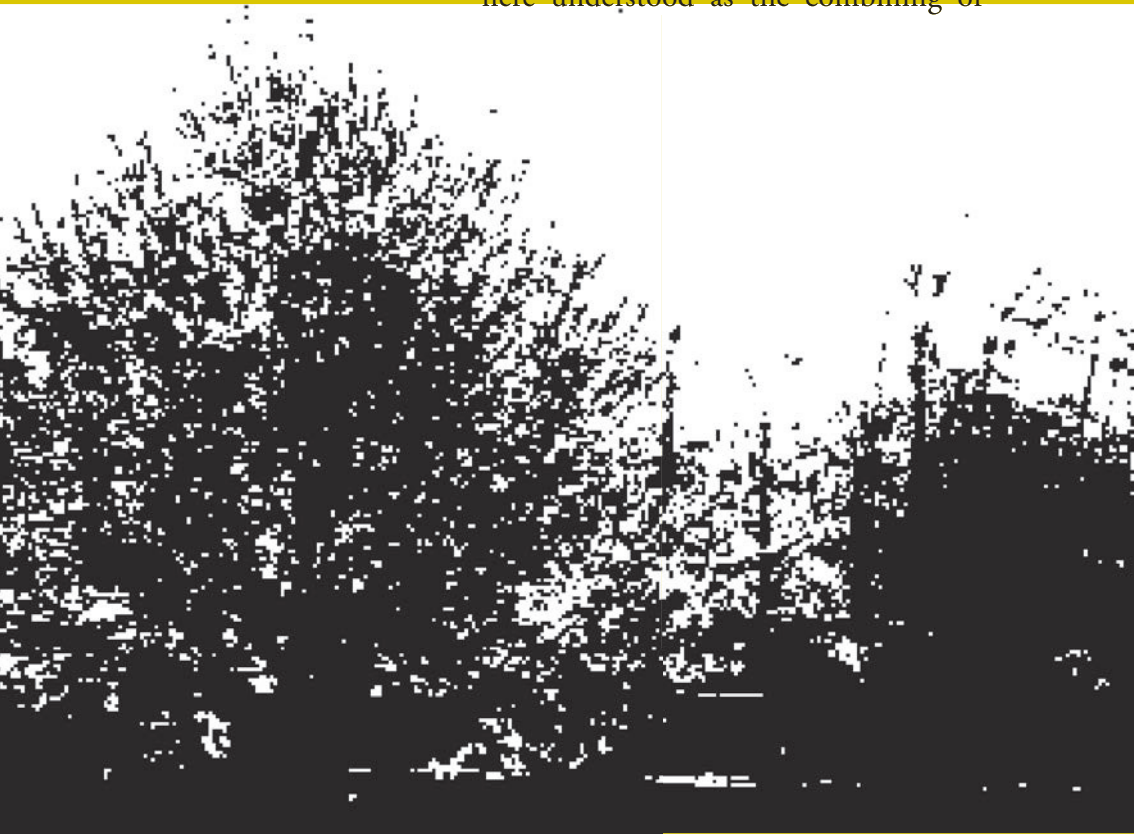
Economic Ideology about the Environment. From Adam Smith to Bjørn Lomborg*

Hans Aage

The basic precondition for scientific analysis, namely the drawing of a distinction between 1) what we know, 2) what we believe, and 3) what we wish and hope for, is particularly important and difficult to achieve in the politically biased social sciences, where these three elements are easily confused, giving rise to what we call "ideology". Ideology is here understood as the combining of



knowledge, beliefs and preferences into a comprehensive but distorted perception, which helps cope with difficult and bewildering problems.[1]

The core problem as regards the environment is the old but increasingly painful awareness that today's economic activity may jeopardize the life and welfare of our descendants hundreds of years from now, and we do not know in what way. This forces us (1) to weigh our own survival against that of other human beings, (2) to do so across the globe and across centuries, (3) and to do so in a condition of uncertainty, involving a hard-to-gauge probability of a man-induced cataclysm sometime in the future. This awareness transcends the habitual limits of our rationality and morality.

The coping strategy of traditional economic ideology is, as a rule, to deny the existence of the problem. Thus, the purpose of this paper is threefold: first, to describe economic ideology about the environment; second, to attempt to sort out true knowledge from false knowledge (beliefs and wishful thinking); and third, to analyze various mechanisms of ideological distortion.

I identify seven distinct but related mechanisms of ideological bias whereby we mislead our own and others' rationality:[2]

1. *Suppression* of relevant information, by ourselves as psychological repression or by external agents.
2. *Repetition* of false statements until we and others believe in them.
3. *Injection* of new meaning into old concepts (Newspeak).
4. *Conciliation* of inconsistent statements.
5. *Oversimplification*, or the use of simplistic theory to explain a complicated issue.

* The author gratefully acknowledges helpful criticisms and suggestions from the editor and the referees.

[1] M. Dubois, "Ideology, Sociology of", in *International Encyclopedia of the Social & Behavioral Sciences*, N.J. Smelser, P.B. Baltes (eds), Elsevier, Amsterdam 2001, p. 7180.

[2] Various types of misrepresentations are analysed by J. Elster, "Transmutation and Misrepresentation", in *Nordic Journal of Political Economy*, 23, 1, 1996, pp. 3-23.

6. *Obfuscation*, or the use of convoluted and incomprehensible theory to explain a simple issue.

7. *Suspicion* as regards the motives of opponents.

Before proceeding to our main subject – economic thought 1776-2000 and Bjørn Lomborg 2001 – just a couple of remarks on these mechanisms.

Conciliation is the switching off of the usual, critical consistency checks, which constitute a fundamental method of verification, often the only one, in mathematics, in science, and in everyday life, for example in choosing between the two competing explanations for the Iraq war: it "was part of a Bush-Cheney strategy to secure what Mr Klare calls the 'strategy of maximum extraction' of Middle Eastern oil";[3] or it was fought to promote democracy in Iraq and prevent the use of weapons of mass destruction.[4]

Obfuscation, the opposite of *oversimplification*, can be observed at work, for example, in Marx's theory of exploitation. This is shrouded in heavy clouds of mumbo-jumbo, which in the 19th century conveyed the aura of science (which is also incomprehensible) to clever but uneducated members of the working class. Another example of *obfuscation* are the arguments employed by adherents of so-called "alternative medicine".

Economists on the environment 1776-2000

When I speak critically of economic ideology, my target is not economic theory per se, but its abuse by economists who claim that let-us-assume theory represents the hard facts of reality. Like the honour of Penelope, economic theory is superior to the delusion of the

[3] As Jeffrey Sachs puts it, *The Economist*, 13 November 2004, p. 18. According to Alan Greenspan, the Iraq war is "largely about oil", *The Economist*, 22 September 2007, p. 91. For the recent handing out of oil extraction rights in Iraq, cf. *The Economist*, 3 March 2007, p. 40.

[4] Notice that two excuses are invoked, an archetypal mistake; excuses are like proofs of the existence of God, but unlike natural numbers: 2 is less than 1.

suitors. However, some elements of ideology are so widespread among economists that it is fair to speak of economic ideology in general, and this is the topic of the present section. The following section will illustrate more examples of this abuse in Bjørn Lomborg's caricatural application of economic theory to environmental issues.

Economic growth without resources

Unlike his successors – Thomas Malthus and David Ricardo – Adam Smith (1776) was not much concerned with the environmental limits to the wealth of nations. His main message was that wealth would grow endlessly thanks to the division of labour and the accumulation of capital, governed by the invisible hand of free markets and free trade and powered by self-interest, although his "shining optimism"[5] was tempered by "impressionistic" reflections on the future food supply and population growth.[6]

David Ricardo (1817), however, gave a precise formulation of the prediction that the natural tendency of profits and growth was to fall concurrently with the declining availability of unused rich and fertile land, and Thomas Malthus (1798) expected a major crisis when the geometrical growth of population inevitably outstripped the arithmetic growth of food production. These pessimistic or realistic views prevailed among economists in the 19th century, although not without debates, and earned economics its nickname of the "dismal science",[7] patterned after the "dismal trade", the business of the undertaker.

Thus, the great English economist William S. Jevons was seriously worried (in his 1865 book, *The Coal Question*) by the increasing costs of coal extraction, which according to his forecast would ruin British industry. John Stuart Mill also predicted that the use of exhaustible re-

[5] E. Heimann, *History of Economic Doctrines*, Oxford University Press, Oxford 1945, p. 81.

[6] E.A. Wrigley, *People, Cities and Wealth*, Basil Blackwell, Oxford 1987, pp. 21-45, 69.

[7] Coined in 1849 by Thomas Carlyle, who disliked political economy for its disgusting and dreary utilitarianism.

sources might lead to severe environmental problems. Later, in 1907, the great Swedish economist Kurt Wicksell predicted the same fate for Swedish industry, which he expected to collapse like a house of cards owing to the ruthless exploitation of Swedish forests.[8] Evidently, their prophecies have not come true, but after all that is no criterion for judging the validity of a prophecy, the proper criterion being whether available, relevant information is used competently. At any rate, it is more accurate to say that they have not come true yet.

At the same time, a more optimistic view was spreading, forcefully promoted by Karl Marx and Friedrich Engels. Contrary to most of their contemporary fellow economists, Marx and Engels had unlimited confidence in technological progress and future growth possibilities, and argued fiercely against Malthus and other representatives of mainstream pessimism:

> The area of land is limited – that is perfectly true. But the labour power to be employed on this area increases together with the population; and even if we assume that the increase in output associated with this increase of labour is not always proportionate to the latter, there still remains a third element – which the economists, however, never consider as important – namely science, the progress of which is just as limitless and at least as rapid as that of the population ... and science advances in proportion to the body of knowledge passed down to it by the previous generation, that is, in the most normal conditions it also grows in geometrical progression – and what is impossible for science?[9]

Marx and Engels' prognosis has proved accurate for 150 years, down to the present day – quite a long time span for economic prognoses – but of course this does not mean that it will continue to prove accurate for the coming 150 years as well.

In the 20th century, the views of Marx and Engels prevailed among

[8] B. Clark, J.B. Foster, "William Stanley Jevons and The Coal Question", in *Organization & Environment*, 14, 1, 2001, pp. 93-98; A. Maddison, *Dynamic Forces in Capitalist Development. A Long-Run Comparative View*, Oxford University Press, Oxford 1991; H. Aage, "Economic Arguments on the Sufficiency of Natural Resources", in *Cambridge Journal of Economics*, 8, 1, 1984, pp. 105-113.

[9] F. Engels, 1844, in *Deutsch-französische Jahrbücher* quoted from R.L. Meek, *Marx and Engels on Malthus,* Lawrence & Wishart, London 1953, pp. 63.

economists. Thus, in the formation of environmental awareness in the last third of the 20th century, mainstream economists played the role of a blimpish rearguard. Resources and the environment pretty much disappeared from general economics textbooks, including the excellent and widely used texts by N.G. Mankiw and M. Burda & C. Wyplosz,[10] who manage to write whole chapters on economic growth containing highly relevant empirical evidence without a single mention of ecological problems or nature as a basis for and limitation to economic activity. Words like ecology, environment, pollution, green taxes and resources simply do not figure in the index of these books.

This ideological *suppression* is grounded in faith in the continued growth of production and consumption thanks to expected technological progress. Thus, it is a case of the application of a too simple theory (constant growth rates) to complicated reality (how future growth is actually determined). This faith is hammered into the reader by frequent *repetition* of statements like the following, by Lawrence H. Summers:

> Our grandchildren will in all likelihood be much better off than we are. ... raising the spectre of our impoverished grandchildren if we fail to address global environmental problems is demagoguery.[11]

Thus, the 2006 Stern Review assumes 1.3 per cent annual GDP growth as the baseline for the next century.[12] Likewise, the Danish report on future social welfare assumes 2.0 per cent annual productivity growth and furthermore claims that this is "well substantiated".[13] It

[10] N.G. Mankiw, *Macroeconomics*, 3rd ed., Worth Publishers, New York 1997; M. Burda, C. Wyplosz, *Macroeconomics. A European Text*, Oxford University Press, Oxford 1993.

[11] *The Economist*, 30 May 1992, p. 71; for further examples, cf. Aage, "Economic Arguments" cit., and C.J. Castro, "Sustainable Development. Mainstream and Critical perspectives", in *Organization & Environment*, 17, 2, 2004, pp. 201-203. World Bank, *Sustainable Development in a Dynamic World, World Development Report 2003*, Oxford University Press, New York 2003, p. 1.

[12] N. Stern (ed.), *The Economics of Climate Change. (The Stern Review, HM Treasury Independent Review)*, Cambridge University Press, Cambridge 2007, p. 161.

[13] T.M. Andersen, L.H. Pedersen, "Demography, Prosperity Dilemmas and

is nothing of the sort; it is an unfounded extrapolation of recent, exceptional historical experience, namely, average growth rates of GDP per capita in the 20th century. Global GDP per capita changed little until 1000 A.D. During the following 800 years it grew by 0.05 per cent annually on average and about 1 per cent in the 19th century. Since 1900, global GDP per capita has increased by a factor of 5 (1.6 per cent annually), total GDP by a factor of 17 (about 3 per cent p.a.), energy consumption by a factor of 12 (half of the original oil supply is already exhausted), water consumption by a factor of 9 (one third of the total supply is being used), and global population by a factor of 4, from 1.6 to 6.1 billion.[14] A *repetition* of this growth in the 21st century is physically impossible. Little is known about future GDP growth. Yet, something is known for sure about exponential growth: that it eventually attains very high speeds and then eventually comes to a stop; the only question is when and how.[15]

In fairness to economics, I must add that there were some well-known dissenting voices among economists.[16] Kenneth Boulding (1966) described the future world economy as a space-ship rather

Macro-Economic Strategies" (in Danish), in *Nationaløkonomisk Tidsskrift*, 143, 2, 2005, pp. 191, 200. The confidence in future growth rates of about 2.0 per cent is widespread among economists for obscure reasons, cf. M.L. Weitzman, "A Review of The Stern Review on the Economics of Climate Change", in *Journal of Economic Literature*, 45, 3, 2007, pp. 707, 720.

[14] A. Maddison, *The World Economy. Historical Statistics*, OECD, Paris 2003; J. McNeill, *Something New under the Sun. An Environmental History of the Twentieth Century*, Penguin, London 2001.

[15] Suppose, that Judas kept his 30 pieces of silver and deposited them at a moderate 3 per cent rate of interest. If they weighed 249.6 g in the year 30 A.D., their weight today, 1977 years later, would be $5.976*10^{24}$ kg, which equals the total mass of the planet Earth. A fairly good approximation is that a capital on interest at r per cent per annum doubles every 70/r years.

[16] Among others, K. Boulding, *The Economics of the Coming Spaceship Earth*, John Hopkins University Press, Baltimore 1966; N. Georgescu-Roegen, *The Entropy Law and the Economic Process*, Harvard University Press, Cambridge (MA) 1971; H.E. Daly, *Steady-state Economics*, Island Press, Washington (DC) 1977; J. Martinez-Alier, *Ecological Economics. Energy, Environment and Society*, Basil Blackwell, Oxford 1987; J. O'Neill, *Ecology, Policy and Politics. Human Well-being and*

than a cowboy frontier.[17] Nicholas Georgescu-Roegen (1971) argued that because of the law of entropy (the second law of thermodynamics) the concept of throughput should replace the traditional concept of input-output in economic analysis.[18] Arguing from a similar standpoint, Herman Daly (1977) investigated the possibility of an economic and ecological steady state.[19] These scholars were all outside mainstream economics and are forerunners of a presently growing sub-branch of economics called "ecological economics".

And in fairness to Marx, I must add that he was less obtuse than many modern textbook authors who claim that "labour is the most important factor of production".[20] Marx scorned the German Social-Democrats for declaring in the opening of their Gotha programme of 1875 that "labour is the source of all wealth and all culture":

> Labour is not the source of all wealth. Nature is just as much the source of use values (and it is surely of such that material wealth consists!) as labour, which itself is only a manifestation of a force of nature, human labour power.[21]

Marx's views on nature have often been misinterpreted, especially in the Soviet Union, where official attitudes among economists were close to those of their Western mainstream colleagues.[22]

> In explaining that capitalist value relations take into account only labor values and treat nature as a free gift, Marx was no more defending this condition of the system than he was defending capitalism itself.[23]

the Natural World, Routledge, London 1993; J.B. Foster, *Marx's Ecology. Materialism and Nature*, Monthly Review Press, New York 2000.

[17] Boulding, *The Economics of the Coming Spaceship Earth* cit.

[18] Georgescu-Roegen, *The Entropy Law and the Economic Process* cit.

[19] Daly, *Steady-state Economics* cit.

[20] Burda, Wyplosz, *Macroeconomics. A European Text* cit., p. 90.

[21] K. Marx, *Critique of the Gotha Programme* (1875), Foreign Languages Press, Peking 1972, p. 8.

[22] H. Aage (ed.), *Environmental Transition in Nordic and Baltic Countries*, Edward Elgar, Cheltenham 1998.

[23] J.B. Foster, "The Crisis of the Earth. Marx's Theory of Ecological Sustainability as a Nature-Imposed Necessity for Human Production", in *Organization & Environment*, 10, 3, 1997, p. 292.

Based on arguments like this one, various – unconvincing – attempts have been made to credit Marx with a theory of ecological sustainability and represent him as an early environmentalist, just because he mentioned the role of nature in production from time to time.[24] Marx also spoke of a "metabolic rift" in modern agriculture, "a squandering of the vitality of the soil"[25] caused by capitalist production,[26] and he was convinced that this problem would – like every other imaginable problem on earth – disappear with the disappearance of private property.[27] He was not principally concerned with environmental limits to growth, but with accumulation for the benefit of future generations:

> From the standpoint of a higher socio-economic formation, the private property of particular individuals in the earth will appear just as absurd as the private property of one man in other men. Even an entire society, a nation, or all simultaneously existing societies taken together, are not the owners of the earth. They are simply its possessors, its beneficiaries, and have to bequeath it in an improved state to succeeding generations, as *boni patres familias*.[28]

Marx envisaged that material wealth would pave the way for a still loftier evolution of the human intellect and reduce the dominance of purely material needs.[29] But there is no anticipation in Marx of

[24] M. Sacristán Luzón, "Political Ecological Considerations in Marx", in *Capitalism, Nature, Socialism*, 3, 1, 1992, pp. 37-48; Foster, *Marx's Ecology. Materialism and Nature* cit., pp. 141-177; P. Burkett, "Ecology and Marx' Vision of Communism", in *Socialism and Democracy*, 17, 2, 2003, pp. 41-72. Several outstanding œuvres of literature and thinking, which are read and debated by generation after generation, share some common features: 1) they embark in discussions upon the eternal questions of life; 2) their form is artistic; 3) they are rife with contradictions. This provides for never ending debate and exegesis. Marx is a prominent exponent.

[25] K. Marx, *Capital* (vol. I 1867, vol. II 1885, vol. III 1894), Penguin, Harmondsworth 1976-81, vol. III, pp. 949-950.

[26] Ibid., vol. I, pp. 637-638.

[27] Ibid., vol. III, pp. 948-949, 959. Cf. Foster, *Marx's Ecology. Materialism and Nature* cit., pp. 141-177.

[28] Marx, *Capital* cit., vol. III, p. 911.

[29] Burkett, "Ecology and Marx' Vision of Communism" cit., pp. 47, 56, 60-63.

material abundance in itself carrying a future threat against nature, the environment and mankind.[30] Marx conjectured, rightly, that capitalism had an enormous potential for economic growth, and considered material abundance created by capitalism as a precondition for socialism. After 150 years it is time to turn Marx upside down: increasing abundance is not the means to solve the enigma of history, to achieve socialism, equality and democracy. It is the other way about: socialism, equality and democracy are means to solve the problems and conflicts emanating from the appearance on the horizon of limits to growth.

The *suppression* of resources and the environment in economics is partly justified by the fact that resource endowments have very limited explanatory power in comparative analyses of growth rates in various countries in the 20th century.[31] The confidence in continued growth relies upon "successful adaptation to resource scarcity",[32] but in order for this kind of analysis to make sense it must be assumed that certain possibilities for substitution exist. It must always be possible to substitute non-renewable resources with greater inputs of labour, man-made capital and renewable resources. Said Robert Solow in 1992, "Without this minimal degree of optimism ...there is no point of talking about sustainability".[33] This assumption is the backbone of a particular brand of economic eco-optimism. If the possibilities for substitution are very ample (the elasticity of substitution between exhaustible resources and other inputs is higher than 1, and the productivity of reproducible capital is sufficiently high), the effect is – as Robert Solow said in 1974 – that "the world can, in effect, get along without natural resources".[34] But it should be noted

[30] Martinez-Alier, *Ecological Economics* cit., pp. 218-225, who also discusses the early debate between Serhii Podolinsky, Engels and Marx about energy productivity in agriculture.

[31] Maddison, *Dynamic Forces in Capitalist Development* cit., pp. 56-60.

[32] Ibid., p. 58.

[33] R. Solow, *An Almost Practical Step towards Sustainability*, Resources for the Future, Washington (DC) 1992, p. 9.

[34] Id., "The Economics of Resources and the Resources of Economics", in *American Economic Review*, 64, 2, 1974, p. 11.

that whether or not this assumption is valid is not at all an economic problem; it belongs to the realm of science.

The market mechanism and perfect competition

In his *Principles of Macroeconomics*, N.G. Mankiw mentions natural resources only once, and his message is that "market prices give no reason to believe that natural resources are a limit to economic growth".[35] This is a rather extreme form of the argument, the more common version being that, because of the market mechanism, scarcity of a resource will cause an increase in its price, thereby creating incentives for exploration, substitution and innovation that will eventually eliminate the scarcity:

> By this I mean all the incentives to new exploration, recycling, and the use of substitutes, that would all be occurring gradually as the increasing scarcity of any product led to an upward trend in its price.[36]

> In fact, prospectors usually discover new natural resources when prices rise, and technological progress has been rather successful in finding substitutes.[37]

Both forms of the argument are based on the economic theory of the market price of an exhaustible raw material:[38] it is equal to the extraction costs plus an increment for scarcity that increases over time by an annual percentage equal to the rate of interest.[39] This is one of the main theorems of environmental economics, a subfield of economics which analyses resources and the environment as specific

[35] N.G. Mankiw, P*rinciples of Macroeconomics*, The Dryden Press, Fort Worth 1977, p. 244.

[36] W. Beckerman, "Economists, Scientists and Environmental Catastrophe", in *Oxford Economic Papers*, 24, 3, 1972, p. 338.

[37] Maddison, *Dynamic Forces in Capitalist Development* cit., p. 58.

[38] Including a typical hint at a historical argument, cf. the section about Bjørn Lomborg below.

[39] D.W. Pearce, R.K. Turner, *Economics of Natural Resources and the Environment*, Harvester Wheatsheaf, London 1990, pp. 271-276.

cases of allocation and optimization, because they are unlike most other goods in two respects: resources are exhaustible, and environmental effects are a major example of an externality.

The problem with the effects of market-generated incentives is that the causation chain has two links that are both weak. Firstly, price rises have to happen early and strongly enough for measures towards substitution and technical development to be taken in due time. However, since the scarcity increment may only make itself felt right before depletion, prices will only rise early enough if geological conditions determine sufficiently rapid increases in extraction costs. This first link in the causation chain can be corrected politically by means of administrative regulations, taxation and subsidies, as well as tradable pollution permits.[40]

Secondly, these endeavours need to succeed. The magnitude of

[40] K. Arrow, B. Bolin, R. Costanza, P. Dasgupta, C. Folke, C.S. Holling, B.O. Jansson, S. Levin, K.G. Mäler, C. Perrings, D. Pimentel, "Economic Growth, Carrying Capacity, and the Environment", in *Ecological Economics*, 15, 2, 1995, pp. 91-95. Reprinted from *Science*, 268, 1995, pp. 520-521. All these policy instruments are incentives for centrally and politically controlled allocations, i.e. what is normally termed planned economy. Moreover, the differences between these instruments are easily overrated. Tradable permits are used mostly in relation to pollution, notably CO_2 emissions; curiously, they are more popular than taxes despite the fact that their effects are largely identical, possibly because they are erroneously considered more conform with the predominant market fetichism ideology (cf. Castro, "Sustainable Development" cit., pp. 203-206; World Bank, *Sustainable Development in a Dynamic World* cit., p 32; *The Economist*, 23 April 2005, pp. 11, 78-80), but most likely because tradable permits are usually handed out for free in the first place, whereas taxes must be paid from the outset. Even administrative regulations can become a purely economic incentive in the form of fines, if the public ignores the stigma incurred by the criminal offence of infringing laws and regulations. No doubt there are good reasons for using economic and other incentives in environmental policies; yet they should not be mistaken for measures seeking to deal with environmental issues within the framework of a market economy, which is something entirely different, where the market is allowed spontaneously and decentrally to determine how resources are allocated. On the contrary, environmental policy and regulation entail central planning: the allocation (amount of pollution, rate of extraction) is fixed in advance by political authorities, before incentives and markets come into play.

resources and possibilities for technological advances are scientific problems of an entirely different nature than economic phenomena such as rising prices. If the laws of supply and demand do not provide sufficient incentives, they can be corrected by government policy. The laws of nature, however, do not lend themselves to amendment by decree.

The market mechanism argument is another instance of *simplification*, i.e. the application of simplistic theory to complicated reality (higher prices will alleviate scarcity). Vice versa, when it is argued, as does Mankiw in the above-quoted statement, that resources are not scarce because prices are not high, we are confronted with the *obfuscation* of a simple issue (depletion of oil) by means of complicated theory (growth theory with exhaustible resources), even to the point of absurdity: "In the currently topical case of oil, the arguments that the world is using too little rather than too much seem irresistible".[41]

In the first place, the market is a peculiar place to go looking for information on the magnitude of resources and likely technical advances in the future. The sensible thing to do would be to directly address geologists and engineers. Secondly, prices depend on market agents' interpretation of current trends of consumption, which does not necessarily reflect their assessment of the future raw material supply. A low price may simply reflect the fact the market is myopic, and the scarcity price increment hence remains minimal until a few decades before depletion.[42] Thirdly, for many ecological resources there is no market, and hence no market price. Emissions caused by resource consumption have given rise to urgent problems, and even if certain types of pollution, notably the most concentrated ones, have been successfully eliminated, other and more elusive pollution

[41] J.A. Kay, J.A. Mirrlees, "The Desirability of Natural Resource Depletion", in *The Economics of Natural Resource Depletion*, D.W. Pearce, J. Rose (eds), Macmillan, London 1972, pp. 171-172.

[42] Moreover, for oil, an estimate based on calorific value only would be shortsighted, since oil is a combination of chemical compounds with many other more sophisticated applications than combustion.

problems have increased. However, there is no such thing as a market for air with a low CO_2 content, or for seawater not contaminated with nutrients.

We cannot trust the market mechanism to provide for generations yet unborn, even though the profiteering owner of an oil well will leave the oil in the ground, if prospective future price rises are sufficiently high. It is true that in theory market equilibria over long spans of time are possible and, again in theory, there is no difference between, say, those who live in Denmark today and those who will be living a hundred years from now. Yet in practice markets are only functioning in the short run, and there is another, even more fundamental problem: there are always a large number of possible market equilibria. They produce widely different distributions of final consumption among market agents, which is precisely the issue here. Which distribution is realised depends on how resource control is distributed at the opening of the market, that is today, when the present generation owns all natural resources. The problem confronting future generations is that they do not own anything. Thus, resource control, in the short term especially labour and capital, is decisive for the people living in Denmark today.

If future generations are left at the mercy of the market and an interest rate of, say, 5 per cent, considerable price rises will be needed for the market to save anything for posterity. The utility value of a barrel of oil may be 132 times greater today than in a hundred years and 17,000 times greater than its utility value in 200 years, which would correspond to a 5 per cent discount rate. Still, our great-grandchildren are likely to see things differently. Whether a hundred years is a long time obviously depends upon the point of view, i.e., from which of the two extremes of the time span it is observed.

Comparability and perfect computation

Money, invented independently in Greece and in China in the 1st millennium B.C., is an epoch-making social institution which facilitates trade and production by making everything commensurable – including the incommensurable. Therefore, as Marx remarked,

ever since antiquity money was denounced as tending to destroy the economic and moral order:

> ... thou visible god,
> That solder'st close impossibilities,
> And mak'st them kiss! that speak'st with every tongue,
> To every purpose![43]

However, for present day economists it is not a vice, but a virtue to compute the money values of everything and compare them as a basis for rational choice. Money values define the social good by the *injection* of new meaning into concepts. This is done mainly by conducting social cost-benefit analyses based upon the money values of human lives, global warming, diseases, children, the spotted owl, time saved by faster traffic, unspoiled wilderness etc. etc.: a simplistic substitution of sums of money values for complicated moral problems of choice in order to achieve a semblance of consistency and rationality.

This notion of money values as a universal standard of commensurability was an issue in the debate on socialist planning in the 1920s. Notably, it was rejected by Otto Neurath, who later became a member of the positivist *Wiener Kreis*. In 1919, in a report to the Munich Workers' Council, Neurath affirmed that for the comparison of different projects

> There are no units that can be used as the basis of a decision, neither units of money nor hours of work. One must directly judge the desirability of the two possibilities.[44]

Cost-benefit analysis is widely used for the assessment of environmental issues, including the long-term effects of global warming. Thus, the DICE model (Dynamic Integrated Model of Climate and the

[43] W. Shakespeare, *Timon of Athens*, Act 4, Scene 3; quoted from Marx (*Paris Manuscripts, 1844*), to whom money was a prime example of alienation; cf. also Marx, *Capital* cit., vol. I, pp. 229-230.

[44] O. Neurath, *Empiricism and Sociology*, Reidel, Dordrecht 1973, p. 146; quoted from O'Neill, *Ecology, Policy and Politics.* cit., p. 126.

Economy),[45] a schematic model of various economic aspects and possible scenarios of global warming for the next century, is constructed upon a host of heroic assumptions, including growth rates of total factor productivity (1.5 per cent, and then decreasing) and social discount rates (5 per cent). Cost-benefit analysis is appropriate for comparing projects that are small, short-term and clearly defined. If used for long-term, large-scale problems, it becomes very sensitive to the choice of assumptions, many of which are completely arbitrary, and its results are invalidated by the fundamental theoretical weaknesses of the instruments employed, which include interpersonal comparisons of utility, the application of discount rates, assumptions of substitutability, assigning money values to human life, and assessing uncertainty.

Interpersonal comparison of utility is the core idea of cost-benefit analysis. Individual utilities are measured as money values and then added to obtain a total, utilitarian measure of social welfare. However, an extra dollar of consumption is likely to be worth more for a poor than for a rich person. Thus, the Stern Review assumes a value of $\eta=1$ (unit elasticity of the marginal utility of consumption).[46] This arbitrary value means that utility grows with the logarithm of consumption and that an extra $ is worth ten times less if the original level of income is ten times higher. This is a typical oversimplifying response to the complicated conflicts arising from environmental problems, which are discussed in the literature on the "environmentalism of the poor".[47]

*The rate of discount***.** For short-term private decisions, the present values of future amounts of money are computed by discounting, according to the same principles employed to compute interest on income deposited into a bank account for future consumption, instead of being consumed now. But attempts at social cost-benefit assessment over long time spans are jeopardized by the discount rate

[45] W.D. Nordhaus, *Managing the Global Commons: The Economics of Climate Change*, The Mit Press, Cambridge (MA) 1994; W.D. Nordhaus, "A Review of The Stern Review on the Economics of Climate Change", in *Journal of Economic Literature*, 45, 3, 2007, pp. 697-701.

[46] Stern, *The Economics of Climate Change* cit., pp. 46, 161-163.

[47] J. Martinez-Alier, *The Environmentalism of the Poor*, Edward Elgar, Cheltenham 2002.

problem. A discount rate of 6 per cent implies that $100 30 years from now will only be worth $17 and 41 cents today; and 100 years from now only 29 cents today. And 6 per cent is "what most economists think are decent parameter values".[48] This means that a positive discount rate will be detrimental to future generations, while a zero discount rate will be detrimental to present generations. There have been several suggestions as to how to formulate the optimisation problem over time with a reasonable allocation between generations, e.g. by including the condition that welfare must not decrease over time, or by applying a discount rate approaching zero over time.[49] But this is all arbitrary. The whole exercise rests on shaky theoretical grounds and belongs more to the realm of ideology than to that of science. The Stern Review does not discount the utility of future generations at all, but uses a low value of the pure time discount rate at δ=0.1 per cent for one reason only, namely a positive probability that the earth could perish, so that prospective generations will not exist.[50] Together with η=1 and an assumed growth rate of 1.3 per cent, this implies a discount rate for income of

$$r = \delta + 1.3\eta = 1.4 \text{ per cent (the Frank Ramsey equation).}$$

This is much below the conventional 5-6 per cent and fundamentally changes the calculation of the costs and benefits of climate change and CO_2-reductions.

Assumptions of substitutability. When adding up the money value of various goods, the possibility of substitution is a basic assumption. Therefore price calculations are well suited for marginal decisions that allow substitution, e.g. whether you want to have gherkins or beetroots with your roast pork. Substitution is also assumed in attempts to calculate true savings, i.e. savings allowing for used-up natural resources and environmental deterioration. This type of calculation examines possibilities of substitution between human capi-

[48] Weitzman, "A Review of The Stern Review" cit., p 707.
[49] Pearce, Turner, *Economics of Natural Resources* cit., pp. 211-238.
[50] Stern, *The Economics of Climate Change* cit., pp. 45-47, 161-163.

tal, man-made physical capital, and natural capital. Most economic calculations show that true savings are positive and hence fulfil a weak sustainability criterion,[51] but this depends upon the assumption of substitutability, e.g. that less North Sea oil can be compensated by more lessons in the French language.[52]

Money values of human life are arbitrary and differ widely. The standard is about 3 million US dollars in the USA, 1 million dollars in Denmark, and 150.000 dollars in the Netherlands.[53] Just imagine that physical constants, like gravitation or the velocity of light, differed by a factor of 20 from one country to another.

Uncertainty. Of course, the most optimistic forecast for our future would hardly be the best decision basis. The task is not to find the most optimistic forecast for our future and then act as though that forecast were certain to come true. If there is some probability of less positive scenarios with serious consequences, it would be rational to try to prevent them, thus acting precautionary on a less probable forecast. After all, few people would consider their fire insurance premium to be wasted just because their houses did not burn down during the insurance period. The risk of fire can be described in terms of probabilities that can be subject to actuarial computations, but environmental problems entail a more fundamental level of uncertainty because of the risk of discontinuous, irreversible and cumulative changes, which renders marginal cost-benefit optimisation absurd.[54] No company would sell insurance against the effects of

[51] Castro, "Sustainable Development" cit., p. 204.

[52] Interestingly, the fronts regarding green amendments to national accounts have reversed: Economists used to be criticized by environmentalists for not taking account of environmental effects; now, when they attempt to do so and the true savings appear to be positive, economists are still criticized, though for opposite reasons. Previously, economists used to say, "How can I put a price on the lark's song?" Now the environmentalist organizations are saying with contempt, "Two pounds of larks, or two French lessons?"

[53] Ministry of Finance, *Manual for Social and Economic Cost-Benefit Analysis* (in Danish), Ministry of Finance, Copenhagen 1999, p. 63.

[54] Arrow et al., "Economic Growth" cit.; Weitzman, "A Review of The Stern Review" cit.

climate change. What distinguishes serious environmental problems is their incalculability. Human activity has often proved to have a much more extensive impact than anticipated. Many environmental effects come as total surprises, as in the case of the impact of DDT in the 1960s, eutrophication in the 1970s, the ozone gap and the greenhouse effect in the 1980s, and the mad cow disease in the 1990s.

We do not know how to handle these ethical problems. Picking some arbitrary numbers, like the η and δ of the Stern Review, does not make us any wiser, as we cannot attribute any genuine meaning to them, either as moral standards or as objective knowledge. The debate on the proper magnitude of η and δ is as futile as alchemy.[55] This approach, rather than having "the virtue of clarity and simplicity", has the virtue of exposing our fundamental ignorance and bewilderment. It is indeed true that "such exercises should be viewed with some circumspection".[56]

Bjørn Lomborg 2001.[57]

"We are not running out of energy or natural resources", nor shall we run out of unspoiled environment or species diversity. Mother Earth can easily sustain increasing economic activity, because "technology makes it possible to achieve growth as well as a better environment". This cornucopian myth[58] is the message of Bjørn Lomborg's *The Skeptical Environmentalist*.[59]

[55] *The Economist*, 16 December 2006, p. 84; Nordhaus, "A Review of The Stern Review on the Economics of Climate Change" cit.; Weitzman, "A Review of The Stern Review" cit.

[56] Stern, *The Economics of Climate Change* cit., pp. 30, 31.

[57] A preliminary version of the following sections was published in the Internet publication by Ege & Christiansen (eds) *Sceptical Questions and Sustainable Answers*, The Danish Ecological Council, Copenhagen 2002, http://www.ecocouncil.dk.

[58] R. Kirkman, "Review of Lomborg (2001)", in *Environmental Ethics*, 25, 4, 2003, p. 426.

[59] B. Lomborg, *The Skeptical Environmentalist: Measuring the Real State of the World*, Cambridge University Press, Cambridge 2001, pp. 4, 176, 211.

Historical probability

Lomborg's core argument is an application of simplistic theory to complicated reality, and his theory is simplistic theory par excellence, namely that history repeats itself. His argument consists of two assertions:

No. 1: Until now "we have experienced fantastic progress in all important areas of human activity",[60] which is true, up to a point (cf. below). This assertion is substantiated with enormous amounts of informative and comprehensive data, which form the greater part of the book.

No. 2: "We have no reason to expect that this progress will not continue".[61] This assertion, however, remains unproven. Only a few pages of the book are devoted to actual studies of potential future development scenarios.[62]

Bjørn Lomborg derives No. 2 directly from No. 1, simply by claiming that "when things are improving we know that we are on the right track".[63] This way of reasoning is popular. It was presumably popular among the passengers on board the *Titanic*, especially those in first class. It is popular among economists too[64] – as exemplified by their faith in growth rate extrapolations, discussed in the above section on economic growth without resources – but it hardly qualifies as an economic argument. It has nothing to do with economics. In fact it

[60] Ibid., pp. 4, 87, 351.

[61] Ibid., p. 330.

[62] Ibid., pp. V (citation from Julian Simon), 5 (general conclusion), 77 (economic growth), 96-98 (grain), 99 (biomass), 106 (soil erosion), 108 (fish), 114 (Amazonas), 127 (coal), 128 (oil shale), 129 (nuclear power and "commercial" fusion energy), 130-132 (costs of renewable energy), 137, 145 (minerals), 155 (water), 207 (waste), 255 (species extinction), 258-324 (greenhouse effect).

[63] Ibid., p. 5.

[64] Aage, "Economic Arguments" cit., pp. 108-110.

[65] Launched by Bjørn Lomborg in the Danish newspaper *Politiken*, 19 January 1998.

[66] C. Rootes, "Review of Lomborg (2001)", in *Organization & Environment*, 15, 3, 2002, p. 340.

has nothing to do with anything. The concept invented by Lomborg, that of "historical probability",[65] has nothing to do with either history or statistics.

This argument permeates the whole book, which mainly consists of loads of perfectly true evidence proving assertion No. 1, the "fantastic progress" of mankind, whereas assertion No. 2 and the inference from No. 1 to No. 2 are generally given for granted. Lomborg's "just plain silly" arguments provoked a "near-hysterical" reaction among environmentalists.[66] His book was debunked loudly by *Nature*, *Scientific American* and others from different points of view,[67] as well as by the Danish government committee on scientific dishonesty, which declared it "objectively dishonest", without sanctions being taken against the author, however, because of his "lack of scientific expertise".[68] Most of the critics tried to prove that Lomborg had got the evidence wrong, with very limited success, because most of Lomborg's impressive amount of evidence is perfectly correct. It is only his logic and conclusions that have gone awry.

The historical argument has been popular among economists for several decades. In 1979, the following statement could be read in the Soviet journal *Social Science*: "There has not been a single case in which science was unable to solve an urgent problem for humanity",[69] and in 1991 dr. Per Stig Møller, then Danish minister of the environment,

[67] S. Schneider, J.P. Holdren, J. Bongaarts, T. Lovejoy, "Misleading Math about the Earth", in *Scientific American*, 286, 1, 2002, pp. 59-69; Kirkman, "Review of Lomborg (2001)" cit.; Rootes, "Review of Lomborg" cit.; S. Pimm, J. Harvey, "No need to worry about the future", in *Nature*, 414, 2001, pp. 149-150; M. Grubb, "Relying on Manna from Heaven?", in *Science*, 294, 2001, pp. 285-286; T. Burke, *Ten Pinches of Salt. A Reply to Bjorn Lomborg*, Green Alliance, London 2001.

[68] UVVU (Udvalgene Vedrørende Videnskabelig Uredelighed), *Afgørelse af klagerne mod Bjørn Lomborg*, Ministry of Research, Copenhagen 2003, http://www.forsk.dk/uvvu/nyt/udtaldebat/afgorelse_lomborg.htm.

[69] E. Fyodorov, "Relations with Nature Optimised", in *Social Sciences*, 10, 1, 1979, p. 221.

[70] See the Danish newspaper *Information*, 18 March 1991.

[71] D.H. Meadows, D.L. Meadows, J. Randers, W.W. Behrens, *The Limits to Growth*, Potomac Associates, Washington (DC) 1972; D.H. Meadows, D.L. Meadows, J. Randers, *Beyond the Limits*. Earthscan Publications, London 1992;

seconded this official Soviet viewpoint: "after all it can be empirically established that whenever man has a problem, he will also solve it".[70]

Besides ample evidence of improvements of human welfare until now, Lomborg presents many examples of mistaken gloomy predictions of the past concerning future environment and resource-related problems in order to substantiate his simplistic historical argument, including Jevons' worries mentioned above and those expressed in *Limits to growth* and *Beyond the limits*.[71] Many ingenious examples have been contrived of what could have caused us to worry in the past. A realistic extrapolation of traffic in London in 1870 could have predicted a disastrous increase in mortality due to poisoning as the result of enormous accumulations of horse dung in the streets.[72]

Whether those concerns would have made any sense is quite a different matter. That would have depended on whether available, relevant information was being used, and not on whether the worst imaginable event did eventually occur. If some among the ancient Egyptians were ever concerned about the depletion of copper reserves in Nubia, the Eastern desert and the Sinai, that was justified, because Egypt was a Bronze Age economy that relied heavily on copper. Based on the state of knowledge of the time, the correct prognosis would have seemed wildly improbable, since people then had no way of knowing that Cyprus had large deposits of copper ore, or that iron would prove to have far more potential applications than bronze.[73]

Such concerns cannot even be said to be based on forecasts; rather, they are based on projections that do not envisage the possibility of the beneficial but uncertain technical advances in which Bjørn Lomborg puts his hopes. According to Lomborg, "fusion energy will

D.H. Meadows, D.L. Meadows, J. Randers, W.W. Behrens, *Limits to Growth: The 30 Year Update*, Chelsea Green Publishing, London 2004.

[72] P. Ravaioli, *Economists and the Environment: What the Top Economists Say about the Environment*, Zed Books, London 1995.

[73] Aage, "Economic Arguments" cit., p. 108.

[74] Lomborg, *The Skeptical Environmentalist* cit., p. 129.

[75] Ibid., pp. 60, 983 (grain), 122-124 (oil), 124 (coal), 137 (raw material costs), 141 (iron), 350 (starvation).

[76] Ibid., pp. 348, 317, 256; cf. also pp. 227, 330.

be commercially available only after 2030 or perhaps well into the twenty-second century".[74] Or perhaps never.

Lomborg takes examples of forecasts that proved wrong[75] as historical proof of a Micawberish "Something will turn up", which, he argues, "necessitates that the precautionary principle be strictly circumscribed", since it is "unreasonable to spend such large sums of money on such uncertain events" (with reference to the consequences of the greenhouse effect), or to prevent the extinction of species "which is claimed to be a catastrophe".[76]

Lomborg admits that "we simply know too little" about the cumulative effect of manmade compounds released into the environment. Such compounds include estrogens, which he mentions, and a number of toxic and dangerous waste substances including dioxins and VOCs (Volatile Organic Compounds), which he does not. In his opinion, uncertainty concerning the future is an argument for *suppression* of the waste problem, because "far fewer data are available" and it is easier to settle for the view that "they probably pose less of a danger to humans".[77]

Lomborg takes great pains with proving the correctness of his assertion No. 1, but he does not give the whole truth. It is far from true that mankind solved all its environmental problems in the past. Environmental problems were with us from the outset. They caused us to inhabit strange places of the globe, to eat cereals, to kill one another. Our history is rife with environmental disasters – though of a relatively local nature so far – in which cultures perished after depleting their own resource basis. But Lomborg sidesteps this issue, despite his declared purpose of providing "a general impression of what is going on in the world" based on "long-term and global trends" as described by means of "figures and trends which are true".[78]

The environmental disasters of the past were certainly serious enough for those who suffered them. Examples include the destruction of agricultural areas in Southern Mesopotamia after 3.000 B.C.

[77] Ibid., pp. 238, 166.
[78] Ibid., pp. 12, 40.

and the subsequent decline of the Sumer empire; the collapse of the culture inhabiting the isolated Easter Island in the Pacific Ocean due to exhaustion of its tree resource base; the decline of the Maya culture; and marshification and desertification in antiquity, notably in North Africa. Current examples include overfishing on the Banks of Newfoundland, soil erosion in Kazakhstan and in the "dust bowl" in the American Midwest, overexploitation of subsoil water in California, in the Middle East and in Central Asia – where in just a few years Lake Aral was transformed into a salty desert after its water level had fallen by 13 metres and its water content had been reduced by two thirds since 1960 as the result of large-scale cotton cultivation and irrigation. Lomborg does indeed mention the tragedies of Easter Island and Lake Aral, but comfort and *conciliation* are easily at hand, as he assures us that "today, we have learnt the lesson".[79] Really?

Bjørn Lomborg represents the environmental history of mankind as a continuous chain of advances.[80] Yet the true lesson of our environmental history is quite different:[81] we have displayed a stunning improvidence and lack of long-term foresight; or, positively phrased, we have an inborn, impressive ability to repress perplexing problems, which there never was a dearth of, and concentrate on doing something more or less sensible. The fundamental problem, which mankind – with varying success – has wrestled with throughout history, is to achieve a balance between

[79] C. Ponting, *A Green History of the World*, Penguin, Harmondsworth 1991, pp. 68-87, 260-265. J. Diamond, *Collapse*, Allen Lane, London 2005. Lomborg, *The Skeptical Environmentalist* cit., pp. 27, 157. According to Lomborg, the problem of soil erosion is "vastly overstated" (p. 105), overfishing can be solved by fish farming and ownership rights to the fish (p. 108), and irrigation is relatively unproblematic and with "great potential" (pp. 66, 155).

[80] Lomborg, *The Skeptical Environmentalist* cit., pp. 50 (life expectancy), 56 (health), 61 (nutrition), 70 (prosperity), 82 (leisure, life), 112 (forests), 164 (air quality), 170 (lead), 197 (eutrophication), 250 (species extinction).

[81] McNeill, *Something New under the Sun* cit., and Ponting, *A Green History of the World* cit., are recommended as correctives. Unfortunately Ponting does not offer the breadth and accuracy of documentation found both in McNeill and Lomborg's books; for example, it peddles information (p. 193) concerning the extinction of species without taking account of criticism reported by B. Lomborg (p. 250).

– first, our desire to live comfortably and increase our supply of commodities; above all, to rise above the starvation threshold by increasing food production,
– second, our desire to proliferate, and
– third, the capacity of our natural basis to sustain production.[82]

The gist of the historical argument is that things have never been so good as they are now, and will therefore continue to get better and better still – a direct inference of assertion No. 2 from assertion No. 1. Now, the first assertion is partly true. The real problem is the second assertion. The arguments for the optimistic predictions are mostly limited to a statement that "there are good reasons to believe them",[83] provided a number of anticipated and productive, but uncertain, technical advances occur. Obviously, such thinking is not very helpful when it comes to evaluating future environmental problems, since it would require evidence showing that the key conditions of the cited historical examples will continue to obtain – and no such evidence is presented or available.

Infinite durability of limited resources

As a supplement to the historical argument, Bjørn Lomborg also provides more elaborate explanations for the inference of assertion No. 2 from assertion No. 1: price trends of natural resources, market incentives, beneficial effects of economic growth, faith in welfare computations combined with uncertainty concerning the future. As will be demonstrated below, all these economic arguments are erroneous, because they evade the true issues, which are of a scientific and moral nature.

This certainly also applies to the most straightforward of Lomborg's

[82] Ponting, *A Green History of the World* cit., p. 17.

[83] Lomborg, *The Skeptical Environmentalist* cit., p. 77 (growth in Third World countries), 100 (increased harvesting yields), 118, 128, 329 (energy prices), 156, 158 (water saving), 159 (solar cells), 176, 211, 329 (environmental improvements in Third World countries), 330 (major problems of the future).

supplementary arguments, which is simply a *suppression*, a denial of the limits of resources and environmental capacity: "Resources are not limited",[84] "we have more and more oil left, not less and less", and our oil reserves can be compared with a "refrigerator" which, when near-empty, can simply be replenished "in the supermarket", because "new oil fields will be continuously added as demand rises".[85] This is clearly a *conciliation* of inconsistencies. What we do know for certain is that the number of yet unknown reserves will go down at precisely the same rate as the number of known reserves goes up.

The argument also comes in the guise of an *obfuscation* of the issue: "It is theoretically possible never to run out of a limited resource, even with continued use".[86] This statement is partly based on confidence in economic incentives and technological possibilities: "This is simply because recycling or efficiency improvement – our ingenuity – compensates for both consumption and increases in consumption". But it is also *obfuscation* of simple reality (exhaustion) by means of incomprehensible theory (the sum of an infinite series can be finite).

The concept of infinite durability of limited resources can appear paradoxical, in the same way as Xenon's (ca. 490-430 B.C.) famous argument about Achilles not being able to catch up with the tortoise. Whenever Achilles reaches the place where the tortoise started, the tortoise will have crawled a tiny bit further, and when Achilles has run that stretch, the tortoise will once more have crawled a bit further, and so forth. For Achilles to catch up with the tortoise the sum of these infinite "bits" has to be finite, which Xenon did not believe. Yet it is indeed possible – that is, provided the elements of the series converge towards zero quickly enough. Archimedes (287-212 B.C.) knew that an infinite geometric progression can have a finite sum; as is the case here. This mathematical reasoning is the basis of Bjørn Lomborg's contention that the consumption of a finite resource can extend over an infinite period of time.

If oil reserves are estimated to last 44 years at the present rate of

[84] The Danish newspaper *Politiken*, 19 January 1998.
[85] Lomborg, *The Skeptical Environmentalist* cit., p. 125.
[86] Ibid., p. 147.

consumption, it will be possible to make them last forever, provided their consumption declines by 2.3 per cent every year. If the efficiency of oil use increases correspondingly, the utility value can be kept unchanged. This requires a doubling of efficiency every 30 years, and in 100 years efficiency will have to increase approximately tenfold. However, nothing indicates that total consumption is on the decline, although oil consumption per unit of GDP in the rich G7 countries has been cut by half since 1970.[87] And nothing indicates that efficiency will continue rising infinitely; indeed, this is theoretically impossible, since the laws of thermodynamics set an upper, finite limit to energy efficiency.

Energy efficiency has indeed increased considerably. All the same,[88] oil consumption of the OECD countries is expected to rise by 1.1 per cent annually until the year 2010 (global oil consumption increased by 3.4 per cent in 2004), gas consumption by 2.6 per cent, and power consumption by 2.1 per cent. Oil consumption in China is 8 per cent of the world total, but strongly increasing at 16 per cent in 2004, which is reflected in recent price increases.[89] In 1987, the Brundtland Report concluded that energy consumption would have to increase by 450 per cent until the year 2025 if 8.2 billion people were by then to have an energy consumption comparable to the 1980 consumption of the wealthy countries.[90]

Economics: markets, growth, computations

Bjørn Lomborg's views in the field of economics are so extreme that few economists would be willing to subscribe to them. He does not show the least critical distance in his unbridled praise of eco-

[87] *The Economist*, 17 November 2007, p. 83.

[88] As another example of "the Jevons Paradox", cf. Clark, Foster, "William Stanley Jevons " cit., p. 95.

[89] *The Economist*, 29 May 1999, p. 70; 19 February 2005, p. 64; 16 April 2005, pp. 67-68; 30 April 2005, survey p. 6.

[90] U.N. World Commission on Environment and Development, *Our Common Future (The Brundtland Report)*, Oxford University Press, Oxford 1987, p. 170.

nomic theory, especially of a laissez-faire interpretation of it, exhibiting unlimited trust in the power of market prices and economic incentives, and in welfare models of costs of climate change.

Lomborg's first economic argument is a verbatim rendition of the *obfuscation* argument about prices: until now no overall increases in raw material prices have occurred. Therefore "there was – and is – enough oil". Because, he argues, "if we want to examine whether oil is getting more and more scarce we have to look at whether oil is getting more and more expensive".[91]

Secondly, he elevates the simplistic argument of market incentives to a natural law: "If *price* increases this will increase the incentive to find more deposits and develop better techniques". Measures towards substitution and technological development will be taken in due time, and those endeavours will also succeed, "automatically".[92]

Thirdly, Lomborg argues that economic activity is not the cause of, but rather the cure for environmental problems, thereby denying the very essence of the environmental question. He strives to make this absurdity seem plausible by constant *repetition*. He blankly dismisses "our myth of the economy undercutting the environment" and affirms again and again that the impact of economic activity on the environment is beneficial, since "over time, the environment and economic prosperity are not opposing concepts, but rather complementary entities".[93]

To tout economic growth as the answer to a host of different problems,[94] Lomborg relies on extrapolations of developments in discrete areas, which he does not relate to one another: again, a sim-

[91] Lomborg, *The Skeptical Environmentalist* cit., pp. 120, 122, 137-140.

[92] Ibid., pp. 124, 176.

[93] Ibid., pp. 32, 210. Poverty is often considered the main cause of environmental problems, cf. Castro, "Sustainable Development" cit., p. 201. For a sobering comment, see Arrow et al., "Economic Growth" cit.

[94] Lomborg, *The Skeptical Environmentalist* cit., pp. 72, 100 (poverty), 109 (starvation), 114, 117 (deforestation), 153 (water shortage), 176 (air pollution), 203 (water pollution), 183 (indoor climate), 289, 323 ("handling" the greenhouse effect).

plistic application of simple calculations to complicated reality.[95] Thus, speaking of agriculture he claims that "there is no 'wall' for maximum yields in sight"; yet fails to mention that higher yields will require higher supplies of other inputs, notably energy, water, and chemicals. As for water, "we are beginning to experience limits", and in developing countries redistribution from irrigation to industry and households "will probably involve a minor decline in the potential for agricultural production". What a drastic increase in energy consumption would mean to the environment is indeterminable. The problem remains whether such a development is possible or, in other words, whether it is sustainable – a concept that Bjørn Lomborg, characteristically, hardly ever mentions.[96]

Fourthly, Lomborg shows no concern about adopting welfare computations and cost-benefit analyses "with a discount rate of minimum 4-6 per cent",[97] which effectively exclude anything happening more than 30 or 40 years from now from the calculations and suppresses the extremely painful problem of allocation between generations.

Lomborg makes an uncritical use of simple extrapolations, assumptions on possibilities for substitution, and rash price calculations, especially in his section on the greenhouse effect,[98] which actually deals with the future. This part of the book is devoted, first of all, to exposing "the basic uncertainty of climate sensitivity". Thus "throughout the past 25 years the basic range of estimates of global warming from CO_2 has *not* improved", and "present models seriously overestimate CO_2-induced warming".

Curiously, uncertainty is no longer an issue when it comes to assessing the optimum expenditure for controlling global warming: "economic analyses clearly show that it will be far more expensive

[95] Further examples are given by Kirkman, "Review of Lomborg (2001)" cit., pp. 434-425.

[96] Lomborg, *The Skeptical Environmentalist* cit., pp. 108, 156, 155, 91. For a critical review of the concept of sustainability, cf. Castro, "Sustainable Development" cit.

[97] Ibid., p. 314.

[98] Ibid., pp. 258-324.

to cut CO_2 emissions radically than to pay the costs of adaptation to the increased temperatures", and "if we go beyond an 11 per cent global CO_2 reduction, the world will lose". Apparently, Lomborg believes economic models are more suitable for analyzing global warming than climatological ones.[99]

Optimal carbon reduction "is 4 per cent of current CO_2 emissions, increasing to 11 per cent by 2100", neither more, nor less, according to the DICE-model.[100] Here we could truly talk about uncertainty or rather arbitrariness (although Lomborg does not), since the DICE-model is based on a number of assumptions that taken individually are quite uncertain. Lomborg's 4 to 11 per cent is the optimum for one among several very hypothetical scenarios, namely the one where it is assumed at the outset that damages are small and where this assumption proves true in 2085. According to Lomborg, the great problem of the greenhouse effect is that we are spending too much money to contain it, since even the greenhouse effect is a "limited and manageable problem". The Stern Review conclude otherwise and testifies that economists are considering climate change increasingly seriously.[101]

Economic models and welfare computations are a superstructure upon models of climate change and open to much more serious criticism, since not only do they rely entirely upon supplementary assumptions, but they also suffer from inconsistencies concerning basic concepts such as discounting, welfare aggregation, and substitutability. If climatological models are "computer-aided storytelling",[102] this is all the more true of economic models.

Price calculations are well suited for marginal decisions in cases where substitution is possible. However, price computations and substitution assumptions become meaningless if critical maximum values are overrun and discontinuity, irreversibility and non-linear effects arise – all of which would call for a precautionary principle, a con-

[99] Ibid., pp. 273, 271, 318.

[100] Ibid., pp. 305-307.

[101] Nordhaus, *Managing the Global Commons* cit.; Lomborg, *The Skeptical Environmentalist* cit., p. 323; Stern, *The Economics of Climate Change* cit.

[102] Lomborg, *The Skeptical Environmentalist* cit., p. 280.

sideration that Bjørn Lomborg evades by ignoring it, by *suppression*. More than most economists, Lomborg is obsessed with calculability, comparability, and rational priorities, and he is so completely trapped in this fallacy that for him cost-benefit analysis defines social welfare and the problem of rational priorities overshadows the environmental problems of the real world. In May 2004, Lomborg called a conference of economists, the *Copenhagen Consensus*, with the purpose of determining how to allocate a given amount of money to prevent a number of threats, including financial market crisis, civil war, climate change, famine, water contamination, diseases, trade barriers, and some other problems. It turned out that the three top priorities were controlling AIDS, fighting malnutrition, and reducing trade barriers, while preventing climate change was ranked at the very bottom. These scientific discoveries were widely publicized by *The Economist*.[103]

Post-modern environmental science

Together with "amazing", "astounding" and "astonishing", "surprising" is Bjørn Lomborg's favourite term,[104] which he usually employs to express his mistrust of gloomy predictions. In his opinion, such predictions are surprising because they are unfounded, and "our unproductive worries" do more harm than good, because "the Litany" (as he calls it) provokes unnecessary fears: "The Litany frightens us".[105]

Lomborg explains and dismisses worries as a kind of psychological inclination to doomsday prophecies on the part of scholars. Many economists share this *suspicion* and ridicule the worries expressed by Jevons in 1865 and those of other worried economists of the past.[106] *The Economist* used to admire this kind of wishful thinking

[103] *The Economist*, 5 June 2004, pp. 59-61; 6 March 2004, p. 76; 17 April 2004, p. 76; 24 April 2004, p. 84; 1 May 2004, p. 80; 8 May 2004, p. 82; 15 May 2004, p. 75.

[104] These terms are used over and over, e.g. Lomborg, *The Skeptical Environmentalist* cit., pp. 38, 73, 119, 123, 171, 227, 245, 252, 315, 331, 339.

[105] Ibid., pp. 331, 351.

[106] Maddison, *Dynamic Forces in Capitalist Development* cit., p. 58.

about the environment and echo it regularly.[107] One article in this vein, "Plenty of Gloom",[108] drew 47 pages of serious comment in the journal *Environment and Development Economics*,[109] which could be read as a comment to Bjørn Lomborg, too.

The *suspicion* argument comes in two main varieties: the reduction of opponents' motives to the psychopathology of doomsday sayers, and their reduction to ordinary materialistic interests.

Bjørn Lomborg mostly latches onto the fact that erroneous and exaggerated claims about the state of the environment have been advanced in the past, which motivates his wholesale distrust in scientific expertise and makes him caution against "taking" the expert of the day "to be anything more than the evidence of one party".[110] In this derailed representation of the world, the environmental sciences lose their objectivity and are reduced to political instruments. Lomborg explains why "we get primarily negative news" about the environment as a power struggle: the struggle of environmental organizations for political power, the struggle of news media for intellectual power, and the struggle of research institutions for economic power – "there are many grants at stake".[111]

Lomborg represents a very contemporary and extremely dangerous trend, namely the postmodern, whose credo is: there is no such thing as truth, and there is no such thing as justice; for they are both subjective. There is only power, which, admittedly, is also subjective, yet, unlike truth and justice, is intelligible and conspicuous.

[107] *The Economist*, 20 December 1997, pp. 21-23; 11 September 1999, survey pp. 29-31; 4 August 2001, pp. 63-65; 5 June 2004, pp. 59-61; 18 December 2004, pp. 94-96.

[108] Ibid.

[109] C. Perrings et al., "Policy Forum: Environmental Scares – The Club of Rome Debate Revisited", in *Environment and Development Economics*, 3, 1998, pp. 491-537.

[110] Bjørn Lomborg in the Danish newspaper *Politiken*, 12 January 1998.

[111] Bjørn Lomborg does admit that "primary research in the environmental field ...appears to be professionally competent and well balanced" (p. 12); still, his key message is that the driving force of research is to grab more and bigger grants, Lomborg, *The Skeptical Environmentalist* cit., pp. 12, 34-42, 36, 37, 254, 411, note 2109.

Using the same psychological and politological method as Lomborg's, one is tempted to ask the opposite question: how can informed readers (of *The Economist* as well as many other publications) fall such easy prey to the ideological distortions of economics such as Lomborg's? This must be explained in terms of the functions of ideology, notably that of making it easier to cope with difficult and bewildering problems: *mundus vult decipi*. This problem of *suppression* as self-deception or psychological repression seems to be more widespread than the opposite problem evoked by Lomborg, namely the doomsday-saying psychology. It is related to the persistence of two elements of modern mentality, materialism and short-sightedness, both strongly rooted in the nature of people and society. As Lomborg correctly points out, wealth has never been greater than to day. Yet wide circles in society, including the wealthier, are feeling material problems as increasingly urgent. Material value is the common standard that allows comparability and perfect computation. Today materialism has become respectable, as our current worship of the free market bears out. In that sense, we are all Marxists: "They do this without being aware of it";[112] but, unlike Marx's, present-day materialism is not a critical one. As Marx said about economics:

> In vulgar economics, the well-meaning good intention of finding the bourgeois world to be the best of all possible worlds makes any desire for truth and any impulse towards scientific investigation unnecessary.[113]

The environment: science, politics, economics

In Bjørn Lomborg, Dr. Pangloss has found yet another double, and one just as lifelike as the real one described in Voltaire's *Candide* in 1759, who

> taught metaphysico-theologo-cosmolonigo-logy. He could prove to admiration that there is no effect without a cause and that in this best of all possible

[112] Marx, *Capital* cit., vol. I, pp. 166-67.
[113] Ibid., vol. III, pp. 983.

> worlds, the Baron's castle was the most magnificent of all castles, and madame the best of all baronesses. It is demonstrable, said he, things cannot be otherwise than as they are, for as all things have been created for some end, it must necessarily be for the best possible end.
>
> Therefore, they who assert that everything is right, do not express themselves correctly: they should say that everything is best.[114]

Bjørn Lomborg's version of economics is a caricature, although too dangerous to be funny. Fortunately, it is also becoming a relic of times past, and a more realistic understanding is finally gaining ground. Influential economists are taking environmental issues increasingly seriously, as borne out by the manifesto of Arrow et al. (1995) as well as Arrow et al. (2004), the impressive Stern Review (2006), and Weitzman (2007).[115] This trend is reflected even in *The Economist*. In 2001, the journal praised Lomborg loudly. The overlaudatory reviewer declared that "*The Skeptical Environmentalist* is a triumph" and "a modern classic of green demythology" and concluded "more power to him".[116] In 2006, Bjørn Lomborg was dismissed as a "hyperactive Danish... controversialist".[117]

In conclusion, I'd like to make some considerations on the contribution of economics as regards the supply and optimal use of resources and the environment. Three different classes of issues can be singled out and considered separately, relating, respectively, to the spheres of science, politics, and economics. Compared to the first and second class, the third one, that of economic issues, is a very minor one.

[114] F.M.A. de Voltaire, "Candide ou l'optimisme", in *Les Œuvres Completes de Voltaire*, Vol. 48, The Voltaire Foundation at the Taylor Institution, Oxford 1980, pp. 119-120. Ironically, the target of Voltaire's persiflage were the great Leibniz's writings on the *théodicée* problem.

[115] Arrow et al., "Economic Growth" cit.; K. Arrow, P. Dasgupta, L. Goulder, G. Daily, P. Ehrlich, G. Heal, S. Levin, K.-G. Mäler, S. Scheider, D. Starrett, B. Walker, "Are We Consuming too Much?", in *Journal of Economic Perspectives*, 18, 3, 2004, pp. 147-172; Stern, *The Economics of Climate Change* cit.; Weitzman, "A Review of The Stern Review" cit.

[116] *The Economist*, 8 September 2001, p. 97; 5 June 2004, p. 59.

[117] Ibid., 9 September 2006, survey p. 4; 16 December 2006, p. 84.

The first class of problems includes sustainability, the environmental effects of economic activity, the magnitude and nature of reserves, and the available technical options, including possible replacements in consumption and production. These are scientific problems and must naturally be investigated using the methods of the natural sciences. Using economics in this sphere is wrong and ideological. Examples abound: neglect or outright denial of the finiteness of nature, from Friedrich Engels to Lomborg's refrigerator parable; conclusions about scarcity based on a scrutiny of price trends on some raw material markets; extrapolation of historical trends; unfounded assumptions about substitutability and automatic technological progress; presumptions that economic growth improves the carrying capacity and resilience of the environment.

That the planet Earth "is so incredibly much larger than all our needs"[118] is true given a sufficiently short – very short – time horizon. Yet we need to apply just a minimum of foresight to see that conclusion for what it is: a *suppression* of the truth. The very basis of contemporary environmental awareness is that the resources of the planet Earth are limited in relation to human global activities. Failure to realize this is a problem of judgment that permeates economic ideology as well as Bjørn Lomborg's book.

The second class includes the painful political and moral issues of how we want to provide for the welfare of future generations and allocate the rights to exploit resources and the environment among rich and poor people. Relying on economics and cost-benefit analysis for solutions to these major problems is equally wrong and ideological. It boils down to the δ and η of the Stern Review (2006), namely the many attempts to solve the problem of the rate of discount and balancing resource distribution between the rich and the poor in a simple and consistent way. Simple it is indeed, and dangerously so, as the inherent contradictions are only suppressed, not overcome, simply because the real world, including man, is contradictory.

When comparing welfare across generations and across the globe

[118] Bjørn Lomborg in the Danish newspaper *Politiken*, 19 January 1998.

under uncertain conditions, the quest for consistency and rationality is misleading and achieves precisely the opposite: a distorted and irrational perception of reality. Growth rates and discount rates, on which computations rely, are largely guesswork. Cost-benefit analyses over long time spans invariably end up in paradoxes.[119] Even for modern physics time remains a mystery.

The main justification for the quest for rationality is the assertion that priorities are established, at least implicitly, and therefore they had better be explicit and rational. This is a case of the application of a simplistic principle to complicated reality: we *must* chose, *ergo* we *can* chose. Sometimes it might be wiser to realize our ignorance and the impossibility of consistent choice, witness Aeschylus, Shakespeare, Racine, Corneille and Schiller. Here is an example: would it not have been better if the wealthy princes of the Italian *Rinascimento* had spent resources on feeding and educating the poor rather than erecting the *Duomo* in Firenze and financing the creation of treasures of art? It is impossible not to say yes, but to say yes is equally impossible; the poor are still with us, but an affirmative answer would imply a rejection of philosophy, literature, music, architecture, science, religion and all other expressions of culture and civilization.

Now for the third class of problems. What is the contribution of economics? Well, economic analysis is squeezed between the first two classes of problems, so that there is little room left for it. Its contribution is to examine the effects of economic incentives under various institutional arrangements, once the answers to the first two classes of problems are known. Adequate supplies and optimal use of resources is a technical, scientific and political issue, not primarily an economic one.

Yet economics can contribute substantially, although marginally, to environmental policy. First of all, there is a need for bookkeeping,

[119] Cf. comments upon Stern, *The Economics of Climate Change* cit., by William Nordhaus and Partha Dasgupt, *The Economist*, 16 December 2006, p. 8; Weitzman, "A Review of The Stern Review" cit.; Nordhaus, "A Review of The Stern Review" cit.

for tracing the short-term macroeconomic effects of environmental changes and policies. Secondly, economics gives useful insights into resource price developments in a competitive market. Thirdly, economic analysis is useful for analyzing institutions, to assess the usefulness of incentives and the effects of various policy instruments (e.g. analysis of pollution taxes vs. tradable permits).[120]

Fourthly, there is an important lesson about environmental policy and democracy to be learned from economics. At the core of environmental policy issues is the inborn myopia of human nature and an inability to assess future hardships against present gains. Long-term foresight is not the forte of the free market. Nor is it the forte of politicians. Thus, the need for long-term decisions presents a problem for the two principal mechanisms of democracy: the market and the political system. However, examples exist of successful coping with the time problem. In monetary policy, the problem is the balancing of presents gains (printing money instead of collecting taxes) against future hardships (destruction of the monetary system). In some cases, a workable, democratic solution has been achieved, namely that democratically elected politicians devolve monetary authority to an independent central bank, which enjoys confidence and is bound by strict laws. A more extreme form of independent monetary authority is the "currency board" system, as found in

[120] Cf. note 40 above. Thus, as part of the ongoing efforts towards reducing nitrogen leaching from agriculture to Danish waters, the cost-efficiency of various measures (growing late crops, better utilisation of animal manure, reducing the use of mineral fertilizer etc.) was computed, and it was estimated that efficiency gains from applying a tax, where the tax base for individual farms is nitrogen input in fertilizer and fodder less nitrogen contents in farm output, would be 20% as compared to administrative instruments used so far. L.G. Hansen, B. Hasler, "Is Regulation of the Nitrogen Loss to the Environment Cost-Efficient?" (in Danish), in *Miljøvurdering på økonomisk vis*, K. Halsnæs, P. Andersen, A. Larsen (eds), Jurist- og Økonomforbundets Forlag, Copenhagen 2007, pp. 55-59; B.H. Jacobsen, J. Abildtrup, M. Andersen, T. Christensen, B. Hasler, Z.B. Hussain, H. Huusom, J.D. Jensen, J.S. Schou, J.E. Ørum, *Costs of Reducing Nutrient Losses from Agriculture. Analysis prior to the Danish Aquatic Programme III*, (in Danish with an English summary), Report No. 167, Fødevareøkonomisk Institut, Copenhagen 2004.

several former British colonies and recently in the Baltic states and Argentina. Correspondingly, one could imagine the institution of "environmental boards".

Hopefully, changing attitudes among influential economists herald a new, constructive role for economics in environmental policy. It is badly needed, as moral reorientation is required if we want to move ahead in less utter darkness than we have so far – this is the true lesson of history – and if we want to approach the global environment and global distribution – the big challenges of our time – in a civilised manner without relying on the familiar regulatory mechanisms, namely wars, famines, migrations, and pandemics. The Gulf and Iraq wars may have been about Kuwaiti and Iraqi democracy, but Middle East oil extraction was certainly not an insignificant consideration.[121] As for the foreseeable future scarcity of oil, American military interest may be a more reliable indicator than the presently increasing prices of oil.

[121] Cf. note 3 above.