

A CRITICAL CONSIDERATION OF THE VERDICT OF THE DANISH COMMITTEE ON SCIENTIFIC DISHONESTY ON THE BOOK BY BJORN LOMBORG ‘THE SKEPTICAL ENVIRONMENTALIST’ (Cambridge University Press 2001).

With an annex “Review of the approaches in the debate on the book”.

The Netherlands, April 4, 2003

EXECUTIVE SUMMARY

The book ‘The Skeptical Environmentalist’ is a critical review of established views of many environmental scientists in the world. The response of some distinguished scientists has been, to accuse the author of having been twisting arguments by improper handling of statistical data and by selective quotation of the scientific literature.

This led to a formal ruling by the Danish Committee on Scientific Dishonesty (DCSD) in the author’s home country Denmark. *“the publication is deemed clearly contrary to the standards of good scientific practice”*

The ruling was made public to the international scientific community through a report entitled “Decision regarding complaints against Bjorn Lomborg”

This report was investigated by an ad hoc working group in the Netherlands. We concluded that there is no evidence that the Danish working party, which first considered the case, and subsequently DCSD, have themselves investigated the accusations. Not a single reference is made to a paragraph in the book, where one of the accusations could apply. The words of the complainants were taken for granted. Consequently the working party and DCSD have not presented proof that the accusations are legitimate. The ruling is based on an opinion. Most remarkably DCSD seems to leave open its ruling for public debate with the statement *“Rather than record extensive correspondence in detail, DCSD has deemed it fit to present not only the Working Party’s summary but the complaints in full, complete with appendices, so that as an appendix to this ruling, incl. the discussion in Scientific American, they form part of the description of the case. The same applies to Bjorn Lomborg’s replies to the complaints”*.

We intend to contribute to the public debate by presenting the “Consideration” including the “Annex”.

By presenting at length earlier presented arguments of opponents, and not quoting from Lomborg’s replies, the report of DCSD boils down to a very biased presentation of a long debate on environmental issues. This selective citation is in itself not good scientific practice.

Disciplinary bodies charged with adjudicating on Good Scientific Practice, should themselves take particular care to adhere to the principles of proper investigation and proper reporting, similar to those which are common in the scientific world. If not, they lose credibility, and even worse contribute strongly to the loss of credibility of the scientific world as a whole.

In the **Annex** to this note the nature of the public debate is analyzed in further detail. The heart of this annex is the investigation of 27 accusations which could be inferred from the official report of DCSD and which fall in the following categories:

1. Fabrication of data (3)
2. Selective discarding of unwanted results (8)
3. Deliberately misleading use of statistical results (8)
4. Distorted interpretation of conclusions (5)
5. Plagiarization of others' results or publications (1)
6. Deliberate misrepresentation of others' results (2)

On a total of 27 accusations that have been identified, two are not specific and one is not to the point. Among the 24 remaining specific accusations, two may be proven if further sustained. But they are of little significance, if the scope of the book as a whole is considered. So at least 25 out of 27 accusations are not substantiated or are simply invalid.

The investigation of the accusations is preceded by a consideration of the scope of the book of Lomborg in the light of sustainable development as it was defined by the UN commission on Environment and Development in its report 'Our common future'. The book can be characterized as a first attempt to comprise all elements of a multi-dimensional approach to promote sustainability.

Having reached the conclusion that the concrete accusations against Lomborg largely don't hold, it is legitimate to question the approaches of Lomborg's opponents. Using some historical examples it is argued that almost all opponents use discussion tactics, which come very near to those of dogmatically driven pseudo-scientists. The inevitable overall impression of the debate is, not that Lomborg has deliberately been twisting arguments, but many of his opponents have. This is somewhat more than embarrassing. And most probably for DCSD not the expected outcome of his investigation when it stated: *The interested public will thus be granted an opportunity to have full access to the facts of the case.*

The ultimate conclusion is that scientific progress in the field of sustainable development can only be achieved if the need for a multidisciplinary approach and some lateral thinking is recognized. The environmental establishment should take care not to disregard offhand provocative ideas, similar to those of Lomborg.

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1. The case

The book 'The Skeptical environmentalist' is a critical review on established views of many environmental scientists in the world, who have met in many international conferences over the last 30 years, which resulted into policy making papers of many countries, partly under the guidance of the United Nations.

The counter attack of the establishment on Lomborg has been, that the author was accused of having been twisting arguments by improper handling of statistical data and by selective quotation of the scientific literature.

This led to a formal ruling by the Danish Committee on Scientific Dishonesty (DCSD) in the author's home country Denmark. *"the publication is deemed clearly contrary to the standards of good scientific practice"*

The ruling is made public to the international scientific community with a report entitled "Decision regarding complaints against Bjorn Lomborg"

http://www.forsk.dk.uvnu/nytt/udtaldebat/bl_decision.htm)

The critical consideration presented below, does essentially not refer to the question whether Lomborg has violated rules of good scientific practice, but it addresses the DCSD on its procedures: That is to say, how apparently research on scientific misconduct has been performed and disseminated.

(A review of the accusations is presented in an annex)

2. The content of the report

The first problem the DCSD had to deal with was whether the book should be considered as a real scientific publication, on which a verdict of the committee is warranted. A working party of five DCSD members was set up to investigate this. This working party did not reach consensus. DCSD decided that it "should not simply decline to take a position on the complaints".

In the report the description of 'The working party's examination of "The skeptical Environmentalist"' is limited to a brief summary of its six parts.

Next is presented (in 6 pages) 'the working party's reproduction of some of the professional published critique of the book, prior the complaints to DCSD'. This is derived from the magazine Scientific American (January 2002) which asked four leading experts to assess Lomborg's treatment of their own fields. At the end, the continued discussion between Lomborg and the critics is mentioned, but no summary is produced of his (30 pages) answer (<http://www.lomborg.com>).

The working party concludes its examination of the critique *"the critics are offended at his belittling a number of researchers[..], parts of the serious scientific research community at any rate being accused of having misunderstood the relevant concepts, of misrepresenting relevant facts, of understating uncertainties, of cherry picking data and of not acknowledging errors when these had been proven, -in a nutshell, at members of the research community being guilty of large-scale infractions of the researchers' code of conduct"*.

The report continues with a short phrasing of the three complaints presented to DCSD: "BL is accused of fabricating data, selectively and surreptitiously discarding

unwanted results, of the deliberately misleading use of statistical methods, consciously distorted interpretation of the conclusions, plagiarization of others' results or publications, and deliberate misrepresentation of others' results"

Then a reply of Lomborg is made mention of: "BL dismisses practically all the counts on which he offers his position, but as with the discussion in Scientific American, his rebuttals are not accepted by the complainants".

Although in this paragraph these accusations and denial go under the heading 'The working Party's examination of the three complaints', no examination, or weighing of arguments is presented.

Next a paragraph is devoted to 'the working party's deliberations on dissemination of scientific results to the public' with the major conclusion: "it is out of keeping with good scientific practice for a researcher to publish by bypassing specialist academic fora, i.e. to notify news media of a result that has not yet been subjected to professional scrutiny in the customary fashion".

In the next paragraph, DCSD's consideration of the content of the complaints is almost limited to the statement that an appendix to its ruling is attached of the complaints in full and the discussion in Scientific American. "The interested public will thus be granted an opportunity to have full access to the facts of the case." It goes in somewhat more depth with the statement "in the context of the present case, DCSD has been sensitive to the World Bank's Development Report 2002 on its cost-benefit analysis. [...]This is mentioned only to highlight the caution that needs to be exercised in connection with such cost-benefit analyses".

Under the heading 'DCSD's position' it is concluded that "based on customary scientific standards and in light of this systematic one-sidedness in the choice of data and line of argument, (the defendant) has clearly acted at variance with good scientific practice". And under its ruling "Objectively speaking, the publication of the work under consideration is deemed to fall within the concept of scientific dishonesty".

It can be observed that the decision as such, does not contain quotes from the defense of the accused. Neither is mentioned whether he had the opportunity to respond to a draft of the decision and its ruling, prior to its publication.

3. Reactions

From a press release of J.M. Hansen, Director of the Danish Research Agency, of January, 10, 2003 it is clear that the decision and ruling of DCSD has raised protests in the media and among politicians and scientists.

The director speaks of a recurring and grave misunderstanding: "Scientific ethics - including DCSD's work - is not about *what* the truth is, but about *how* people who refer to themselves as scientists, pursue the truth. That is to say, how research and scientific investigations are to be conducted and disseminated. [...] If methodological errors are present in this way to any material extent, the work can be characterized as *objectively dishonest*. [...] The decision does *not* take a stance, nor is it supposed to take a stance on whether Bjorn Lomborg's theories are right or wrong"

The critical consideration presented below, also does not address the question whether Lomborg or his critics are right or wrong, but it addresses the DCSD on its procedures: That is to say, how research on scientific *misconduct* has been performed

and disseminated (in this case to the international scientific community by DCSD's website).

4. The scope

The decision is in itself a novelty in the sense that a disciplinary (scientific) body has taken the stand that its ruling should go beyond scientific publications in refereed journals.

Rules for good scientific practice and the handling of allegations of scientific misconduct, have been subject of discussion in many countries for many years, and general agreement on 90 percent of the written rules has been established in the international scientific community (ref: www.natutech.nl: Good Scientific Practice, a compilation of views of the National Academy of Sciences USA [NAS] and the Deutsche Forschungsgemeinschaft [DFG]). Some are still under discussion, and among these concerning communications from scientists directly to the public at large.

The DCSD has produced now jurisprudence in Denmark, which deserves serious consideration in other countries.

The major argument of DCSD to consider *The Skeptical Environmentalist* to be under its ruling is in short that a scientist is always a scientist, even if he goes public outside the refereed journals. Some will challenge this, with the argument that should be differentiated between *scientific* misconduct and other forms of deceit. Others may state that public deceit by a scientist is nevertheless to be considered as *professional* misconduct. These definitions deserve further attention.

It should also be observed that the ruling of DCSD is largely (if not exclusively) based on published information by *Scientific American* and a long quote from *Time Magazine*. These are not scientific journals in the pure sense. Herewith is once more stipulated that DCSD is prepared, with its assessments, to go beyond information provided by the inner circle of the scientific world. This is as such not a novelty. Many cases of the investigation of scientific misconduct were originally initiated through the press. The question to ask here is whether a disciplinary body (of the scientific community) should use this information (which most probably was not subjected to the customary referee system) from outside the scientific community as evidence in a scientific controversy.

Another important feature of the Lomborg case is that it concerns a controversial field of research and public debate. Consequently one should be especially aware of potential bias of witnesses. In many cases of allegations of scientific misconduct, in less controversial fields, the protests of whistleblowers were initiated by personal controversies, not necessarily of scientific nature. It is quite clear that the outcome of the debate in *Scientific American* did not satisfy the opponents of Lomborg, and that the allegations addressed to a disciplinary body became subsequently instrumental to these opponents. Most likely, the Lomborg case will not end with the ruling of the DCSD and public discussion will continue. Therefore, at this point, shortly after the ruling, it is of importance to consider the grounds on which this ruling was based.

5. The review

The reviewers had as sources:

(http://www.forsk.dk.uvnu/nyt/udtaldebat/bl_decision.htm)

And the answers of Lomborg to critics in Scientific American, (<http://www.lomborg.com>),
And no access to probably additional information in the Danish language.

There is no evidence in the report that the working party and DCSD have themselves investigated the accusations. Not a single reference is made to a paragraph in the book, where one of the accusations could apply. The words of the complainants were taken for granted. Consequently the working party and DCSD have not presented proof that the accusations are legitimate. The ruling is based on an opinion. Most remarkably DCSD seems to leave open its ruling for public debate with the statement “Rather than record extensive correspondence in detail, DCSD has deemed it fit to present not only the Working Party’s summary but the complaints in full, complete with appendices, so that as an appendix to this ruling, incl. the discussion in Scientific American, they form part of the description of the case. The same applies to Bjorn Lomborg’s replies to the complaints. The interested public will *thus be granted an opportunity to have full access to the facts of the case*”.

[Note that Lomborg has previously presented himself on his website the criticisms on the book, e.g., in Scientific American and from the WWF, with his answers. The appendix to the ruling was not available on the website of DCSD]

It goes in principle beyond this review (which is restricted to the consideration of the procedure used for the ruling) to consider all these facts, but again it is remarkable that the report only reproduces quite at length material of the opponents of Lomborg in Scientific American, but not his replies. And this especially because the major criticism to Lomborgs’ book is its one-sidedness.

If we nevertheless accept the invitation to consider some facts, e.g., reading through the disputes, and consider the style of the reply to the opponents, it is observed that the answers of Lomborg go into very great detail. The judging committee was, as a matter of fact, because of all the available written material, in a very good position to weigh pros and contras on the suspected violations of Good Scientific Practice. By neglecting this, and because of its own chosen position to present the contras one-sidedly, it is not doing a favor to all those who are propagating the maintenance of Good Scientific Practice. The suspicion of its one-sidedness, in favor of the ‘green’ establishment, is fortified by reproduction of tendentious opinions in the report, such as “Lomborg is giving skepticism – and statisticians – a bad name”, “Peter Raven, chairman AAAS, calls Lomborg the prime example in our time of someone who distorts statistics and statements to meet his own political end”, “The USA is the society with the highest energy consumption in the world, and there are powerful interests in the USA bound up with increasing energy consumption “. “Apart from the unusually widespread professional disagreement with Bjorn Lomborg”

This last statement neglects the also widespread appreciation of (other) scientists for the book (see the first pages of the book and the acknowledgments).

“Bjorn Lomborg’s personal attacks and apparent inability to take part in such a discussion, cf. the critique of BL’s style of argument and of the fact that he, so to speak, accepts nothing of the massive criticism”.

On this point the reader is indeed invited to consider the style of both, Lomborg and his critics, in the exchanges of views on controversial issues. The statement, “*so to speak, (BL) accepts nothing of the massive criticism*” is certainly beyond the truth. (See the annex)

The rules of procedures for an investigation of an allegation of misconduct are attached to the annual report 2001 of DCSD. It is not clear from the report whether

the judging committees have kept to these rules since no specific references to these have been made. Section 8.4 of the rules states “Once the *ad hoc* committee has compiled a report, the report shall be sent to the parties to the case in order to ensure that factual information in the report is correct.” Whether this also applies to the draft report of the plenary DCSD, is not clear. This is customary in other disciplinary bodies in other countries. What is, however, especially missing in the rules of procedures, are details on how and into what depth an investigation should be performed, and what the minimum requirements of a report to sustain the ruling should be. (see e.g., ORI and DFG rules).

Another question is whether in Denmark sanctions have been formulated when scientific misconduct has been ruled, and who has to apply a sanction. The usual sanction on a misleading paper is its retraction. Most likely the (private) publisher of the book will not cooperate in this respect. Not seldom sales increase with the public attention being focused. This is an aspect which DCSD probably has not considered when it decided to judge a publication which it assumed to be non-refereed.

But was the book non-refereed at all?

In the edition 2002 in the acknowledgments mention is made of “the large number of researchers who have read through different parts of the book [..] All contributed with constructive suggestions and useful information, although definitely not all agree with my overall conclusions”. As a matter of fact, on the very first pages of this edition is presented the opinion of four people with scientific or scientific-managerial background, which can be read as referee reports.

That no mention of that has been made in the DCSD report, demonstrates once more its one-sidedness. It could also have inquired about the referee procedure used by the publisher Cambridge University Press.

The reviewers made the enquiry and were informed that four referees, and not those mentioned above, read the script. “One was a climate scientist; one was a specialist in biodiversity and sustainable development and one an economist with an expertise on the economics of climate change. All three were from top-ranking environmental studies departments in the US and the UK and all had strong policy interests in addition to their scientific credentials. ”

Next it should be mentioned that in the past several articles in refereed journals nevertheless had to be retracted. The referee system is far from infallible, if referees don't do their work in an appropriate way. Its major negative side effect is, however, that established scientific authority may hamper the dissemination of original ideas, a factor which, to the opinion of the reviewers, has been underestimated so far when considering violation of good scientific practice. It is considered highly unfortunate that a disciplinary body like DCSD seems not to be aware of this aspect of the ongoing debate on the environmental issues.

6. Discussion

As said before, the reviewers may have missed information on which the judgment of DCSD was based. In the above is, however, especially considered how DCSD , through its web site and press releases, brought its ruling to the attention of the international scientific community.

Here we discuss especially the effect of reports in which insufficient proof of scientific misconduct, or of violation of GSP is presented.

An important point to make is that any allegation of misconduct, justified or not justified, is injurious to the image of the scientific world.

In the history of science, the power of scientific authority of established scientists, has been shown to be quite frequently detrimental to scientific progress. Disciplinary bodies, judging scientific misconduct from the point of view of good scientific practice, and from their authority's position, should be especially aware of that.

To maintain Good Scientific Practice, disciplinary bodies should especially adhere to the principles of proper investigation and proper reporting, similar to those which are common in the scientific world. If not, they loose credibility, and even worse contribute strongly to the loss of credibility of the scientific world as a whole.

In the opinion of the reviewers the DCSD is up to a thorough revision of its methods of investigation and reporting, taking in account the lessons to be taken from the failures of OSI in the US and the improved rules adopted by its successor ORI. In short is the recommendation: adopt the same rules for reporting on observations on violation of good scientific practice, as we are used to in pure scientific publications. Make a clear distinction between sections 'Materials and Methods', 'Observations', 'Discussion', 'Conclusions'.

In the context of the European Community we are up to a harmonization of locally adopted rules. We need especially an European Court for appeal.

On the other hand, the reviewers observed that DCSD has quite a good reputation on its dealing with accusations of scientific misconduct over the last 10 years. Its views on GSP have also been taken note of by other countries, and have contributed to their stance taking.

Annex to “A critical consideration of the verdict of DCSD on the book”

**A REVIEW OF THE APPROACHES IN THE DEBATE ON THE BOOK
“THE SKEPTICAL ENVIRONMENTALIST” BY BJORN LOMBORG
(Cambridge University Press, tenth edition 2002)**

A. Rörsch, April 4, 2003

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1. Introduction

The book 'The Skeptical Environmentalist' (SE) was judged by the Danish Committee on Scientific Dishonesty (DCSD) as being at variance with good scientific practice.

The following three quotes from the decision of the DCSD are relevant to this essay.

1. On the basis of the material adduced by the complainants, and particularly the assessment in Scientific American, DCSD deems it to have been adequately substantiated that the defendant, who has himself insisted on presenting his publication in scientific form and not allowing the book to assume the appearance of a provocative debate-generating paper, based on customary scientific standards and in light of his systematic one-sidedness in the choice of data and line of argument, has clearly acted at variance with good scientific practice.

2. Bjørn Lomborg claims that he has presented all the facts and has substantiated this with a large body of notes and a bulky bibliography. The exchanges of views between Bjørn Lomborg and his critics are technical, scientific and scholarly in content. What is not usual in "common" specialist-scientific discussion is Bjørn Lomborg's personal attacks and apparent inability to take part in such a discussion, cf. the critique of BL's style of argument and of the fact that he, so to speak, accepts nothing of the massive criticism.

3. As already mentioned, there has been extremely extensive correspondence during DCSD's deliberation of the matter. Rather than record this in detail, DCSD has deemed it fit to present not only the Working Party's summary but the complaints in full, complete with appendices, so that as an appendix to this ruling, incl. the discussions in Scientific American, they form part of the description of the case. The same applies to Bjørn Lomborg's replies to the complaints. The interested public will thus be granted an opportunity to have full access to the facts of the case.

Herewith is accepted the invitation to investigate this material, and then especially from the point of view of the style of argumentation used by Lomborg's opponents on the environmental issues.

2. The nature and scope of the book and the criticisms

The book was first published in English in 2001 and reached in 2002 its tenth edition. Apparently it attracted much attention.

The book is very critical on those who advocate the so called 'dooms day syndrome': the earth faces a catastrophe due to the impact of human activities on the environment.

The author is not himself a researcher on environmental subjects; he was educated in 'political science' and appointed professor in statistics in the political science faculty in Aarhus, Denmark.

He studied with a working group in his university the (scientific) literature on environmental issues.

The book is consequently a literature study, on which the author based his own conclusions, from his own background: statistics and political science.

The established circle of environmentalists disapproved strongly of the book, accusing the author especially of selective citation from the refereed scientific literature. It resulted in a world wide discourse on disagreements, in scientific journals like Nature and Science, and newspapers. This apparently did not satisfy the opponents of the book. They lodged with the Danish Committee on Scientific Dishonesty (DCSD) a complaint of violation of Good Scientific Practice, which was granted.

There is, however, no indication in its decision to what extent DCSD itself investigated the accusations, and consequently whether its ruling is justified.

It should be clear that the book is not a balanced review of the primary literature on environmental issues. Not like e.g., the Annual review of Genetics, Microbiology or Biochemistry. This is not the scope of the book. Reference is made especially to *numbers and statistics* from official sources, e.g., FAO, WHO, UNDP, UNEP, the World Bank and the IMF. The scope of the book is that it criticizes the use of these statistics by a number of environmental scientists and especially the rhetoric of comments that are frequently accompanying their interpretations when asking the attention of the public at large. Many of his citations outside the official sources mentioned above, from the scientific literature or from general journals, are of the nature 'further reading for those who are interested'.

3. The mutual criticism during the debate

The mutual criticism made in the debate can be summarized as follows:

3.1 From BL to others:

1. The rhetorics which accompany the litany on the bad state of the world
2. Insufficient longitudinal statistical studies as a base for forecasts
3. Disregarding of complexity

3.2 From the opponents of the book:

1. Belittling opponents and lack of respect for well known scientists
2. Insufficient use of the traditional referee system
3. Disregarding of articles in refereed journals
4. Inability to take part in a scholarly debate

3.3 The accusations mentioned in the DCSD report:

1. Fabrication of data
2. Selective discarding of unwanted results
3. Deliberately misleading use of statistical methods
4. Distorted interpretation of conclusions
5. plagiarism of others' results or publications
6. Deliberate misrepresentation of others results

The obvious way to assess the validity of these criticisms is to go over each of the accusations, and the defense by BL

But very first some attention should be given to the complex and multidisciplinary aspects of sustainable development in order to place the book in the context of the on-going ecological debate and current general science philosophy.

4. Sustainable development and modern complexity theory

Without making elaborate reference to it, the book goes back to the fundamentals of ‘Our Common Future, 1987’ (the report of UN World Commission on Environment and Development), (1)

“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”.

Sustainable development is highly multi-dimensional, and we can group these dimensions in three main ones: ecological, technological and economic developments. ‘The state of the world’ is, in mathematical terms, a complex system in which ‘the state’ is influenced by many different forces (on each dimension). The mathematical theory (for a popular treatise see (2)), predicts that if three or more forces to change the state are active, there is a high chance of unforeseen change in the system as a whole.

This basic principle, applicable to all sciences, is apparently still poorly understood among researchers of sustainable development (with meteorologists probably as an exception). Also by Lomborg, although he shows an intuitive sense for it.

In complexity theory especially ‘changes with time’ are being considered, changes described by non-linear differential equations. Its ‘laws’ predict whether a particular system may be in a perfect stable state, show oscillatory behavior, be in the chaotic state or will collapse. And when it may change from one state to another.

This is now mathematically very well founded, but of course with very complex natural and social systems (e.g., respectively the state of the world or the economy of the free market) it is mostly impossible to describe changes of variables with accurate differential equations, and consequently apply the tests provided by complexity theory. But this does not mean that it is admissible to neglect the basic principles how complex systems may behave, changing from one state into another.

5. Some general features of the debate

Many scientists still ignore these principles. They have not learned of these results outside their own field, nor do they want to learn of these results if they affect their established, dogmatic views. At this moment this is probably the most widespread violation of Good Scientific Practice (GSP) (3). If dogmatism is underlying science, it is called pseudo-science (4).

If we read Lomborg’s book with this insight, the more important issue than his conclusion (“the real state of the world is better than orthodox environmentalists make us believe”) becomes whether those whom he criticizes, are pseudo scientists. If so, in this context the title of the article of his opponents in *Scientific American* (SA) (5) could be read as “Pseudo science defends itself against The Skeptical Environmentalist”.

A definite test whether an approach is pseudo scientific is, however, not that easy to apply and still subject of discussions among science philosophers (4). But the major feature is dogmatism. (Best known examples are creationism and scientology).

It should, however, also be noted that in the field of sustainable development, dogmas have a right of their own to be considered as forces in a fourth social/political dimension (next to the three mentioned above), which need not by definition to be disgraced. To name two: maximum biodiversity has to be maintained and trans species recombination is forbidden, out of a cultural respect of Nature).

These dogmas, however, don't have the same strong limiting power such as laws of thermodynamics in technological development, and may change with time and geographic location. If their possible change is not considered in relationship to other shifts on the main axes ecology, economy, technology, (put forward already in "Our Common Future (1)) the multi-dimensional character of sustainable development is denied.

"Our Common Future" was in itself a political issue, and some may want to ignore it as non-scientific from the start. This may also be the explanation why Lomborg's opponents belittled him as a student of political science, who dared to enter their mono- or bi-dimensional fields. Such trespasses over traditional disciplinary borders have been seen detested before. In the middle of the 20th century, physicists and chemists had great problems to be recognized by the established biologists when they entered the latter's field. It took some 20 years before molecular biology became respected among biologists.

Next, from an analysis of the Science Citation Index (6) it appeared that also at the borders of many other disciplines much progress in research was made.

The strong and repeated denouncement of Lomborg as a layman, because he did not use the traditional inner circle of the orthodox environmentalists to referee the book, raises some other questions with respect to the opponents' notion of the philosophy of scientific progress.

No doubt the (anonymous) referee system is important as a form of professional social control among scientists to maintain good scientific practice with respect to research methods, citation and interpretation of data. But the system is also very conservative in the sense that proliferation of orthodox views tends to dominate the more revolutionary ones. Since Lomborg had the strong intention to break through orthodox views, he used another method of professional social control and requested criticism himself (according to the acknowledgments) on the manuscript of the book from scientists from very different disciplines. These "referees" may have missed some mistakes and the opponents may disagree on certain issues of Lomborg and his "referees" and naturally this resulted in a debate.

6. Some specific features of the debate

This debate took an unusual shape, by the invitation of Scientific American (SA) of four orthodox environmentalists to comment on the book, not giving room to supporters of Lomborg's view, nor to Lomborg himself to respond directly to the criticism. Lomborg had to answer his opponents with statements on his own web site. The style of the opponents was venomous on Lomborg's credentials and little matter-of-fact. SA itself summarized nine alleged factual errors in the Skeptical Environmentalist (SE). In his cool response Lomborg refuted seven of these, leaving two, which were considered by him and his supporters (7) as trivial.

In the opinion of Schoenbrod (7) SA actually committed more mistakes in its eleven page attack than it was able to identify in Lomborg's 500 page book.

The opponents were apparently not satisfied and by four others complaint of scientific dishonesty was lodged with DCSD.

In its 'decision' the DCSD cited at length (and again in a poor matter-of-fact way), the text from the opponents in the SA, and none of Lomborg's refutations.

Apparently the working method of DCSD raised protests (8,9,10,11) and the director of the Danish Research Agency (DRA) decided to appoint a working group to investigate the procedure of DCSD and make proposals for improvement.

At this stage not only the important point what (and how) rules for GSP should be applied to an extremely multi-disciplinary field of research is at stake, but also whether the opponents of Lomborg have in the past and through the debate and the accusations, shown signs of the characteristics of pseudo-science, which may be detrimental to science.

7. The accusations provided by the DCSD report (see paragraph 3 of the 'decision') and the defense of Lomborg.

An accusation of violation of GSP can only be considered proven, if it is made specific and is not wrapped up in generalizations. A generalized statement comes easily near to pulpit style dogmatism.

For the sake of clarity in the next paragraphs the accusations are classified according to the list in 3.3. This classification is sometimes rather arbitrary because the accusers make themselves seldom direct reference to the classes, with accusation 3 "misleading statistics" as an exception.

Also the shortened reproduction in de DCSD report of the published criticism of SA, contains excessive generalized statements, and also no correlation is made with the concrete accusations. Therefore the more concrete accusations have been taken from the SA article (5), with Lomborg's responses to them. Although the number of actual accusations presented here is larger then concluded in the SA article, the reviewer may have missed some, because they are buried under by general statements.

Next to the 21 accusations which could be extracted from the SA discussion, the DCSD acted on three actual submitted complaints, two in Danish and with only the third in English (by Pimm and Harvey, 20 May 2002) being accessible to the reviewer. From the last 6 more accusations could be extracted.

In the next paragraphs, A stands for the abstracted accusation of various opponents, D for the defense of Lomborg and R for the conclusion of the reviewer.

Accusation 1: Fabrication of data

SA11, Holdren (not mentioned in the decision)

A: Concerning nuclear energy, Lomborg tells us it constitutes 6 percent of global energy production and 20 percent in the countries that have nuclear power. The first figure is right the second wrong.

D: Holdren is correct here that the 20 percent is an error. I should have written "20 percent of the electricity generation from nuclear power" (this will be put up on the error page of my web site). But to claim that it is a serious error, when the figure is given as general information, and not used in any arguments, seems out of proportion.

R: A minor mistake and as accusation of fabricating data not relevant.

SA17 Lovejoy

A: He completely missed the point that the world's bird fauna was reduced by 7 species.

D: I write it in the text and accompanying endnote.

R: False accusation.

Pimm and Harvey 1

A: There are many examples where Lomborg presented data in such a way as to provide a pre-determined outcome. He switches back and forth between percentage and absolute numbers. For example on page 61 he says that the proportion of undernourished children in the developing world has fallen from 40 to 30 percent over the past 15 years.

D: I clearly stake out why I display relative numbers rather than absolute numbers in an extra box on page 64.

R: Lomborg and his opponents may have different views on the desirability for relative and absolute numbers, but it is not fabrication of data to have a preference for either. When considering 'change' in a 'state' over time it is general practice to use a differential.

Conclusion on accusation 1: No fabrication of data in the sense of violation of GSP is proven in these 3 accusations.

Accusation 2: Selective discarding unwanted results (selective citation)

SA1 Schneider

A: Lomborg's quotes allude to secondary literature and media articles.

D: Use of secondary sources (reviews) is justified. Opponents use the same sources (FAO, UNDP, UNEP, IMF, World Bank, OECD, WRI, WWI, US agencies, IPPC). Media articles were used to analyze media discussions.

R: Accusation is not proven with examples.

SA2 Schneider

A: Lomborg uses peer review articles only when they support his rose-colored views.

D: No specific reference is made.

R: Accusation should be dismissed.

SA5 Schneider

A; Lomborg quotes an article in Nature (Hadley Center 1989) uncritically and without the authors' caveats.

D: Quote is from Science magazine (Kerr 1997a, 1040) as a secondary source. More literature is presented. The example of secondary source quotation seems curious at best and deliberately misleading at worst.

R: Accusation is not justified.

SA21 Lovejoy

A: The consideration of acid rain has almost no citation from the peer-reviewed literature. Lomborg asserts that big city pollution has nothing to do with acid rain, when it is a fact that NOx from traffic are a major source.

D: none

R: Lomborg does not answer this criticism in an adequate way. Accusation may be proven if Lovejoy presents citations from the peer review literature.

SA18 Lovejoy

A: It is simply untrue that “there is no case of forest decline in which acidic deposition is known to be a prominent cause” (examples red spruce and sugar maple).

D: The quote is not mine but the conclusion of NAPAP, the official American Acid Rain Project, which is the world biggest, longest and most expensive study of acid rain. It would seem that a little more than “simple untrue” would be needed for Lovejoy to counter this conclusion.

R: Lovejoy may have a case here with two examples of species, although it is not documented. He may well be able to counter NAPAP’s conclusion.

SA20 Lovejoy

A: Lomborg’s discussion of the great fires in Indonesia in 1997 is misleading readers with selective information. WWF first estimated the amount of forest burned at 2 million hectares. Indonesia 165.000 – 219.000 hectares. But Lomborg fails to mention that the latter were not credible and that Indonesia and the World Bank signed off that the real number was 4.6 million hectares.

D: The WWF proclaimed 1997 as “the year the world caught fire”. That is what was challenged. I clearly do not accept the Indonesian estimate and also say that satellite pictures indicated upwards 1.3 million hectares (SE 116).

R: Lomborg failed to mention the exact number 4.6 million hectares from the report Lovejoy refers to. But it is of little significance to the fact that WWF exaggerated rhetorically with “the year the world caught fire.” Lomborg’s argument is that WWF failed to sum up the extent of other fires. And that according to UNEP (SE reference UNEP 1999a) 20-40 million hectares of tropical forest each year are burned down. This Lovejoy apparently did not want to challenge.

Pimm and Harvey 2

A: Lomborg (in the economist) states tropical forest is not being lost at rates of 2-4 percent as many environmentalists have claimed. The latest UN figures indicate a loss of less than 0.5 percent. The details of how much forest are clear cut are readily available in the pages of Science and Nature.

D: This is not an expression of discarding unwanted results. I am merely pointing out that environmentalist claimed the former figures and the UN the latter.

R: P and H challenge apparently the UN numbers with Science and Nature articles, but without pointing out on what argument.

Pimm and Harvey 3

A: “Professional” publications in Science, Nature, PNAS indicated typically 10 percent or more species likely to become extinct in the near future. Lomborg states an UN number of 0.7 percent actual loss. Lomborg does not tell us why he choose the one number that is less than a tenth as large as all the other sources.

D: Actually the book documents analyses of the 1000 birds claimed to become extinct. 7 birds have been recorded to have vanished. P and H could argue that the category “threatened” is a better measure of biodiversity loss than “extinct”, but merely contrasting the two numbers to imply that I am wrong in my biodiversity loss estimate is plainly incorrect.

R: The accusation is not substantiated.

Conclusion on accusation 2: 8 accusations of which 5 are not justified. SA17 and SA18 may be proven if sustained by citation from the peer review literature. SA20 misses one number but it is hardly relevant to the point Lomborg makes on the exaggeration of WWF.

Accusation 3: Deliberately misleading use of statistical methods

SA3, Schneider

A: Lomborg employs no clear and discrete distinctions between various forms of probabilities.

D: Probabilities have been defined (note SE IPCC 2001d)

R: General statement; should be dismissed.

SA4 Schneider

A: IPCC gives a large range for the majority of projections, but Lomborg *selects* the least serious outcomes.

D: Quotes from SE 315, 316, 317 show that selections have been discussed.

R: Unjustified accusation.

SA10 Holdren

A: He is correct in his basic proposition that resources of coal, oil shale, nuclear fuels and renewable energy are immense. But his handling of the technical, economic and environmental data is superficial, muddled and often plain wrong. His mistakes include apparent misreading or misunderstanding of statistical data as well as elementary blunders of quantitative manipulation.

D: These are harsh words. Holdren should be able to back up.

R: Accusation not proven.

SA13 Bongaarts (not mentioned in decision)

A: His selective use of statistics gives the reader the impression that the population problem is largely behind us. The global population growth rate has indeed declined slowly, but absolute growth remains close to the very high levels observed in recent decades. World's population today stands at 6 billion, 3 billion more than in 1960. According to the UN projections, another 3 billion will likely be added by 2050, eventually 10 billion.

D: Bongaarts accuses me of fudging the statistics. Bongaarts says that the global population growth rate indeed declined slowly, but the absolute growth rate remains close to the top. He makes it sound I don't say that. I do (SE 47).

R: Bongaarts prefers to use absolute numbers only, Lomborg also the differentials, which is in accordance with general practice. The difference has nothing to do with statistics. The accusation is false.

SA16, Lovejoy

A: In contrast to Lomborg's claim, the loss of species from habitat remnants is a widely documented phenomenon. Current estimates are given in terms of the increased over normal extinction rates. He ought to acknowledge that rates are currently 100-1000 times the normal.

D: Lovejoy does not actually challenge my central prediction of 0.7 percent species, over the next 50 years which is in line with the UN prediction of 0.1 – 1 % /50 year.
R: On page 255 of the SE is mentioned: 0.7 percent is 1.500 times higher than the natural background extinction. This is a false accusation.

SA19 Lovejoy and Pimm and Harvey in letter of 20 May 2002

A: The chapter on forest suffers from selective use of numbers and not knowing that FAO's data marred by the weight of so many different definitions and methods that any statistician should know they are not valid in terms of time series.

D: Lovejoy neglects to say that this is the only long run data series, and that I actually point out that these data series are uncertain (SE 111)

R: Lomborg is in his text very modest. Lovejoy is splitting straws.

Pimm and Harvey 5

A: Statistical use of data on forestry are incredible, as when he argues that global forest cover has increased from 30.04 to 30.89 percent between 1950 and 1994 (SE 111). Since our ability to measure forest cover is well below the prediction of these data, Lomborg's claim that forest cover has increased 0.85 percent is deliberate obfuscation.

D: This claim neglects that I state right after SE 111 that the area covered by forest had shrunk from 27.25 to 25.8 percent. If P and H claim should hold up, I'm here demonstrating the opposite bias, but this they failed to note.

R: It is doubtful indeed whether both these increase and decrease numbers are significant. But Lomborg shows both sides of the coin.

In science statistics has to do with the interpretation of large datasets, not single observations.

Pimm and Harvey 6

A: Gleick reveals that Lomborg combines data sets on access to drinking water and sanitation that he admits were collected using different definitions, different time periods and different combinations of countries, then attempts to draw a logistic best fit to the data.

D: There is no need for Gleick to *reveal* this, because I note it clearly in the caption.

R: The best fit line is no more than an attempt to summarize and comprehend the general trend of all data sets, which show the same upwards slope (SE 22).

Conclusion on accusation 3: eight not justified accusations.

Accusation 4: Distorted interpretation of conclusions

SA6 Schneider

A: Lomborg quotes Lindzen's controversial iris effect as evidence that IPCC's climate range needs to be reduced by a factor of almost three.

D: Lomborg uses as a defense a letter by Lindzen himself to SA (December 2001) complaining about Schneider's unreasonable attack.

Lomborg wrote himself in the book: it *might* pose a challenge to the IPCC. His conclusion: Schneider misrepresents both the book he is attacking and the science he is allegedly representing.

R: The iris effect may be controversial but Lomborg has been careful to present it. Accusation should be dismissed.

SA7 Schneider

A: He quotes a controversial Danish paper claiming that solar magnetic events modulate cosmic radiation [...] incoming cosmic rays as an *alternative* to CO2 to explain climate change. IPCC discounts this theory.

D: The Danish researchers nor I say they are an alternative but a supplementary explanation for global warming.

R: The sun spot theory may still be controversial but the careful presentation by Lomborg does not prove distorted interpretation.

SA8 Schneider

A: Lomborg's most egregious distortions and feeblest analyses are his citations of cost-benefit calculations. He chides the governments that they modified the penultimate draft of the IPCC's working group II report. Lomborg cites only a single value for climate change.

D: Yes I chide the governments for editing the WGII technical summary which stated the controversial point: moderate global warming will have negative impact on the developing world, but zero for the developed world.

R: The paragraph in SE 300-302 is indeed scanty of numbers. But no more citations or numbers were presented in the accusation. The paragraph 'cost of warming' is hardly more than a report of IPCC's own struggling with cost-benefit analyses. Therefore the accusation should be dismissed on presenting no proof of distortions (and the addition 'most egregious' is misleading).

SA12 Bongaarts

A: "Population: ignoring its impact".

R: In the 'decision' (1 page) Bongaarts is just represented with a personal view, different from Lomborg. Like in SA9 no reference is made to a specific paragraph where mistakes could be located.

In the original SA article more specific reference is made to probably distorting interpretations (see accusation 3, SA13).

Conclusion on accusation 4: 5 accusations have been abstracted of which 3 unjustified and 2 insufficiently specific.

Accusation 5: Plagiarism

Pimm and Harvey 4

A: Lomborg admits at the bottom of footnote 2011 that this chapter is to a large degree based on Simon and Wildacsky 1995.

D: So it is.

R: This is a willfully tendentious, even false accusation. A footnote is far from an unusual way to credit previous investigators. And in particular in this case since in Lomborg's introduction is mentioned that his work was strongly initiated by the work of Simon.

Accusation 6: Deliberate misinterpretation of others results.

SA14 Bongaarts (in SA, missing in the 'decision')

A: The population density of Egypt equals 68/km², but if the unirrigated deserts are excluded it is an extraordinary 2,000/km².

D: It is curious that Bongaarts, trying to show how wrong I am, is forced to use a hypothetical argument of Egypt. And does not even find it necessary to point out that I never make this argument. I point out some of the most densely populated areas of the world in Europe. Bongaarts point is not relevant to my examples, e.g., the Netherlands, far more densely populated than India.

R: Accusation is not to the point.

SA15 Bongaarts (in SA, missing in the 'decision')

A: The land now used for agriculture is generally of better quality than unused, potentially cultivated land. Consequently, each new increase in food production is more expensive to obtain.

D: This is one of the stunningly simplistic analyses from the environmental Litany. However, this clearly neglects the historical trend towards even more efficient production and better crops, which have given us steadily declining prices. Bongaarts simply does not supply any evidence that his scenario of increasing prices should become true. Yet both IFPRI, USDA and the World Bank predict ever lower prices (SE 62).

R: Accusation is not justified.

Conclusion on accusation 6: Two not justified accusations.

8. Conclusions arising from the accusations

On a total of 27 accusations that have been identified, two are not specific and one is not to the point. Among the 24 remaining specific accusations, two may be proven if further sustained.

These two fall both in the class 'selective discarding unwanted results', which to the opinion of the reviewer may be considered as selective citation.

It is not surprising that Lomborg's opponents could catch him on citation for the reason that they are more familiar for a longer time with the literature than he is. Here we have considered only part of the debate on the book over the last years (these criticisms which are documented in the DCSD decision, in English). And it may well be that from the not considered literature on the debate, in particular in the field of citation, more mistakes may arise.

On the other hand, the two cases in which Lomborg was apparently unable to meet the criticism, both have only to do with acid rain. He could easily have missed the point that two species have indeed been suffering from acid rain (S18). Whether NAPAP's conclusion, or these from the peer reviewed literature are correct still has to be sustained. Consequently it is still questionable whether Lomborg is guilty of deliberate selective citation.

The more significant point to make here is that Lomborg has shown to be able to meet the large majority of the criticism in a scholarly way.

DCSD denies this and even states: Lomborg is apparently unable to take part in 'such' a discussion.

This is misleading and likely deliberately. It is remarkable that in the decision the criticism is shortened in such a way that several concrete accusations are omitted,

probably because Lomborg had already dealt with them in an appropriate way. This omission may be correct in itself, but it should have been mentioned, when referring to 'overwhelming' evidence. This could be due to incompetence to fathom the discussion, but it remains in itself 'selective citation' and this view is reinforced by the fact that in the decision no single word of Lomborg's defenses is mentioned.

Lastly, the number of false accusations, largely due to misreading of the book, should have alarmed the judges on the motivation of the opponents and accusers.

9. The book in the historical context of the notion of sustainable development.

The significance of the book, although it may contain some errors, must be seen in this broader context.

Silent Spring, Carson 1962, and the Club of Rome warned the world for the disasters that half of the human population may perish in its filth and the other half would starve. It took some time, before this was generally accepted, but it is clear that in itself the warnings were justified by the available knowledge.

Most proposed measures to be taken were mono-, at highest bi-dimensional: Biodiversity should be maintained, pollution and population growth be mastered, exhaustion of natural sources averted.

They were advocated by many well-known, specialized scientists, who succeeded in convincing the public at large (and subsequently the politicians) that the situation was really serious in their fields.

However, most forecasts on catastrophes did not materialize in the next 20 years after 1962 (see e.g., the bet between Simon and Ehrlich). Moreover many politicians remained ambiguous, still having economic growth as their first priority, which in the opinion of the catastrophists is injurious to the environment.

A more balanced view emerged in 1987 from the UN Commission on Environment and Development (1) which defined sustainable development as multi-dimensional. In retrospect this seems to have had little impact on the attitude of the catastrophists; they continued to advocate the catastrophe. Ten years before Lomborg this was pointed out by the journalist Ronald Bailey in his book "Ecoscam; the false prophets of ecological apocalypse" (13).

When Lomborg was still a member of Greenpeace he met Simon, and he felt challenged by the latter to prove that Simon's anti-catastrophic views were wrong. Lomborg became, however, a renegade, and therefore it is not surprising that his former colleagues/activists denounced him strongly.

The most important features of Lomborg's treatise are (a) the broad survey of almost all elements which are important for sustainable development (in terms of complexity theory, the inventory of forces), (b) the attempt to describe the current situation (the state/time condition) and (c) the analysis of long and short time variability (the change). In fact it is the first thorough approach recommended by "Our common Future" and in line with current ideas from complexity theory: how to deal with an extremely complicated system like the earth.

10. The approach of Lomborg's opponents

Here it is noted first that strong persistent confidence in a conventional theory in established scientific fields, can be disastrous for the progress of science and may be indicated as pseudo-science within science. An example is the great influence which an English researcher (from Cambridge (Eng.)) E. Thomson had on the interpretation of the Maya script (12) since 1922. His deciphering was wrong which in itself is not a shame; scientists can also make mistakes.

A Russian worker Y.V. Knorosov published in 1952 in the Russian literature and presented at a congress in Copenhagen (1958) a beginning of a decipherment which is now considered to make sense. But Thomson cannonaded from 1953 the Russian with illogical arguments and created an atmosphere with suspected writings such as "Has Knorosov any scientific honor? The answer is clearly No" [...] "The so called decipherment is a Marxist hoax and propaganda ploy". Although Knorosov received support from a Swedish linguist, "during Thomson's lifetime, it was a rare Maya scholar who dared to contradict the Grand Panjandrum on this, certainly not in print" (ref. 12 page 153). Thomson's dirty writing continued until his death in 1975. Since then the deciphering has gone on and in 1992 it was concluded that 85 percent of all texts can be read in Mayan language, with some 20 years retardation.

Note further how Thomson cannonaded the Russian newcomer with personal attacks and repeated rhetoric.

The opponents of Lomborg have refreshed this approach. In this respect is especially illustrative the last letter (20 May 2002) of Pimm and Harvey, sent to DCSD.

[Some quotes]

"We make two key points in noticing Lomborg's failure to respond. The first is that those who raised these issues are senior, well respected scientists. The second is that the charges they raise are extremely serious"

"He goes on to intimate that Professors Wilson and Ehrlich support a project that most readers would find offensive and ridiculous"

"I have tried to present all the facts, Lomborg assures us. He doesn't even come close"

"There is nothing so damns Lomborg than this extraordinary statement"

"Many of Lomborg's critics notice his almost total lack of scientific publications"

"In responding to the critical essays published in the SA, it is also instructive that Lomborg apparently did not feel he could manage an adequate response by himself"

"He states he wrote the book from a human perspective. But this is a complete smokescreen"

"What we see here is part of Lomborg's pattern of random incompetence: throw figures around without properly doing the math"

"This clearly shows that he is either an environmental expert after all (although I find this almost impossible to believe considering his complete lack of contribution to the relevant fields of research) or else that he is not telling the truth, because to do so would undermine his credibility and those presented in his book as facts" (three times repeated)

"He states that this fact is clearly stated in the footnotes, but this is just another smokescreen"

"Lomborg's performance carries far across the line that divides respectable even if controversial science from thoroughgoing and unrepentant incompetence"

“And by sowing distrust of the environmental science community with his rhetoric Lomborg has done a severe disservice not only to those scientists, but also to the public he has misinformed”

[Unquote]

Many of these quotes are reiterations of previous accusations. Some additional ones are:

[Quote]

“So whom is Lomborg, so resoundingly refuting with this treatise on the abundance of world energy sources?”

“ He shows no sign of understanding why there is a real debate about this among serious people”

“Lomborg is giving skepticism – and statistics – a bad name”

[Unquote]

This is not the way scientists among themselves, how young or established they may be, should continue to discuss.

11. Discussion in Denmark

It is no wonder that Lomborg did not consider it worthwhile to respond once more to the letter of 20 May 2002, although it may hide a few more concrete accusations and corrections. If wrapped up so much in rhetoric, one should indeed retire out of self respect.

However, another interesting reply of Lomborg to his Danish opponents, dated 27 June 2002, was made available in English by DCSD

Previously Danish scientists had produced a criticism on the Danish version of SE (1998), entitled ‘Skeptical Questions and sustainable answers’ (15), on which in return Lomborg produced an answer of 185 pages. The Danish Broadcasting Company asked Lomborg to comment on the latest version of Skeptical Questions, now revised and translated into English.

He had only a few days the opportunity to produce comments and he concentrated on the three most novel parts of the book (chapters 1,3,11) and again he goes in great length to meet the criticism.

He disproves many of the opponent’s arguments in a similar cool style in which he responded to the SA criticism, although he incidentally slips (unfortunately) now into a similar tone as his opponents, naming statements embarrassing or blunt errors.

Most striking in this discussion is, however, that he proves that references or quotes from his book are wrong, misreadings or incomplete, by presenting next to these quotes his original text.

12. Conclusions and discussion

The inevitable overall impression of the debate is not that Lomborg has deliberately been twisting arguments, but many of his opponents did. This is somewhat more than embarrassing. And most probably for DCSD not the expected outcome of this investigation when it stated: *The interested public will thus be granted an opportunity to have full access to the facts of the case.*

The book infuriated the orthodox environmentalists because (the renegade) Lomborg attacked their liturgy and especially by its provocative subtitle “The *real* state of the world”, suggesting that the year book of the World Watch Institute is not a good description. (Note by the way that Lomborg praised the data collection of WWI, but not its interpretations). He revealed some 50, let’s say ‘jumpings to conclusions’, which I have not seen challenged by its opponents. However, it is indeed questionable from the scientific point of view, whether the book deserves the pretentious title *real state*, just for the fact this title shows insufficient doubts, which is characteristic for the real scientist. Lomborg probably chose the provocative style to attract world wide attention for his new approach, against the great, media carried, attention that the orthodox liturgy enjoys.

It may be necessary to continue the challenge of the orthodox views if detrimental to science.

For example, the Danish response (“Skeptical Questions”) to the SE, now available in English (15). A start has been made (16) to scrutinize this response for orthodox and irresponsible statements.

The book contains a few scholarly chapters, e.g., number 4 on the importance of biodiversity from a non-anthropocentrically view by H.S. Christensen. (“Biodiversity is more than extinction rates”) Her views on the usefulness of maintaining the highest possible biodiversity for medical and other practical applications can, however, be challenged with the new insights arising from molecular biology.

The second part of this chapter (“How many species go extinct?”) by K. Fog also begins with a scholarly treatise, in which especially attention is given to the problem that the results of observed disappearing, specific species in specific habitats are difficult to globalize. Although the author (Fog) makes a single reference to the Global Biodiversity Assessment of UNEP (17), the full scope of this 1000 page book is apparently not appreciated by him. As a matter of fact, Lomborg had better asked UNEP permission to reprint paragraph 4.4.1 (“Current rate of extinctions”) instead of relying on Simon and Wildavsky, 1995 (“species loss revisited”), firstly because UNEP has greater authority and secondly it should have equally well proven his point that many environmentalists exaggerate the loss of species.

The second half of Fog’s criticism on Lomborg’s Biodiversity chapter contains a dozen accusations of violations of good practice, which are insufficiently sustained. Most likely Lomborg has pointed out this already in his first (185 pages) response in Danish on the Danish version of “Skeptical Questions”. In his “short reply to Skeptical Questions” (June 22, 2002) he challenges at least several other statements of Fog.

Since in the English version of “Skeptical Questions” no mention is made of Lomborg’s responses, the one-sided and self-conceited approach of his opponents is unmistakable.

The first chapter in “Skeptical Answers” (‘Science, method and ethics. Lomborg’s journalistic method’) by J. Jespersen beats any record, with respect to insinuations. More than 40 skeptical questions can be raised about Jespersen’s way of arguing. He claims to have presented ‘massive amounts of data towards which Lomborg would not have responded’. He does not present a single figure in his chapter. Not a single proof is presented of bias or selective citation. Mention is frequently made to ‘theories’ in relationship to Lomborg’s suspected atheoretical approach. No theories

are formulated. The point to make here is, that if one criticizes a colleague (put him on the stand for the public at large) the criticism has to be made specific, not wrapped up in insinuations of incompetence. To do so is poor scholarly practice.

The “Skeptical Questions” certainly deserves further attention. But, if we consider the spastic way (see paragraph 7) in which the opponents tried to corner Lomborg (22 not justified accusations), and belittled him on being a poor statistician (8 false accusations), lost themselves in rhetoric (“the whole book is wrong”), there is little hope this will lead to a fruitful discussion.

Let us return to the question of the litany and whether it really exists. If Lomborg did not prove it, the style of writing of the opponents in the debate does. And it should be mentioned again that Lomborg was not the first to identify it (13). (Another reference Lomborg missed, when mentioning the public debate).

I experienced myself in 1980 the resistance against unorthodox views, when I dared to challenge the statements by Myers, Ehrlich, and Wilson on the importance of the loss of biodiversity from the point of view of molecular biology. So far I have not seen mentioned by any of the orthodox environmentalists the new insights that arise from molecular genetics on the spread of gene functions in Nature and on new concepts what it means to be a specific species and to go extinct.

This is not the place to sustain the meager treatment of Lomborg of the biodiversity problem, or to quarrel whether the extinction rate is 0.7 or 2 percent. Here the point to make is that the liturgy seems to be that Nature, as it came spontaneously into being, is perfect. Which it is not (e.g., it did not ‘invent’ a simple instrument like the wheel to move). And that new insights from other fields than classical biology are being neglected.

I prefer to speak of liturgy instead of litany, because I took the trouble to debate during several years with creationists, on the new insights arising from e.g., enzyme and DNA phylogeny. (14) That was fruitless.

One could state that Lomborg himself produced a kind of liturgy, a catechesis, by repeating himself frequently. The book has made this impression on his opponents, probably the reason for their misreadings.

Let’s call both sides liturgies, or as we are used to in science, conflicting hypotheses, respectively the approach through problem solving and the catastrophe theory. Then discussion has to be continued, with rhetoric and jumping to conclusions avoided. And then the book of Lomborg and especially the subsequent debate have at least the merit, that many weak points in the catastrophe theory have been revealed .

Progress in science can only be made if the philosophical principles behind (the math of) complexity theory, and the multi-disciplinary character of the field are recognized. And some lateral thinking is required, in the sense that provocative ideas, similar to these of Lomborg, are not torpedoed by the establishment.

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Notes

1. "Our Common Future". The UN World Commission on Environment and Development. Oxford University Press, 1987. Page 9
2. J.Cohen and I. Stewart. "The Collapse of Chaos. Viking 1994
3. See for example the many references in the Skeptical Scientist to the World Watch Institute, Leslie Brown, his short term observations, interpreted for the long term
4. In Martin Curd and J.A. Cover. "Philosophy of Science; the central issues", (Norton 1998) I. Lakatos "Science and Pseudo Science", page 20
5. "Science defends itself against The Skeptical Environmentalist", Scientific American, January 2002, page 61—71. Essays by Stephen Schneider, John P. Holdren, John Bongaarts and Thomas Lovejeoy
6. In Douglas N. Jackson and J. Philippe Rushton "Scientific Excellence; Origins and Assessment", (Sage 1987), E. Garfield "Mapping the World of Science", page 18-39
7. D. Schoenbrod, "The Mau-Mauing of Bjorn Lomborg", Commentary NY Sept 2002, vol 114 (2) page 51
8. "The Lomborg Case and the debate". Press release of Danish Research Agency, 10 January 2003. www.forsk.dk.uvvu/press/lomborg_pres_eng.htm
9. "Working Group on Scientific Dishonesty" Press release DRA 15 January 2003
10. "Chairman appointed to the working party on scientific dishonesty. DRA 24 January 2003
11. "Statement from the Danish Committees on Scientific Dishonesty. Press release 23 January 2003
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