momentum institut

l'anthropocène et ses issues

Three World Models

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Translated by Alexandre Edwardes

"We cannot win against entropy, but we must act as if we could", Marc-Aurèle, (Pensées pour moi-même, p.170) and Ugo Bardi* (conference, 4th of Mai 2011).

**** Ugo Bardi, « Entropy, Peak Oil, and Stoic Philosophy », theoildrum.com, 25 Mai 2011.***

It is vain to claim that we can describe the future as precisely as we can the past. Nevertheless, one of the key concerns of economic and political actors alike is to project their convictions into the future, in order for them to materialize by some self-fulfilling prophecy. Today, despite a much deeper climate of incertitude than the past, a first model of the world's future is trying to impose itself over the people, as heard in the recurring speeches of world leaders. We shall call this model, the "productivist" model. Indeed, once the current "crisis" is averted, our leaders do not seem to doubt their vision of our future, as a "better" continuation of the past. Economic growth – and its associated myths of shared prosperity and peace between all nations - will resume its course on the condition that some more or less "structural reforms", based on a competitive vision of innovation, adaptation and the regulated freedom of the market, are accepted by the people. This is "progress". Causality is perceived as been linear, without any return of the consequences on what has caused them, knowledge is cumulative, well being is defined as "always more", the present is without any foreseeable end. Greatly dominating the discourses of economic and political leaders in Europe and elsewhere, whether left or right wing, this model is incessantly repeated without any fundamental form of criticism from most of the media, or by any unions and associations that all seem to share a naïve optimism over humanity's capacity to overcome every hurdle, despite the incessant counterexamples found throughout history. Thus, a consensual vision of the future that encompasses all popular myths over progress is established, erecting contingent hypotheses as transcendental truths and enforcing mental habits of blindness to reality. In economic and political spheres, this now unique and exclusive framework repeats its doctrine to satiety: "Our main priority is strong, intelligent, sustainable and inclusive economic growth that relies on healthy public finances, structural reforms and investments to stimulate competitivity[1]".

Scientists, thinkers and activists put forward a second model of the world's evolution, in complete contradiction with the first and still marginal in current public opinion. Within a medium-term timeframe, the principal indicators of the world's current state will begin to decline, such as population, food, industrial production and consequently global GDP. In 1972, the Club of Rome[2] published the inaugural text describing this model, which was subsequently followed by numerous other ecologically inspired studies. This model could be called "the bell" model to depict the shape drawn by its growth curves: an explosive start, a peak and finally decline. We shall call it "Augustinian" according to the saying "the world is like a man: he is born, grows up and dies"[3]. Many historians and anthropologists have expressed their research according to this gradual model where time passes in a rhythmic and cyclical manner. Phenomena and systems of all sorts start by a period of development, which is followed by a period of mature stagnation, before finally ending in desolating decay. The theory of peak oil is the paradigmatic example of this model that claims to encompass the quasi totality of global phenomena: "The universe is constituted of cycles. Everything that is born will die: stars, daylight, species, humans and civilizations (…) everything that rises must one day fall. The question is: when will be the peak? (…) Our civilization is used to growth and it is difficult to imagine that growth is a transitional phenomenon. The only thing I know about the future, is that one day, I shall die. We do not like imagining our own deaths, no more than we are enthusiastic about accepting that the production of oil will one day peak and continuously decline until exhaustion (…) Never listen to those who speak of growth without mentioning a peak[4]".

More recently, a third model that depicts the evolution of the world emerged, influenced by physico-mathematical research in the domain of dynamical systems and its vision of the future and of natural and social ecosystems. From the smooth, regular and progressive vocabulary and concepts of the second model, we are now confronted with an arsenal of notions and images composed of ruptures, bifurcations and catastrophes in the variation of systems. This third model is "discontinuous". Sometimes, a small disturbance in the system can cause considerable, unforeseeable and even brutal changes; the amplitude of change is almost impossible to anticipate. The relations of causality are non-linear, in the sense that a consequence can have an effect on its own cause and thus on itself; this implies, amongst other things, the relativisation of extension methodologies concerning tendencies and samplings from observations; it thus gets harder to make predictions on the evolution of a system based on factual data. The description of the system itself is based on the interaction between its own elements, such as the absence of central control and tangled multi-scalar organizations; despite a formal resemblance with liberal economics, this model goes directly against Adam Smith's "invisible hand" as it does not see all agents as selfish, calculating and rational. The dynamics of this model are inspired by the following quote: "In fact, discontinuity controls itself in many ways. Discontinuity is produced because an initially unstable state was suddenly precipitated into a

1 European Council, 28th and 29th of June 2012, conclusions.

2 Donella H. Meadows, Dennis Meadows, Jorgen Randers, William W. Behrens III, *The Limits to Growth*, New York, Universe Books, 1972.

3 Saint-Augustin, sermon 81, § 8, December 410.

4 Jean Laherrère, « What goes up must come down: When will it peak? », draft of an article for *Oil and Gas Journal*, Nov. 1998. http://http://www.oilcrisis.com/laherrere/ogj1998/

more stable one. As such it can be said that discontinuity annihilates tensions within the system[5]".

The Productivist Model

The birth of productivism coincides with the emergence of 18th century industrial societies.[6] It has a vision of social relations that is completely built around the production-consumption nexus: a blind faith in progress, a linear interpretation of passing time, the multiplication of the means of production, the rise of rationalization and of disenchanted societies. Human beings have simply been reduced to producing and consuming subjects. An obsessional form of production-consumption has been substituted to social interactions, goods exchanged have been conceived as metonymical extensions of the people exchanging them, and the commodity fetishism of merchandise reifies rarefies interpersonal linkages. Whether the means of production are collective, as in the ex-soviet system, or private does not change a thing. Indeed, productivism is not specific to liberalism: the USSR was just as productivist as the United States is today, just as communist China is currently as productivist as Japan. The overturning of the political by the economical is inherent to both liberal and Marxist doctrines. The first, establishes production and consumption connected by the market, as the foundation of "good" society. The second on the other hand, asserts that the basis of society is its relationship to production, rejecting all other domains into secondary superstructures that are ultimately determined by the economical. This hegemonic position granted to the economy is the first attribute of productivism: it imposes itself through representations and decisions in human activities, to the detriment of other dimensions of being.

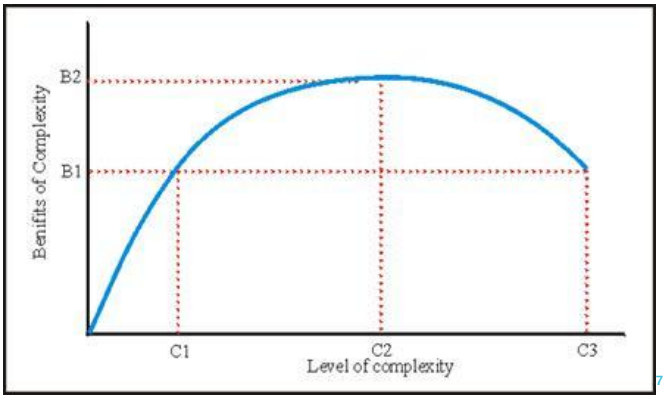
A total indifference for the natural environment is another common point shared by both capitalist and socialist economies. This indifference is not an accidental mistake, but a deep architectural flaw that in both cases, is based on an erroneous representation of nature. Nature is quite simply ignored by these two conceptions. They implicitly consider it as inexhaustible, indestructible and even hostile (shortages, illnesses, climate…), or as a stock of resources available to bolster the growth of productive forces that will require human management and domination. This ecological omission of capitalist and socialist societies is the second attribute of productivism.

Having been cleared from all public debates concerning the usefulness of such and such production and having been completely oblivious to ecological impacts upstream and downstream, the economy has focused on efficiency and the maximization of production in a systematic and ruthless way (this is mirrored in the label "productivist", or in its current triumphant format: "liberal-productivism"). This third attribute of productivism does not only relate to the growth of production and to the mantra "always more", but also includes an objective to maximize efficiency where productivity has to be incessantly increased in order to survive. Productivism embodies excess, *hubris* and a lack of boundaries.

More generally, we shall define as productivist all social structures that seek to maximize production and productivity whilst neglecting the destructive consequences for their social, cultural and ecological environments. The productivist character of such structures (markets, General Motors, agriculture, education, health…) has harmful internal and external consequences that are entirely disregarded by this model. A variety of heterogeneous production factors are tentatively assembled in one fell swoop to create a productive structure in accordance with the dictates of the Solow model, namely human labour, capital and technical progress. In fact, the myth of productivism mobilises the whole of science to support its demiurgic project: indeed as the political (society of real humans) and the natural domains are sources of disorder and hazards, it falls upon us to recreate, fabricate and sell everything according to allegedly indisputable rational-scientific methods. Thus appears the fourth metaphysical attribute of productivism: the will to reconstruct the entire world. To sum up, this first model of the world is totalitarian.

The Augustinian Model

A myriad of natural and cultural phenomena evolve following a bell curve as in the case of peak oil, which we will subsequently examine. In the early days of their existence, such phenomena grow rapidly. Eventually, this growth will decelerate due to various factors, reach a maximum, and attain their peak beyond which they will inevitably decline. The production of boric acid in Tuscany resembles an imperfect bell curve. The same can be said of global phosphate, one of the most important agricultural fertilizers, whose production also evolved following a bell curve. Another such curve has nothing to do with mineral resources, but with the production of whale oil for lighting and whalebones used in corsets during the 19th century. In principle, whales reproduce, but their hunting was so intense that the evolution of the whale population cycle resembles the curve of a non-renewable resource such as oil. More generally, many phenomena will end their periods of growth during this century and start to decline: world population, cereal production, sea fishing, the availability of freshwater per person, the exploitation of certain strategic metals and minerals…



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5 René Thom, « Théorie des catastrophes, sciences sociales et prospective », Revue *Futuribles*, 9, January 1977.

6 This paragraph is based on an analysis found in our book: Yves Cochet and Agnès Sinaï, "Sauver la Terre", Fayard, Paris, 2003.

7 Joseph A. Tainter, *The Collapse of Complex Societies*, Cambridge University Press, 1989, p. 119.

Joseph Tainter can be credited for the expansion of this model to human societies, most notably those he identifies as “complex”. By complexity, we must understand the diversification of social, economic and political roles, the development of infrastructures and the surge in service economies, all of which is supported by high rates of energy consumption. We can generally observe three periods that occur during societal complexification with relation to social benefits. The first characteristic is the strong increase in benefits relative to the costs of complexification (this is the marginal rate, or in other words when the rate between benefits and costs is superior to 1, or in between the origin and point (C1, B1) on figure 1). Indeed, the most simple, general and cheapest solutions are generally the most efficient. A second period starts when marginal cost falls below 1: increasing complexity still produces benefits for society but the costs are much higher than the benefits (see interval between points (C1,B1) and (C2,B2)). Following this decline societies become more fragile, their complexification less attractive, mandatory levies are less well accepted, the population’s trust in those who govern wanes, society slowly breaks down and its constituents loose their solidarity for central political objectives. Finally, once the marginal cost turns negative (past the peak where complexity is beneficial for society, beyond point (C2,B2)), any increase in complexity (and thus in costs) will lead to a decrease in social benefits for society. From here onwards, economic and political breakdown become likely.

Another Augustinian model can be constructed by using a thermodynamic approach of the world.[8] This very simple modelling is based on three stocks: resources, capital and waste. Resources are those factors not yet exploited by a society: material resources from the soil or sub-soil such as iron mines or exploitable arable land, but also human resources in the context of the job market and information resources such as future scientific discoveries. Although they are many, complex and changing, all these resources are considered as one single variable. Capital includes all factors that have already been and that can still be exploited in the energy and material flows of a society. This is the case for physical capital such as food, fields, machines and buildings; human capital such as workers and engineers; social capital such as institutional hierarchies and economic systems; information capital such as knowledge and technical knowhow. Waste includes all factors incorporated within a society’s material and energy flows that are no longer exploitable: used materials and machines, retired human beings and lost or corrupted information. In this model, the economy is presented as a cycle of interactions in between resources, capital and waste that is subjected to the laws of entropy: when the availability of resources diminishes and when the cost of waste increases, the maintenance of society becomes more fragile. Just like the models put forward by Tainter and the Club of Rome’s “Meadows team”, this last model depicts the world’s evolution as the succession of three periods: prosperous development, a clear plateau and finally fatal decline. Degrowth is our destiny.

Peak Oil

The paradigmatic example of the Augustinian model is the rarefaction of oil. This phenomenon is popularly referred to as “peak oil” in Anglophone speaking countries, and refers to the maximum point attained by petroleum extraction curves, as this non-renewable resource is depleted. Hydrocarbon experts have, for the past decades, diverged as to the date and magnitude of this peak. However, the results of geological observations in many countries throughout the world have shown that once the initial reserves of a region have been extracted, production stagnates and declines. As such, oil production in the United States has been in decline since 1971, despite the use of more modern extraction technologies. It seems highly possible that the peak of global conventional oil production was reached in 2005. Today, the main reason for slightly higher production levels than back in 2005, is due to the much harder and more expensive extraction of non-conventional fossil fuels. Hence, there is a certain level of doubt over the growth potential of non-conventional hydrocarbons, as the limits of profitability and production output have already been reached. It is very probable that by 2015, all liquid hydrocarbons will have reached their peaks, with a production level inferior to 90 million barrels per day. The first signs of oil shortages in a world addicted to “black gold” will be due to these geological constraints. From an economic point of view, it is the volume effect that will cause a long-term recession and not necessarily the price effect. The passing of peak oil does not mean that oil supplies will suddenly run dry, but hails the end of the era of cheap and abundant oil and the shift towards a market where demand is now unsatisfied.

Industrial societies and the international financial system were themselves built on the hypothesis of a growing access to cheap fossil fuels, especially oil, the most practical and used energy of them all: oil represents around 40% of global energy consumption. Whether we have already reached peak oil or not, what will be the annual rate of decline once we have reached it? Most experts agree on a range of 2% to 4% a year. This rate will be even higher for net oil importing countries, as exporting countries will limit exports and keep a growing share of production for their own domestic consumption. What matters for a country like France then, is this decline in imports that could soon reach 5% to 7% a year, unless it pays some exorbitant price as buyer competition rises with market shortages.

But aren’t there any other forms of energy that could replace declining oil availability? Many economists and some ecologists do believe that, to escape the carbon constraint of climate change, hope most be placed in nuclear energy for some or renewable energy for others. I on the other hand, highly doubt this possibility.[9] The replacement of the oil industry by another one just as powerful and with similar capacity would demand decades of considerable investment in infrastructure, whereas peak oil is now imminent. It is too late for energy not to become rarer and more expensive. The political, economic and social consequences will be severe. This is why insurers and the military take peak oil much more seriously than economists or politicians who either ignore or despise it: “In the short term, increasing oil prices could lead to a

8 John Michael Greer, *The Long Descent*, New Society Publishers, Gabriola Island (Canada), 2008.

9 The case for non-substitutability of oil by other energies is examined in my book: “Pétrole Apocalypse”, Fayard, Paris 2005.

reduction in consumption and production. This would lead to a recession (…) In the medium-term, the global economic system and market economies could collapse[10]".

Examples of initially flourishing worlds that reach a climax and finally collapse are not rare in history. This was the case of the Mayas in between the 8th and 10th century. Such a slow decline can also be defined as oscillating. To describe this variant we will continue with the example of petroleum (energy) as representing resource depletion. When oil production declines, prices rise. Because this is a vital resource, spending declines in other areas – such as for comfort or prestige – as well as for employment and associated companies. We also observe geopolitical tensions. The subsequent decline of economic activity produces a drop in energy demand and thus a drop in prices. If these prices remain above the marginal costs of production and supply, growth can resume but the economy's purchasing power does not return to its initial rate as production is limited by resource depletion. This recovery is thus inferior to what the economy used to be, but still contributes to the growth in oil demand and increasing prices. To resume: economic growth → rise in energy prices → recession → drop in energy prices → economic recovery but to an inferior level because of resource depletion. In this model the economy oscillates in stages towards a lower and lower level of activity but still avoids any form of catastrophic breakdown.

The Discontinuous Model

Inspired by the laws of thermodynamics (resources – capital – waste and feedback in between stocks), we created a model of globalized society that fits into one single graph. Of course, the complexity and the number of parameters that impact the evolution of such a society are much more numerous than in this graph[11]. Nevertheless, the general state of globalized society can often be dependent on one or two key parameters. As such, important concepts are those of integration, coupling, connectivity and interdependence in between key elements of society. Research on the theory of dynamical systems shows that, as these systems get near a "Tipping Point[12]", they all share a common behaviour regardless of their diversity. Thus, we can pretty accurately describe globalized society by its GDP and its principle state variable: energy flows.

The collapse of the Roman Empire lasted for several centuries[13] that of the Vikings in Greenland took decades, whereas China's Ming dynasty collapsed in less than ten years. But what about our current globalized society? My hypothesis is that the likelihood for rapid collapse is a function of integration, coupling, connectivity and interdependence between key elements of our globalized world. These key elements are crucial processes that aren't redundant and do not have scalable substitutes. They are also submitted to the law of the minimum: "the result of an integrated network of processes is limited by the weakest of them". If, for example, the financial and monetary system weakens, the flows of materials and energy and the maintenance of critical infrastructures will also weaken, banks will collapse and, with the intensification of specular interaction[14] the ensuing social chaos could topple over governments. In this hypothesis, collapse is possible before 2020 and certain before 2030. To be plausible, such a statement must be supported by arguments that we shall now examine by using a new conceptual framework coming from contemporary research on dynamic systems theory and social psychology. This is the third model of world evolution, the discontinuous model.

In physics, a "phase transition" or "critical transition" designates a change in the physical state of matter. The fusion of ice – from the solid state of water – leads to a puddle – which is the liquid state of water. Sublimation directly transforms a body from a solid state into a gas state without passing by the liquid phase. Ecologists have imported this vocabulary after many observations of local critical transitions within ecosystems[15]. Today, anthropogenic pressures are taking the biosphere (earth system) towards a new global phase transition of which we do not know the following state but in which we can fear certain characteristics[16].

A "system" is simply a set of elements with the ability to interact between each other according to certain rules and principles. For this general definition to be useful, we need to specify the nature of these elements and their interactions within this given system. To qualify a system as dynamical is to show an interest in its evolution over time. "State variables" are all physical quantities that determine the current state of the system. Take for example, the position and speed of each element in a system of particles. The dynamical state of a system is an instantaneous state determined by the values of all state variables at that precise moment in time. The phase space is a structure corresponding to a set of all potential states of the observed system. We can distinguish state variables that describe the internal evolution of the system and "control variables" over which it is possible to act upon from outside.

10 Zentrum für Transformation der Buendeswehr, Peak Oil, Strausberg (Germany), 2010.

11 Yves Cochet, "Les vraies causes de la recession", *Entropia*, 7, autumn 2009, p. 11-21, Parangon edition.

12 David Korowicz, « Tipping Point: Near-Term Systemic Implications of a Peak in Global Oil Production », http://www.feasta.org/wp-content/uploads/2010/03/Tipping-Point-Nov.pdf, 15th of March 2010.

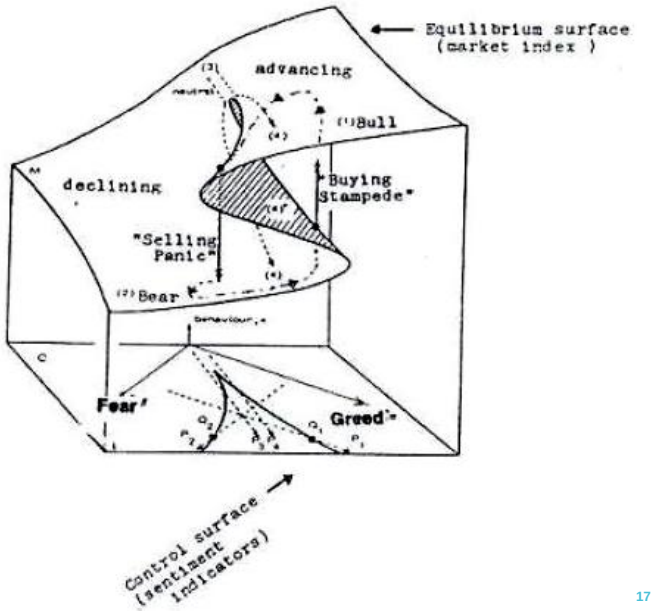
13 In his article « Empires on the Edge of Chaos », Foreign Affairs, March/April 2010, historian Niall Ferguson estimates that the collapse of the occidental roman empire took place in between 406 and 452, or at the latest, 476. These dates depend on the precision given to the definition of « collapse ».

14 See below.

15 Sonia Kéfi, « Des écosystèmes sur le fil : comment certains écosystèmes basculent d'un état à un autre », Société française d'Ecologie, Regard 37, 19th of October 2012. http://www.sfecologie.org/regards/2012/10/19/r37-hysteresis-sonia-kefi/

16 Anthony D. Barnosky et alii, « Approaching a state shift in Earth's biosphere », *Nature*, 486 (7402), 7th of June 2012.

The language of systems has even inspired social and economic modelling, as in the example of market dynamics:



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The state of a speculator (as an element of the financial system) can be assessed by two independent variables, fear and greed, but also by a dependent variable, the market index. When fear wins over greed, the speculator is taken by a “selling panic”. On the contrary, if greed takes over he will launch himself on a “buying stampede”. The evolution of the market index takes place on a smooth surface made of equilibrium points. Changes in control variables such as fear and greed, have unique responses on the behaviour surface. From a “bear market”, where the market index is on the lower attractor of the surface, the level of greed (demand) is offset by the level of fear (supply). But the eagerness for a price hike gradually becomes stronger than fear to the point where the lower threshold of the market is reached. At this point powerful market forces are unleashed in a confusing array of tendencies, represented by a catastrophic leap to the upper level of the market that now turns bullish. When these bullish tendencies are exhausted, the index calmly evolves on the higher attractor. At this stage the two variables, greed and fear, are high. Finally, as fear overcomes greed, the market index is pushed to the upper fold of the surface, making the price index plunge downwards towards the lower attractor of the market with a catastrophic bearish jump.

The Specular Interaction

How does one pass from the local (one speculator) to the global (all market actors)? Answering this question requires stating a hypothesis on the explanation of collective behaviours. Following the works of Jean-Louis Vullierme[18], we shall name this hypothesis “the specular interaction”. The totality of human social relations are based on cognitive interactions (specular interactions) that necessarily take place when two individuals meet each other and simultaneously constitute their relation to the world, by an incessant cycle in between the individual and his environment. Human beings are themselves sculpted by the pre-existing world, but also sculptors of the world through the actions they undertake. Indeed, as argued by René Girard[19], this cycle is powered by imitation, but in specular interactions this imitation is not only an imitation of the similar but also of the different; this is also known as duplicative mimesis and distinctive mimesis. Specularity concerns the inter-weaving of representations of the world that everyone progressively creates in relation to his inter-subjectivity with others and third parties. A child (and an adult!) with this ability to shape the world, will learn just as well to imitate others than to distinguish himself from them. He thus possesses a set of world representations, including one of himself seen through the eyes of others (others are our mirrors as indicated in the word “specular”). Within a human community, as each individual is placed in the same position as others, the trend of duplicative mimesis tends to make world representations converge, in such a manner that reactions to my actions are not unpredictable or dangerous. Duplicative mimesis thus tends to unify a community around common values, principals and behaviours. In parallel to this, distinctive mimesis (the principle of distinction would have said Pierre Bourdieu) guarantees diversity, without which a contagious wave of uniformity would create a social chaos of pure rivalry, a generally violent community, “a war of all against all” wrote Thomas Hobbes.

The social psychology that underpins our societies is partly a phenomenon that emerges when two individuals meet and partly a generic process of their composition, of human nature itself. Human beings are themselves, sculpted by the pre-existing world, but also sculptors of the world through the actions they undertake. This conception opposes itself to the one-dimensional vision of “Homo economicus” where man is reduced to a unitary, rational self that incessantly searches for coherence and the maximization of his utility (capitalism). It also opposes the conception of a collectivized individual whose conscience would be entirely determined by his class position (Marxism). If there is a human nature, it constructs itself in relation to others. If a society exists, it emerged from individual interactions. Duplicative mimesis of models is what guarantees the unification of societies. Distinctive mimesis is what guarantees their essential diversity. Social ecology talks of this. The specular interaction hypothesis enables us to forget about the old epistemological debate over the anteriority of individuals or of society. They both compose themselves in a mutual manner.

How can you anticipate the fact that a social system is approaching a critical threshold? Here, we should return to the market example: recent studies[20] seem to indicate that specular interactions intensify before a

17 Christopher Zeeman, Catastrophe Theory- Selected Papers 1972-1977, Reading, MA, Addison-Wesley, 1977.

18 Jean-Louis Vullierme, *Le concept de système politique*, Presses universitaires de France, Paris, 1989.

19 René Girard, *La violence et le sacré*, Grasset, Paris, 1972.

20 http://www.wired.com/wiredscience/2011/03/market-panic-signs

financial crisis. One of the modalities of this specular interaction is contagion by duplicative mimesis, or in other words that widespread mutual imitation takes place within a social group. This is sometimes the case in the world of finance, where we can observe buying and selling trends on the stock market. The element that reveals this movement is measured by the amplitude of combined movements, or co-movements, measured by the number of stock movements that go in one same direction (whether higher or lower has no importance). Market agents imitate each other more and more, in which case a small fluctuation can send everyone in the same direction. The system is very vulnerable in these situations, even close to collapse. Whereas co-movements are low when the market is healthy (as in the early 2000s), they will significantly increase during the months that precede a crash (as in 2008). In 2008, co-movement became absolute: market agents didn't take independent decisions, but mutually copied each other.

In a similar way within natural ecosystems, the "critical slowdown" phenomenon taken from physics established an early warning signal indicating a phase transition: the system requires more and more time to return to its initial state of equilibrium after a disturbance. Another realisation of this discontinuous model concerns "food riots". Answering the question "why do we revolt?" we spontaneously answer thinking about oppression, the weakening of public freedoms, poverty and so on. However, the primary cause of riots in the world is hunger, especially when food becomes either too rare or too expensive. An American research team has even found a "trigger threshold" in food prices, past which food riots become more possible.[21] For billions of people throughout the world, food represents nearly 80% of their household budgets (compared to 20% for middle-class French people). At a time when food prices increase, people cannot buy anything else. When you and your family cannot eat anymore, you will only revolt if the neighbours do as well (specular interaction). The crossing of a certain threshold triggers the shift from an individual to a widespread, mass revolt. A small increase in prices can cause a society to shift from a state of peace to a state of rampant riots, through the rapid diffusion of specularity. This shift reveals a non-linear behaviour found in our social system: small cause (light increase in food prices), large consequences (riots). This is also an explanation for the "Arab Spring" uprisings in 2011.

Our common sense leads us to think that certain serious phenomena can certainly take place, but we always expect that a return to stability will then follow. Today, I believe the contrary. The singularity of this situation is the imminence of collapse as theorised in the preceding pages that may seem intellectual and abstract, with not much room for intuition. For me this does not come down to a sort of ontological catastrophism that inhabits me, but to a general ecological reflexion. Because it is too late to avoid collapse, there will be no soft landing. Protecting the most exposed of our human brothers and sisters – those who only possess little money, little domestic stocks, little possible mobility and little family or social relations – is thus the key political priority, of which we can find certain elements in the other chapters of this book.

21 http://motherboard.vice.com/2012/9/10/we-are-now-one-year-and-counting-from-global-riots-complex-systems-theorists-say--2

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Change of Era

The Momentum Institute met for the first time on the 10th of March 2011, the day before an earthquake struck Japan and unleashed the nuclear catastrophe we know as Fukushima.

The starting point of the Momentum Institute is based on the awareness that today we are living at the end of the period marked by the greatest material wealth human history has ever known – a wealth that is founded on cheap, concentrated, temporary energy sources that made everything else possible. Just as the most important sources of energy for this material wealth are entering irreversible and inevitable decline, we are embarking on a period of generalised economic contraction.

The Momentum Institute is dedicated to responding to the challenges of our era: how can we organise the transition to a post-growth, post-fossil fuel, climate-altered world? How can we understand and act on the issues of the Anthropocene? What are the emergency exits? What will resilient societies look like in the time of the triple crisis: energetic, economic, and ecological?

The post petrol, post-nuclear, post-coal transition means completely redesigning and rethinking the infrastructures of society and alongside this, working to achieve a new social imaginary by envisaging a near future without petrol and without non-renewable energy. The objective of our approach is to establish a community of contributors made up of citizens engaged in the major areas of transition.

The contributors to the Momentum Institute intervene in their area of expertise, in relation with the thinking on transition. They produce diagnostics, analyses, scenarios, and original proposals regarding strategies of transition and resilience. The Momentum Institute is there to encourage them and to make them known, to individuals, to businesses, to local and national governments. We are also concerned with providing visibility to emerging solutions that are already put into practice by towns in transition, such as energy cooperatives, AMAPs (organic local produce cooperatives), non-profit businesses, social employment, and eco-districts.

If we manage to disseminate them, the initiatives and contributions for imagining and creating the post-petrol world will spread – both locally and globally. They will come to represent the status quo and the efforts that we go to today will not be unusual tomorrow. In the meantime, we have a chance, and it is perhaps our last chance, to step back from the precipice. A challenge, a singular moment, a window of opportunity: Momentum.