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Entering the anthropocene: 'Geonauts' or sorcerer's apprentices?

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Abstract
The Second Earth Summit to be held in Rio de Janeiro in 2012 will coincide with the ratification by the International Commission on Stratigraphy of the concept of a new geological era, the anthropocene. This term emphasizes the acknowledgement of the increasing impact of human intervention on the future of the Spaceship Earth. Humanity is thus at a crossroads and we need, more than ever, to abide by the principle of responsibility. We must mobilize ourselves to learn how to speedily mitigate deleterious climate change without losing sight of the urgent need to reduce the abyssal social disparities. The immediate imperative is to propose long-term development strategies to go hand in hand with an *aggiornamento* of long-term democratic planning. Such strategies must rely on two pillars: food security and energy security. Last but not least, the United Nations ought to take advantage of the forthcoming Earth Summit to set in motion a global transition towards a socially inclusionary and environmentally sustainable path.

Keywords
aggiornamento of democratic planning, anthropocene, climate change, Earth Summit Rio 2012, evergreen revolution, food and energy security, green economy and social inclusion, principle of responsibility

Résumé
Le Second Sommet de la Terre qui se tiendra à Rio de Janeiro en 2012 coïncidera avec la ratification par la Commission Internationale de Stratigraphie du concept d'une nouvelle ère géologique: l'anthropocène. Ce terme souligne la reconnaissance de l'impact croissant de l'intervention humaine sur l'avenir du vaisseau spatial Terre. L'humanité se

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trouve à un moment décisif et il nous faut plus que jamais accepter le principe de responsabilité. Nous devons nous mobiliser pour apprendre rapidement à mitiger les changements climatiques délétères sans perdre de vue la nécessité urgente de réduire les disparités sociales abyssales. L'impératif immédiat est de proposer des stratégies à long terme allant de pair avec un *aggiornamento* de la planification démocratique à long terme. Ces stratégies doivent reposer sur deux piliers: la sécurité alimentaire et la sécurité énergétique. Enfin, les Nations Unies doivent profiter du prochain Sommet de la Terre pour mettre en œuvre la transition du monde vers une voie socialement incluante et respectueuse de l'environnement.

Mots-clés
aggiornamento de la planification démocratique, anthropocène, changement climatique, économie verte et inclusion sociale, principe de responsabilité, réduction de la pauvreté, révolution doublement verte, sécurité alimentaire et énergétique, Sommet de la Terre Rio 2012

According to Paul J Crutzen and Eugene F Stoermer, a new geological era – *the anthropocene* – started with the industrial revolution. This term has been chosen to emphasize the astounding expansion of mankind, both in numbers and per capita exploitation of the earth's resources: the tenfold increase of human passengers on the Spaceship Earth during the past three centuries to 6000 million, accompanied by a growth in cattle population to 1400 million, a tenfold growth of urbanization in the past century and the near exhaustion of the fossil fuels that were generated over several hundred million years (see Crutzen & Stoermer, 2000).[1] In addition, we could mention that between 1800 and 2010, the output of the world-economy increased by a factor of almost 50, yet about one billion people still suffer from food insecurity (see Diniz Alves, 2011).

The entry into the anthropocene should be seen as an unprecedented disruption in the long history of the co-evolution between our species and the biosphere insofar as 'it is at once the golden age marked by great discoveries, scientific progress, democracy, the lengthening of human life and the era of blindness; we had not seen it coming, we were and would be for ever the most powerful' (Lorius & Carpentier, 2010: 13). The least we can say is that we ought to abide by the *principle of responsibility* as formulated by Hans Jonas (1984).

We might remind ourselves that the first disruption occurred some twelve thousand years ago and has been known as the Neolithic revolution, marked by the domestication of various vegetable and animal species, the sedentarization of human settlements and the very beginnings of urbanization.[2] The second, recognized *ex post* as the starting-point of the anthropocene, was triggered by the fantastic changes brought about by the industrial revolution in terms of demographic growth, scientific and technical progress, for good and evil, two world wars and major upheavals in the geopolitical setting, from the colonial age to the emancipation of the Third World, to which we should add the rise and fall of the Soviet Union.

As a matter of fact, we have been living up to now in the anthropocene without acknowledging it, like the main character of Molière's *Bourgeois Gentilhomme* who did

not know that he was speaking prose. Most likely, the ratification of the new term by the International Commission on Stratigraphy will broadly coincide with the second Rio de Janeiro Earth Summit, scheduled to meet in the middle of 2012.

Changing the time-scale, we should point to the acceleration of history since the end of the Second World War with the following major events briefly enumerated here: the pacific independence of India in 1947 (followed by the outbreak of hostilities between India and Pakistan), the victory of the communists in China in 1949, the Bandung Conference of Afro-Asian nations in 1955 and the recognition of the five principles of pacific coexistence (Panchsheel, proposed by India and the People's Republic of China), the decolonization of Africa in 1960, the invasion of Czechoslovakia in 1968, followed by the fall of the Berlin wall in 1989 and the implosion of the Soviet Union, and, finally, the recent awareness of an impending ecological catastrophe, unless we manage in the next few decades to reduce drastically our planet's greenhouse gas emissions.

Humanity is thus at a crossroads. Will we continue to behave like sorcerers' apprentices moved by greed and locked into 'short-termism' (as rightly stressed by Deepak Nayyar)? Or shall we speedily mobilize ourselves to learn the new function of '*geonauts*', in Erik Orsenna's words, co-pilots of Spaceship Earth, capable of mitigating the deleterious climate change brought about by excessive greenhouse gas emissions without losing sight of the social imperative – the urgent need to reduce the abyssal disparities between the affluent minority and those, much more numerous, who continue to go to bed hungry in spite of the progress achieved by the world-economy?

A caveat should be introduced here. The adaptive capacity is not equally distributed among the human passengers of the Spaceship Earth. One can assume that the Dutch could, were it necessary, strengthen their dykes to protect themselves from the rising sea-levels. However, the same cannot be said for the inhabitants of the Maldives and of Bangladesh, unless the latter can count on the solidarity of richer nations, by no means to be taken for granted in the present international setup.

On a more philosophical level, we shall never be full '*masters of nature*', as thought by Descartes. But we can still hope to contribute to the ascent of man by acting as Pascal's '*thinking reeds*' to reduce the greenhouse gas emissions and thus adapt ourselves to the still plentiful potentialities of various biomes in order to meet the basic necessities of life for the whole population of Spaceship Earth: more than six billion today, at least nine billion by the middle of the century when demographic growth is likely to come to a standstill.

Until now, there has been no reason to listen to Cassandras who claim that our planet – Gaia – will destroy us unless we learn to preserve it and reduce the world population to half a billion equipped with nuclear energy – surprisingly deemed to be the safest (see Lovelock, 2008). Nor should we indulge in unrestricted *epistemological optimism* as illustrated in a recent book edited by Sylvie Brunel and Jean-Robert Pitte (2010). The anthropocene era requires an urgent dialogue between scientists and citizens in order to overcome the narrow confines of technoscience, which has no legitimacy to define its own research programmes (Testard, Sinaï & Bourgain, 2010).

Our long-term future should be thought of as the *unfolding of a civilization of being in the equitable sharing of having* (JL Lebret).[3] Yet, as shown in the path-breaking study conducted by the Barriloche Foundation in Argentina (Herrera et al., 1977) as a response

to the Club of Rome's *Limits to Growth* (Meadows et al., 1972), eliminating appalling social disparities and lifting everybody above the threshold of a decent material life is a precondition for moving towards this higher stage of our history, in which an ever greater parcel of societal time will be consumed in cultural activities in the broadest meaning of this term, and Huizinga's (1955) *homo ludens* will take the upper hand over the *homo faber*.

Our immediate task is to propose long-term development strategies, environmentally sound and socially inclusionary,[4] at the antipodes of the course defined by the unconstrained play of market forces. Left to themselves, markets are short-sighted and socially insensitive, as the present crisis has yet again shown. At the same time, we should reject, at least for the next few decades, the proposition to halt material growth and even start a process of 'degrowth', as suggested by Serge Latouche (2006).

It follows that we must give utmost priority to an *aggiornamento* of long-term democratic planning as the main instrument of governance within each nation and at the global level.

Towards a new planning paradigm for a green and inclusionary economy

As a starting-point, we could use the following quite comprehensive quote:

> The green and inclusionary economy is a new form of organization of productive activities, enabling an improvement in the well-being of humanity and a reduction in social inequalities, while avoiding to expose the biosphere and the future generations to significant environmental risks and ecological scarcity. It deals with the reconfiguration processes of economic activities and infrastructure, in order to bring better returns to natural, human and economic capital investment, at the same time as it reduces the greenhouse gas emissions, uses less natural resources, produces less residues and allows for waste recycling, the generalization of sanitation and the reuse of raw materials and manufactured products. It is an economy that achieves more with less and uses a smaller quantity of material goods and a greater quantity of immaterial and intangible goods and services. The green economy implies forest reconstitution, biodiversity protection, promotion of sustainable agriculture, aquiculture and water resources, as well as urban planning and the nurturing of sustainable transportation and housing. It is an economy which fosters and articulates the society of knowledge with sustainable development, creation of green jobs and decrease in polluting activities, generating the growth of new income opportunities, less consumerism and greater social inclusion. (Diniz Alves, 2011)

This is a tall order indeed. The UNEP (2011) has just released the first comprehensive study of the green economy, rightly aimed at reconciling the twin development goals of environmental prudence and social justice. Fortunately, we are not starting from scratch even though future historians of our time will have some difficulty in explaining the ups and downs of planning over the last hundred years.

Born as the offspring of a war economy, central planning was adopted as the main tool of governance by the Soviet Union, at a moment when the only instrument available to

planners in this huge country was the abacus. It spread to many other countries, both socialist and capitalist, after the Second World War. Even the US government went so far as to advise Latin American countries in the early 1960s to produce development plans as part of the Alliance for Progress launched by President Kennedy to counter the influence of the Cuban revolution.

Paradoxically, planning lost its appeal at the very moment when it could count with new powerful tools associated with the computer revolution. Part of the opprobrium attached nowadays to planning comes from the misdoings of the authoritarian regimes, which used planning as a cover for arbitrary actions. However, the ultimate explanation is to be sought in the implosion of the Soviet Union and the neoliberal counter-reform fostered by the so-called Washington consensus.

The tide is turning once more as the present crisis has exposed as bogus the alleged capacity of markets to regulate themselves.

We owe to M Kalecki, author of a remarkable and pioneering methodology of long-term planning in the Polish economy (Kalecki, 1993; see also Feiwel, 1975: 414–433), the shortest definition of planning: 'planning is variant thinking'.

As a matter of fact, the simple extrapolation of the past trend seldom corresponds to the best possible use of an economy's potential for the satisfaction of the population's basic and less basic needs. Two pitfalls must be avoided: on the one hand, we may encounter bottlenecks which prevent further growth, unless they are taken care of; on the other, it would be a pity not to make full use of the growth potential of the economy, postponing in this way the satisfaction of the population's urgent needs.

At the same time, we must recognize the ethical and political dimension of the trade-off between, on the one hand, more investment, leading to quicker growth and paid for by lower consumption in the short run, and, on the other, greater consumption in the short run, compensated for by a slower long-term growth rate. No algorithm exists to find an optimum. Hence the importance of a democratic setting in which these trade-offs are examined and debated before a decision is taken. Two remarks are in order here.

Quite clearly, the absence or the weakness of this debate was the Achilles' heel of planning in former socialist countries. Furthermore, political leaders were always pressing for the highest possible growth rate, as if the competition between socialism and capitalism were to be solved in this way.[5]

Another limitation of the planning experiences in the post-war period stemmed from the non-inclusion of the environmental dimension. Planning methodologies should incorporate such concepts as the ecological footprint and biocapacity, leading to the distinction between deficit and surplus countries in terms of their biocapacity. International action should be geared to assist the countries with a low footprint to make better use of their biocapacity, while countries with a high footprint should be called to order.[6]

The best way of advancing in this direction would consist in deciding at the 2012 Rio de Janeiro Second Earth Summit that all UN member countries ought to produce, say in a 2-year time span, comprehensive national development plans, facing the double challenge of climate change and of the urgent need to overcome poverty and social inequality.

Such plans, meant to be socially inclusionary and environmentally sound, should be built on two pillars: food and energy security.[7]

Food and energy security

By *food security* we mean an adequate and regular supply of calories and proteins to all members of the workforce and their families, made accessible through markets and self-produced by consumers, both in rural and urban settings, or else distributed by the State and charities, so as to ensure that the workforce is in good enough condition to fulfil its productive functions. According to MS Swaminathan (2004), food security has three major dimensions:

- availability of food – a function of production;
- access to food – a function of purchasing power/access to sustainable livelihoods; and
- absorption of food in the body – determined by access to safe drinking water and non-food factors such as environmental hygiene, primary health care and primary education.

Improving food security calls for further progress in the green and blue revolutions, without forgetting that land reforms, a not so popular theme nowadays, may be in many countries a precondition to moving in these directions.

MS Swaminathan (2004) coined the term '*evergreen revolution*' to highlight a pathway 'where advances in crop and farm animal productivity are not accompanied by either ecological or social harm', and the small producers are the main beneficiaries. According to him, the growing paradox between grain mountains and hungry millions can be overcome by *food-for-ecodevelopment initiatives* managed at the local level by community food banks (CFBs) operated by women's self-help groups. Such CFBs would be instrumental in addressing chronic, hidden and transient hunger with low transaction costs and transparency. Where animal husbandry is important, the CFBs could also operate food and fodder banks.

Other initiatives might include growing food within cities, exploring the potential of small, yet highly productive super-vegetable gardens, using biochar (charcoal) as a soil enhancer following the example of the indigenous populations of the Amazon region that has resulted in the creation of the so-called *terras pretas*, known for their fertility (see Bakewell-Stone, 2010). With biochar we find ourselves on the threshold of a third wave in the green revolution, allowing millions of urban and peri-urban dwellers to improve their daily food consumption[8] and calling for a reconsideration of the rural–urban divide.

Side by side with the advances of the evergreen revolution, we should explore the potential of the *blue revolution*, with its two main components:

- Shifting from fishing to fish breeding, both along the seashores and in the continental waters – rivers, lakes and manmade reservoirs often associated with the building of dams to produce hydroelectricity. There are reasons to believe that the hitherto untapped potential for fish breeding, especially of vegetarian species,[9] is still considerable. The future may belong more to the expansion of pisciculture than that of cattle breeding on account of the environmental harm caused by cattle's methane exhalations and the felling of forests to expand grazing lands.

This expansion should go side by side with increasing the number of cattle per hectare and converting degraded extensive pastures thus released into agricultural land. An important research programme led at the Instituto Socioambiental de São Paulo (ISA) by a team coordinated by Gerd Sparovek pointed out, on the basis of the census conducted in 2006, that at present, pastures account for 158 million hectares, i.e. one-fifth of Brazilian territory, the equivalent of almost three Frances. Around 20 percent of these pastures occupy land with a reasonable aptitude for agriculture (see *Notícias da Amazônia*, 2011).

- Growing microalgae and algae for bioenergy production, a promising technological frontier likely to be operational within the near future.[10] Insofar as the blue revolution transfers the production of animal proteins and of bioenergy from limited agricultural land to yet unexplored sea expanses, it ought to play a major role in long-term development strategies which aspire to improve the living standards of a growing human population, which, as already mentioned, will reach nine billion in the middle of the century before stabilizing.

By 2050, shall we be able to fill the plates of nine billion men, women and children every day? John Parker, in a recent well-documented special report on feeding the world (*The Economist*, 2011) tells us that, though not easy, it should be perfectly possible to feed nine billion people by 2050. It will require boosting yields and reducing harvest losses in Africa, where production averages one ton of grain per hectare, as compared with four to five tons per hectare achieved through the green revolution and the ten tons per hectare obtained at the Rothamsted farm on the outskirts of London, a leading British research outfit. The report ends on an optimistic note:

> There are plenty of reasons to worry about food: uncertain politics, volatile prices, hunger amid plenty. Yet, when all is said and done, the world is at the start of a new agricultural revolution that could, for the first time ever, feed all mankind adequately. The genomes of most major crops have been sequenced and the benefits of that are starting to appear. Countries from Brazil to Vietnam have shown that, given the right technology, sensible policies and a bit of luck, they can transform themselves from basket cases to bread baskets. (*The Economist*, 2011: 18)

An even greater optimism permeates the UNEP report (2011) entitled *Towards a Green Economy – Pathways to a Sustainable Development and Poverty Eradication*. Its authors claim that 'Moving towards a green economy has the potential to achieve sustainable development and eradicate poverty on an unprecedented scale, with speed and effectiveness' (2011: 622). Green economy is defined as *low carbon, resource efficient and socially inclusionary*. The authors of this document go so far as to say that the so-called trade-off between economic progress and environmental sustainability is a myth and that a green economy delivers more jobs in the short, medium and long term than business as usual. The least one can say is that this assertion is yet to be demonstrated. The fad for green has equally spread to other international agencies, such as the OECD (see OECD, 2010).[11]

Energy security refers to the adequate supply of stationary energy and fuels, allowing for increases in labour productivity as well as for the transportation of goods and people.

The main problem here is to phase out the production and consumption of fossil fuels responsible for emitting greenhouse gases in the atmosphere and thus causing global warming which will be instrumental in bringing about, if unchecked, deleterious climate changes; our future as a species may be endangered unless we manage in the next few decades to radically reduce these emissions.

Hence the importance of the search for *new energy paradigms* responding to the three criteria of greater sobriety, greater efficiency and, whenever possible, substitution of fossil fuels by renewables: wind, solar and biomass, the latter subject to the need for respecting the postulate of food security.[12] How fast and how far can we move in these directions? According to the bold and ambitious (over-ambitious?) scenario prepared by the WWF (2011), humanity might shift one hundred percent to renewable energy by 2050, while phasing out nuclear energy deemed costly and too dangerous.

Whither the United Nations?

A final word should go to the United Nations. This, the main international organization, also requires an *aggiornamento.* Beside the long overdue reform of the Security Council, the United Nations ought at last to move in the direction of transferring one percent of the world's GNP from richer countries to those whose GNP per head is well below the world average. It might in addition consider establishing tolls on oceans, as well as an international tax on carbon, so as to substantially increase the funds available for assisting the least-developed countries in their development.

Another urgent task for the UN is to promote meaningful scientific and technical cooperation between countries sharing similar biomes.

Last but not least, the UN should take advantage of the forthcoming Second Earth Summit in 2012 to set in motion the process of defining national long-term plans with a view to their harmonization and coordination, in order to smooth the world's transition towards following a socially inclusive and environmentally sustainable path.

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Notes

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1 See Crutzen & Stoermer (2000); also Lorius & Carpentier (2010: 126): '[L]'anthropocène, cette drôle de petite fenêtre dans l'histoire de la Terre, où l'homme a découvert les énergies fossiles, les a exploitées, consommées, brûlées, et entièrement épuisées, détruisant son atmosphère, ses océans, ses sols, et massacrant le vivant.'

2 See the pioneering book by Gordon Childe, *What Happened in History*, 1942.

3 *Civilisation de l'être dans le partage équitable de l'avoir* ('La civilisation de l'être dans le partage équitable de l'avoir', cited by P Blancher: 'Quel développement? Humain parce que durable'; available at: *www.economie-humanisme.org/Revue360*…). Who will put it better in so few words?

4 The adjective inclusionary (rather than inclusive) has been used by AK Sen.
5 To temper the enthusiasm of growth maniacs, Kalecki had the following joke: the highest growth rate in the short run will be achieved by investing the whole GNP, thus starving to death the whole population.
6 The reader may consult the Global Footprint Network's website: http://www.footprintnetwork.org/en/index.php/GFN/; see also Wackernagel & Rees (1999); Boutaud & Gondran (2009).
7 Furthermore, they should take advantage of recent discussions on economic, social and environmental indicators; see in this respect Méda (2008); Stiglitz, Sen & Fitoussi (2009); and also a critical appraisal of the same by another group of scholars, FAIR (Forum pour d'Autres Indicateurs de Richesse) (2011: in particular pp. 41–42).
8 According to data provided by the NGO Pro-natura International (http://www.pronatura.org/), a biochar-enriched *Super Vegetable Garden* of less than 60 m^2 may provide a balanced diet for a family of 10 with 80% less water consumption.
9 To avoid 'fish cannibalism' among carnivore species.
10 According to Bill Gibbons, from the South Dakota State University, the new generation of ethanol produced from blue algae (cyanobacteria) is around the corner, just 4 or 5 years away (Gibbons, 2011).
11 See OECD (2010). The OECD's work on green growth will form a major part of its contribution to Rio+20 along with the forthcoming Environmental Outlook to 2050.
12 See on this point Dessus & Gassin (2004) and the negawatt scenario, available at: http://www.negawatt.org/V4%20scenario%20nW/scenario.htm.

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