

The battle for the citizens' opinions, the power of language, the media and climate change: The sources and their strategies in the U.S. and in Sweden

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Abstract

The purpose of this article is to show how the battle for the citizens' opinions and actions regarding climate change has been played out via language, i.e. via written documents or oral statements, in the media in the U.S. and in Sweden. The results show the importance of language and discourse in our understanding of science and of the relations of power between consensus scientist and contrarians. They also show how these groups have a different resonance in the media as a result of the media logic, the journalistic narrative form and the journalists' professional ideologies as well as of the journalists' and ordinary peoples' lack of knowledge when it comes to the conditions and restrictions of science.

Keywords: Climate change, Media, Sources, Power relations

Introduction

The battle for the citizens' opinions, attitudes and actions regarding the issue of climate change is largely played out by means of reports, mass media and lobbying. This article deals with the debate which is taking place there, a debate which also forms the basis for various rulings and legislations.

According to a survey published in *TIME* magazine in 2006, only 56% of the Americans believed that the earth's temperature had risen. When *ABC News* made a similar survey, the figure was 85%, but then half of those people were of the belief that current research was not sure about this actually being true, and as much as 64% believed that there was considerable disagreement on this point. According to *The Pew Research Center for the People and the Press*, those 71% who in 2008 had believed that the earth's temperature was rising, had by 2009 dropped to 57% (Oreskes & Conway, 2010: 169-170). How is this possible? Perhaps the answer is to be found in history, in journalistic working methods and professional ideologies, and in media logic.

Many of the groups spreading eco-hostile information have adopted positively charged names such as "*The Abundant Wildlife Society of North America*", "*Alliance for Environmental and Resources*", "*B.C Forest Alliance*", "*Business Council for Sustainable Development*", "*Citizens for the Environment*", "*Consumer Alert*", "*Environmental Conservation Organization*", "*Scientists and Engineers for Secure Energy*", "*The Sea Lion Defense Found*" and "*The Global Climate Coalition*", to mention a few. (Deal, 1993). Within the

scientific field, it seems as if industries with particular economic interests fund workshops, conferences and some peer-reviewed journals in which the climate skeptics are free to ventilate their opinions (Robert N. Proctor cited by Oreskes & Conway, 2010: 244).

One of these groups, *The Global Climate Coalition*, was founded in 1989 by 46 companies and trade organizations, primarily American ones. The financiers were, among others, *American Petroleum Institute*, *Association of International Automobile Manufacturers*, *Chemical Manufacturers Association*, *DuPont*, *Enron*, *National Coal Association*, *Texaco* and *US Chamber of Commerce* (Deal, 1993: 55-57). The purpose of the coalition was to try to convince the U.S. Congress and the American people that the notion of global warming was a myth. The group's CEO of that time, John Shlaes, argued that if the idea of global warming was taken seriously and carbon dioxide emissions were to be inhibited, "the nation's economy and the ability of the US to compete in international markets" would dwindle (Shlaes cited in Deal, 1993: 56). In other words, Shlaes was not particularly concerned about the consequences of climate change, but instead what consequences an inhibition of carbon dioxide emissions would have for the U.S. economy. We find a similar reasoning among members of the Marshall Institute, the main opponents of measures intended to prevent further emissions of greenhouse gas. In Sweden, it is primarily the *Stockholm Initiative* that represents similar opinions.

The purpose of this article is to show how the battle for the citizens' opinions and actions regarding climate change has taken place via language, i.e. via written documents or oral statements, in the media, in the U.S. and in Sweden. The section dealing with the battle going on in the U.S. is based mainly on Naomi Oreskes' and Erik Conway's book *Merchants of Doubt* in which these historians/researchers account, in great detail, for the mechanisms and methods which lay behind the contrarians' orchestration of doubt among the citizens. The section dealing with the battle taking place in Sweden is based on empirical studies in which we have analyzed the character of the debate as represented in various types of media, including a website questioning the causes and consequences of climate change and a blog defending the consensus scientists. The article will conclude with a discussion about the resonance which groups and individuals defending and questioning the consensus scientists respectively, have in the media as a result of media logic, the journalistic narrative form, the journalists' professional ideologies as well as of the journalists' and ordinary peoples' lack of knowledge when it comes to the conditions and restrictions of science.

Methodological considerations

Our theoretical starting points go hand-in-hand with the tradition developed by Stuart Hall (1982), Thompson (1984), Fairclough (1992; 1995; 2000; 2002) and others, and highlight the importance of language and discourse in our understanding of reality and the social relations of power.

The section dealing with the events behind American scientists having questioned the causes and consequences of climate change, is mainly based on the book *Merchants of Doubt* (2010), written by historians/researchers Naomi Oreskes (University of California) and Erik Conway (California Institute of Technology). Accompanied by a handful of assistants, they examined thousands of documents from, to mention a few, *National Academy of Sciences (NAS)*, *Scripps Institution of Oceanography*, *Massachusetts Institute of Technology*, *Lyndon B. Johnson Presidential Library* and *George H. W. Bush Presidential Library*. The book offers a detailed account of how a small group of former researchers came to question thousands of active researchers' previous conclusions. According to Oreskes and Conway, this questioning did not however take place in a scientific forum. Instead, the group opted to turn to the media and to actively spread their views among those in power in the U.S. What the media presented as being scientific debates were thus rarely, if ever, supported by "scientific", i.e. peer reviewed articles, but rather merely media-construed debates.

Since this section is based on secondary literature, some thoughts on the reliability of the book *Merchants of Doubt* are in place. Robert N. Proctor, Professor of History of Science at Stanford University, and Philip Kitcher, Professor of Philosophy of Science at Columbia University, noticed the book for its wealth of detail and for its way of presenting a "convincing evidence for a surprising and disturbing thesis". William O'Keefe and Jeff Kueter, on the other hand – the CEO and the President of the Marshall Institute, a conservative think tank in which several of the researchers examined in the book were active – criticized the book. Not for the facts stated there, e.g. that the organizations funding these researchers came directly or indirectly from industries with interests in fossil fuels, or that the political preferences of these researchers were clearly right-wing. Instead, O'Keefe and Kueter question the idea that these funding sources would supposedly have effected the directions and results of the researchers' work and that these researcher's political views would have influenced their work. They also question the idea of IPCC authors/scientists being representative of researchers around the world (although they acknowledge their capability) and the idea of current knowledge on climate change being sufficient as a basis for any action. O'Keefe and Kueter also criticize Oreskes and Conway's mode of procedure, more precisely for not basing their argument on interviews with people but instead on an analysis of historical documents, something which, according to O'Keefe and Kueter, diminishes the veracity of the book. They also accuse the book's authors of "faulty logic and preconceived opinion", but offer no examples of either.

Within this context and from a scientific perspective, we would like to comment on two of the statements made by O'Keefe and Kueter: the assumption that the current knowledge on climate change would not be sufficient to form a basis for any action and the critique of how Oreskes and Conway did not conduct any interviews but instead based their reasoning on the analysis of historical documents. The criticism holding that the IPCC authors/scientists would not be representative of researchers around the world, is in fact like saying that "we who are not climate scientists know more about the scientists active within the field than the IPCC scientists do".

We need to start by rejecting the myth holding that science can give us an actual and unerring picture of reality. In studies of complex conditions - whether these are ecological systems, physiological systems, quantum systems, earth systems or societal systems - science is not concerned with truths but with probabilities. The widespread and erroneous idea that science can provide the answers to how things "really are" is nothing but a relic from the 15th and 16th century mindset as expressed by Galileo, Newton and Descartes and later, in the early 1900's, by the Positivists. This mindset held that science should deal only with what was measurable (Galileo); that a whole was equal to the sum of its parts; and that a direct relation between cause and effect existed regardless of time and that events therefore could be predicted and generalized (Newton).

The things we know today about climate change, we know through observations of current physical and biological processes, experiments, interpretations of statistical data, interpretations of fossils and geological deposits as well as through mathematical models which, on the basis of different variables, calculate future values. None of these methods can provide us with a 100 percent certain "truth". Not today, nor tomorrow. Put together, however, they can give us as complete a picture of our physical and biological world as is possible. In reports and compilations such as the IPCC reports and the Millennium Ecosystem Assessment (MA), a conceptual apparatus which puts forward the understanding that science deals with probabilities and not with factual truths is being used. Also, scientific articles use expressions such as "x indicates that..." and "this implies that...". The IPCC and the MA explicitly transform concepts such as "very certain" and "high certainty" to percentage of probability and also employ a qualitative conceptual framework (e.g. "established but incomplete") in assessing and evaluating the scientific understanding of a phenomenon.

Oreskes and Conway assume a need for certain measures in order to tackle the problems caused by climate change. This starting point is rooted in the results which scientist within environmental and climate research has arrived at. We can not see O'Keefe's and Kueter's criticism here as anything other than a lack of understanding of the scientific conditions or, alternatively, an attempt to manipulate readers who are unfamiliar with how science works.

When O'Keefe and Kueter criticize Oreskes and Conway for interpreting various documents instead of interviewing key people, they implicitly express a naive belief in empiricism and a lack of knowledge of historical methods of interpretation. Statements made by interviewees are not true just because these people say so; we also need to interpret what they are actually saying and ask ourselves why they say what they say. Oreskes and Conway employ historical methods of interpretation by means of which they read, interpret and relate different documents to each other.

The section on the debate taking place in the Swedish media does not set out to give a comprehensive picture of this debate throughout all times, but rather to show the character of the debate. Methodologically, we have gone about it so that we have used different examples as long as these have brought new categories to our study; these categories are portrayed through the article's subheadings. Once new examples ended up fitting in to already existing categories, i.e. showed evidence of the same type of character in the debate, we put a stop to the search.

The examined material is taken from one of our previous studies in which we analyzed the online versions of Sweden's two largest newspapers *Dagens Nyheter* and *Svenska Dagbladet* (2009), as well as a website belonging to a group that questions climate change and a blog that argues along the same line as the consensus scientists, both studied in April 2011. In those cases where a text published on the website or on the blog made a reference to another text, either for the purpose of supporting an argument or of criticizing it, we have included these texts in our analysis. For that reason, texts from the two journals *Folkvett* and *Axess* are included in our study (*Folkvett* is a journal published by an association that promotes popular education on scientific methods and the use of science; *Axess* is a journal on culture and society) as are texts published on "SVT Debatt", a blog for debate owned by the national television broadcaster Sweden's Television (SVT). In the analysis of these texts, we have examined their qualitative characteristics and looked to see what strategies different groups and individuals use in order to argue their position and criticize others'.

The battle for hegemony in the U.S.: The history of the denialists

This section is based on the book *Merchants of Doubt*, written by the historians Naomi Oreskes and Erik M. Conway. We choose to reproduce a relatively extensive part of the book's content because we want the reader to understand the different types of connections and because of its importance for our reasoning.

The skeptics' most prominent figures in the U.S. were the physicists Robert Jastrow, Fred Seitz, Fred Singer and William Nierenberg. In the mid 1980's, they founded and/or sat in the management of the Marshall Institute. As members, Seitz questioned the idea of smoking being harmful whereas Singer contested that

acid rain would be a product of human activity and that chlorofluorocarbons (CFCs) would be the cause of the ozone hole. Institute members also questioned the notion of man being responsible for recent years' global warming (Oreskes & Conway, 2010). Today we know that they were wrong in all these areas.

During the 1980's and the 1990's, that is, during the time when Jastrow, Seitz and Nierenberg argued against the idea of climate change, none of them were working actively as a researcher. The only exception was Fred Singer who, in addition to his scientific activities, also was linked to an organization that promoted unregulated oil production. Fred Seitz had been the CEO of a program within the tobacco industry operating to find evidence of smoking not being harmful; as a member of the institute he attacked the U.S. *Environmental Protection Agency* (EPA) for its recommendations regarding smoking, accusing them of trying to control people's actions and their free will (*ibid.*).

In their investigation, Oreskes and Conway find that research on the causes and consequences of acid rain has an interesting history. In the early 1980's, the White House launched a panel headed by William Nierenberg to investigate the causes and consequences of acid rain. Most of those who participated in the panel were involved in either the *National Academy of Science* (NAS) or the *National Academy of Engineering*. This however was not the case with Fred Singer who got a place in the panel on the initiative of the White House. These scientists, with the exception of Singer, reached the same conclusions as had earlier studies conducted by the NAS and the EPA, i.e. that acid rain was damaging to the environment and that its main agent was human emissions of sulfur dioxide (SO^2). Despite the other scientists' findings, Singer wrote an appendix to the report in which he argued that the actual conditions could not be determined for certain and thus that no action aimed to reduce SO^2 emissions were necessary. The report was sent to the White House who returned it after having deleted key sections showing the consequences of acid rain.

Judging simply from the White House's edited document version and Singer's appendix, the panel was not in agreement on the causes and consequences of acid rain. In reality, however, nine researchers agreed whereas only one, Singer, did not. Oreskes and Conway point to the fact that Singer's appendix contains no analysis but instead merely recommendations and statements holding that no action needs to be taken. The executive summary, as well as Singer's appendix, were never approved by the entire panel. Oreskes and Conway also claim that the historical data they analyzed in their study shows that parts of the document in question was modified after having been completed.

F. Sherwood Rowland and Mario Molina (who together with J. Crutzen was awarded the 1995 Nobel Prize in Chemistry for their work on understanding the chemical reactions of ozone in the stratosphere) published already in 1974 a peer-reviewed article where they pointed out that the industry's CFC emissions could be the cause of the emergence of chlorine monoxide in the stratosphere, i.e. the part of the atmosphere

located farthest from the earth. Under the influence of the sun's ultraviolet rays, these substances could be converted to fluorine and chlorine, which in turn could destroy the ozone. Industry representatives questioned the truth of this alleged ozone reduction, and later claimed that, if it this reduction existed at all, it was caused by volcanic eruptions. In order to receive more funding for his research, Singer accused the scientific research community of lying about the ozone situation (the same arguments were later used against the climate scientists) and refused to recognize the connection between the hole in the ozone layer and skin cancer. Just like Seitz regarding the link between smoking and cancer, Singer now argued that there were so many carcinogens around that it was impossible to determine whether UV radiation specifically was the cause of skin cancer (*ibid.*). Today, the use of CFCs is prohibited.

When Rowland, Molina and Crutzen were awarded the Nobel Prize in chemistry in the mid 1990's, Singer accused the entire Nobel Committee of having made a political rather than scientific decision, and the whole of the Swedish society of suffering from "environmental hysteria". Singer was, according to himself, afraid that the environmental action that could follow upon acknowledging the ozone problem, would result in a change in the prevailing economic system. He accused environmentally conscious people of being "technology haters" and opponents of the free market; he also considered researchers to be corrupt and therefore not reliable (*ibid.*).

In 1980, NAS launched a study on the relationship between carbon dioxide and global warming. The study was led by Thomas Schelling, an economist who spoke about the social and political meanings of global warming. Schelling, who was not a scientific researcher, argued that because human beings could adapt to climate change – e.g. by means of emigrating, like in the past – there was no call for measures designed to reduce oil consumption. In the same year and at the request of a senator in the U.S. Congress, yet another NAS study was conducted; this time, a group of scientific researchers and economists were led by Bill Nierenberg. The scientific researchers wrote five chapters and the economists wrote two. In the chapters written by the scientists, earlier conclusions regarding both the link between carbon dioxide emissions and global warming, and the negative consequences of this warming, were confirmed. In the economists' chapters, however, as in the summary authored by these economists, carbon dioxide was claimed to be not a big problem. The economists' texts were placed at the beginning as well as at the end of the report.

The economists did not question the figures and other facts that the scientists had arrived at; they did, however, express doubts about whether those facts and figures actually constituted a problem. Just as had Schelling previously done, Nierenberg now put forward migration as a possible alternative. The economists and Nierenberg held the opinion that, as it would be so costly to fix the cause of the problem (the CO² emissions), it was preferable to treat the symptoms. They were also of the belief that future technologies would help to solve the problem. Those reviewers who pointed out that the report's synthesis lacked

support from the presented analysis, were ignored and the White House used the report for the purpose of questioning the conclusion of an EPA report according to which global warming was a serious problem (*ibid.*).

In 1989, Jastrow, Seitz, Nierenberg and members of the Marshall Institute co-wrote a book in which they claimed the sun being the cause of global warming. In other words, they did not question global warming but rather the idea that it would have been caused by human activities, more specifically, by CO² emissions. The authors presented the book to the members of three American official institutions, all involved in policy development. The book concludes that, since the hottest periods during recent years occurred before the year 1940, i.e. before the large CO² emissions had begun, it must be the sun that causes global warming. It also points out that temperatures had been lower until the mid 1970s and then had risen again; the warming itself was only a temporary condition, soon it would get colder again (*ibid.*).

In 1988, UN's climate panel, *The Intergovernmental Panel on Climate Change* (IPCC), was put together as an organization involving more than 300 scientists from 25 different countries. The panel's first report came in early 1990 and questioned the possibility that the sun could be the reason behind recent increases in temperature.

Nierenberg and Singer attacked the IPCC's conclusions. Before the World Petroleum Congress in Argentina, Nierenberg argued that the temperature would rise by only one degree until the year 2100. By doing so, he received criticism from the Swedish meteorologist and one of the IPCC's founders, Bert Bolin, who pointed out that greenhouse gases do not increase linearly (which Nierenberg seemed to believe) but exponentially. Singer accused the IPCC's scientists to be "ignorant" and used the same argument as when debating on the cause of acid rain and the hole in the ozone layer, i.e. that the scientific basis for the cause of climate change was far too uncertain to justify any measures (*ibid.*).

Today, researchers believe that the sun may have affected the earth's temperature before the year 1940, but not in recent decades; as for the rise in temperatures after the mid 1970s, surveys have shown that the amount of solar radiation has not increased. The same surveys have also shown that the aerosol particles, and in particular sulfate particles, in the air (a product of fossil fuel combustion) have a cooling effect. This could have caused temperatures to drop before the decrease of particles in the atmosphere actually began (as a result of an international policy). According to research conducted by Professor Compton Tucker (NASA/Goddard Space Flight Center, Maryland, USA) (2011), and by Mike Lockwood & Claus Fröhlich (2007) (*School of Physics and Astronomy, University of Southampton*, Great Britain and *World Radiation Center*, Switzerland respectively) there are "three ways the sun can influence the earth's temperature: 1. Variation in total solar energy output ---> earth warms or cools; 2. Variation in ultraviolet solar output ---> earth warms or cools and 3. The solar wind interacts with Earth's magnetic field and this modulates the

absorption of cosmic rays that in turn provide more cloud nucleating particles that produces ± clouds and the earth warms or cools" (Tucker, 2011)

Data from Lockwood and Fröhlich shows that while the stratosphere gets colder, the troposphere, i.e. the part of the atmosphere closest to earth, gets warmer. If the sun really had been the cause of global warming, both the stratosphere and the troposphere would get warmer. Lockwood's and Fröhlich's surveys also show that "the solar forcing has declined over the past 20 years while surface air temperatures have continued to rise" (Lockwood and Fröhlich 2007: abstract).

The skeptics go far in their attempt to gain support for their ideas. Oreskes' and Conway's research shows that in the early 1990's, Singer set out to write an article on climate change along with Roger Revelle, who at the time was retired but had previously been the CEO of the *Scripps Institution of Oceanography*. As it happened, Revelle became ill and subsequently passed away during the writing process and ever since then, his team has argued that Singer distorted Revelle's thoughts and conclusions during the editing. When one of Revelle's former students, Justin Lancaster, tried to publish his teacher's views on climate change, he was taken to court by Singer who argued that it was Lancaster, and not Singer himself, who had misunderstood Revelle's ideas.

In 1997, chemist Arthur Robinson published an article in the *Wall Street Journal*, where he claimed that the earth's temperature was not rising. The article got distributed via e-mail to a number of researchers along with a letter in which Fred Seitz asked the researchers to sign a petition against the Kyoto Protocol. In the e-mail, Seitz suggested that NAS endorsed both the article and the petition; NAS, however, held a press conference in which they distanced themselves from both.

Several of the articles questioning global warming were published in *the Journal of Physicians and Surgeons*, a journal directed to physicians and surgeons. This magazine had earlier (under a different name) published articles that questioned the relationship between HIV and AIDS and articles advocating the use of DDT, a toxic pesticide which is nowadays prohibited within agriculture (Oreskes and Conway, 2010).

The denialists' political ideologies and their faith in technology

Why then, did Jastrow, Seitz, Nierenberg and Singer question the idea that smoking would be harmful and that the ozone hole, acid rain and global warming would be products of human activity? It's an interesting question that lacks a clear answer. Oreskes and Conway do, however, find that these four former researchers have a few characteristics in common.

Jastrow, Seitz, Nierenberg and Singer were all free-market fundamentalists. To acknowledge that smoking, acid rain, the ozone hole and global warming are all products of the free market would mean having to

change the economic rules of the game, perhaps even having to let the state regulate the market. While Singer explicitly recognized this, Jastrow accused his opponents of being "communists" (Oreskes and Conway, 2010: 251). Another explanation for their opinions was their belief in that technology could solve all essentially social, political and economic problems. One of the most famous representatives of this idea was the economist Julian Simon. He claimed, among other things that, thanks to technology and human ingenuity, the earth's resources would last for all time. Simon's initial strategy was to simply deny all studies showing the gravity of the different issues; in an article from 1998 he denies, for example, that there are studies showing the problems caused by today's extinction of organisms.

Although an economist by profession, Simon made one scientific claim after another without quoting any sources. In the article "Scarcity or Abundance" (Westra & Werhane, 1998) he writes: "I'm not a technical expert on the atmosphere [...] There has been no increase in skin cancer from ozone, no damage to agriculture from greenhouse effect, and most slight damage to lakes from acid rain. It may even be that a greenhouse effect would benefit us on balance by warming some areas and we'd like warmer, and by increasing the carbon dioxide to agriculture" (*ibid*, 1998: 240). Today, thousands of peer-reviewed articles and official reports have shown an increase in UV radiation-related cancer forms. Current research has also shown that agriculture in most places is adversely affected by climate change and that an elevated level of carbon dioxide may promote growth, but only up to a given temperature. We also read daily reports on the human suffering caused by drought and floods. As Ernest Partridge (*ibid.*) points out, Julian Simon seems not to have understood that it is not just about a warming of the atmosphere but about changes in climate, and that there are synergies between the climate and the ecosystem.

Simon's new strategy is to maintain that - thanks to new technologies - human well-being has improved throughout history. From this he concludes that progress will always move forward and that we therefore have nothing to worry about. The fact that technology is precisely the reason why we have the problems that we have today, he does not mention.

For the "ordinary" run of people, all those who do not possess any technical and scientific knowledge themselves, it may be difficult to assess the reliability of the claims made by various researchers. However, from the debate presented here, we can discern some important points. The best-known climate skeptics, i.e. the members of the Marshall Institute, were the same people who had previously questioned the dangers of smoking and the causes and consequences of the ozone hole and of acid rain. Today we know that they were wrong in all these areas.

Why does the debate in the U.S. media look the way it does?

As pointed out before, scientific texts are filled with terms such as "This suggests...", "This may point to..." etc. Oreskes and Conway also emphasize how scientists often highlight uncertainties, rather than undisputable knowledge. Apart from the fact that science is about just probabilities, it is also important for researchers to know what knowledge is uncertain in order to make research advance forward. Oreskes and Conway point out that if we just confirm what we already know, then research will come to a standstill. The authors also emphasize that the skeptics' way of questioning potential consequences is by automation a winning concept: naturally, it is impossible to "prove" what may happen in the future. The fact that journalists give voice to writers who have not been peer-reviewed has partly to do with ignorance of how the scientific research community works, and partly with a false notion of how balance is achieved by simply presenting two sides of a story, i.e. not necessarily taking into account these sources' dignity or magnitude. In this context, the inequalities in power and resources among news sources, therefore play a major role (E.g. Trumbo, 1996; Antilla, 2005, Jacques et al 2008)

In an article from 2007, Maxwell Boykoff accounts for how he, between the years 1995 and 2006 examined 143 television news features and 800 articles published in *The New York Times*, *The Los Angeles Times*, *Washington Post* and *The Wall Street Journal*, all in which the issue of climate change was raised. He also interviewed 40 scientists and journalists between the years 2004 and 2005.

Boykoff discovered, among other things, that despite the consensus that existed among scientists with regards to the causes of current climate change, the issue was nevertheless a controversial one. Boykoff explains this by referring to the norms and rules that journalists are put to work along. The idea of objectivity and balance in the journalistic discourse results in an attempt to, as mentioned above, at all times point out two sides of a story. This effort can lead to absurd situations where the media gives an equal amount of space to the "side" which has majority and which houses active researchers within climate science, as to the side represented by people who either come from other disciplines (often economists) or who have relevant background but are not as scientifically active. (For examples of other authors who also have developed this theme, see e.g. Anderson, 1997; Mc Cright and Dunlap, 2003; Moser and Dilling, 2004; Corbett and Durfee, 2004).

Boykoff (and many others) saw yet another reason to why the skeptics so frequently appeared in the American media, namely that they often worked in groups funded by large companies, companies which also controlled the media financially, either through ownership or by means of advertising. The skeptics' claims were only very rarely replied to by scientists and Boykoff saw this as partly due to the fact that a newspaper article is not regarded creditable in the scientific research community, partly due to the risk of being misquoted.

It is well known that journalists, for the purpose of increasing single copy sales, often use a language freed from nuances. Moreover they often interpret science's careful mode of expression as a lack of evidence on the issue in question. A "theory" in the scientific sense is confused with the use of the term "theory" in the colloquial sense. The need to ensure the newspaper's marketability is especially important in times when financial resources (which would allow a more investigative journalism) are being cut down; the journalists' professional existence is nothing less than dependent on high sales figures and they therefore have a tendency to focus on conflict rather than on consensus.

In connection with George W. Bush censoring the EPA's "Report on the Environment" in 2003, Boykoff found that the *NBC Evening News*, instead of addressing the consensus that prevailed in the scientific research community, focused on the conflict between the EPA and the White House. Boykoff makes yet another interesting observation when he notes that the U.S. media often brings up the impact which various environmental policies could have on trade and economy, rather than discussing what impact trade and economy could have on climate change.

Who is debating in Sweden and what has the debate been like?

The purpose of this section is to show examples of the character of the Swedish debate. Just as in the U.S. debate, the Swedish version also takes place in the media. We have not, however, examined the extent to which a politicization of science through lobbying and/or changes in scientific documents may have occurred in Sweden as has been the case in the U.S. Many of the Swedish climate skeptics are linked to the Stockholm Initiative, a group that presents itself as a nonprofit organization that "has the objective to promote a rational climate, energy and environmental policy". In connection with the Copenhagen Climate Conference in 2009, the group asserted that they wanted to encourage the EU "to waiver from any binding commitments to so-called climate measures which will result in a deepening of the global economic crisis". According to their own testimony, the Stockholm Initiative believes, among other things, that "the climate has always changed and the recent changes are undramatic" and that "no observations suggest that carbon dioxide emissions have any significant effect on the climate" (The Stockholm Initiative website). Those articles addressing the issue of climate change taking place or not which appear in the analyzed Swedish media are not written by journalists but by the sources themselves, either representing themselves individually or an entire group. The media selects the articles in order to make sure the various "sides" are represented.

Researchers and other people within the climate consensus seem less well organized than the skeptics when it comes to participating in the media debate. The Uppsala Initiative is not so much an established,

formal organization as it is a blog created in response to the skeptics' appearance in the media. Both the Stockholm Initiative and the Uppsala Initiative publish (on their website and blog respectively) previously published debate articles and less extensive papers on various subjects.

According to an article published on the web based forum *SVT Debatt* on March 31, 2011 (and later on the Uppsala Initiative's blog) one can find links between yesterday's deniers of the dangers of smoking and current days climate deniers in Sweden as well. The authors of the article, a few academics, a journalist and an Apple technician, have in their spare time engaged in some investigative journalism (as they call it) and have found three people with such connections: Ingemar Nordin, Wibjörn Karlén och Robert Nilsson. According to the forum, Ingemar Nordin, one of the founders of the Stockholm Initiative and now a professor at the Division of Health and Society at Linköping University, published in 1995 an article in the Swedish newspaper *Dagens Nyheter* in which he questioned the link between passive smoking and lung cancer. Wibjörn Karlén, also a member of the Stockholm Initiative and now Professor Emeritus of Natural Geography at Stockholm University, was a member of the *European Science and Environment Forum* (ESEF), an organization partially funded by *RJ Reynolds Tobacco*. Karlén was later a member of another organization which criticized the IPCC reports and received funding from companies such as Exxon and Shell. Robert Nilsson, a professor of molecular toxicology at Stockholm University, was also a member of the ESEF; according to the forum he is today busy spreading uncertainty on the issue of climate change.

Discrediting of article writers and accusations of erroneous interpretations of observations and of history

In a post on the Uppsala initiative blog from 5 February 2011, an article written by the Brazilian geologist Paulo Cesar Soares is being criticized, as is the journal in which the article is published, *International Journal of Geosciences*. According to the post's author, an associate professor of computer science, this journal, just like the journal *Energy & Environment*, has "a tendency to let articles of very poor quality pass through". The author also points out that after having searched through Google Scholar (a web search engine that indexes scientific publications), he "could not find any previous, climate-related publications authored by Soares. Most of [what he did find] is decade-old geology articles."

In the said article Soares questioned - with reference to the results he got when he compared correlations during the course of some (a few) years – the impact which carbon dioxide has upon temperature. He claimed that temperature affects the level of carbon dioxide, and not vice versa. The reply to that statement, presented in the blog post, held that it is not possible to establish trends by comparing only a few months or even a few years, and that the observations which Soares referred to had to do with

differences between winter and summer seasons in the northern hemisphere. During the flourishing months of summer, nature absorbs more carbon dioxide, whereas in winter, in conjunction with decomposition, it is releasing more. This, the author of the post says, Soares had erroneously and in a generalizing way interpreted as temperature affecting the level of carbon dioxide.

The same post further explains how we can actually know that carbon dioxide affects the temperature because we know the mechanism behind the phenomenon. Greenhouse molecules, including carbon dioxide molecules, have a form that allows for absorption of the infrared radiation coming from a ground surface heated by solar radiation. In that way, the carbon dioxide molecule can absorb extra energy which can then either be transferred to other molecules when these collide with each other, or radiated in different directions.

In 2010, the journal *Axess* published an article by Peter Stilbs, a professor of physical chemistry at the Royal Institute of Technology (KTH) in Stockholm, and a reply to this article, written by Olle Häggström, Professor of mathematical statistics at *Chalmers*, another Swedish technical university (No. 7 / 2010). Stilbs's article had, in turn, been written in response to a review of Naomi Oreskes' and Erik M. Conway's book *Merchants of Doubt*, authored by Häggström. Stilbs accuses the book of being "anti-scientific" and the scientific magazine of having previously published an article written by Oreskes without having reviewed it first. How Stilbs can know this, is not however clear. Stilbs defends Fred Singer, who along with other writers had published an article in *The International Journal of Climatology* which, according to Stilbs, "totally punctures the argument that a heightened greenhouse effect really has been detected from the increase in carbon dioxide levels". Stilbs concludes his article by accusing Häggström for what he calls an "outrageous lie", referring to how Häggström, in relation to the Revelle-Lancaster-Hoover affair, held the same opinions as Oreskes and Conway (see previous section on Oreskes' and Conway's book *Merchants of Doubt*).

Häggström begins his reply by pointing out that Stilbs does not make clear in what way the book would be "anti-scientific" and then move on to the issue of the Revelle-Lancaster-Hoover affair. Here he writes: "It may be true that Justin Lancaster withdrew his accusations against Singer, but what Stilbs 'forgets' to mention is that this happened at the end of an agreement which Lancaster had to sign at the risk of otherwise seeing himself and his young family ruined by the costs. As the agreed ten-year qualifying period had passed, Lancaster retracted this infamously forced withdrawal. It is not difficult to find testimonies of this being true among Revelle's colleagues and relatives". Of Singer's article Häggström says: "The result of the article all depends upon the use of the statistical tool *confidence interval*, which is so up the creek that I would have torn my hair in despair had I caught one of my students at Chalmers doing something similar."

Using an emotionally charged language, discrediting authorities, playing at people's fears and accusing them of hating the free market

In one of her studies, Stoehrel (2010) analyzed the narratives of climate change and environment published in the online editions of nationwide Swedish newspapers Svenska Dagbladet and Dagens Nyheter during 2009. One of the themes of this study was the "climate skeptics": who were they and how did they reason? In her study, Stoehrel also examined the replies to these skeptics. Many of the analyzed texts were signed by members of the Stockholm Initiative, at some point also by members of its sister organization *The Swedish Landscape Protection*. In some cases, the texts were authored by individual writers with backgrounds in various subjects. None of these writers, and none of the writers from the Stockholm Initiative or the Swedish Landscape Protection, presented themselves as a climate scientist.

In the same way as the U.S. climate skeptics are attacking those U.S. authorities that care for the environment, the Swedish skeptics attack the Swedish and European authorities for doing the same thing. For example, they claim that it is scandalous that the British government has "spent £6 million of the taxpayers' money on propaganda designed to scare people." Also, the Swedish skeptics - just like their American counterparts - accuse the climate scientists of being dishonest: "The models are constructed so that moderately elevated levels of carbon dioxide in the atmosphere give rise to a substantial warming."

Further Stoehrel finds that the language and the way of reasoning employed by the skeptics are often emotionally charged. We can read about "the green upper class", about how "150 000 Swedes are threatened by their living environment being destructed" (due to the building of wind farms) as well as about "the green fatwa" and how "truth [must] catch up with science". Scientific explanations or scientific arguments, however, are missing entirely. The argumentation is rather based either on warning against certain environmental policies or on highlighting uncertainties in the research. For instance, we can read about "the almost morally infused demand put on everyone to buy small cars that run on a small amount of petrol, without any consideration to families' transportation needs and children's' safety". We can also read about how "before society makes far-reaching decisions regarding climate policy, we should make sure that we stand on more certain scientific grounds than we do today" or that "a climate policy based on IPCC's scenarios could lead to a devastating waste of human and financial resources which primarily would affect the world's poor people". Nothing is said about the fact that many of the problems which the world's poor are suffering from today are in fact *due to* climate change. Statements lacking any scientific basis are common. For instance, it is asserted that "the observed global warming during the 1900's does not, whatever its' causes, give reason for concern"; that "no observations suggest that carbon dioxide emissions have or will have a significant impact on the climate or that the political climate measures are meaningful";

and that "one [has] failed to show a significant causal link between elevated levels of carbon dioxide and possible climate change".

The Swedish climate skeptics express, in the same spirit as their American counterparts, a fear of environmental policies undermining the principles of market economy. They accuse climate scientists and environmentally conscious people of being "fanatics of various kinds, trade and market-haters" and they defend emissions of carbon dioxide: "A European system for emission allowances within the steel industry [...] is a hard blow against the most energy efficient steel production - such as SSAB ..." (a Swedish steel company).

Those replying to the skeptics' posts are individuals working in different scientific disciplines. Their language is not as emotionally charged and they respond to the skeptics' claims with technical explanations, direct references to various scientific reports and/or by pointing out how the skeptics' statements "show a deep lack of knowledge about current research."

Scientific reasoning, scientific theories and scientific consensus

In 2008, the journal *Folkvett* (4/ 2008) published an article written by Olle Häggström entitled: "*Science and pseudoscience: example Stockholm Initiative*" ("*Vetenskap och pseudovetenskap: exempel Stockholmsinitiativet*"). In his discussion of the differences between science and pseudoscience, this professor of mathematics claims, among other things, that one should not, in scientific reasoning, use arguments that have been refuted, and that the researcher has an obligation to familiarize him- or herself with the literature related to the area he or she speaks about. Unawareness of the arguments in question having been refuted, is no excuse. Häggström accuses the Stockholm Initiative to employ precisely such refuted arguments and gives a few examples, one of which is taken from a text by Stilbs and Singer and another from a text by Ahlgren, Ortmark and Stilbs: "The 'global warming' is a result of models that assume that temperature would follow the atmospheric level of carbon dioxide, this in spite of the fact that all available observations show that the fact of the matter is the exact opposite: the carbon dioxide follows temperature" (Ahlgren, Ortmark and Stilbs quoted in Häggström).

Häggström accuses the authors of erroneously assuming that triggering mechanisms remain the same throughout different periods of time. Häggström points out that while prehistoric climate change is assumed to have been triggered by astronomical factors, the last decades of fossil fuel combustion have brought to the atmosphere a level of carbon dioxide which under normal circumstances would have taken millions of years to reach. He states that this last point is general scientific knowledge, and that the skeptics should know about it.

Climate change denialists Stilbs and Singer claim in their text that "the global modern times' mean temperature have not increased since 1998." Häggström here refers to concrete studies covering the period 1998–2006 and showing that the temperature *has* increased; he also criticizes Stilbs and Singer for attempting to draw general conclusions from a far too short period of time. This also, he says, they should know.

Häggström further criticizes the members of the Stockholm Initiative for confusing the meaning of the term "theory" in the scientific sense and the term "theory" in the colloquial sense. He points out that a *scientific theory* is a coherent structure of thought while *theory* in the colloquial sense, refers to an unproven assumption. When the members of the Stockholm Initiative criticize the climate scientists' theories, they accuse them of being unverified, i.e. they employ the term "theory" in the colloquial sense. Häggström argues that the notion of elevated levels of carbon dioxide in the atmosphere being largely a product of human activities, just like the notion of the greenhouse effect enhancing global warming, are well-founded *scientific theories*. He also points out that today you can not find a single scientific article in any of the leading scientific journals or specialized climate science journals that would say otherwise. The scientific literature as a whole, Häggström continues, also shows that the positive feedback mechanisms, i.e. the mechanisms that accelerate the greenhouse effect, are much stronger than the negative feedback mechanisms, i.e. the mechanisms which slow these effects down. Häggström further refers to two studies conducted by Oreskes and in which she analyzes the contents of the 928 articles published in peer-reviewed scientific journals between 1993 and 2003. Oreskes searched for the keywords "global climate change" and did not find any articles which rejected the idea of global warming being largely due to human activities. Häggström believes that the reason why the skeptics' opinions are rarely, if ever, published in journals of this kind, is simply because they do not measure up to sufficient reasoning standard. He also points out that when the members of the Stockholm Initiative claim the consensus existing within these areas to be wrong they in fact suggest that they themselves "understand this better than the scientists".

In the previously mentioned article published on the web based forum *SVT Debatt*, we read that while no scientific academy has distanced itself from the scientific consensus which exists on issues related to climate change, 32 national academies of science, including the *Swedish Royal Academy of Science*, has written declarations in which the knowledge of climate change is confirmed. The authors of the article also says that a review of the scientific literature show a 97–98% consensus among researchers in this field. In relation to the "Climategate" affair, we can read that "despite the fact that the contested scientists have been exonerated in independent investigations, the lobbyists maintain that scientific fraud occurs."

Ironization of the skeptics' arguments

Although ironization does not seem to be as commonplace as more fact-oriented arguments among researchers within the climate consensus, we can still find some examples of occasions when it has been used for the purpose of ridiculing the skeptics' arguments.

When Häggström (2008) criticizes Stilbs and Singer for trying to draw conclusions based on observations made over a period of eight years, he claims this to be the same thing as saying "Sweden seems to be heading into a recession, given the sharp decline in trade since the shops closed half an hour ago". In a post in the Swedish newspaper Svenska Dagbladet (31 July 2009) an economist points out the absurdity in that "so many intelligent and distinguished researchers and scientists around the world simultaneously could have the wrong perception of the negative effect of CO² emissions on our environment [...]".

Around New Year's Eve 2011, two posts are published on the Uppsala Initiative's blog. The first post is written by the same associate professor of computer science who criticized the Brazilian geologist Paulo Cesar Soares; the second post is an e-mail sent by Lennart Bengtsson, a Swedish climate scientist and specialist on climate models, to representatives of the Stockholm Initiative. In the first post Ingemar Nordin of the Stockholm Initiative is being accused of using an American politician and not a scientific study as a source for his assertions. In his e-mail, Bengtsson accuses the Stockholm Initiative of appearing far too sure of their claims: "Since I am actively involved in these issues, I am unfortunately not as sure of my case as the Stockholm Initiative members are".

Final considerations: A strategic complex of problems for the consensus scientists

The media debate between followers of the consensus scientists and climate change denialists is a theoretically and strategically interesting phenomenon. The skeptics often speak - as someone termed it in a different context - in "headlines", i.e. in short, simple sentences that everyone can understand and that rarely includes any scientific explanations, a language which is simply excellent for the journalistic form. When consensus scientists and scholars set out to reply to the skeptics' claims, they find themselves facing a dilemma. They try to explain the mechanisms underlying some of the processes yet such explanations, combined with the use of complex concepts, do not lend itself particularly well to the journalistic narrative form. Ironically, when the denialists argue that we do not need to take any action in order to prevent continued emissions of greenhouse gas, they hold that climate science is too complicated to draw any conclusions from. They do not attempt to make clear any of these complex mechanisms, but instead simply plant doubt in the mind of the readers. And, forced to choose between answering to the skeptics' claims or ignoring what is thought of as being nothing short of rubbish, scientists find themselves in a conflict not

unlike the one journalists are faced with when it comes to choosing between reporting the views of racist groups or not. If one refrains from confronting these groups they operate unchallenged; by responding to them, one legitimizes their existence.

The skeptics' fear that an acknowledgment of the causes and consequences of climate change would make the question of whether the current economic system is beneficial or harmful to the environment come to a head, is partly justified. It is therefore not strange how no discussion of the trade's and the economy's impact on the climate is to be found in the U.S. media (as examined by Boykoff) and its Swedish counterpart (Stoehrel, 2009). The media logic does not consider long-term processes to be news. Skeptics make use of the hegemonic idea of the "free market" having a positive impact on the global economy which circulates in society, and plays at people's fear of this "free market" disappearing. This seems to be a notion right up the media advertisers' street.

Another thing which also seems to fit in to the media logic perfectly is the mix-up of the term "theory" in the scientific sense and the term in its colloquial sense. Scientific theories, defined as a system of statements which in a coherent way try to explain a phenomenon or a continuous structure of thought, has nothing in common with everyday "theories" defined as "unproved assumptions". When skeptics point out that many of the arguments that climate scientists use to interpret their results are unverified theories, they exploit people's lack of knowledge as to how science works. In the journalistic world without nuances, such an argument fits perfectly: something is either proven or it is not proven; there is no room for consensus researchers' explanations of how science actually works.

The journalists' professional ideologies (as many researchers have previously pointed out) leave their mark in the articles and sources selected for publication. By applying "balance" as a criterion for publication, the citizens get to read, in equally sized portions, about that which is accepted as consensus among various research institutions in the world and that which individual researchers question. This approach is not just a journalistic problem, but moreover a politically philosophical issue. Not everyone can discuss technical matters in the name of democracy.

In the struggle for hegemony, that which is absent plays a major role. In their studies, Oreskes and Conway found examples of how both economists and the White House have changed scientific reports in ways that weakened that report's message. In a testimony, climate scientist Tom Knutson (*NOAA's Geophysical Fluid Dynamics Laboratory* in Princeton, New Jersey) tells the *Senate Committee on Commerce, Science and Transportation* of how NOAA's *Public Affairs Department*, in cooperation with the White House, examines and monitors the contexts in which researchers are allowed to comment, the interviews which they are to take part in and even what terms they are allowed to use in different types of presentations. Knutson tells, among other things, of how he himself was not allowed to appear on the CNBC's program

"*On the Money*", when NOAA Public Affairs Department realized that he intended to talk about trends in relation to hurricane activity in the Atlantic (Knutson, 2007). Hence media does not completely set the agenda for what the audience gets to be a part of, but also the sources. Within this context, a further examination of these sources appears to be acute.

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