking into account the numerous false accusations.

Since the DCSD did not accept the challenge produced by the Ministry to reinvestigate the case because it judged the previous decision of DCSD (January 2003) invalid, (DCSD did not retract this decision from its web site), a very unsatisfactory situation has arisen. *Here it is suggested that bodies that propagate the rules of Good Scientific Practice and the disciplinary bodies that judge violations of those rules should themselves adhere strictly to the rules for Good Scientific Practice. For a conviction of malpractice the expression of an "opinion" by a committee is not sufficient. "Proof" should be presented. If proof is presented that a report contains unreliable data, (as is the case with the DCSD report of January 2003), the report should be formally retracted with the note that one should no longer refer to it.*

*Lomborg does not demonstrate familiarity with complexity theory, but he seems to have a feeling for its principles, as shown by his searching for border conditions in the future in relationship to the fundamentals of the Brundtland report: *"Sustainable development is not a fixed state of harmony, but rather a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are made consistent with future as well as present needs."* A "shortened and annotated Lomborg" does focus on these principles. See <www.stichting-han.nl/reviewlomborg.htm>

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