Visions for Sustainability

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Vision without action is useless.
But action without vision
is directionless and feeble.
Vision is absolutely necessary
to guide and motivate.
(Donella Meadows)

Interactions between different logical levels
produce phenomena unseen at either level.
(Gregory Bateson)

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June 21st, 2016 **21 giugno 2016**

Contents:

Visions for Sustainability

Direttore Responsabile: Luca Biamonte
Proprietario: IRIS – Istituto Ricerche interdisciplinari sulla Sostenibilità
Editore: IRIS – Istituto Ricerche interdisciplinari sulla Sostenibilità
Web: http://www.ojs.unito.it/index.php/visions
ISSN: 2384-8677

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Via Accademia Albertina, 13 – 10123 Torino - Italy
www.iris-sostenibilita.net

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VISIONS FOR SUSTAINABILITY is an indexed scientific journal published in open access by the Interdisciplinary Research Institute on Sustainability (IRIS). The journal promotes a debate on how the concept of sustainability can be addressed and applied in existing and foreseeable societies worldwide. Particular emphasis is placed on facilitating communication between researchers of different disciplines, supporting educational projects and examining the role of contemporary science in dealing with issues related to sustainability. Papers are welcome from researchers and scholars of natural, political, social and other sciences as well as philosophical and humanistic disciplines, and in particular from anyone wishing to make a contribution which combines multiple viewpoints. The aim is to host as wide a range as possible of multidisciplinary, interdisciplinary and transdisciplinary perspectives on sustainability. Discussions or comments on articles which have previously appeared in the journal are also welcome. All submissions will be refereed before publication.

Articles can be submitted directly online at the journal website http://www.ojs.unito.it/index.php/visions by authors through the login procedure.

Any further questions and/or submission enquiries can be addressed to Editors-in-Chief

EDITORIAL DOI: 10.13135/2384-8677/1751

Rethinking human impacts and actions. Rebuilding time scales and sequences.

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ISSN 2384-8677 **DOI:** http://dx.doi.org/10.13135/2384-8677/1751

Published: June, 21, 2016

Citation: Ferrara, E., Camino E., Dodman M. (2016) Rethinking human impacts and actions. Rebuilding time scales and sequences. *Visions for Sustainability* 5: 2-5.

Competing Interests: The authors have declared that no competing interests exist.

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***Perspective**: Theoretical vision*

***Fields**: Earth life support systems - Economy and technology - Social processes and structures*

***Issues**: Bio-geological equilibrium and ecological decay*

In line with much widespread post-1989 enthusiasm, Francis Fukuyama foresaw that the liberal democracies of the Western world and the economic systems on which they were based were close to providing humanity with an era of prosperity and harmony. In *The End of History and the Last Man* (1992), he indeed claimed that liberalism represents the ultimate form of human governance, capable of bringing an end to conflicts or the need to fight to defend people's rights, since capitalism together with its concomitant technological development would by themselves bring about political participation and egalitarianism, paving the way for freedom and justice for all.

The longest and still ongoing economic crisis yet known within capitalism, increasing conflicts over rights and access to resources and large-scale migrant flows determined by unsustainable living conditions are but some of the manifestations of current developments that demolish such facile optimism and render Fukuyama's scenario of social harmony evermore remote from the reality within our affluent societies. Moreover, the very social classes that have based their wealth and wellbeing on liberalism seem suspended in a temporal limbo, incapable of recognizing and assuming their moral responsibilities both for an untenable past and toward future generations for whom the idea of increasing prosperity seems evermore a mockery of their legitimate aspirations.

This issue of *Visions for Sustainability* aims at offering some analyses and perspectives that contain examples of the kinds of discontinuities necessary to break out of current temporal impasses and the associated partial or total blindness they engender.

Starting from a wide-ranging historical perspective and with particular reference to the French historians Christophe Bonneuil and Jean-Baptiste Fressoz, in *A Philosophical Point of View on the Theory of Anthropocene,* Mariaenrica Giannuzzi considers various aspects of human impacts on our planet, proposes a view of the interrelatedness of the history of nature and the philosophy of history and examines the relationships between conscious human activity and its unconscious environmental outcomes. She critiques current limited views of the anthropocene that seem to assign blame to humanity in general rather than to specific political and economic forces that are as oppressive towards vast numbers of human beings as they are to our planet in general and poses the question of how to go beyond the modern paradigm of the relationship between capital and labor that is no longer environmentally sustainable.

Since we now know that all Earth system processes are being overwhelmingly altered by human activities, we can have no faith in any kind of human governance that claim the advent of prosperity and peace while maintaining unchanged the current inequalities in power and consumption. However, the reactions of mainstream politics and economics are very far from being sustainable. For example, the last COP21 climate conference, held in Paris on December 2015, resulted in a purely technical and non-binding agreement to maintain a two-degree target for global temperature rise. If the Paris Conference brought back climate change to the center of the international agenda, we are still a far cry from the kind of action required.

In *Knowledge and competence. Key concepts in an educational paradigm for a sustainable society*, Martin Dodman suggests that way of acting depends on our way of knowing. By examining the concepts of knowledge and competence from the perspective of their importance for creating the kind of resilience and transformability necessary to build a sustainable society, he proposes a need to change the current educational paradigm in which there is a given body of knowledge that needs to be acquired and then applied as

competence. Knowledge is seen as a cultural construct that depends on the reasons for which it is built and that determine its types and characteristics. Education should see competence as first and foremost the capacity to build new knowledge based on a desire for sustainability rather than the desire to exploit and manipulate that has long characterized much of the knowledge valued by human capital and functionalist paradigms. In this way, lifelong learning becomes a process of asking why, what and how to build knowledge, together with how to use it, thereby promoting a new relationship between human beings and the global ecosystem that hosts us.

In *Francis of Assisi and the Wolf: Nonviolence as a moral value of biophilia*, Giuseppe Barbiero considers questions relating to social ethics and suggests that solidarity and nonviolence are examples of the many potential ways through which biophilia can express itself. Through reference to the social ecologist Stephen Kellert, he argues that love for life and moral values can feed into and out of each other. In this way they are able produce advantageous attitudes potentially expressed as human behavioral patterns that emerge through long-term evolutionary processes, despite the fact that recent human history would seem to have endangered them.

The final contributions to this issue address the question of *Law, ecology, and infrastructural megaprojects*, highlighting the current failure of jurisprudence to defend environmental rights in the face of the greed of an industrialized, capitalistic economy. Alessandra Algostino examines *The Authoritarian approach of Megaprojects versus Democracy: The International People's Court Defends The Right Of Participation*, with particular reference to a case concerning the construction of a high–speed rail in Valsusa in Piedmont, Italy. Enzo Ferrara reviews *The Ecology of Law. Toward a Legal System in Tune with Nature and Community* by Fritjof Capra and Ugo Mattei, taking as a point of departure for his analysis a number of controversial decisions by courts in Italy.

Many ways of promoting different forms of action exist, bringing together, for example, perspectives from art, science and literature, as the Swedish KTH Environmental Humanities Laboratory is trying to do through organizing a Festival of *Stories of the Anthropocene* in Stockholm from October 27th to October 29th, 2016. A further example is provided by the many endeavors to promote peace and cooperation through nonviolent action. The International Peace Bureau is planning a World Congress under the title *Disarm! For a Climate of Peace*, to be held from September 30th to October 3rd 2016 in Berlin. One crucial question is, however, that of whether it is possible – and how – to create the will within our affluent societies to change direction and give rise to a process of transformation based on environmental justice and equal distribution of resources and rights all over the world, thereby reducing the current credibility gap between international claims on sustainability and the real outcomes of dominant human actions.

References

Algostino, A. (2016) The Authoritarian approach of Megaprojects versus Democracy: The International People's Court Defends The Right Of Participation. *Visions for Sustainability* 5: 33-36.

Barbiero, G. (2016) Francis of Assisi and the Wolf: Nonviolence as a moral value of biophilia. *Visions for Sustainability* 5: 28-31.

Bonneuil, C. & Fressoz, J.B. (2013) *L'Evénement Anthropocène. La Terre, l'histoire et nous*, Paris : Le Seuil

Capra, F. & Mattei, U. (2015) *The Ecology of Law. Toward a Legal System in Tune with Nature and Community*, Oakland–CA: Berrett-Koheler Publishers

Dodman, M. (2016) Knowledge and competence. Key concepts in an educational paradigm for a sustainable society. *Visions for Sustainability* 5: 15-27.

Ferrara, E. (2016) The law of nature and the nature of law. *Visions for Sustainability* 5: 37-40.

Fukuyama, F. (1992) *The End of History and the Last Man* New York: Free Press

Giannuzzi, M. (2016) A Philosophical Point of View on the Theory of Anthropocene. *Visions for Sustainability* 5: 6-14.

IPB World Congress 2016 on Military and Social Spending, *Disarm! For a Climate of Peace – Creating an Action Agenda*, https://www.ipb2016.berlin/

Stories of the Anthropocene Festival, Call for stories, 27-29 October 2016: Stockholm, Sweden

http://www.kth.se/en/abe/inst/philhist/historia/ehl/stories-of-the-anthr/call-for-stories-1.644935

ORIGINAL PAPER DOI: 10.13135/2384-8677/1618

A Philosophical Point of View on the Theory of Anthropocene

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Abstract. This paper discusses how the model of a universal history which emerges in the current debate on the theory of Anthropocene, in particular in the field of evolutionary biology, risks ignoring differences in ways of economic production and consumption. A tendency for life sciences to gather concepts from the dominant neoliberal ideology has already been the focus of academic research. Within the Italian political debate, in the magazine effimera.org several scholars have criticized the neoliberal assumptions underlying studies of the Anthropocene, since scientific debate on this theory has thus far focused on the quantitative perspective of a biodiversity crisis without paying any attention to political and social inequalities. Since it does not take into account the conditions of environmental justice, the quantitative method of universal ecology seems to produce a sense of catastrophe so widespread as to be almost a symptom of an apocalyptic social disease. Following the historical perspective of Fressoz and Bonneuil (2013), in this paper the theory of Anthropocene is considered as a theory of universal history. Referring to evidence of climate change, the two historians have developed an historical perspective that connects both the philosophy of history and the history of "nature", inasmuch as the two disciplines set out to propose answers for the same questions: How can we imagine going beyond the modern paradigm of labor, since it seems to be no more environmentally sustainable? How can we explain the relationship between conscious human activity and its unconscious environmental consequence? Which constructs of global history can adequately describe the environmental crisis?

Keywords: Anthropocene, universalist ecology, universal history, environmental justice, capitalism, labor

ISSN 2384-8677 **DOI:** http://dx.doi.org/10.13135/2384-8677/1618

Article history: Submitted February, 26, 2016. Accepted in revised form March, 29, 2016

Published online: April, 10, 2016

Citation: Giannuzzi M. (2016). A philosophical point of view on the Theory of Anthropocene. *Visions for Sustainability,* 5: 6-14.

Competing Interests: The author has declared that no competing interests exist.

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***Perspective**: Theoretical visions*

***Fields**: Human and natural sciences*

***Issues**: Universalism in history and ecology, social, economic and environmental justice*

1. Introduction

In the 1980s Stoermer and Crutzen began proposing a redefinition of the current geological era as that in which the agency of the human species impacts on the planet's biodiversity in a way that is so significant as to warrant describing a passage from the Holocene to the Anthropocene (Stoermer and Crutzen, 2000). In 2016, the Anthropocene Working Group (AWG), a branch of the International Commission for Stratigraphy, London, will decide on whether to accept this proposal as a valid scientific theory. Starting from its introduction within the field of geology, the theory of Anthropocene has also become increasingly widespread in anthropology, political ecology, and the philosophy of history[1]. And so it has become evermore necessary for the humanities to respond to this scientific description of extinctions and natural catastrophes, above all if we consider that media representations of these phenomena are already part of our daily experiences. They modify our perception of the planet, as suggested by Latour (2014), from Galileo's "Eppur si muove!" (*and yet it moves*) to a planet *moved* by the global system of industrial production. The "anthropological shift" of natural sciences is testified by several developments in recent years, with the creation of *The Anthropocene Review* (2014), the by now decades-old debate conducted in *Nature,* and public initiatives on the subject, promoted above all by the Max Plank Institute and the Haus der Kulturen der Welt, Berlin, by the Collège de France, and the Institute Momentum in Paris. "Anthropocene" has thus become the name for a new geological era in which our species, by destroying local systems on an ever-increasing scale, decreases the levels of bio diversity among all living species. "Anthropocene" has been defined as the era in which humans have become the global ecosystem of all other species (Eldredge, 1998) and also as the new political era determined by climate change (Chakrabarty. 2009).

Ecological definitions of "environment" and "human species" always pose philosophical problems. In the first place, the "emergence" of the human species among others as a "global species", postulated in the evolutionary biology of Eldredge, requires further examination. Within the idea of humans playing a special role among other species there is a tendency to read the behavior of humans not according to relationships between particular experiences, cultures or identities, but rather according to the universality of the species. And this idea of universality in environmental history - criticized both by Marxist ecology (Moore, 2015) and in seminal works of ecofeminism, such as the analysis of the gendered division of labor (Mies, 2014), tends to identify "humanity" and "species" and to unify unequal responsibilities, since it hides massive social and environmental inequalities under the umbrella-term of "the human species". By analogy with Freud's assumption that "wo Es war, soll Ich werden" (*where id was, ego shall be*), since therapy transforms the unconscious into consciousness, one could say that where the term "human species" is the subject of a discussion on ecology, we should rather insert terms like "society", or "financial capitalism". If the universal subject "human species" can be useful to expresses certain commensurate data in the universal language of natural sciences, the need to search for words and narrations to express the differences in patterns of economic production and consumption on a

[1] For an account of the diffusion of the term "Anthropocene" in the humanities cfr. "Comment penser l'Anthropocene?", 5-6 November 2015. Collége de France, Paris (http://2015.paris/2015/05/23/programme-du-colloque-comment-penser-lanthropocene-5-6-novembre-2015/).

global scale cannot be ignored. Words capable of telling the history of the environmental crisis should make global inequalities as apparent as possible in order to identify actors and decision-makers in the crisis. As Bonneuil and Fressoz have pointed out, this problem poses new questions for philosophy too. Contemporary philosophy has to re-define a conception of finite freedom in relation to a finite environment.

> One of the main tasks of contemporary philosophy is indubitably to reconsider freedom as something other than the rupture of natural determination, and rather to explore what can infinitely enrich and emancipate the attachment we attribute to the other beings of a finite Earth. What is left of infinity in a finite world? (Fressoz and Bonneuil, 2013, p. 56).

In the debate on the theory of Anthropocene this finite freedom has been defined as "geological agency", since the data on climate change seem to correspond to the unconscious consequences of a human agency (Chakrabarty, 2009). But, on a practical level, this agency risks coinciding with the ecological effects of global capitalism, another object that seems extremely difficult to describe. To avoid such a risk of indicating objects that cannot be adequately explained as causes of the environmental crisis, without being able to distinguish responsibilities and alternatives within the context, it may be useful to recall some of the traditional issues of environmental ethics. How is it possible to speak in general terms of all the multifarious diversity that surrounds us before the world becomes an object of scientific disciplines (Husserl, 1970)? How was the concept of environment first coined in its illuminist formulation (Canguillhelm, 1971)? Is the whole of mankind involved in the environmental crisis in the same way? Or is the environmental crisis a particular ideology that belongs to the industrial – and cultural – production of "developed" countries (Stengers, 2009)? And how are those labor practices we call "environment" produced through the historical process of capital accumulation (Moore, 2015)?

2. The concept of environment

From a philosophical point of view, the concept of environment can be understood as the universal and material substance of all the phenomena of human history, regardless of their qualities, as in the *res extensa* of modern philosophy of nature. This notion is the result of what Edmund Husserl (1970) called the mathematisation of the qualities of bodies. It is a mechanical notion of environment, introduced into modern culture under the heading of *milieu* in d'Alembert and Diderot's *Encyclopédie* in which the results of the mechanistic physics of Newton were presented (Canguillhelm, 1971). If the qualities of bodies had been excluded from the Galilean model of modern science, they returned in the biological understanding of environment. Biologically, environment is defined as the complex of exchanges between organisms in a given geographical space, together forming an ecosystem. This is the geographical element introduced by Buffon within Lamarck's mechanistic understanding of "influencing circumstances". If for Lamarck circumstances are a *genus* whose species are climate, place, and milieu and thus still belong to mathematical schemes, Buffon re-introduced the tradition of anthropo-geographers in biology, which, after Machiavelli and Bodin, had been kept alive in France by Montesquieu (Canguillhelm, 1971). In ecology, environment is today defined as the basis of the pure and simple

existence of the species (Eldredge, 1998), which can be analyzed according to mathematical models and the total energy produced and exchanged by the organisms of a habitat. But how is the concept of environment used in the theory of the Anthropocene? And what political, discursive, and visual practices turn the places surrounding us and that we inhabit into specific and finite places as ecosystems? How do these practices produce meaning in the continuous exchange between organisms?

3. The privilege of the human life form as a problem of political ecology

According to Eldredge, the behavior of the human species with respect to its own ecosystem is different from the behavior of all the other species in that "for the first time in the entire history of life, one species, us, *Homo sapiens*, has gone out of his natural ecosystem" (Eldredge, 1998, p. 149). Thanks to agriculture, the human species became independent of the productive capacity of the local ecosystem it lived in up to 10,000 years ago in small groups of hunter-gatherers. The clearest indicator of the ecological success of this fact is the increase in the size of the human population. As opposed to all other species, which are in a relationship of exchange with the organisms in their local ecosystem and thus have a locally limited habitat, the human species has an exclusive ecological quality – it is a "global species". "We have to realize that, over the past 10,000 years, we have redefined the global system as our own mega-ecosystem" (Eldredge, 1998, p. 150) and established a narrative of its progressive destruction. But the fact that "we are an internally integrated global species" due to our economic exchanges, in no way means that we are also safe from the effects the global system has *on us*:

> Because we are still stuck with the notion that we have escaped the natural world, few of us see the dependence that our species truly has on the health of the global system. The main reason we should fear the Sixth Extinction, I truly believe, is that we ourselves stand a good chance becoming one of its victims (Eldredge, 1998, p. 150).

The widespread ideology that considers the human species a privileged form of life also involves the tendency to deny differences between cultures. Yet the very extinction we should be afraid of is that of "western" living standards. "We might well avoid literal biological extinction – but our cultural diversity, and, for the developed nations, our high standards of living, are very much at risk" (Eldredge, 1998, p. 150). It is thus clear that in this analysis "human species" means above all "our cultural diversity", that of wealthy elites, and the outcome of this view can be very much that of a political conservationism towards both ecology and social movements.

When the definition of human environment coincides with global economy, single behaviors are dissolved into an abstract and undetermined "climate" which, more than ever, seems to favor the destruction of autonomous cultures. If the borders of human agency are the same as those of global economy, the tendency of neoliberalism to expand and create monetary value from every aspect of life, thereby promoting an all-pervasive biocapitalism (Morini-Fumagalli, 2009), inexorably destroys single cultures and autonomous communities that do not accept the cosmology of local/global agency. Yet authors such as Naomi Klein (2014), Vandana Shiva (1993) and Silvia Federici (2004) have always criticized the idea of capitalism as a self-regulating system, since an all-pervasive financial oligopoly constantly endeavors to regulate

communities that oppose financial management of the land and defend subsistence economics.

Moreover, according to Chakrabarty (2009), the ecological limits of capitalism – underlined by the idea of the Anthropocene - pose a conundrum for the whole of modern political theory. Whereas such theory developed historically around the concept and the goal of human freedom, in contemporary political ecology the agency gained by mankind is the capacity to ask to what extent the planet is free from the effects of this human activity, which in turn has up to now considered itself free. As a consequence, the modern idea of political freedom, has, together with industrial development, shown itself to be rather a geological capacity, and thus a loss in terms of individual freedom, since the geological agency is entrusted to the productive process of the species and not of the individual or the social groups Chakrabarty (2009).

4. The emergence of the human species as a problem of the philosophy of history

Following Adorno's criticism of Hegel's philosophy of history, Chakrabarty proposes the idea of a *negative universal history*, one that does not subsume the particular to a unique normative global narrative. This narrative would be based within a global identity, founded on the sense of catastrophe, which stems from the awareness of not being able to have a universal experience of the world:

> Climate change is an unintended consequence of human actions and shows, only through scientific analysis, the effects of our actions as a species. Species may indeed be the name of a placeholder for an emergent, new universal history of humans that flashes up in the moment of the danger that is climate change. But we can never understand this universal. It is not a Hegelian universal arising dialectically out of the movement of history, or a universal of capital brought forth by the present crisis. Geyer and Bright are right to reject those two varieties of the universal. Yet climate change poses for us a question of a human collectivity, an us, pointing to a figure of the universal that escapes our capacity to experience the world. It is more like a universal that arises from a shared sense of a catastrophe. It calls for a global approach to politics without the myth of a global identity, for, unlike a Hegelian universal, it cannot subsume particularities. We may provisionally call it a "negative universal history" (Chakrabarty, 2009, p.222).

This critique of positive historiographies, whether they are universalist or Marxist, can also be usefully re-examined through the lens of cultural history. Chakrabarty's reasoning seems to move towards a phenomenology of history with a negative universal, in some ways close to De Martino's writings on the end of the world. De Martino (2002) devoted his cultural phenomenology to the sense of catastrophe embedded in the lack of a universal experience of the world. Our experience of the world is not available to human nature in rationalist ways, as the experience we have of the whole world is always a relationship between heterogeneous singularities. From De Martino's point of view the sense of catastrophe always arises from the meeting between cultures. It is the manifestation of the Western sense of the end in the face of *the Other*. The sense of catastrophe observed by Chakrabarty is very close to De Martino analysis. In both cases the sense of catastrophe comes from the collapse of a Western universal identity.

Chakrabarty proposes *four theses* that provide a useful tool for dividing contemporary ecology into three main positions. In each of them, universal history is considered in a different way.

The first position is that of Chakrabarty himself and is shared by many authors who were shaped by Frankfurt critical theory, above all in the US. It can be called the *historical-critical vision of ecology*. In brief, it states that the scientific discussion on the Anthropocene, with its quantitative universality, represents a universal history, which emerges only through the data of the natural sciences. It constitutes, for the humanities, a negative universal, which shows the impossibility of giving an account of multiplicity in local histories at the same time. In this respect, "species" is an available, empty signifier-signified relationship, open to being filled by political actions. Human agency as a species does not yet consciously exist and so it can be invented through political imagination. Such a perspective is present in the work of Isabelle Stengers (2009), McKenzie Wark (2015) and Bonneuil and Fressoz (2013) and it investigates the relationship between historiographies and environmental crisis.

The second position is the *universalist vision of ecology*. Here, the human species is considered as a real universal composed of free individuals competing for their own ecological success. This vision is the principal feature of the quantitative studies of natural sciences, often presented in popular literature. Such a thesis is contested by the *Marxist vision of ecology*, for which the universal of the species hides economic disparities between the planet's populations, a position shared by radical geographers like Saskia Sassen (2008).

In order to continue our investigation, we need to ask why the humanities also believe quantitative universality to be a valid *modus operandi*. What institutions, rules, and processes in the production of culture can generate universalism in political ecology? Even without exploring in detail the specific arguments of each one, the variety of positions illustrated demonstrates that universal and quantitative criteria are not exhausted within the description of their ecological objects. Ecology is a hybrid discipline that is also informed by the problems and the critiques of the humanities that do not require acceptance of universality or quantitative criteria.

5. Anthropocene and the cultural politics of extinction

The activity of the Anthropocene Working Group (AWG) over the last six years has centered on the quantitative aspect. The group comprises some forty members, including oceanographers, paleontologists and meteorologists, assigned in 2009 by the International Commission of Stratigraphy the task of carrying out the research project of the geologist Jan Zalasiewicz. Zalasiewicz proposed studying through stratigraphic analysis evidence that would justify adopting the term Anthropocene and the AWG's increasing number of publications and conferences have met with considerable interest, also on the part of a public of non-specialists. Maslin and Lewis (2015) provide an update of the AWG's work from a very specific standpoint. The**ir** main focus is on if there are events in human history that have an impact that can be verified geologically in the same way as climatic changes of the past can be shown in fossil documentation. Looking at geological traces, the Commission has the goal of confirming or disproving by 2016 the hypothesis that there actually is a

relationship between the crisis in the biodiversity of living species and the impact of the human species on the environment, and whether it has become a geological cause of extinctions on a par with the natural catastrophes which caused previous extinctions. Other researchers of extinction such as Raup and Sepkoski Jr. (1984, 1993) have presented a much more nuanced view of natural catastrophes than the apparent equation between the linear growth of the human population and the crisis of biodiversity due to human impact. Natural catastrophes are either unforeseeable and devastating, or cyclical and recurring. In the second case, the direct impact of humans on biodiversity may be questioned. The studies on cyclical occurrence of extinctions are of great importance for the philosophy of history. They testify that the concept of environment as it is used in universalist ecology and in the description of a universal history of the planet, is not properly a concept. On the contrary, it is a fluctuating signifier, in that it moves from a condition of existence to a condition of extinction of the species.

The research of the AWG is rewriting the traditional time boundaries of human history. Until now it seemed that it took place in the long spring of the Holocene, a climatic situation generally favorable to the development of life. The human species was part of a general diversification of life forms. Today, the beginning of the human species refers to time boundaries and situations that are the involuntary effect of a given system of production – the world-system of global capitalism. On the other hand, the beginning of the Anthropocene varies from the success of agriculture 10,000 years ago and other much more recent events such as the extinction of indigenous forms of life following the colonization of the New World, or the explosion of the first nuclear bomb in the desert of New Mexico. It is thus clear that establishing time boundaries for the beginning of the Anthropocene is an act of cultural policy, because it forces its proponents to establish a foundation myth based on the relationship between the human species, contemporary capitalism and its inhabitants.

6. Conclusions

Faced with the variety of the time-boundaries considered as the essential beginning of this natural history, many questions that closely intersect with the history of culture, the philosophy of history, and natural sciences can be posed. What model of dating and chronology of events is selected to explain a complete assimilation of natural history to human history? What are the criteria of this selection? What models and technologies produce the space and time of local ecosystems? And how is the narrative of human evolution changed if the theory propounded by Charles Darwin is integrated into the system of capitalist production? These are the questions the environmental crisis urges the humanities to inquire into. Yet their further development and an agreement on the definition of the concepts involved can only be achieved through a public debate and after collectively rethinking political ecology in specific contexts.

References

Baranzoni, S., Vignola, P. (2015) “Ultima fermata: Antropocene. Accelerare o biforcare”, in *Kayak. A Philosophical Journey*, 2 - *Apocalissi culturali*

Barca S. and Guidi L. (eds.) (2013) “Ecostorie: donne e uomini nella storia dell'ambiente”, in

Genesis: rivista della società italiana delle storiche, n. 2/2013

Bateson, G. (1987) *Steps to an Ecology of Mind*. *Collected Essays in Anthropology, Psychiatry, Evolution and Epistemology*, Northvale-London: Jason Aronso Inc.

Bonneuil, C., Fressoz, J.B. (2013) *L'evenement anthropocene. La terre, l'histoire et nous*. Paris: Seuil

Canguilhem, G. (1971) *Knowledge of Life*, ed. by Marrati, P. and Meyers T., trans. by Geroulanos S. and Ginsburg D., New York: Fordham University Press

Cavazzini, A. (2013) "Oltre (e senza) la mano invisibile. Spostamenti concettuali tra economia e scienza dell'evoluzione", in *Aperture*, 29

Chakrabarty D. (2009) "The Climate of History. Four Theses", in *Critical Inquiry*, 35

Crutzen, P. J. (2002) "Geology of Mankind", in *Nature,* 415

De Martino, E. (2002) *La fine del mondo. Contributo all'analisi delle apocalissi culturali*, ed. by Gallini C. and Massenzio, M., Torino: Einaudi

Eldredge N. (1998) *Life in the Balance: Humanity and the Biodiversity Crisis*, Princeton: Princeton University Press

Enzensberger H. M. (1974) *Palaver. Politische Überlegungen 1967–1973*, Frankfurt am Main: Suhrkamp

Federici S. (2004) *Caliban and the Witch. The Body and Primitive Accumulation*, New York: Autonomedia

Freud S. (1991) "Neue Folge der Vorlesungen zur Einführung in der Psychoanalyse" in *Gesammelte Werke*, Bd. 15, London: Imago Publishing

Gibson-Graham, J.K. (2006) *A Post-Capitalist Politics*, Minneapolis: University of Minnesota Press

Gould S. J. (1987) *Time's Arrow, time's Cycle: Myth and Metaphor in the Discovery of Geological Time*, Cambridge-London: Harvard University Press

Gould S. J. (1989) *Wonderful Life: The Burgess Shale and The Nature of History*, London: Hutchinson Radius

Husserl E. (1970) *The Crisis of European Sciences and Transcendental Phenomenology*, transl. by Carr D., Evanston: Northwestern University Press

Klein N. (2014) *This Changes Everything. Capitalism vs. The Climate*, New York: Simon & Schuster Paperbacks

Kolbert E. (2014) *The Sixth Extinction: An Unnatural History*, London: Bloomsbury

Latour, B. (2014) "Agency at the Time of the Anthropocene" in *New Literary History*, Vol. 45

Lewis S. L., Maslin M. A. (2015) "Defining the Anthropocene" in *Nature*, 519

McKenzie Wark, K. (2015) *Molecular red. Theory for the Anthropocene*, New York: Verso books

Merchant C. (1989) *The Death of Nature. Woman, Nature and the Scientific Revolution*, New York: Harper-Collins

Mies M. (2014) *Patriarchy and accumulation on a world scale : women in the international division of labour*, with a foreword by Federici S., London: Zed Books

Moore J. W. (2015) *Ecologia-mondo e crisi del capitalismo*, trad. it. Avallone, G., Verona: Ombre Corte

Morini C., Fumagalli A. (2009) "La vita messa a lavoro: verso una teoria del valore-vita. Il caso del valore affetto" in *Sociologia del lavoro*, n. 115

Pievani T. (2014) "The Sixth Mass Extinction: Anthropocene and the Human Impact on Biodiversity" in *Lincei*, 25

Pomian K. (1981) "La crisi dell'avvenire" in *Le frontiere del tempo*, Milano: Il Saggiatore

Pomian K. (1984) *L'ordre du temp,* Paris: Gallimard

Raup D. M. (1993) *Extinction: Bad Genes or Bad Luck?* Intr. by Gould S. J., Oxford: Oxford University Press

Raup D. M., Sepkoski J.J. Jr, (1984) "Periodicity of extinctions in the geologic past". In *Proc. Natl. Acad. Sci. USA*, vol. 81

Sassen S. (2008) *Territory, Authority, Rights: From Medieval to Global Assemblages*. Princeton; Oxford: Princeton University Press

Shiva V. (1993) *Monocultures of the Mind. Perspectives on Biodiversity and Biotechnology*, Penang: London: Zed Books

Stengers I. (2008) *Au temps des catastrophes. Résister à la barbarie qui vient*. Paris: Ediz. La Découverte

Stengers I. (2013) *Une autre science est possible! Manifeste pour un ralentissement des sciences*. Paris: Ediz. Les Empêcheurs de penser en rond / La Découverte

Toulmin S., Goodfield J. (1967) *The Discovery of Time*, Victoria: Pelican Books

Viveiros de Castro E., Danowski D. "Is there Any World to Come?" in *e-flux journal*, 7 luglio 2015, (http://supercommunity.e-flux.com/authors/eduardo-viveiros-de-castro/)

Zalasiewicz J. (2008) *The Earth After Us: What Legacy Will Humans Leave in the Rocks*?, Oxford: Oxford University Press

ORIGINAL PAPER DOI: 10.13135/2384-8677/1660

Knowledge and competence. Key concepts in an educational paradigm for a sustainable society

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Abstract. This paper examines two key concepts in educational paradigms - knowledge and competence - from the perspective of their importance for a sustainable society. It is argued that knowledge should not be considered as something existing that is to be acquired, but rather as part of a knowledge-building process that poses questions regarding why we build knowledge and what kind of knowledge we build, as well as how we build it and how we use it. Knowledge building is also considered a type of competence in an endeavour to go beyond current models that tend to see competence as merely the application of knowledge and fail to do justice to the role of both in promoting sustainability.

Keywords: Knowledge, competence, education, sustainability, resilience, transformability

ISSN 2384-8677 **DOI:** http://dx.doi.org/10.13135/2384-8677/1660

Article history: Submitted May 23, 2016. Accepted in revised form June 10, 2016

Published online: June 21, 2016

Citation: Dodman M. (2016). Knowledge and competence. Key concepts in an educational paradigm for a sustainable society. *Visions for Sustainability,* 5: 15-27.

Competing Interests: The author has declared that no competing interests exist.

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***Perspective**: Theoretical visions*

***Fields**: Human sciences*

***Issues**: Knowledge-building, education*

Introduction

A society makes two types of essential investment for a sustainable future. In this paper, a sustainable future is seen as depending on an educational process which both for society and its members is able to promote *resilience* (*the capacity of a system to absorb disturbance and reorganize while undergoing change, so as to still retain essentially the same function, structure, identity, and feedbacks* - Westley et al., 2011) and *transformability* (*the capacity to create untried beginnings from which to evolve a fundamentally new way of living when existing ecological, economic and social conditions make the current system untenable* - Westley, et al., 2011).

As a first investment, society gives birth to children and takes in immigrants in order to *assimilate* both and *accommodate* itself to the change brought by these new generations and new arrivals. In this context, *assimilation* is intended as a composite both of knowledge-building processes, whereby new information is incorporated into given information already stored in existing cognitive structures (Piaget, 1977, Vygotsky, 1978, von Glaserfeld, 1995), and physiological processes, whereby nutrients are absorbed and incorporated into metabolic pathways for building new materials and producing work (Jobling, 1993, Kroemer et. al., 2010, López-Arredondo et. al. 2013)[1]. Accommodation is the resulting process of reframing existing structures on the basis of the new input, of deriving sustenance that promotes vitality and endurance.

The way in which such processes of assimilation and accommodation feed into and out of each other is characteristic of all learning processes and in this sense a society is a living organism that evolves to the extent that it is able to learn by adapting to input provided by the experience furnished by formal, non-formal and informal learning environments. In order to ensure this, a society must make a second investment in its future by promoting an educational process based on an educational system that permits every person and every new generation to develop their learning potential to the maximum extent and thereby make a full contribution to society as a dynamic cultural community (Rogoff, 2003). By educating its members, society educates itself. The learning processes of the people who inhabit it are the learning processes of society itself. Through education a society shapes the future of both its individual members and its collective self. If the goal of an educational system is to promote the sustainability of society, then the achievement of that goal depends on the sustainability of the system, on its capacity to promote individual and collective resilience and transformability.

The purpose of this paper is to consider one particular aspect of current educational paradigms - the relationship between the concepts of knowledge and competence - from this perspective on sustainability. Until relatively recently - and in large measure still today - the dual process of shaping and contributing to society was conceived of principally in terms of economic growth. Educational systems have been largely based on human capital and functionalist paradigms (Parsons, 1951, Durkheim, 1956, Blau and Duncan, 1967, Davis and Moore, 1970, Ball, 2008, Gewirtz and Cribb, 2009). Although these paradigms have been heavily criticized in terms of concentration of economic and political power, social injustice and ecological imbalance, much less attention has been paid to questioning their epistemological base in terms of the relationship between knowledge, competence and learning. Even if within educational theory social constructivist paradigms of learning (Ormrod, 1995, Hill, 2002, Driscoll, 2005, Jordan et al., 2008) have become widespread, school systems still tend to be based on the assumption of given bodies of knowledge that are to be acquired (perhaps through innovative teaching/learning methodologies) and then applied in terms of developing competence. This paper argues that at the heart of sustainable educational processes should be posed questions such as why build knowledge, what knowledge to

[1] In both senses the term *assimilation* is used quite differently from that which makes reference to various forms of *cultural assimilation* whereby immigrants should become indistinguishable from the members of the existing group they join (Alba and Nee, 1997).

build, how to build it, how to use it and how all these aspects are interrelated.

Linguistic and epistemological premises for analysing current educational paradigms

Before examining these questions about the importance of knowledge building, we first need to analyse the concept of competence in current educational paradigms. Over the past two decades in particular there has been an increasing awareness of how a progressive acceleration of change in every aspect of life requires a new educational paradigm, able both to understand a society characterized by complexity, impermanence, uncertainty and unpredictability and to promote an educational process that is coherent with these characteristics. All member countries and various organisations within the UN, OCSE or the EU are involved in researching such a paradigm and a central role is generally assigned to the concept of competence.

In order to analyse the significance of any concept, it is useful to examine some linguistic and epistemological premises that form its theoretical background. Indeed, the existing literature concerning the concept of competence provides an interesting example of the phenomenon of *signification*, the way we use language to create meaning and thereby understand and act in the world. Within any language *signifiers* and *signifieds* interact in a process of construction of *signs*, the building blocks with which we make sense of the world by giving meaning to it and our experience. The signifier and the signified mutually define each other. A concept is built through various types of relationships: between signifiers and signifieds, between signifiers or between signifieds (Dodman, 2014a).

Within this perspective, it can be particularly useful to consider the four *paradigmatic* relations that characterize the lexis of a language system: *synonymy, antonymy, hyponymy and meronymy*. Synonymy is a relation of *equivalence* or similarity between signifiers and signifieds. Antonymy is a relation of *opposition* or difference. Hyponymy is a relation of *categorization* or exemplification, in which signifiers and signifieds are examples of the superordinate categories. Meronymy is a relation of *particalization* or fragmentation, where signifiers and signifieds are parts of an overall whole. These four paradigmatic relationships can shed light on the process of conceptualization of competence, in which there exists considerable diversity in the way that the relationship between signifiers and signifieds is built. Problems can arise both at the *intralingual* level (for example, the relationship between words like *knowledge, skill, ability* and *competence* in English) and the interlingual level (the relationship between these terms and their apparent equivalents in other languages).

These linguistic premises can also help us understand the importance of another, epistemological, premise which concerns one of the specific characteristics of any transition from one paradigm of reference to another. According to Kuhn (1962), such a transition requires the search for new lexis and new relationships with which to interpret the complex processes of change taking place, and therefore leads to an inevitable terminological confusion, which involves both existing and new signifiers and signifieds. This confusion is not necessarily negative, but is rather a reorganization of relationships and a redefinition of meanings that are naturally part of the new conceptualization. From this confusion new relationships emerge and establish themselves, thereby enabling users of the paradigm to share and make reference to common definition.

In many respects today we are experiencing the paradox of how the very same features that the new paradigm must encompass - the accelerating speed of change and ever increasing complexity of society - make more and more difficult our attempts to build it. No sooner does the paradigm begin to emerge than it risks being superseded by new developments. Thus we are obliged to live with the inevitable terminological confusion and treat it as a potentially fruitful and enriching feature of educational discourse.

The concept of competence within current paradigms

In spite of their differing perspectives and terminologies, the various current national and international documents produced by and for educational systems refer to three general objectives of the educational process: 1) developing an aptitude for lifelong and lifewide learning; 2) furthering a process of personal acculturation and the building of ones own personal and professional life project life; 3) promoting an idea of citizenship based on awareness, responsibility and active participation. Each of these goals is considered to require the development of competence through education. Some documents put more emphasis on the definition of what competence is and why it is important, while others are more concerned with the description of the types and levels of competence envisaged. In most cases national curriculum documents emphasize why certain competences are considered important and list some types. Competence is described with regards to *motivation* (*essential for achieving the general objectives*, ...), *categories* (*basic, technical-professional, cross-curricular, key for citizenship* , ...), *types* and/or *examples* (*mathematical, social, digital*, ...), *features* (*dynamic, polyfunctional, specific to contexts, generalizable*, ...) or *components* (*knowledge, skills, attitudes,* …).

In general, competences are considered as a *threshold* or *base*, *essential* or *key*. Many countries refer to specific aspects of the general objectives of the educational process for which competences are important. In this way, in French-speaking Belgium "socles de compétences" are "necessary for social integration and the continuation of studies", in Luxembourg "compétences de base" are "necessary for further learning and study", in Spain "competencias essencias" are "necessary for citizenship in today's society", in the UK "key competences/skills" are "necessary for membership of a flexible and competitive workforce and for lifelong learning", in Germany "Schlüsselkompetenzen" are "essential for operating effectively on a personal and professional level" and in France "socles de compétences" are "indispensable for the successful conclusion of school, continuing with further education, building one's personal and professional future and being successful in social life". Less frequent is reference to certain characteristics of competences, such as in Flemish Belgium, where the "sleutelcompetenties" are described as "transferable, applicable in different contexts and situations and polyfunctional in terms of reaching various kinds of objectives, solving problems and performing tasks".

Over the past ten years, two documents have become required points of reference for all European educational systems: the "Recommendation of the European Parliament and of the Council on key competences for lifelong learning" (KCLL, 2006) and the "Recommendation of the European Parliament and of the Council for the establishment of the European Qualifications Framework for lifelong learning" (EQF, 2008). Both provide descriptions rather than definitions of elements considered as constitutive of competence and reasons for its importance. In the KCLL competence is described as "a combination of knowledge, skills and attitudes appropriate to the context". "Key competencies" are those which all individuals need for "personal fulfilment and development, active citizenship, social inclusion and employment".

In this sense, knowledge, skills and attitudes would seem to be meronyms of competence, i.e. parts of a whole, called competence, which allows an individual to deal with a given situation. At the same time, an idea of competence as the *application* of expertise emerges, as the combination of knowledge, skills and attitudes to be assembled and applied in a particular context in order to achieve a goal or solve a problem. But where do the knowledge, skills and attitudes come from? How is it that someone can possess them in order to have them ready to face the situation? The EFQ states that knowledge is "the result of the assimilation of information through learning, the set of facts, principles, theories and practices related to a field of work or study", described as being "theoretical and/or practical".

The problem with this description is that first it begs the question of how one comes to know, how people build knowledge, and second it seems to suggest that the body of knowledge to be learnt already exists as a given set related to a given field. We will consider the second aspect later in this paper and for the moment concentrate on the question of how we know. If the process of *assimilation* is at the heart of knowledge-building, in which new information is incorporated into given information already stored in existing cognitive structures, surely this process of construction should be considered a *hyponym*, or type, of competence, that of being capable of building knowledge. It is indeed arguably the most important component of a lifelong and lifewide learning process. The key question is whether knowledge (relegated to the status of something which comes before and is then used as a constituent part of competence) is to be considered a meronym, a part or element which is constitutive of competence (as in the KCLL and the EQF), or rather, and I would suggest much more importantly, as a knowledge-building process, a hyponym, an example or type of competence, of vital significance for individual and collective learning as well as the sustainability of the entire human enterprise. This perspective assigns to knowledge-building competence an essential and dynamic role in learning processes together with other types of competence.

Types of competence

To understand this relationship between knowledge-building and other types of competence, we can examine the use made in the KCLL and the EQF of the signifier "skills". These are described as "the ability to apply knowledge and use know-how to complete tasks and solve problems", and divided into two types: "cognitive (the use of logical, intuitive and creative thinking) and practical (involving manual dexterity and the use of methods, materials, tools)". What kind of relationship between skill and competence emerges from this description? While "the use of logical thinking" can be considered a cognitive ability and therefore a meronym, or part, of competence (since logical thinking enables one to excogitate possible problems and solutions), surely "complete tasks and solve problems " is a hyponym, or example, of competence? Similarly, is not "manual dexterity" a meronym, a part of "use methods, materials, tools" (since using ones hands enables one to manipulate things and put procedures into practice), while "use methods, materials, tools" is a hyponym of competence? In many cases it is indeed difficult to distinguish between the examples of what is considered skill ("the ability to apply knowledge and use know-how to complete tasks and solve problems") and competence ("the proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and/or personal development").
Clearly what characterizes this idea of the concept of competence is always the *application* of knowledge in situations or contexts. Why, what and how to build knowledge are not considered as being under discussion, but merely to be taken for granted. The principle argument of this paper is that this is a serious defect in the prevailing notion of what competence is and thus an impediment to defining the importance of its role in educational processes and systems. Moreover, such a characterization is hardly compatible with many of the proposed examples in the KCLL itself. For instance, "competence in science" refers to "the ability and willingness to use the body of knowledge and methodology employed to explain the world around us, to identify questions and to draw conclusions that are based on proven facts". Examples of knowledge are "fundamental scientific concepts, principles and methods, technology and technological products and processes". Skills include "the ability to use technological tools and machines as well as scientific data to achieve a goal or to a decision or conclusion based on evidence ... to be able to recognize the essential features of scientific inquiry ... communicate the conclusions and reasoning that led to them". In these descriptions,

knowledge and skills would often seem to be hyponyms or even synonyms of competence.
The EQF, an instrument that unites educational institutions and work-based contexts for lifelong learning, addresses the question of how to describe different levels of knowledge, skills and competence. Competence is described as a contextualization of knowledge and skills "in terms of autonomy and responsibility", in which the various levels of competence are determined by elements such as contexts characterized by simpler or more complex problems and by different degrees of predictability and unpredictability. While the attempt to describe the levels with reference to features such as complexity and unpredictability is clear and important, we always encounter the same types of problems as those previously illustrated. For example, at the 7th and 8th levels of competence, in the column referring to skill we find "to develop new knowledge". In this case it would seem clear that knowledge and skills are not antonyms, or different things, and that skill is not only "the ability to apply knowledge", but also that of building it. But should we consider the building of knowledge in some cases as a hyponym of skill and in others as something different from skill? Should not building new knowledge and activating skills be rather considered as two hyponyms, or two types, of competence?

Redefining the concept of competence

If the concept of competence is to occupy a central role in the educational paradigm, then its definition must be of particular relevance to the educational process. The definition must be able to interpret and facilitate learning processes and to promote formal institutional as well as non-formal and informal environmental (workplace and society in general) curricula as well as learning pathways, personal curricula and life projects. Starting from its etymology, the concept of competence is particularly significant in that it expresses (*cum-petere* = “seek”, “aim, “project” - “with”, “together”) the idea of learning as process which is dynamic and based on constructing something which is essential (“essence”, “vital” as well as “necessary”, “indispensable”), capable of constant expansion and enrichment, to adapt to change, the need to pose and face new problems that require new solutions, identify new requirements and challenges, continuously build new knowledge.
My proposal is to define competence as the ability to *orientate oneself* in life in such a way as to promote sustainability. In this sense, *orientation* is considered as identifying a position (for example, in space, in time, within thought processes) and taking a direction (for example, a point of reference, a pathway, a way of proceeding), thereby adapting to the circumstances presented by environments and specific settings. In other words, competence is the ability to understand situations with particular characteristics and act with awareness in order to achieve objectives related to personal and social resilience and transformability. These objectives can be grouped into four major categories that relate to building knowledge (knowledge-building competence), communicating information (communicative competence), experimenting and consolidating a range of approaches, ways of doing and acting (methodological and operational competence) and developing relationships with oneself and others (personal and social, competence). Thus four types of objectives that enable people and societies to orient themselves in all situations, lifelong and lifewide, can be considered the four major types of competence that form human learning and render orientation central to the sustainability of human enterprise.
These competences are interdependent and feed into and out of each other. The construction of any form of knowledge depends on a simultaneous acquisition of language as the vehicle that is indispensable for this process (Dodman, 2014b). In this sense, the development of communicative competence - knowing how to use a multiplicity of languages to understand, interpret, narrate, describe and represent phenomena and processes, re-elaborate data, express and argue ideas - is essential to the

development of knowledge-building competence. Moreover, in all learning processes the growth of these two competences depends on the criteria that determine practices and procedures, both consolidated and innovative, and require the development of methodological and operational competence - analysing data, assessing situations and evaluating outcomes, formulating hypotheses and predictions, experimenting choices, solutions and procedures, using tools and instruments, carrying out processes and realising products. And at the same time, all these competences require personal and social competence – developing relationships with oneself and with others, acting with autonomy and awareness, reflecting on and assessing ones own work, respecting environments, people and things, discussing, collaborating, cooperating within a group.
Moreover, each type of competence is lifelong and lifewide and therefore cross-curricular in any educational agency. Each specific example of a competence is the result of the way in which it is declined on the basis of the particular characteristics of the situation, be it in study-based, work-based or recreational contexts, or any specific combination of these variables. At the same time, every way of declining specific competences (both promoting them through education and developing them through personal experience) must be determined by criteria of resilience and transformability.

Knowing and acting

If knowledge-building competence is placed at the heart of the educational process, we can now consider some aspects of questions concerning what is knowledge and why, what and how to build knowledge. My aim is to consider knowledge-building competence as an essential aspect of the ability to orient oneself in situations, a human potential to be used and developed by learners who build their own learning pathways in order to be able to develop personal resilience and transformability and enable society to do likewise.

For our purposes, knowledge can be considered as a construct, the product of a process whereby a *knower* constructs a *known* that is the outcome of adapting, or accommodating, given to new experience. The consolidation of this relationship between the *knower* and the *known* gives rise to *knowledge* in the same way that the relationship between *signifiers* and *signifieds* gives rise to *signs* and thereby our way of creating meaning and making sense of the world. One feature of this relationship is what Dewey defines as making "one experience freely available to other experiences" (1916: 349) and therefore generalising experience by creating connections and relationships in order to build concepts (*cum-capere*). Such a process of sharing experiences takes place both at intra- and inter-mental levels. At the intra-mental level the individual creates connections between experiences, builds personal knowledge and develops personal intelligence. The consolidation of relationships at an inter-mental level, based on criteria that are commonly determined, held and applied, turns individual processes of knowing into shared knowledge and thereby a potential for collective intelligence within a participatory culture (Lévy, 1997, New London Group, 2000, Ivey & Tepper, 2006, Jenkins, 2006), particularly if based on developing personal and social competence related to respecting, collaborating and cooperating.
For Dewey, another feature of the knowledge-building process is "knowing as understanding and thereby acting" (1916: 350). Moreover, "knowledge is a perception of those connections of an object which determine its applicability in a given situation" (1916: 353-54). Central to this idea is "maintain[ing] the continuity of knowing with an activity which purposely modifies the environment" inasmuch as "knowledge in its strict sense of something possessed consists of our intellectual resources - of all the habits that render our action intelligent" (1916: 400). If our action is to be intelligent, then it cannot be mere understanding and application of existing knowledge, but rather a complex construction based on questioning why, what, how to know and act in such a way as to maintain sustainability through promoting resilience

and transformability. In this respect, the link between knowing and acting described by Dewey is the same as that between knowledge-building and methodological-operational competence and the dynamic interplay between them.

On the basis of this relationship between knowing and acting, knowledge can be considered as an interpretative model that works, inasmuch as it satisfies the conditions established by given criteria and it continues to produce the desired outcomes, generally conceived of as satisfactory explanations or functional applications. When it fails to satisfy the criteria applied it becomes invalid and when it ceases to produce the desired outcomes it becomes obsolete.

Knowledge-building: motivations, types and characteristics

Both knowledge and the criteria that render it valid or invalid, functional or obsolete, can be analysed from three intersecting perspectives: *motivations, types and characteristics.* The nature of the relationship between knowing and acting is essentially defined by the reasons why knowledge is built. These reasons determine both the type of knowledge and its particular characteristics. Within human history, as within the life of every human being, we can identify a number of different motivations for knowledge building. The stimulus to build knowledge may stem from wonder and a desire to understand together with a natural impulse to satisfy needs. Much indigenous knowledge (Adamson, 1978-2007, Martinéz-Cobo, 1986, Ajibade, 2003) demonstrates motivations, types and characteristics that would seem to unite these two components in a relationship of dynamic equilibrium designed also to place the sustainability of the human enterprise at the heart of their knowing and acting in the world. This equilibrium is based, for example on types of knowledge that can be defined as practical, craft-based and narrative, with characteristics such as local, contextual and experiential linked to ways of learning based on observing and pitching in (Rogoff, 2003, Ochs, 2014)).

By contrast, while both wonder and satisfying needs can be considered important initial stimuli at all phylogenetic and ontogenetic levels, much recent human history clearly shows how knowledge building has increasingly become a prerequisite for something else, generally dominating, manipulating and exploiting, a driving force for exercising power and enslaving, thereby rendering large parts of the human enterprise unsustainable, precisely because they become destructive of resilience and incapable of transforming *the current untenable system*. The types of knowledge generally associated with this tendency relate to categories such as disciplinary, paradigmatic, scientific and technological (largely concerned with extracting, manipulating and producing for mass-consumption, as well as for devastation linked to military purposes).

At the same time, it is possible to envisage the wish to build knowledge as the impulse to problematize what we know and how we act and foresee outcomes in terms of potential and limits, opportunities and risks, taking nothing for granted, above all, some spurious idea of the superiority of our way of knowing and acting in the world. Sustainable educational processes and systems must promote this vision as crucial to lifelong learning, personal acculturation and life projects, active and responsible citizenship. In this respect there is a crucial link between the development of personal and social competence, based on respecting, collaborating and cooperating, and the move from disciplinary to inter- and transdisciplinary knowledge

Educational systems are generally based on the primacy of disciplinary knowledge and in recent decades increasing attention has been paid to approaches based on interdisciplinary and transdisciplinary perspectives. Disciplines can be considered as particular sets of cultural practices typical of given fields of enquiry, experience and activity characterised by specific epistemological, linguistic and methodological features. While the belief in the importance or even supremacy of disciplinary knowledge is deeply rooted and widely held,

the limits and dangers of concentrating learning curricula within disciplinary boundaries have long been recognized. As Popper puts it: "We are not students of some subject matter, but students of problems. And problems may cut right across the borders of any subject matter or discipline" (Popper 1963: 8). In the same way, for Clark sustainability science requires a perspective which "... brings together scholarship and practice, global and local perspectives from north and south, and disciplines across the natural and social sciences, engineering, and medicine — it can be usefully thought of as "neither ''basic'' nor ''applied'' research but as a field defined by the problems it addresses rather than by the disciplines it employs; it serves the need for advancing both knowledge and action by creating a dynamic bridge between the two" (Clark, 2007: 1737-1738).

Other criticisms involve the risk of blinkered or tunnel vision and objectification since phenomena are represented as being apparently objective or definitive, rather than as contingent events that depend on circumstances and agencies, the perspective of the observer and the linguistic lens that determines both vision and representation (Wells, 2013, Dodman, 2014a, Stenner, 2015). Moreover there is the paradox of a constant proliferation of disciplines that splinter and limit vision and have the effect of excluding both people who do not possess a certain expert knowledge and different visions that might offer different ways of knowing and acting.

What is fundamental for educational processes is the presence of interdisciplinary approaches that are collaborative, in that disciplines and their practitioners help each other to better address the questions they pose, and transdisciplinary approaches which are cooperative, in that disciplines and their practitioners come together to build new constructs that are the very reason for being of the team, developing new epistemologies, methodologies and languages that go beyond those of the single disciplines in order to address new and common questions (Camino et. al. 2014).

Of equal importance is the perspective of the relationship between narrative and paradigmatic knowledge (Bruner 1991). Narrative knowledge is experiential, both in the sense that it is built on experience and in that it is still encoded as experience. It is knowledge as process, understanding a world in which things happen, people act in particular circumstances, knowledge mediated by verbal language (Dodman, 2014a). By contrast, paradigmatic knowledge is experience re-codified through nominal language. It is knowledge as product, an abstract, symbolic, objective and economic way of managing complexity and variability, rebuilding and structuring everything in terms of scientific concepts and taxonomies, rendering it subject to forms of logic and reason that lead to reification, categories as rigid containers built on principles of identification and exclusion rather than based on relationships and overlapping flexible networks that promote empowerment and inclusion.

The way in which motivations for knowledge-building influence the types of knowledge built has led to modes of perceiving, constructing and acting based on a dominance of disciplinary and paradigmatic knowledge whose principal characteristics have at different times and in various ways been seen as global, objective, certain, determinate, complete, permanent and product-oriented. Much education still tends to promote such a vision and a risk of *understanding without awareness*. By contrast, the focus of interdisciplinary, transdisciplinary and narrative knowledge leads to characteristics such as local, subjective, uncertain, indeterminate, incomplete, temporary and process-oriented and thereby modes of performing and reflecting which lead to *awareness and responsibility*.

Cross-curricular themes and visions for sustainability

What could such an approach to educational processes and systems look like? One possible answer could be that of basing learning curricula on unifying cross-curricular themes,

designed to give rise to interwoven visions for sustainability that reciprocally feed out of and into each other, as in the following example. Such a theme could unite the key questions this paper has proposed and could be called *Why/what/where/when/how on earth*?[2] These are questions of vital importance for all learners of whatever age, be they in nursery schools or universities, formal, non-formal or informal educational contexts. The theme can link parallel phylogenetic and ontogenetic learning processes, both in terms of the history of human ways of learning and being and our understanding and awareness of ways of learning and being, reflecting on ways of learning and being, posing problems related to why, what, how I have learnt, participating in activities that also constantly involve asking the question "what if …?". Such imagining of alternatives should be seen as indispensable for true understanding of what we know (Gramsci, 1971) and the predicting involved should be considered not just as abstract hypothesis but rather as an urgent prerequisite for intelligent action.

The initial focus for the theme can be that of considering and practising, imagining and experiencing human and personal learning as discovering the world, initially perceived as a world *that is as it is*, unchanging and outside me, to explore, measure, describe, draw, a process of creating maps and imagining unknown parts still to be mapped, calculating dimensions of what exists, exploring new horizons and producing narratives of this experience, constructing different spatial scales and building relative borders within space, developing types of language and using metaphors to mediate and transform experience, create different ways of representing reality and establish frames of reference.

Gradually the idea of a changing world emerges, a world that develops and grows in complexity, something that, rather than static, becomes dynamic, rather than a-temporal, becomes evolving, something with a history that ranges from the formation of planets to the movement of plates and colonisation by forms of life, the emergence of biomes, climatic zones, ecosystems, cycles of matter, the causes of spatial and temporal changes, the crucial role of solar energy, gathering data and making predictions. This changing world becomes one in which life itself changes the world. I perceive life as a cause of change, ranging from the large-scale effects of life on the environment, from dolomitic deposits to the composition of the air and climate changes to the small-scale effects of life on the environment, niches and biodiversity.

At a crucial point the relationship between my knowing and my acting involves a movement from representing to remodelling, my knowledge becomes related to - both determined by and potentially aware of - the development of human communities and territories. From the first communities and their reciprocal interactions with their environments in different parts of the world, the development of anthropic spaces and environments based on science and technology, distancing and reification, spreads voraciously, leading to present day communities, a world of omnivores and populations, local and global inhabitants, a prevailing idea of knowing and acting as incorporating for using, employing measures of utility, producing ecological footprints, determining biocapacity, a parallel socio-cultural construction of beliefs, norms and stereotypes related to categories such as ethnic origins, gender or status.

Gradually I become conscious that if our knowing and acting are to be sustainable, they must be based on awareness of possible ways of being and possible worlds to inhabit. Our recent history is based on new forces that emerge, the growth of science as an idea of the world and technology as a means of acting in that world often based on anthropocentric motivations and beliefs in progress and betraying ignorance of the "limits of human ingenuity in the face of complex dynamics" (Westley et al., 2011). I realise the importance of understanding and analysing past and present uses of technology, awareness of its

[2] I am indebted to Elena Camino for many conversations that have helped me develop ideas for the example proposed.

potential and impact, assessing future developments, the relationship between needs and opportunities and the exploitation of large-scale reserves of energy, new problems such as the distribution and the availability of water for all the uses of it we foresee, and the consequences that derive from such complexity. I realise the significance of changing concepts of borders, rules, means and time-scales for travel, ways of communicating and purposes/themes, ways of living and using territory, knowing people and places, new forms of understanding the cumbersome and overbearing presence of human populations, the need to redefine consumption habits in terms of what is a sustainable relationship between resources, products and services. I become aware of how knowledge building must crucially be linked to understanding feedback in complex systems, local changes, global effects, local consequences, of the necessity to understand the nature of spatial and temporal limits, the interdependence of all knowing and acting, the reasons for, presence and consequences of conflicts, sustainability relationships based on who and what sustains who and what, the need to identify and monitor bioindicators of environmental health, the crucial importance of moving from an anthropocentric to an ecocentric vision.

Conclusions

The principal idea of this paper is the crucial importance for educational processes of posing problems about human knowledge in order to build a paradigm based on sustainable knowledge. The sustainability of the human enterprise on our planet depends on building such knowledge. In this sense we need to create some common assumptions, starting from the main reason why we try to construct the paradigm: to promote an educational *process* and an educational *system* capable of promoting that process, made up of *agencies* that propose *institutional and environmental curricula* and learners who create their own *learning pathways* and thereby build their own *personal curricula* and *life projects* based on awareness and responsibility in knowing and acting, foreseeing and producing outcomes.

Within this vision the constructivist idea of learning (that has thus far considered how we learn, but not why) addresses the vital question of why and what knowledge to build as well as how to build it and use it. At the same time, competence is considered as working together and towards (as in a constructivist model) rather than being in competition with (as in an economic functionalist model). In this way, teachers and learners can be seen as working together in a co-construction of knowledge and scenarios for social learning and sustainable being. Knowledge should primarily be seen as a resource, to be built, stored and used with care. Since all sustainability depends on the use of resources, sustainable knowledge depends on the use we make of it and the use we make of it depends on why we build it. As with all kinds of resources, this depends on our relationship with the ecosystems in which we live and that are the unique source and reservoir of all the processes that give rise to us and to our products on the planet we inhabit as *earthlings* (Latour, 2007).

Knowledge is always based on motivations and the consequent criteria that derive and determine its types and characteristics. In this sense knowledge is never innocent nor is it completely disinterested. All knowledge contains within itself a relationship with the specific nature of the knowledge builder and user, with the context of its construction. At the same time, how we know and how we use what we know are intertwined. Assuming that there are given, unquestioned bodies of knowledge to be learned and then applied as competence is not only an inadequate treatment of the relationship between learning, knowledge and competence but is incapable of assigning to knowledge-building competence its vital role in promoting sustainability. Sustainable knowledge is both resilient and transformable and at the same time promotes resilience and transformability.

References

Adamson, R. (1978-2007) *Papers,* https://asteria.fivecolleges.edu/findaids/sophiasmith/mnsss532.html

Ajibade, L.T. (2003) Techniques of Environmental Monitoring and Compliance, *Techniques in Environmental Studies,* Jimoh, H.I. (ed.), 186-194, Ilorin: Nathadex Publishers

Alba, R. D. and Nee, V., (1997) Rethinking Assimilation Theory for a New Era of Immigration. *International Migration Review*, 3 1 (4), pp. 826-874

Ball, S. J. (2008) *The Education Debate. Policy and Politics in the 21st Century*. Bristol: The Policy Press

Blau, P.M. and Duncan, O.D. (1967) *The American Occupational Structure*. New York: John Wiley & Sons

Bruner, J. (1991) The Narrative Construction of Reality, in *Critical Inquiry*, 18 Chicago: University of Chicago Press

Camino, E., Dodman, M., Barbiero, G., Benessia, A., Bianco, E., Caretto, A., Cerutti, A.K., Colucci Gray, L, Ferrara, E., Folco, S., Gray, D., Perazzone, A. (2014) Sustainability research and new visions for humanity's dialogue with itself and nature, *Visions for Sustainability,* **1,** DOI: 10.7401/visions.01.01.

Clark, W.C. (2007) Sustainability Science: A room of its own. *Proceedings of the National Academy of Science* 104; published online on February 6, 2007, 10.1073/pnas.0611291104

Davis, K. and Moore, W.E. (1970). Some Principles of Stratification, *American Sociological Review,* 10 (2), 242-9

Dewey, J. (1916) *Democracy and Education. An Introduction to the Philosophy of Education.* New York: Macmillan

Dodman, M. (2014a) Language, its technologies and sustainability**,** ***Visions for Sustainability,*** **1,** DOI: 10.7401/visions.01.02.

Dodman, M. (2014b) Language, multilingualism, biocultural diversity and sustainability, ***Visions for Sustainability,*** **2,** DOI: 10.7401/visions.02.02.

Driscoll, M. (2005). *Psychology of learning for instruction.* New York: Pearson

Durkheim, E., (1956) *Education and Sociology*. New York: Free Press

Fantl, J. and Mcgrath, M. (2009) *Knowledge in an Uncertain World*. New York: Oxford University Press.

Gewirtz, S. and Cribb, A. (2009) *Understanding Education. A Sociological Perspective.* Cambridge: Polity Press

Gramsci, A. (1971). *Selections from the Prison Notebooks of Antonio Gramsci.* Translated by Hoare, Q. and Smith, G.N. New York: International

Kroemer, K.H.E., Kroemer, H.J. and Kroemer-Elbert, K.E. (2010) *Engineering Physiology.* Berlin Heideburg: Springer

Kuhn, T. (1970) *The Structure of Scientific Revolutions.* (2nd edition) Chicago: University of Chicago Press

Hill, W.F. (2002) *Learning: A survey of psychological interpretation* (7th edition) Boston, MA: Allyn & Bacon

Ivey, B. and Tepper, S.J. (2006) Cultural Renaissance or Cultural Divide? *Chronicle of Higher Education,* 52

Jenkins, H. (2006) *Convergence Culture: Where Old and New Media Collide.* New York: New York University Press

Jobling, M. (1993). Bioenergetics: feed intake and energy partitioning, in Rankin J. C.,

Jensen F.B. (eds.) *Fish Ecophysiology*. London: Chapman & Hall

Jordan, A., Carlile, O., & Stack, A. (2008). *Approaches to learning: A guide for teachers.* Berkshire: McGraw-Hill, Open University Press.

Latour, B. (2007) A Plea for Earthly Sciences, in Burnett, J. Jeffers, S. & Thomas, G. (eds.) *New Social Connections: Sociology's Subjects and Objects*. London: Palgrave Macmillan

López-Arredondo, D.L., Leyva-González, M.A., Alatorre-Cobos, F., Herrera-Estrella, L. (2013) Biotechnology of nutrient uptake and assimilation in plants. In *International Journal of Developmental Biology*. 57(6-8) 595-610. doi: 10.1387/ijdb.130268lh.

Lévy, P. (1997) *Collective Intelligence. Mankind's Emerging World in Cyberspace*. Cambridge, MA: Perseus Books

Martinéz Cobo, J. (1986) *Report to the UN Sub-Commission on the Prevention of Discrimination of Minorities* UN Doc. E/CN.4/Sub.2/1986/7.

New London Group, (2000) A Pedagogy of Multiliteracies: Designing Social Futures, in Cope, B. and Kalantzis, M. (eds) *Multiliteracies: Literacy Learning and the Design of Social Futures*, London: Routledge

Ochs, E. (2014) Children Learning by Observing and Pitching In, *Human Development*, 57:162–170 DOI: 10.1159/000359915

Official Journal of the European Union (2006) *Recommendation of the European Parliament and of the Council on key competences for lifelong learning*.

Official Journal of the European Union (2008) *Recommendation of the European Parliament and of the Council on the establishment of the European Qualifications Framework for lifelong learning*.

Ormrod, J.E. (1995). *Human Learning (2nd edition)*. New Jersey: Prentice Hall.
Parsons, T. (1951), *The Social System*. London: Routledge & Kegan Paul

Piaget, J. (1977*). The Development of Thought. Equilibrium of Cognitive Structures.* New York: Viking

Popper, K. R. (1963) *Conjectures and Refutations. The Growth of Scientific Knowledge*. New York: Routledge and Kegan Paul.

Rogoff, B. (2003). *The Cultural Nature of Human Learning*. Oxford: Oxford University Press

Stenner, P. (2015) A Transdisciplinary Psychosocial Approach in Martin, J., Sugarman, J and Slaney, K.L. *Theoretical and Philosophical Psychology. Methods, Directions and New Approaches for the Social Sciences*. Oxford: Wiley

von Glasersfeld, E. (1995). A Constructivist Approach to Teaching, in L. P. Steffe & J. Gale, *Constructivism in Education* (pp. 3-16). Hillsdale, NJ: Erlbaum

Vygotsky, L. S. (1978*). Mind in Society. The Development of Higher Psychological Process.* Cambridge, MA: Harvard University Press
Wells, J. (2013) *Complexity and Sustainability*. New York: Routledge & Kegan Paul

Westley, F., Olsson, P., Folke, C., Homer-Dixon, T.,,Vredenburg, H., Loorbach, D. Thompson, J., Nilsson, M., Lambin, E., Sendzimir, J., Banerjee, B., Galaz, V.,van der Leeuw, S. (2011). Tipping Toward Sustainability: Emerging Pathways of Transformation. *Ambio*, Vol. 40.7

ORIGINAL PAPER DOI: 10.13135/2384-8677/1504

Francis of Assisi and the Wolf: Nonviolence as a moral value of biophilia

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ISSN 2384-8677 **DOI:** http://dx.doi.org/10.13135/2384-8677/1504

Article history: Submitted February 13, 2016. Accepted in revised form April 10, 2016

Published online: June 21, 2016

Citation: Barbiero G. (2016) Francis of Assisi and the Wolf: Nonviolence as a moral value of biophilia. *Visions for Sustainability,* 5: 28-31.

Competing Interests: The author has declared that no competing interests exist.

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***Perspective**: Theoretical visions*

***Fields**: Human and natural sciences*

***Issues**: Universalism in history and ecology, social, economic and environmental justice*

According to Stephen Kellert (1996; 1997), moral values provide one of the potential ways through which biophilia can be expressed. Without doubt, love for life (biophilia) goes together well with the moral value of nonviolence. But is the contrary also true? That is, does the ethical choice of nonviolence offer any evolutionary advantage? Biophilia is an attitude of human behaviour forged by evolution (Wilson, 1984). Tens of thousands of years are required before a human tendency becomes established as a phylogenetically adapted behavioural pattern (Kellert & Wilson, 1993). But if the behavioural model offers an advantage in terms of fitness, sooner or later it will be expressed. If the moral value of a pro-biophilic choice offers an advantage in terms of fitness (Barbiero, 2011), then nonviolence will be expressed, sooner or later, as a human generalised behavioural pattern. It is simply a question of time.

However, the question remains whether nonviolence, as an expression of biophilia, other than expressing a survival advantage, can lead to the openness that Aldo Capitini dreamt of, when we ask whether reality is able to abide by nonviolence, and by reality we intend the hard laws of biology (Falcicchio, 2015). This can only be verified if the moral principles of nonviolence activate in some way genetically determined learning rules (Barbiero, 2014). An interesting model could come from the idea of placating the "ferocious beasts", not in the sense of a 'lion tamer' who demands submission, but like a saint who, through his clemency, tames the fierce (Barbiero, 2007); as was the case of Francis of Assisi and the Wolf of Gubbio.

According to an oral tradition (*Fioretti di San Francesco*, XXI), an "enormous, terrible and ferocious" wolf suddenly appeared in Gubbio causing great harm to animals and men alike; until one day when "Saint Francis took the *inverse*[1] road to the place where the wolf was" (my italics). The wolf did not seem to be afraid and "it came to meet Saint Francis with its mouth wide open", but Francis called to it and said: "Come here, brother wolf" and the Saint spoke frankly to the wolf – Saint Francis's discourse holds all the pride and boldness of nonviolence. He looked into the face of wickedness in the absence of judgement or doubt: wicked is wicked and good is good ("Brother wolf, you are doing much harm in these parts and you have committed great evils, harming and killing the creatures of God without His permission. You have not only killed and devoured animals, but you have dared to kill men made in God's image. For this, you deserve to be hanged as the terrible thief and murderer that you are"); here we can note the awareness that violence is destructivity, which is an end in itself (Barbiero, 2004), and that it only provokes more violence in return ("and the people clamour and murmur against you, and this entire land is your enemy"). Finally, the historical (and personal) 'opening up' occurs, the turning point that goes beyond prejudice, that transcends the conflict and requires the integration inside us of the enemy ("But I want, brother wolf, to make peace between you and them, so that you will no longer offend them, and they will forgive your past crimes, and neither men nor dogs will chase you any longer"). It is interesting to note that to face the "enemy"[2], the "nemesis", it seems that a transformation is necessary. Choosing the *inverse* road to go to meet the enemy (see also Genesis 33.1) is a radical change of perspective: the "enemy" becomes the "adversary"[3] (Barbiero, 2004). Here it becomes clear just how much the "Wolf of Gubbio" is the

[1]The word "inverso" was used in the original *Fioretti di San Francesco* (*The little Flowers of St. Francis*), a text on the life of St. Francis attributed to Tommaso da Celano). In old Italian, the preposition "inverso" meant to "change course" or even "to con-vert oneself", in that it is derived from the verb "to invert". I believe that Tommaso da Celano, the XIII century biographer of Francis of Assisi used this preposition to highlight the fact that in order for Francis to approach the wolf he had to "in-vert", i.e. change, his attitude towards him. The entire story seems to suggest this interpretation. The wolf reacts ferociously towards everyone, but it is a reaction to the fear and hate that the people feel towards him. Instead, Francis's inner attitude towards the wolf is different; he does not fear or hate the wolf. If my observation is correct, Tommaso da Celano is telling us that Francis has, above all, "inverted" his own attitude.

[2] The word "enemy" derives from the ancient Greek "Nemesis", the goddess that sooner or later revenged injustices. It was not possible to argue with or escape from Nemesis because it was she who dealt out what was due and restored justice. By extension, by the enemy it is intended he with whom no negotiations are possible.

[3] The word "adversary" derives from the Latin word "ad versus", i.e. "to come against (in opposition)". With an adversary, rules can be established (as in sport), common ground identified and agreements or compromises made.

external projection of "Francis's inner wolf". The wolf is the terrifying, the unresolved, the unfulfilled that waits to be fulfilled. It is Francis's "dark" side.

Let us imagine that (1) biophilia is the genetically determined link between Man and Nature; (2) Nature is the external reflection of Man's inner energies; (3) energies can be integrated, guarded and valorized, instead of "dominated"; (4) nonviolence is the practice of relationship we need to integrate, govern and liberate these energies. If this is correct, we must recognize, using the language of today, that Saint Francis was a man endowed with extraordinary biophilia. His sermons to the birds and to the fish ("that stayed to listen to him"), the legend of the Wolf of Gubbio and his retreat into the forest are all stories that make us think about a man who lived in harmony with his wild soul. In the *Laudes Creaturarum* (Canticle of the Creatures) Francis turns to all creatures – living and non living – calling them brothers and sisters. He feels bound to all the natural world, a bond that goes far beyond love for human brothers and sisters, far beyond love for animals and plants. Francis is a brother to the moon, to the sun, to fire, to water, to the wind, to death. One who proclaims to be a brother of the stars and of Nature is wild and cosmic (Barbiero, 2015). Francis seems to recognize Nature as the mirror image of his inner energies that are integrated and valued. Francis has evolved: he needed to achieve harmony with Nature by progressively integrating the wildness that resided within him. Francis is the man that enlightened his "Shadow" and fulfilled the unfulfilled, achieved his inner cosmos, and only in this way could he experience being the master of homologous elements in the external cosmos. In some way he was able to penetrate deep down into the depths of his being, incarnating the Eden-like landscape within himself, where Adam "presided over dry ground and ruled over the fish of the sea, over the birds of the sky and over each living being that creeps on the earth" (Genesis 1:28; *Biblia Hebraica Stuttgartensia*, 5th revised edition, 1997). The reference here to dry ground gives the sense of accomplishment: the breaking of a mother's waters delivers a baby to a new, dry world. To carry out this work of inner integration, Francis seems to follow the divine suggestion to the letter (Genesis 2:16-17): "eat the fruit of every tree in the garden" (Genesis 3:2), because to eat you must eat, "but not of the tree of knowledge of the fulfilled and the unfulfilled[4] for in the day that you eat of it you shall surely transform[5]" (Genesis 3:3). Because when it is ready, when the fruit is truly mature, then it will be possible to integrate even the most dark and terrible parts. But if a man is not ready, if he eats the fruit before the time is right, he will not be able to transform. And the wolf will eat him, the enemy will win. There are no short-cuts, there is no escape.

[4] Here, I propose a new translation of the original Hebrew word עֵ֣ץ הַדַּ֔עַת טוֹב וָרָ֑ע (*Etz ha-da'at tov ve-ra*), usually translated as "tree of knowledge of good and evil". My proposal is based on the fact that the noun *tov*, usually translated as "good", con also mean "complete" or "fulfilled", while the noun *ra*, usually translated as "evil", can also imply "incomplete" or "unfulfilled".

[5] The Hebrew noun מות, usually translated as "death", can sometimes mean "transformation" or "mutation". I have opted for this translation, which seems more appropriate in this context.

References

Barbiero, G. (2004) "La violenza: il carattere patologico della combattività destrutturata", in E. Camino e A. Dogliotti Marasso (a cura di), *Il conflitto: rischio e opportunità*. Torre dei Nolfi (AQ): Edizioni Qualevita, pp. 147-163.

Barbiero, G. (2011) "Biophilia and Gaia. Two hypothesis for an affective ecology". *Journal of Bio-Urbanism* 1, 11-27

Barbiero, G. (2014) "Affective Ecology for Sustainability". *Visions for Sustainability* 1, 20-30

Barbiero, G., Benessia, A., Bianco, E., Camino, E., Ferrando, M., Freire, D.D., Vittori, R. (2007) *Di silenzio in silenzio*. Cesena: Anima Mundi.

Barbiero, G., Gasparotti, F., Baruzzi, E. (2015) *La verde pelle di Gaia*. Limena, PD: Libreriauniversitaria.it

Falcicchio, G., Barbiero, G. (2015) Loving openness towards Nature: Aldo Capitini and the moral value of biophilia. *Visions for Sustainability* 3, 5-15.

Fioretti di San Francesco. A cura di D'Alatri (1982) Edizioni Paoline

Kellert, S.R. (1996) *The Value of Life: Biological Diversity and Human Society*. Washington (DC): Island Press.

Kellert, S.R.(1997) *Kinship to Mastery.* Washington DC: Island Press.

Kellert, S.R. and Wilson E.O. (1993) *The Biophilia Hypothesis*. Washington (DC): Island Press Wilson, E.O. (1984) *Biophilia*. Cambridge (MA): Harvard University Press

Wilson, E.O. (2006) *The Creation*. New York (NY): W. W. Norton & Company.

LAW, ECOLOGY, AND INFRASTRUCTURAL MEGAPROJECTS

The Visions Editorial Board

Human rights cannot be separated from environmental justice, which in turn is a precondition for satisfying fundamental needs for each and every person on Earth. Democracy and participation follow, granting people the rights necessary in order to protect their own land and communities. However, it appears that environmental justice now faces a crisis of law, which is no longer capable of defending commons and territories from the greed of industrialized economy. Science and jurisprudence, mutually relying on notions of a world governed by mechanistic principles, both support a worldview of perfectible human control but together fail to govern the complex dangers posed by indiscriminate extraction and use of natural resources as well as by industrial wastes, which, as in the case of asbestos, can remain poisonous much longer than the time scales conceived of by law. On the other hand, the authoritarian approach employed by infrastructural megaprojects severely reduces the space available for shared decisions and leads to the criminalization of protest movements. Analyses of trends concerning these issues are proposed by Alessandra Algostino regarding the sentence by the International People's Court in the case of the No-Tav movement against the construction of high-speed rail track in Val Susa (Piedmont – Italy), and by Enzo Ferrara in a review of *The Ecology of Law. Toward a Legal System in Tune with Nature and Community* by Fritjof Capra and Ugo Mattei (Berrett-Koheler Publishers, Oakland–CA 2015).

VISIONS REVIEWED DOI: 10.13135/2384-8677/1634

The authoritarian approach of megaprojects versus democracy: the international people's court defends the right of participation

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Abstract. This paper proposes a reflection on the current model used to conduct infrastructural Megaprojects, which is recurrently applied at global level and – in the name of economic interests that are private, although purporting to be general – clashes with the proper horizon of Democracy. The key elements of this model deal with the defence of fundamental human rights in the design and construction of Megaprojects, which are highlighted by analyzing the sentence of the Permanent People's Tribunal (PPT), emitted on November 2015, in reply to the appeal promoted by the popular movement opposing the construction of a high–speed rail in Valsusa (Piedmont – Italy). Two issues emerge in particular: the denial of public spaces for participation and the criminalization of protest..

ISSN 2384-8677 **DOI:** http://dx.doi.org/10.13135/2384-8677/1634

Published online: June 21, 2016

Citation: Algostino A. (2016) The authoritarian approach of megaprojects versus democracy: the international people's court defends the right of participation. *Visions for Sustainability,* 5: 33-36.

Competing Interests: The author has declared that no competing interests exist.

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"People protesting against the high-speed trains in Valsusa, as against the *Notre Dame Des Landes* airport or other projects, should be considered like "sentinels sounding the alarm" observing rights violations that could greatly affect society and environment".

"All that has been highlighted, seems to demonstrate the existence of a consolidated behaviour model in the management of the territory and social dynamics each time one finds himself in a scenery of approval and realization of infrastructural Megaprojects: governments are at the service of great financial, national and transnational economic interests".

These are two key passages of the sentence emitted by the International People's Court (TPP), in the recent session devoted to the "Fundamental rights to participate of local communities and Mega Projects. From TAV to global reality", held in Turin and Almese (Northern Italy) on November 5-8th 2015.[1,2]
The TPP is a judgement tribunal, connected with the Lelio Basso International Foundation for the rights and freedom of people, heir of Russell I and Russell II tribunals (the first instituted in relation with the USA crimes committed during the Vietnam War; the second, on repression in South America). It is not an empowered jurisdictional agency, but its moral authority along with the authoritativeness of its members makes its sentences highly noteworthy.
The aim of the Tribunal is to intervene in case of systematic violations of human and people's rights, which do not receive appropriate institutional answers from the single countries or from the international community, thereby granting a space for denouncing, documenting and judging, giving voice to a community that risks not being listened to, and visibility to contexts and situations that are hidden.
Through its activities, as the TPP itself points out, more and more frequently the Tribunal has to confront with the impact of economics, or rather with "the implications of the inverted hierarchy between human and economic rights". Among many cases dealt with, we can recall the previous TPP sessions on transnational enterprises and the rights of the populations in Colombia (2001-2008), on the politics of the European Union in Latin America (2006-2010) or on the impact of the *North American Free Trade Agreement* (NAFTA) in Mexico (2011-2014).
This session on Megaprojects originates from the appeal of the *Valsusa Counter-observatory (Controsservatorio Valsusa)* supported by numerous mayors in the Valsusa territory, but more largely it concerns the connection between Megaprojects and fundamental rights, as well as between Democracy, rights and economy. The Court hears testimonies of academics, experts, activists and public administrators, and collects documents relating with the local movement (No-Tav) against high-speed trains. Furthermore, it extends the investigation to other cases related with Megaprojects, which encounter increasing opposition from the involved populations. Most of these cases take place in Italy: the *Mose* (*Experimental Electromechanical Module*) barrier in Venice; the No-Tav movement again in Florence; the invasive MUOS (*Mobile User Objective System), a* military radar station in Niscemi–Sicily; the solar power thermodynamic plant in Basilicata; the oil drilling projects spread over the Italian territory; the bridge over the Channel of Sicily; the Orte-Mestre motorway; the marble quarries in the Apuan Alps. The cases heard can also be European, like the *Notre Dame des Landes* airport in France, the opposition to high-speed trains in France, Pays Basques, United Kingdom and Germany and the mine of Rosia Montana in Romania. The final analysis includes a general overview and report on the strategies of Megaprojects at a global level (with particular attention to Mexico and Latin America).
The TPP identifies an "anti-model" in the elaboration and management of Megaprojects, involving the question of the connection between general interest and particular interest together with the effectiveness of Democracy.
Megaprojects are characterised by a typical scheme of reference for the way they proceed, because the interests are the same and pretend

[1] The Acts of the Session and the sentence have been collected in Livio Pepino (ed.), *Il Tribunale permanente dei popoli. Le grandi opere e la Valsusa*, Intra Moenia, Napoli, 2016. They are also available on the website of the Controsservatorio Valsusa, http://controsservatoriovalsusa.org/, where one can also find the videos of all the speeches, witnesses, and the sentence pronunciation (the latter is also available on the website of the TPP, http://tribunalepermanentedeipopoli.fondazionebasso.it/).
[2] See also the website of *Useless Imposed Mega-Projects,* http://www.presidioeuropa.net/

that they can advocate to themselves the democratic procedures, closing spaces for political participation and limiting the exercise of rights: in short, profit against people through the manipulation of democracy.

The case of opposition to high-speed trains (No-Tav) in Valsusa can be taken as an example, emblematic of the "diffused method of intervention towards the big question of territorial and environmental impacts"[3]. This is founded on the "authoritarian and centralized character of the decisions", the "exclusion of people and local administrations" or their only apparent involvement, the "insufficient and (sometimes) evident incongruity of information and data provided to support the project", the "transformation of the political questions inherent to the works into problems of public order demanded to police and magistracy (also using expressed legislative and administrative measures of general character)". "Police and judiciary interventions excessively severe are interpreted by many as methodologies aimed at disincentive and/or block from the beginning opposition and protest" (quotations from the sentence of TPP, 2015).

For twenty years in Valsusa a pluralist and transversal movement has been growing, which asks that attention be given to its reasons, based on the opinions of experts and scientific studies. The meetings held within the territory have been in the order of hundreds and thousands. The tens of demonstrations periodically held have been crowded and intensely participated (from a thousand to tens of thousands of people). Thousands of citizens have signed public petitions to the European Parliament. The pleas to tribunals have been numerous and the deliberations of local administrative councils recurrent. Yet the answer has always been an attempt to propose a fake dialogue, in the ancient Roman tradition of *Divide et Impera,* creating an Observatory substantially biased in its composition and brief, a massive denigratory campaign by the controlled media, a particular attention towards the participants in the movement by the judiciary apparatus and a militarized territory[4,5].

In the words of the Tribunal, the "trust with citizens is broken", and so the relationship between politics and society is changed: "the equilibrium between economic reasons and society needs is sacrificed in favour of the first". The market appears as the undiscussed – and undiscussable – parameter of reference and its needs become *by default* general interest, marginalizing democratic needs, aspirations and rights.

This state of affairs corresponds neither to the original intention of the Italian Constitution nor to constitutional theory, which places people and their rights at the centre of the social order. Thus, as the TPP observes, there is "more respect of general interest in the instances coming from local communities than in the instances coming from politics and private companies".

This is a "contrast of values: on one side societal values and reasons are posed…, on the other side, values and reasons of economics".

The construction of Megaprojects creates a challenge for Democracy, in terms of the capacity to grant effective and open participation by everybody (art. 3, Italian Constitution), and the capacity to resist hegemonic tendencies of economic power.

The pluralistic, conflictual but discursive horizon of Democracy does not offer sufficient evidence of resistance and so political-economic *élites* impose their will.

The imposition, in the first place, implies the denial of the right to real participation by citizens and communities, a denial that originates from serious lacks and/or manipulations made by institutions of information available to citizens, and which effectively results in their exclusion from decision-making processes.

Moreover, the enforcement disposition implies the use of various forms of repression of dissent. These are applied through the creation of exceptional conditions, for example, by putting under police control the area involved by the projects, and even worse by the militarization of the territory accompanied by it being put "off limits" to citizens. As a specific example, the worksite near Chiomonte in Valsusa, where a secondary tunnel is being excavated under the Alps, has been defined as a "strategic area of national interest", its access is forbidden and protected by the army. Likewise, the numerous Prefect ordinances in Valsusa, the huge recourse to penal instruments and security procedures, and a media and press denigratory campaign

[3] Guido Rizzi, Angelo Tartaglia (Eds.), *Il Tav Torino-Lione. Le Bugie e La Realtà*, Intra Moenia, Napoli 2015

[4] Livio Pepino (Ed.), *Come si reprime un movimento: il caso Tav, analisi e materiali giudiziari*, Intra Moenia, Napoli 2014

[5] Paolo Mattone (Ed.), *Tav E Valsusa. Diritti Alla Ricerca Di Tutela*, Intra Moenia, Napoli 2014

(the TPP describes how "media are converted into agents of disinformation, and frequently of contamination"), are "functional" to the interests of the promoters and beneficiaries of the Megaprojects.

The refusal to listen to the voice of the people is accompanied by the criminalization of protest, producing a violation of fundamental civil and political rights such as freedom of opinion, speech, demonstration and movement" (See [1] TPP sentence, 2015).

The Inter-American Court of Human Rights, in a recent sentence about Mapuche population (*Caso Norín Catrimán y otros vs. Chile*, 29 Mayo 2014), ruled that protests and social assertion should not find on the institutional side law enforcements that produce «*un temor razonable en otros miembros de… pueblo involucrados en acciones relacionadas con la protesta social y la reivindicación de sus derechos territoriales o que eventualmente desearan participar en estas*[6]».

The global strategy followed for the realization of Megaprojects is the same – the TPP claims – that nowadays presides over the conduct of the global crisis, and – I would add – it is emblematic of the *global economic governance*, structured on the basis of a meta–principle: the achievement of profit (of the few, *ça va sans dire*). State institutions remain, but are rendered functional and bent to economic interests.

The effectiveness of Democracy is challenged, which means that its real significance is endangered under the guise of a merely formal Democracy, whose existence is entrenched in institutions more and more distant from the pluralism and conflicts that occur in society. A Democracy without involvement is no more than a simulacrum of true Democracy, as in relation to the independence of democratic political process from economic powers.

The motor roads and the pathways forbidden to free circulation in Val Susa resemble the symbol of a suspended Democracy. The fences protecting the tunnel worksite create the physical counterpart of the closure of the political space for participation in political decision, as well as for the expression of dissent.

The TPP, in recognizing the violation of fundamental right of citizens, asserts that "States have the constitutional duty to protect the rights of their citizens" and must "assure this protection against economic and financial national and transnational lobbies, examining each project according to criteria defined by various international treaties, in particular the Aarhus Convention signed on June 25th 1998. The Aarhus Convention prescribes appropriate and adequate efficient information, effective participation of citizens through all the decisional process and the obligation for competent institutions of taking into account appropriately results deriving from people participation". In addition, it entrusts to social movements the task of claiming that the right of the voice of the people to be taken into account is granted, "exercising their own rights with the necessary vigour". In the movements against the Megaprojects, there are citizens who, as single free people, but also within a collective dimension, think, study and act, reminding everybody that alternative ways are possible and trying to construct them, transversally and pluralistically, discussing about Democracy and exercising Democracy. A community of people that make politics, and look ahead *onwards.*[7,8]

[6] Translation: *"A reasonable fear in the other members of… the people's movement involved with actions related with social protest and the vindication of their territorial rights or who, in the end, desires to be part of them".*

[7] Jeremy Brecher, Tim *Costello*, and Brendan Smith, *Globalization from Below*: *The Power of Solidarity*, South End Press, Cambridge–Mass. 2000

[8] Santos Boaventura de Sousa (Ed.), *Democratizing Democracy. Beyond the Liberal Democratic Canon*, Verso, London 2005

VISIONS REVIEWED DOI: 10.13135/2384-8677/1651

The laws of nature and the nature of law

Book Review: *The Ecology of Law. Toward a Legal System in Tune with Nature and Community*, by Fritjof Capra, and Ugo Mattei, Berrett-Koheler Publishers, Oakland (CA) 2015

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ISSN 2384-8677 **DOI:** http://dx.doi.org/10.13135/2384-8677/1651

Published online: June 21, 2016

Citation: Ferrara E. (2016) The laws of nature and the nature of law. *Visions for Sustainability,* 5: 37-40.

Competing Interests: The author has declared that no competing interests exist.

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In November 2014, environmental control, healthcare strategies and the justice system itself all suffered a defeat when the Italian Supreme Court overturned a previous 18-year prison sentence on Stephan Schmidheiny, the former owner of Eternit, a giant construction corporation whose activities had caused 3.000 deaths due to the use of asbestos in its plants in Italy [1,2]. In December 2014 there was a similar case in another trial concerning 250.000 tons of highly toxic substances that had been discovered in Bussi sul Tirino (Pescara), buried by Montedison, a former leader in the chemicals industry. The huge amount of poisons – the largest single example of abusive dumping of toxic wastes in Europe – heavily contaminated drinking water[3]. Nevertheless, for the Court nobody could be found guilty, since by Italian law the evidence for prosecuting Eternit and Montedison was statute-barred, because the statutory time limit had been exceeded in both cases. Eternit left Italy in 1986, some 30 years ago, and, according to investigators, the toxic dumping in Bussi sul Tirino took place in the same period, continuing up to the 1990s.

While some may argue that preserving the individual's right to time-limitation in certain legal prosecutions can produce justice today, it can clearly cause much greater injustice in the future. In the case of environmental crimes, there is a clear discrepancy between the time-scales of law and those of nature[4]. There are significant latency intervals for contaminants dispersed in the environment before they irremediably pollute the soil, deep waters or the air, thereby causing the insurgence of degenerative diseases. Mesothelioma – a malignant cancer induced by asbestos – typically arises 20 to 50 years after exposure. It is extremely difficult to base a trial on evidence that emerges after such a long period of time. In the end, the largest-ever trial involving asbestos-related deaths[5] led to a Court ruling that nullified some 30 years of legal battles, failing to bring justice for the rights of people who still die from asbestos even four decades after Eternit went bankrupt.

While ecological disasters (e.g. Casale Monferrato, Minamata Bay, Bhopal, Exxon-Valdez, the BP Gulf oil spill, the Niger Delta and many more) create media attention and may make legal history as regards the global environment[6], they also represent a major weakness in Western jurisprudence since no means are available to remedy past errors and prevent their reiteration. It could be argued that in the light of such disasters a precautionary principle should be adopted[7] and that jurisprudence should be more concerned with the environment, since, as proponents of the *Anthropocene* sustain, mankind – or at least a part of it – now endangers all biological and physical systems on Earth and no species, lands, or water sinks are free from its impact[8].

While recognising the importance of this perspective, Ugo Mattei warns of the risk of succumbing to Western capitalism's illusion of its own omnipotence. Humanity must realize that its grandiose analysis of the extent of its own agency is more fantasy than fact. The current state of ecological catastrophe would suggest following a path toward devolution rather than an insistence on even more human power and control[9]. Mattei is professor of law at the Universities of California (USA) and Turin (Italy) and co-authored with Fritjof Capra – the Viennese physicist and philosopher – *The Ecology of Law*, a book presenting jurisprudence as a discipline with a conceptual structure parallel to that of natural science. The volume comes out of years of dialogues and seminars

[1] *Procès Eternit: annulation de la condamnation de l'industriel suisse, Schmidheiny*, Le Soir (Belgique), online 19 novembre 2014.

[2] Eliane Patriarca, *Amiante : «Le déni du crime industriel»,* Liberation, 4 décembre 2014

[3] Peter Popham, *Toxic secret of Italy's 'unspoilt' region*, The Independent, 21 April 2007

[4] See Rob Nixon, *Slow Violence and the Environmentalism of the Poor*, Harvard University Press, 2013

[5] David Allen, Laurie Kazan-Allen (eds.), *Eternit and the Great Asbestos Trial*, The International Ban Asbestos Secretariat – IBAS, London 2012

[6] *Late lessons from early warnings: the precautionary principle 1896-2000,* Environmental issue report No 22/2001, 2002

[7] *Late lessons from early warnings: science, precaution, innovation*, EEA Report No 1/201, 2012

[8] Will Steffen, Paul J. Crutzen and John R. McNeill, *The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature?*, Ambio, Vol. 36, No. 8, December 2007

[9] Ugo Mattei, *The new nature forum*, The Boston Review online, January 11th 2016 http://bostonreview.net/forum/new-nature/ugo-mattei-ugo-mattei-response-new-nature

jointly held by the two authors who address the question of how to move "toward a legal system in tune with nature and community", and it was the 2016 gold winner in the political/current events category of the Benjamin Franklin award, one of the highest honours for independent USA publishers.

Over ten chapters, Capra and Mattei connect conceptual changes in scientific knowledge with changes in society and analyse the relationship between science and law, exploring the evolution of Western thought from the ideas of the cosmos as a chaos, to the faith in the world as a collection of single entities resembling machines. In a similar fashion, the authors argue, seeing society as a collection of mechanisms, the evolution of Western jurisprudence has pursued a reductionist paradigm. The same has happened to natural resources that, from indivisible socialised commons, have been transformed into assets subject to financial capital (Ch. III: *From Commons to Capital*). According to the authors, this is the transformation of the environment caused by economics and the most dangerous legacy of modernity (Ch. IV: *The Great Transformation and the Legacy of Modernity*).

Nature's lifecycles bring a series of periodic transformations sustained by the contribution of a few crucial inorganic substances and their cycles. Complex ecological principles rule all the ongoing changes of the environment, which in turn have generative rather than extractive features. By contrast, modernity has a dangerous commitment to speed, control and domination underlying the ideology of consumerism and the pretence that it is always possible to remedy the damage done to nature and society and fill in the extractive dynamic of industrialism. Capra and Mattei observe that science and jurisprudence mutually rely on notions of a world governed by rigid principles and in this sense tend to give support to the dominant Western worldview of perfectible human control. Western economy has accordingly used politics, law, and technology to exploit nature, leaving non-experts unaware of the short and long-term costs. Jurisprudence is thus just as responsible for the illusion of control as technology. Moreover, since modernity produced the materialistic and extractive attitude of the Industrial Age, both scientists and jurists share responsibility for today's global crisis. However, even this perspective does not fully encompass the ongoing transformation of science. Although the mechanistic trap still dominates jurisprudence and economics, even hard sciences have already produced a new vision. Quantum theory and relativity have shattered the dogmas of positivism by showing that the world can no longer only be broken down into independent, elementary units. Subatomic particles interact in ways such that the quantum state of each one cannot be described independently. "A subatomic particle is a set of relationships that reach outward to other things, which are themselves sets of relationships" (Ch. V: *From the Machine to the Network*). A shift in emphasis from the parts to the whole has followed in science, undermining the Cartesian-Newtonian paradigm. Gradually the idea of a connected-world has emerged, challenging the previous notion of a world made of machine-like entities.

Unfortunately, an equivalent paradigm shift has not followed in the development of human laws and an involution of the human societies toward irreversible disorder seems unavoidable. However, human laws, like those of nature, are not ineluctably constrained within the mechanistic vision and Capra and Mattei make some proposals for change, embracing a vision of nature based on patterns of relationships, systemic thinking, and ecological community (Ch. VIII: *From Capital to Commons*).

A revolution able to introduce a systemic paradigm also within politics requires long-term strategies to move the focus within the social domain from the individual to relationships, promoting all sustainable behaviours. In order to re-generate relationships, institutional structures must avoid concentrating power and instead render it widespread throughout the community. It must also reject the accumulation and exploitation by few of resources belonging to all members of the community. The need for such a shift is urgent as for the first time a separation occurs in the Western thought between the laws of nature, which are self-sustaining and community-based, and human laws that support the extractive and exploitative together with individual gain.

A new ecological legal order should be based on natural literacy, a common defence of shared resources, and a concerted effort to limit anthropogenic impacts. Rather than demand that nature submit to human laws, we need a profound change in legal paradigms and an ecological adaptation of social rules. The ecology

of law shows that everyone can participate in resisting the positivist attitudes, which concentrate power and serve accumulation. Capra and Mattei observe that many attempts are already taking place worldwide for the emancipation of nature and society from the mechanistic view. They warn also that insurgencies without a vision are like the riots of the desperate, easy to delegitimize and repress with the violent means inherent in the current legal and economic orders. However, the ecology of law is ready to endow these shared visions of change with a plan: allowing natural and complex laws to thrive and seeking to learn from them is better than making them the object of our ephemeral political projects.