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The Two Faces of James Lovelock

An Alternative Social and political View

By

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Midday
Midday. A corner of the deserted beach.
The huge, deep, open sun on high
Has chased all the gods from the sky.
The harsh light falls like a punishment.
There are no ghosts and no souls,
And the vast, ancient, solitary sea
Loudly claps its hands. [i]

Sophia de Mello Breyner Andresen
Cited With Permission From The Leaflet Of Casa Branca Beach & Golf Hotel, Vila Nova De Gaia, Porto

Abstract[ii]

According to Lovelock's Gaia Theory, the present favourable conditions for life result from an instable equilibrium, caused by negative interactions between living organisms and material environment. If such equilibrium is disturbed, the negative interactions may shift into positive interactions, resulting in a non-linear transformation towards a new, for life very unfavourable, equilibrium. As these interactions are not taken into account in the IPCC reports, his predictions of the consequences of our present interventions, are much more alarming than those of IPCC.
Gaia Theory is based on broad insights from Earth and Life sciences. Whereas Lovelock bases Gaia Theory and predictions from Gaia Theory on scientific insights (his first face), he does not derive solutions from a scientific theory that includes insights from behavioural and social sciences. That implies that his solutions are not very convincing and mainly focused on Britain rather than Gaia itself (his second face).
Fundamental solutions need to change our institutions in such a way that short-term goals are forced to be in line with long-term ones. Moreover solutions should solve not only energy problems, but also other urgent problems in a proactive way. Three of such solutions are elaborated:
- Regional organizations for solar energy plants in deserts and a High Voltage Direct Current (HVDC) grid and a worldwide ban on unsustainable electricity use after 2050;
- Local cooperative organizations for the production of decentralized sustainable electricity, heating, and cooling;
- A sustainable economic growth index.

1. Introduction

I read James Lovelock's *The Vanishing Face of Gaia. A last Warning* (Lovelock 2009), with a view on the beach of the Atlantic Ocean in Vila Nova de Gaia. Vila Nova de Gaia is the sister city of Porto (Portugal) on the other side of the Douro. Looking up from my book, I could hardly imagine the terrible consequences of Lovelock's predictions for such a nice place on Earth.

My visit to Vila Nova de Gaia came close after a Learning Journey to Greenland, organized by the Tällberg Foundation. We stayed at Illulisat, one of the places where the Icefjord Glacier comes into the ocean. We learned and observed how the glacier withdrew 60 kilometres since the beginning of the industrial revolution in the second half of the 19th century. In the last year, not less than 15 kilometres were added to it! This large and alarming withdrawal is just one of the indications that the rise of the average world temperature, the melting of the ice at the North Pole, the size of the dark blue deserts in the oceans, and the increase in CO_2 concentration in the atmosphere are larger than predicted in the computer simulations that are the basis of the IPCC reports. These alarming empirical data about climate change and its effects were the starting points for the Greenland journey presentations of the climatologists Dorthe Dahl-Jensen (University of Copenhagen, Denmark) and Johan Rockström (Stockholm Environment Institute) as well as for the book of Lovelock.

2. Lovelock's first face

Lovelock and his associates developed in the 1980s Gaia Theory. Gaia Theory sees Earth as a self-regulating system in which the totality of organisms, the surface rocks, the ocean and the atmosphere are tightly coupled as an evolving system. The goal of the system is the regulation of surface conditions to be as favourable for contemporary life as possible (p 166). Central in the theory are negative interactions between different phenomena, resulting in an instable, for life favourable, equilibrium. As an example of such negative interactions, is the increase of CO_2 concentration in the atmosphere in the past due to increasing temperatures. The increased CO_2 concentration results in larger plants and woods, which on its turn results in a reduction of CO_2 concentration and lower temperatures. Many others of such negative feedbacks can be and are given in Lovelock's book. The feedback between living organisms and material environment is essential for our understanding of the Earth as a self-regulating system and for the predictions about future climate effects. If a self-regulating system is seriously disturbed, however, negative interactions may not work anymore, on the contrary may shift into positive interactions that seriously increase the problem. Such positive interactions result in non-linear developments, for example in future temperature increases. Moreover, if a self-regulating system is seriously disturbed, it may result in a new, much less favourable, stable condition that can last for a very long period.

On the basis of his Gaia Theory, Lovelock disputes the predictive power of the dominant climate models. These models, on which the IPCC report are based, do not include interaction effects and consequently predict a rather linear increase of temperature with increased CO_2 emissions and a gradual decrease in temperature when we stop the large CO_2 emissions. This results in too

favourable predictions in the near future and the false belief that a large increase in temperature can be corrected by simply reducing CO_2 emissions. Instead, Lovelock predicts that we will experience much larger, shock wise increases of temperatures in the near future, resulting in a for us and other living organisms very unfavourable new equilibrium that may well remain stable for 100,000 years. Also Dorthe Dahl-Jensen and Johan Rockström expressed that the linearity of the present climate models is a very important and misleading shortcoming of them. With this knowledge, I read the above poem with completely different eyes as an almost apocalyptic expression of the unfavourable sun and sea conditions in Vila Nova de Gaia over twenty to thirty years.

In the past 400,000 years, temperature and CO_2 level fluctuated very closely with one another. Whereas in the past, CO_2 levels followed temperature levels, our present interventions since the industrial revolution changed that order. More importantly, the present CO_2 concentration (390 ppm) is already much higher than in earlier extreme warm periods. We simply do not yet experience large temperature increases due to the time lag required to increase the temperature of the ocean water. Taking that into account, the present concentration of CO_2 will cause already more than 2^0 C. Lovelock gives many examples of positive interactions we may expect in the near future due to our present interventions. To mention some of them:

- The increasing temperatures will result in melting of the icecap at the North Pool in the summer. The icecap absorbs only 20% of the sunlight, whereas water absorbs 80%. This will result in an increase of temperature as big as the future temperature increase of the present CO_2 concentration.

- The temperature increase and pollution will result in acidification of the Oceans and serious reduction of the CO_2 absorbing capacity of the oceans. It may also result in instability of the permafrost in the oceans, resulting in large eruptions of methane (with an effect on temperature four times as high as CO_2). Large emissions of methane are also to be expected from Siberia if the ice melts there.

- The tropic forest in the Amazon area will die due to water shortage, again reducing the CO_2 absorbing capacity of the earth dramatically.

As 6 to 9 billion people with their livestock already produces more than 50% of all CO_2 emissions, Lovelock is very pessimistic whether a timely solution will be possible. In any case, the political and IPCC intention to reduce CO_2 emissions with 60% in 2050 is completely insufficient and is likely to result in an Earth where only a few areas far North (from Great Britain to Scandinavia and Canada) and South have sufficient low temperatures and water for food production. This will result in a forced reduction of mankind to 10 to 100 million people.

Gaia Theory is a real scientific theory, based on a well-elaborated theory, tested on the basis of observations and experiments. Its predictions are based on a computer simulation model where at least some interactions between living organisms and material environment are taken into account. As with many radical new theories, Lovelock experienced large difficulties to get access to international journals, but since 2001 more and more scientists take his theory

seriously. Given the enormous consequences, he predicts, we can better do the same.

As a scientist, specialized in political decision making processes, I fully agree with Lovelock's vision that scientific and the political processes are fundamentally different from one another. In science, number of adherents does not count. New theories are often based on intuitive ideas that are subsequently further elaborated into theories and tested on their empirical value in observations and experiments. Consensus does not matter in science, on the contrary may hinder further new insights. Arguments and convincing empirical corroboration of theoretical predictions on the basis of good research designs count. In politics, however, consensus and political cloud counts. Decision making is based on a simultaneous mix of three processes: persuasion, harmonization of interests through exchange processes, and enforcement through power and authority (Thomson et al 2006). Which of the three processes is dominant, is situation dependent. What counts is that at the end there is sufficient social and political support to make and implement the decisions. Lovelock rightly sees the unanimity of a 1000 scientists behind the IPCC reports as the result of a political and not as the result of a scientific process. He claims that certain conclusions in the IPCC reports have been moderated to make them political acceptable and perceives that as one of the causes why the IPCC predictions are too moderate. He attributes the false conclusions to the fact that IPCC scientists do not integrate insights from and theories of earth and life sciences (as Gaia theory does), and consequently miss the above-mentioned serious effects of positive interactions between material environment and living organisms.

3. Lovelock's second face

Given all these positive elements in the vividly written and polemic book, I regret that Lovelock shows a second, completely different face in his book as soon as he shifts from Gaia Theory to solutions. His proposed solutions are *not* based on broader scientific insights from the behavioural and social sciences, but on a narrow political vision. Is it too much to expect that such a broad scientist (as Lovelock) is able to integrate not only earth and life sciences but also behavioural and social sciences? Lovelock fails in this respect. Whereas Gaia Theory concerns the total Earth, his solutions are almost all focused on Britain. Born in the era where Britain still ruled the world (Lovelock is 89 years old), he seems to believe that Britain has to save mankind from extinction. He is advocating throughout the whole book that Britain should build as many nuclear energy plants as possible as the cleanest electricity option. His biggest enemies in Britain are the Greens who want to build large windmill parks on land and in the sea with a lot of subsidies from the government, outside Britain the European Union who is promoting the same. I agree with him that the large windmills at land and in the sea are the wrong options to pursue, as they are expensive, require large areas of fruitful land, and require other energy plants to fill the gaps with too little or too much wind. But I disagree with him that nuclear energy is *the* alternative, although he convinced me that it is a better option than the windmill parks. The reason is that both solutions try to solve the energy

problem in isolation from the other important problems we face.[iii] We should, however, seek for proactive solutions that simultaneously solve several of them.

4. Alternative social and political solutions

Tällberg Foundation identified ten natural borders that we are likely to cross and crossing any of them endangers seriously future life conditions on Earth (see Figure 1). Central in Lovelock's analysis is climate change due to the huge CO_2 emissions. As we have seen, these emissions are not only induced by fossil energy use, but also by the size of the human population. Climate change will have serious consequences for many other planetary borders as well, particularly for Ocean acidity, availability of fresh water, availability of sufficient land for agricultural land use, terrestrial biodiversity. *Proactive* climate change solutions solve or relieve, when possible, the other problems as well and should certainly have no negative effects on them.

Figure 1: Exploring Planetary Boundaries[iv]

In a similar way as Lovelock identified important negative interactions in the Earth system that cause an instable equilibrium, social systems are characterized by similar negative interactions that establish instable equilibriums in social life, and if disturbed too much, may shift into positive interactions, accelerating problems and resulting into a new, not always more optimal, equilibrium. As an example, let's consider the interactions between population size, health care, and welfare. If health care and welfare are bad, having many children assure care to

the elderly, but deceases keep the size of the population low and in control. If health care cures many deceases, but welfare is still below a certain minimum, still many children assure care at older ages. We know that good health care and a minimal level of welfare, on the other hand, reduces population sizes because children are not anymore the main resource for care to the elderly. The 20 percent of the world population with health care and welfare indeed stabilize in size, but the 80 percent of have-nots do not, as they have better health care but still lack the minimal level of welfare. The present disequilibrium becomes really bad, as the 20 percent of the world population realizes welfare in an unsustainable way, causing huge climate, natural resources and future water problems. These latter problems get dramatic proportions now more than 20 percent of the world population becomes successful in generating welfare in the same unsustainable way as the 20 percent did so far. Energy, population size, and water problems are interlinked therefore and require integrated solutions, crossing traditional policy borders, very much in line with the Lovelock's thinking in Gaia Theory. We therefore have to think in much more fundamental solutions than Lovelock did, crossing borders between scientific disciplines and policy sectors. We have to solve simultaneously a social problem and a problem of disharmony between the present social and natural systems. And we know now, that Gaia will solve these problems in a, for us, very unpleasant way, if we do not solve them by ourselves. In Lovelock's words:

> "…we have the intelligence to begin to expand our minds to understand life, the universe and ourselves; we can communicate and exchange our deep thoughts and keep them outside our minds as a permanent record. We have all this but are quite unable to live with one another or with our living planet. Our inherited urge to be fruitful and multiply, and to ensure that our own tribe rules the Earth, thwarts our best intentions." (p 156)

In other words, we realize now, thanks to Lovelock's analysis, more than ever before, that we are dealing not only with natural boundaries, but also with a humanitarian problem. Not solving the problems around the natural borders implies that we are guilty for starvation of billions of people and many species of other living organisms, giving priority to our unsustainably generated welfare above a wider shared social well being in harmony with nature. The solution can therefore not just be a technological one, but has to be a social one as well.

In seeking such integrated solutions for harmful interactions at the system level, we should realize that such interactions at the system level result from a multitude of choices at the micro-level of individuals. We therefore have to change the conditions at the individual level to get the proper solutions at the macro level. This implies that we have to accept that human beings, as all animals, tend to give higher priority to short-term goals than to long-term ones and that these two are often not in line with one another. Social problems and disharmony with nature particularly arise when institutions do not correct this natural inclination, but strengthen it. And that is precisely the case with the main present economic and political institutions: the bonus system, linked to shareholder value in the large economic institutions, the four-year elections in politics, and the large attention for incidents in the mass media. The result of this is the priority of financial goals above other goals, like job and client satisfaction

and care for the long-term social and environmental consequences; the drive to seek larger scale solutions for any problem, with the important consequence that we loose our connection with our local social system and do not feel responsible for our own natural surrounding. What is needed, are institutions that enforce or at least strongly promote that our short-term goals (and behavioural choices based on them) are in line with the long-term ones and re-establish our mutual interdependencies in our own social environment.

To be effective, the institutional changes and measures should simultaneously result in sufficient sustainable welfare for the 80 percent have-nots to reduce birth rates, transformation of the welfare of the 20 percent haves into sustainable welfare, and in relieve of present and to be expected water problems. The following three institutional changes and policies will bring us miles closer to the required solution:

1. *Regional organizations for solar energy plants in deserts and a High Voltage Direct Current (HVDC) grid and a worldwide ban on unsustainable electricity use after 2050.* There should be a global agreement (in Copenhagen 2009?) to form regional groups of states and companies for the construction of solar energy plants in deserts and an HVDC grid for the worldwide production and distribution of sustainable electricity.[v] An example of such a regional organization is the Union of the Mediterranean that was created by the European Union and the Mediterranean States in 2008 on the initiative of President Sarkozy of France. If we start now, there is no necessity to produce unsustainable electricity in any part of the world from 2050 on. The technology is available (as Lovelock notes himself) and the modern HVDC grid is loosing not more than one percent of energy over a distance of 1000 kilometres. This solution also contributes considerably to the solution of water problems as the energy plants can be used simultaneously for the desalination of water. It will create the required infrastructure to spread sustainable welfare all over the world, reducing population sizes in a human way. The deserts are well distributed throughout the world to make this an effective worldwide solution.
   There are strong arguments why electricity production cannot be regulated by market forces alone. Electricity companies have too many short-term stakes in the present energy plants to be expected to make the shift by their own. Moreover, when the sustainable energy program becomes successful, we may expect that fossil energy will become available for very cheap prices (the so called green paradox, see Sinn 2008). The states should, therefore, agree on a worldwide ban of unsustainable electricity production from 2050 on and an obligatory stepwise reduction program till then. CO_2 emission rights help, but will not be sufficient for such a complete shift.

2. *Local cooperative organizations for the production of decentralized sustainable electricity, heating, and cooling.* Presently, new technologies are available for the local production of sustainable electricity, heating, and cooling. These technologies are particularly effective at the level of neighbourhoods and can already compete with the present unsustainable energy production. If we create cooperative organizations for the local production of energy, people in neighbourhoods are transformed from consumers into producers of energy,

increasing their shared interests and, as a consequence of that, increasing social cohesion and concern with the environment at the local level. The local cooperative organizations can create regional and national cooperative organizations for support and efficient infrastructure. In that way, financial goals are subordinated to and in harmony with the long-term goals of the members of these organizations and the environment.
Another important advance of these new sustainable energy alternatives is that they do not necessarily require large infrastructure at regional or national levels. This implies that they can be very effective for developing regions with primitive or without infrastructure. The states should agree that dumping old, polluting cars and other engines to developing regions is not allowed anymore. Rather, programs should be developed and financial means used for local sustainable production in those regions. This guarantees quick and sustainable development in these regions, followed by a reduction in population size without the present disadvantages of the unsustainable welfare in the developed regions.
Another important characteristic of these solutions is that sustainable energy is connected to the solution of other problems as well: they create social cohesion and concern with the own environment; some of them use green houses to produce heating, cooling, and electricity for houses and offices, connecting local energy with local food production; some of them save water use, like vacuum sewerage; some of them produce sustainable energy by gasification of garbage, solving the worldwide garbage problem as well.

3. *A sustainable index of economic growth.* The present economic growth index needs urgently be revised in such a way that the net use of scarce natural resources is subtracted from the overall economic growth. Such a redefinition corrects the anomaly that we can have positive short-term economic growth together with negative opportunities for economic welfare and growth in the future. The anomaly creates widely spread false beliefs about our present and future welfare. As the present index of economic growth is one of the most important indicators for shareholder value and political success, the proposed redefinition brings this important indicator in line with the interests of both the present and future generations (see Serageldin 1996 and Stokman 2009).
A worldwide application of emission rights covers the idea that negative externalities have to be charged and included in the prices and is as such an important instrument in the transition process. The proposed redefinition of economic growth covers not only the negative externalities, but also the extinction of important natural resources and is consequently an additional important instrument to accelerate the transition.

Let's hope that these institutional changes contribute to a human worldwide solution, rather than a British solution on a very empty and unpleasant Earth.

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[i] In its original Portuguese version the poem reads as follows:

Meio-dia
Meio-dia. Um canto da praia sem ninguém.
O sol no alto, fundo, enorme, aberto,
Tornou o céu de todo o dues deserto.
A luz cai implacável como um castigo.
Não há fantasmas nem almas,
E o mar imenso solitário e antigo,
Parece bater palmas.
Sophia de Mello Breyner Andresen

[ii] I thank Peter Wrenfelt (U&W (you and we), Rita Smaniotto (ICS University of Groningen), Pablo Smolders and Caroline de Vries (Dutch Group) for their comments on the first draft

[iii] That is also the case with Lovelock's broader discussion of energy resources and their effects on climate change in the chapters 4 and 5.

[iv]Source: www.tallbergfoundation.org/TÄLLBERGFORUM/TällbergForum2008/Exploringplanetaryboundaries/tabid/487/Default.aspx

[v] See for more detailed information: http://www.desertec.org/concept.html