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The Future of the Noosphere*

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Conceptualizing an »Age of Man«

The Anthropocene was launched as a concept for a new geological epoch in, arguably, the year 2000. Central to this concept of an Age of Man is the advancement of the view that humans are now driving profound changes in the earth's physical processes, and are thus competing with other natural forces: »Humankind has become a global geological force in its own right«.[1] By altering fundamental mechanisms of the earth system,[2] humans threaten the conditions of their own life on the planet.[3] Humanity, as a species, has moved itself out of the Holocene, the period in which basically all of human recorded history has played out, and has now moved into a new era. To paraphrase a classic in the field of environmental history: there is indeed something new under the sun.[4]

Leaving the contested claims of the concept's coinage aside, one recurring narrative of the Anthropocene concept casts Nobel laureate Paul Crutzen as its inventor. According to this narrative, he first used the term in a discussion at the *International Geosphere–Biosphere* meeting in Cuernavaca in 2000.[5] Two years later Crutzen developed his argument for naming a new geological age in an article in Nature.[6] In the decade and a half that has passed since it was first coined, the Anthropocene has generated a lot of literature that seems to be growing exponentially and becoming increasingly transdisciplinary.[7] The

* I would like to thank the participants of the 17th International Conference on the History of Concepts in Bielefeld 2014 for comments on a paper adjacent to this one, as well as Hans Andersson and the editors and commentators at *Forum Interdisziplinäre Begriffsgeschichte* for helpful remarks on this text.

1 Will Steffen et al.: »The Anthropocene: Conceptual and Historical Perspectives«, in: *Philosophical Transactions of the Royal Society* 369 (2011), pp. 842–867, here p. 843.

2 The concept of earth system would definitely merit a conceptual historical study of its own. A definition of the concept is offered by Frank Oldfield and Will Steffen, key researchers in the field. According to them, the earth system is »the suite of interacting physical, chemical, and biological global-scale cycles (often called biogeochemical cycles) and energy fluxes which provide the conditions necessary for life on the planet«. Frank Oldfield/Will Steffen: »The earth system«, in: Will Steffen et al. (eds.): *Global Change and the Earth System: A Planet Under Pressure*, Berlin 2004, p. 7.

3 Steffen et al.: »The Anthropocene« (note 1), p. 862.

4 John Robert McNeill: *Something New Under the Sun: An Environmental History of the Twentieth-Century World*, New York 2000.

5 Paul J. Crutzen/Eugene Stoermer, »The ›Anthropocene‹«, in: *IGBP Newsletter* 41 (2000), pp. 17–18; Christophe Bonneuil/Jean-Baptiste Fressoz, *L'événement anthropocène: La Terre, l'histoire et nous*, Paris 2013, p. 17.

6 Paul J. Crutzen: »Geology of Mankind«, in *Nature* 415 (2002), p. 23.

7 A complete list of the relevant titles cannot be provided here due to their great and steadily growing numbers. A few examples of the special issues and even journals dedicated to the Anthropocene are nevertheless telling. In 2011 the *Philosophical Transactions of the Royal Society* dedicated a theme issue to The Anthropocene: *A New Epoch of Geological Time?* and in 2012 the *Oxford Literary Review* published issue on deconstruction in the Anthropocene. In addition, new scholarly journals have been founded: in September 2013 the first issue of the journal *Anthropocene* was published, followed by *Elementa: Science of the Anthropocene* in December of that same year, and in April 2014 the first issue of the transdisciplinary *Anthropocene Review* came out. The concept has continued to attract a growing general interest. In 2011 the concept made it onto the cover of *The Economist*.

Anthropocene concept has certainly generated new perspectives on the environmental crises facing the globe in the 21st century. Notably, some of these new perspectives have included pertinent and substantial criticism of the Age of Man concept. One of the points raised has been the concept's false claims of universality, e.g. from a global inequality or gender perspective.[8]

From the very first discussions about the Anthropocene, recurrent references have been made to earlier Age of Man concepts, most notably to the concept of the noosphere, coined in the 1920s.[9] Although the science underpinning the concept of Anthropocene is new (perhaps its most important advances have been made in connection with the science of global warming), it has spurred wider debates on the meaning and experience of an Age of Man that often echo those on the noosphere. This applies not least to matters of the timescales and experience of time implied by the Anthropocene epoch concept.[10]

In this article, a Koselleckian approach to the issue of time will be employed. In Koselleck's view, modernity has been characterized by a multiplicity of synchronous times, or as Helge Jordheim puts it, by »multiple temporalities«.[11] By temporality, Koselleck means something different than epochs or periodizations. More precisely, Jordheim asserts, Koselleck uses this term to reach for experiences of time, such as »progress, decadence, acceleration, or delay, the ›not yet‹ and the ›no longer‹, the ›earlier‹ or ›later than‹, the ›too early‹ and the ›too late‹, situation and the duration«.[12] Especially pertinent for this article is Koselleck's category of a horizon of expectations (*Erwartungshorizont*), understood as perceived prospects for the future.[13]

In both the noosphere and the Anthropocene discussion, the notion of an Age of Man seems to merge different timescales into one another, or, as stated by one of the most prominent scientists in the early debate, »The division of historical and geological time is levelled out for us«.[14] This article examines the temporality implied in the noosphere concept in order to formulate a specific question regarding the Anthropocene. The article is thus intended to contribute to the on-going examination of the Anthropocene concept by way of historicising its temporality.

Unexpected acquaintances

The noosphere concept was the result of a somewhat extraordinary encounter and intellectual exchange between a Soviet mineralogist/geo-chemist and two Catholic philosopher-scientists in 1920s Paris. In the

8 For examples of thorough critiques, see Andreas Malm/Alf Hornborg: »The Geology of Mankind? A Critique of the Anthropocene Narrative«, in *The Anthropocene Review* 1 (2014), pp. 62–69; Bonneuil/Fressoz: *L'événement anthropocène* (note 5). Another line of critique has been developed from feminist points of view, and a conference on the theme Anthropocene Feminism was held at the University of Wisconsin-Milwaukee in April 2014, see http://c21uwm.com/anthropocene/ (20.11.2014).

9 Crutzen/Stoermer: »The ›Anthropocene‹« (note 5), p. 18; Crutzen: »Geology of Mankind« (note 6); Will Steffen/Paul J. Crutzen/John R. McNeill: »The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature«, in: *AMBIO: A Journal of the Human Environment*, 36 (2007) 8, pp. 614–621, here p. 615.

10 Only burgeoning attention has so far been paid to what kind of time the Anthropocene implies in this literature. If a full-fledged examination of the temporality and horizon of expectation implied in the Anthropocene concept remains to be written, questions of time and timescales have been posed in the literature. Those discussions have revolved around the issue how geological timescales can be made sense of as they are intertwined with historical times. The events causing the Anthropocene, such as the invention of methods to extract and use fossil fuels, are historical, whereas the consequences must be understood on a geological as well as a historical timescale. See, for example, Libby Robin: »Histories for Changing Times: Entering the Anthropocene?«, in: *Australian Historical Studies* 44 (2013) 3, pp. 329–340; Dipesh Chakrabarty: »The Climate of History: Four Theses«, in: *Critical Inquiry* 35 (2009) 2, pp. 197–222.

11 Helge Jordheim: »Against Periodization: Koselleck's Theory of Multiple Temporalities«, in: *History and Theory* 51 (2012), pp. 151–171.

12 Reinhart Koselleck (transl. Keith Tribe): *Futures Past: On the Semantics of Historical Time*, Cambridge, MA 1985, p. 94; Koselleck's temporalities are extensively discussed in Jordheim: »Against Periodization« (note 11).

13 Koselleck: *Futures Past* (note 12), p. 267 ff.

14 Vladimir Illich Vernadsky: »The Biosphere and Noosphere«, in: *American Scientist* 33 (1945) 1, pp. 1–12, here p. 12.

words of one of its inventors, »the word ›noösphere‹ is composed of the Greek term *noos* mind, and *sphere*, as last used in the sense of an envelope of the earth«.[15]

The noosphere was constructed as a parallel concept to that of biosphere. The latter denoted the sphere of life and was probably first used by the Swiss geologist Eduard Suess (1831–1914) in 1875.16 But it was not until the Soviet geo-chemist Vladimir Illich Vernadsky (1863–1945) refashioned the concept in his synthesizing work in the 1920s that it gained momentum in international scientific discussions.[17]

Although Vernadsky had been a high-profile liberal before 1917 and his ideas often deviated from a straightforward materialist ideology (he stuck to the label »cosmic realist«), he managed to navigate through the turmoil and political minefields of the pre-revolutionary and revolutionary periods as well as the Lenin and Stalin years and pursue a successful scientific career.[18] He was a member of the Imperial, and then Soviet, Academy of Sciences and enjoyed a larger amount of freedom than many of his fellow scientists.[19] Like many of his intellectual peers, a number of his works nevertheless remained unpublished until the 1970s and 1980s.[20] Vernadsky's geo-chemical perspective on life formed the immediate and necessary scientific and conceptual background to the noosphere concept.[21]

In 1922 Vernadsky was invited to Paris by the rector of the Sorbonne. Once he was finally granted permission to go abroad, he accepted the invitation. After his series of lectures there, he stayed in the city until 1925. It was during this time that Vernadsky met with two scientists and Bergsonian philosophers who came to exercise an important influence on his work, namely, the Jesuit, palaeontologist Pierre Teilhard de Chardin (1881–1955) and the mathematician, philosopher, and professor at the *Collège de France* and later member of the *Académie française* Edouard Le Roy (1870–1954).[22]

Like the other two, Le Roy was a philosopher-scientist, and he followed closely in his teacher Henri Bergson's footsteps, both philosophically and in terms of academic positions. Teilhard de Chardin was as devoted a theologian as he was a scientist and started to develop his idiosyncratic synthesis of evolutionary theory and theology in the 1920s. After a brief period of teaching geology at the *Institut catholique de Paris*, he was forbidden to continue teaching, and the Vatican also prohibited the publication of his works.[23] His writings on the noosphere were published only posthumously.

Bringing together Vernadsky and the two Bergsonists Teilhard de Chardin and Le Roy, the former's sojourn in Paris appears to have been decisive for the development of the noosphere concept. During the years following Vernadsky's stay in Paris, all three published works in which the noosphere concept played a part. Vernadsky published *La géochimie* (1924 in French, 1926 in Russian, 1930 in German),[24] *Biochemistry*

15 Vernadsky: »The Biosphere and Noosphere« (note 14), p.11. Elsewhere in this article, the simplified spelling (noosphere) will be employed.

16 Vernadsky met with Suess in Vienna in 1911 and then suggested a different interpretation of the term as the sum of all the Earth's living systems. Bertrand Guillaume: »Vernadsky's Philosophical Legacy: A Perspective from the Anthropocene«, in: *The Anthropocene Review* 1 (2014) 2, pp. 137–146, here p. 137.

17 Jonathan Oldfield/Denis J. B. Shaw: »V.I. Vernadskii and the Development of Biogeochemical Understandings of the Biosphere, c.1880s–1968«, in: *The British Journal for the History of Science* 46 (2013), pp. 287–310, here p. 291.

18 Kristian Petrov: »Russia in the European Home? Convergence, Cosmopolitanism and Cosmism in Late Soviet Europeanisation«, in: *Europe-Asia Studies* 65 (2013) 2, pp. 321–346, here p. 338.

19 Kendall E. Bailes: »Science, Philosophy and Politics in Soviet History: The Case of Vladimir Vernadskii«, in: *Russian Review* 40 (1981) 3, pp. 278–299, here pp. 279 ff.

20 Aleksej M. Ghiralov: »Vernadsky's Biosphere Concept: An Historical Perspective«, in: *The Quarterly Review of Biology* 70 (1995) 2, pp. 193–203, here p. 196; Paul R. Samson/David Pitt (eds.): *The Biosphere and Noosphere Reader: Global Environment, Society and Change*, New York 1999, p. 54.

21 The development and dissemination of Vernadsky's geo-chemical views have been explored by a number of scholars. See, for example, Guillaume: »Vernadsky's Philosophical Legacy« (note 16); Jonathan Oldfield/Denis J. B. Shaw: »V.I. Vernadsky and the Noosphere Concept: Russian Understandings of Society-Nature Interaction«, in: *Geoforum* 37 (2006) 1, pp. 145–154; Oldfield/Shaw: »V.I. Vernadskii and the Development of Biogeochemical Understandings of the Biosphere, c.1880s–1968« (note 17); Bailes: »Science, Philosophy and Politics in Soviet History« (note 19); Kendall E. Bailes: *Science and Russian Culture in an Age of Revolution*, Bloomington 1990.

22 Guillaume: »Vernadsky's Philosophical Legacy« (note 16), p. 138; "Edouard Le Roy", in: Académie française, see www.académie-française.fr/les-immortels/edouard-le-roy (20.11.2014).

23 Julian Huxley: »Introduction«, in Pierre Teilhard de Chardin (transl. Bernard Wall): *The Phenomenon of Man*, London 1959, pp. 11–30, here p. 21 ff.; Oliver Krüger: »Gaia, God and the Internet: The History of Evolution and the Utopia of Community in Media Society«, in: *Numen*, 54 (2007) 2, pp. 138–173, here p. 147.

24 Guillaume: »Vernadsky's Philosophical Legacy« (note 16), p. 138.

(Russian edition in 1924), *The Biosphere* (Russian edition in 1926, French edition in 1929). Le Roy held a series of lectures at the *Collège de France* in 1927–1928, published shortly thereafter as *Revue des cours et conférences* and in 1928 as a monograph entitled *Les origines humaines et l'évolution de l'intelligence*.[25] For reasons mentioned above, Teilhard de Chardin's most important writings on the noosphere came later. Most important was *Le phénomène humain*, published in 1959. It is nevertheless clear that his contribution to the development of the noosphere concept in the 1920s was absolutely central.[26]

Space and time

The noosphere is described as an immaterial aspect of the earth's constitution, in Vernadsky's words, »an envelope of the earth«.[27] To Le Roy, the noosphere was rather an aspect of the living sphere, »The biosphere and the noosphere are not spatially distinct [.] In many respects, they overlap; but the latter is a transfiguration of the former«.[28] At first sight, the noosphere appears to be a spatial concept, or at least dimensional.

It is, however, important to the notion of the noosphere that it describes an aspect of a constantly changing world, »the seat of a certain global and irreversible evolution«.[29] Especially for Teilhard de Chardin, the noosphere's development or evolution in time is central to its existence. If not exclusively a temporal concept, it nevertheless seems clear that in an important sense the noosphere implies time – but what kind of time?

In their anthology on the biosphere and noosphere, Paul R. Samson and David Pitt stress that »At the outset, it is essential to underline that the noosphere concept is intrinsically linked to the notion of a continuously evolving planet Earth«.[30] The noosphere is a processual concept, more precisely: it is implicated in an evolutionary process. What is more, it seems that the evolution the noosphere is part of carries some of the polysemy historically sedimented in that concept. It is well known that the term evolution was used long before it became associated with Darwin's theories of the transmutation of species.[31] Some of its historical meanings turn out to be pertinent for understanding in what sense the noosphere is an evolutionary concept.

Evolutionary leaps

Teilhard de Chardin's description of the noosphere rests on the vitalist notion of there always being something more in the whole than in the parts taken together. There is, to use his example, more to the molecule than just the atoms out of which it is made; and there is something more still to the cell compared to its molecules; the social is something beyond the individuals that make it up; mathematics is

25 Edouard Le Roy: *Les origines humaines et l'évolution de l'intelligence*, Paris 1928, p. v.

26 Le Roy explicitly refers to Teilhard de Chardin. Le Roy: *Les origines humaines* (note 25), p. 55. Vernadsky states that it was Le Roy who introduced the notion of noosphere during his 1927 lectures at *Collège de France*. Vernadsky also states that this concept was developed in close collaboration between Le Roy and Teilhard de Chardin. Vernadsky: »The Biosphere and Noosphere« (note 14), p. 10.

27 Vernadsky: »The Biosphere and Noosphere« (note 14), p. 11.

28 Le Roy: *Les origines humaines* (note 25), p. 54.

29 Teilhard de Chardin: *The Phenomenon of Man* (note 23), p. 147.

30 Samson/Pitt: *The Biosphere and Noosphere Reader* (note 20), p. 2.

31 Peter J. Bowler: »The Changing Meaning of ›Evolution‹«, in: *Journal of the History of Ideas* 36 (1975) 1, pp. 95–114, here p. 95.

something beyond single theorems and calculations: »At each further degree of combination *something* which is irreducible to isolated elements *emerges* in a new order«.[32] This engendering principle structures the evolutionary process.

One of evolutionary characteristics of the noosphere involves how it plays out in stages or by discrete leaps, each adding a layer or sphere of reality. The appearance of reflexive consciousness in the world represents such a leap. To Teilhard de Chardin, self-reflection is the distinguishing characteristic of humans. It signifies »the power acquired by a consciousness to turn in upon itself, to take possession of itself as an object […] no longer merely to know, but to know oneself«.[33] The introduction of this kind of consciousness in the world meant a leap: »When for the first time in a living creature instinct perceived itself in its own mirror, the whole world took a pace forward«.[34] The »mutational emergence in nature of a reflexive, or ›self-conscious‹, type of consciousness« appeared as something qualitatively new and as an event in cosmic history.[35]

In a similar manner, Le Roy describes the birth and rise of humanity as a radical change in the evolution of the world, »the beginning of a new age in human evolution«.[36] Both Le Roy and Teilhard de Chardin talk of a »change of age«.[37] The changes humanity has brought about are on the order of life's emergence from inert matter: »Man appears as a new order of reality, maintaining with the inferior world of life a relation equivalent to the one that can be discerned below between life and matter«.[38] Since the appearance of humanity and the human mind, the development has taken yet another qualitative step: the birth of the noosphere.

For Teilhard de Chardin, the noosphere represents the third phase in a process he calls *hominisation*, which approximates a step-by-step heightening of consciousness in the world. The first phase is the hominisation of the individual; the second, of the species; and the third phase is the emergences of noosphere as consciousness crosses the terrestrial threshold.[39]

The question posed in this article is what kind of temporality is implied in the concept of noosphere. It seems clear so far that the noospheric temporality is evolutionary. More precisely, it implies a temporality that moves by discrete leaps, each introducing new orders of reality. This type of development is reminiscent of the pre-Darwinian and general use of the concept of evolution as intertwined with that of epigenesis and described by 17th-century scientists like William Harvey as »the sequential formation of the parts of the embryo«.[40] Noospheric temporality seems evolutionary in a vitalist and epigenetic sense.

Is the future open?

In the 18th century the scientific debate on how to explain the development of individual organic form was polarized between two positions. Preformation, the realisation of an already formed organism, was opposed by the new theory of epigenesis, the individual's successive self-organization.[41] At stake was

32 Teilhard de Chardin: *The Phenomenon of Man* (note 23), p. 268. Italics in the original.
33 Ibid., p. 165.
34 Ibid., p. 181.
35 Teilhard de Chardin: »The Antiquity and World Expansion of Human Culture«, in W. L. Thomas (ed.): *Man's Role in Changing the Face of the Earth*, Chicago 1956, pp. 103–112.
36 Le Roy: *Les origines humaines* (note 25), p. 316.
37 Teilhard de Chardin: *The Phenomenon of Man* (note 23), p. 213; Le Roy: *Les origines humaines* (note 25), p. 315.
38 Le Roy: *Les origines humaines* (note 25), p. 46f.
39 Teilhard de Chardin: *The Phenomenon of Man* (note 23), p. 164, 174, 180.
40 Bowler: »The Changing Meaning of ›Evolution‹« (note 31), p. 95; Georges Canguilhem et al.: *Du développement à l'évolution au XIXè siècle*, Paris 1985.
41 Victoria Fareld: »Wilhelm von Humboldts frihet som epigenetisk bildning«, in: *Lychnos* (2006), pp. 30–45, here p. 32.

the issue of open-ended development, often called evolution. »Does every individual start from material that is unformed, and the form emerges only gradually, over time? Or does the individual start in some already preformed, or predelineated, or predetermined way?«[42] This tension is indeed still at hand in the evolutionary views bound up in the noosphere concept: Is the evolutionary process open-ended or teleologically directed towards a certain end? Does the noosphere imply an epigenetic temporality, stressing open-ended change, process, and becoming?[43] Or does it rather realize an immanent plan?

Both Teilhard de Chardin and Le Roy describe humanity as constantly torn between its increasing power on the one hand and self-control on the other. Human beings are, in this way, inherently ambiguous. They are by nature involved in a »moral crisis«, faced with the temptation of using technological power for personal benefit and against others, against life and not for it.[44] With their technological and scientific developments, humans have gained an unprecedented technological potency and »become[] responsible for the destiny of Life«. This intensifies the moral conflict to an aggregated level, and humanity's »systematic position« then poses »a kind of enigma«.[45] The potential gap between human morals and technological power gives the impression that »humanity is systematically much more biologically potent than it should be«.[46]

Here, evolution is complicated by the emergence of moral consciousness in human beings. Teilhard de Chardin and Le Roy seem, in certain passages, to suggest a genuinely open-ended development of the noosphere, determined by choices made by humans. This suggests a temporality in which the future is open, giving human agency free play.

Nevertheless, both thinkers are ambiguous on this matter. while they do indicates this potential, unformed future, other passages in their writings suggest a less open-ended temporality. Indeed, Teilhard de Chardin's presentation of evolution sometimes seems to be directed to, or attracted by, an »epigenetic pull«, to borrow Müller-Sievers' term.[47] When Teilhard de Chardin discusses the uneven temporal structure of evolutionary development, he employs the metaphor of a »pace forward«.[48] Evolution has a direction; its movement can be identified as forward. From one layer of reality to the next, »something is carried over: it grows, jerkily, but ceaselessly and in a constant direction«.[49] In these instances, humanity is described as bound up in a grand plan: it »will never take a step in a direction he knows to be blocked«.

The numerous meanings of the noosphere concept in this sense mirror the polysemic etymology of the term. If the primary meaning of the Greek word *noos* [νόος] is that of mind »as employed in perceiving and thinking«, it also denotes other aspects of the mind, such as »resolve« and »purpose«, which are equally pertinent in the noosphere concept.[50]

In some passages, Teilhard de Chardin's hominisation concept comes close to echoing the German concept of *Bildung*, as a cumulative journey of becoming and an ever-stronger refusal of being un-free. Teilhard de Chardin writes, »The more man becomes man, the less will he be prepared to move except towards that which is interminably and indestructibly new«.[51] Both the concepts of *Bildung* and evolution have housed a tension between open-ended and spontaneous generation on the one hand and the un-folding of an

42 Jane Maienschein: »Epigenesis and Preformationism«, in: Edward N. Zalta (ed.): *The Stanford Encyclopaedia of Philosophy*, Spring 2012, see http://plato.stanford.edu/archives/spr2012/entries/epigenesis/ (20.11.2014).

43 Scott F. Gilbert: »Foreword«, in: Donna Haraway: *Crystals, Fabrics and Fields*, 2004 (1976), pp. xi–xii; Joseph Schneider: *Donna Haraway: Live Theory*, London 2005, p. 160.

44 Le Roy: *Les origines humaines* (note 25), p. 332 f. In this passage, Le Roy makes references to unpublished lectures by Teilhard de Chardin.

45 Le Roy: *Les origines humaines* (note 25), p. 37.

46 Ibid.

47 Helmut Müller-Sievers: *Self-generation: Biology, Philosophy, and Literature around 1800*, Stanford 1997, p. 7.

48 Teilhard de Chardin: *The Phenomenon of Man* (note 23), p. 181.

49 Ibid., p. 148.

50 Henry George Liddell/Robert Scott (rev. Sir Henry Stuart Jones/Roderick McKenzie): *A Greek-English Lexicon Oxford1940*, see http://perseus.uchicago.edu/cgi-bin/philologic/getobject.pl?c.49:5:186.LSJ (20.11.2014).

51 Teilhard de Chardin: *The Phenomenon of Man* (note 23), p. 231f.

immanent form on the other.[52] In a similar vein, the evolutionary temporality implied in the noosphere concept seems to be torn between open-endedness and the realization of a plan.

Teilhard de Chardin at one point sums up his ideas as a description of the universe »in a process of organic involution upon itself (from the extremely simple to the extremely complex)«.[53] At the same time, he sees convergence as a seminal force pulling humanity together. Teilhard de Chardin's convergence concept denotes a force that counteracts evolutionary diversification of the human race. In the words of Julian Huxley, it is a centripetal force perpetually acting on humanity:

> *After Homo sapiens began to differentiate into distinct races (or subspecies, in more scientific terminology) migration and intermarriage prevented the pioneers from going further, and led to increasing interbreeding between all human variants. As a result, man is the only successful type which has remained as a single interbreeding group or species, and has not radiated out into a number of biologically separated assemblages.*[54]

If the human species has remained one, the activity of its mind has become increasingly complex. Humanity has remained unified as the noosphere has diversified. Vernadsky stresses this aspect in his 1945 English language article on the noosphere. In a fundamentally different European situation, Vernadsky turns the tendency of convergence into a law of nature with juridical overtones.

> *The geological evolutionary process shows the biological unity and equality of all men […]. This is a* law of nature. *In a historical contest, as for instance in a war of such magnitude as the present one, he finally wins who follows that law. One cannot oppose with impunity the principle of the unity of all men as a law of nature.*[55]

The evolution of the noosphere must go in a direction that helps hold humanity together. Somewhat confusingly, it nevertheless seems from Vernadsky's passage that this law can be disobeyed, and, by consequence, human agency does have a part to play. From a more long-term perspective, however, no breaking of this law will come to pass. The noosphere has a set evolutionary direction; humans have no choice but to obey.

Despite living through the bleakest possible of times, this view seems to permit an explicit optimism about the future on Vernadsky's part.

> *Now we live in the period of a new geological evolutionary change in the biosphere. We are entering the noosphere. This new elemental geological process is taking place at a stormy time, in the epoch of a destructive world war. But the important fact is that our democratic ideals are in tune with the elemental geological processes, with the laws of nature, and with the noosphere. Therefore we may face the future with confidence. It is in our hands. We will not let it go.*[56]

52 For a discussion of the parallels between *Bildung* and the epigenesis and preformation debate, see Fareld: »Wilhelm von Humboldts frihet som epigenetisk bildning« (note 41).

53 Teilhard de Chardin: *The Phenomenon of Man* (note 23), p. 301.

54 Huxley: »Introduction« (note 23), p. 14.

55 Vernadsky: »The Biosphere and Noosphere« (note 14), p. 8.

56 Vernadsky: »The Biosphere and Noosphere« (note 14), p. 10.

Humans have agency, but on an aggregated level their choices are directed by the laws of nature and will ultimately go in one direction: »We have elementally chosen the right path leading into the noosphere. I say elementally, as the whole history of mankind is proceeding in this direction«.[57]

In a similar manner, Teilhard de Chardin pictures a future of convergence – »the ascent towards a collective threshold of reflection« – with a similar confidence: »There are innumerable critical points on the way, but a halt or a reversion is impossible«.[58] The noosphere implies an inevitable historical direction towards greater unity and peace.

Afterlife of the noospheric future

The temporality implied in the noosphere is generally optimistic. A brief glance at some of the many branches of its reception history suggests that one of the most prominent legacies of the concept has been precisely its evolutionary-epigenetic horizon of expectations with utopian overtones.

Already in Teilhard de Chardin's lifetime, the noosphere concept was picked up in internationalist circles and by United Nations officials. The UN has repeatedly been regarded as a realization of noospheric ideals and as evidence of the world reaching a new state of self-consciousness and unification. Teilhard de Chardin purportedly influenced the UNESCO constitution, most notably in a passage stating that peace and war are in the »minds of men«, and he is also said to have been a great inspiration for secretaries-general such as Dag Hammarskjöld and U Thant.[59] Robert Muller, assistant secretary general of the UN for 40 years, saw the organisation as a noospheric body reflecting planetary concerns and consciousness.[60] In 2009, Nicaraguan Miguel d'Escoto Brockmann referred to Teilhard de Chardin in a speech to the United Nations General Assembly, of which he was the president: »Now comes the new sphere, the sphere of synchronized minds and hearts: the noosphere«.[61]

In a Soviet context, Vernadsky's writings and use of the noosphere concept have exercised influence on numerous and heterogeneous fields. In 1989 a ›Centre for Ecological Noosphere Studies‹ was established in the Soviet Republic of Armenia.[62] In literary and semiotic theory, Vernadsky's thought inspired Mikhail Bachtin's logosphere as well as Yury Lotman's semiosphere concepts.[63]

Later on, the noosphere concept, especially in Vernadsky's renditions of it, caught the eye of people thinking about the *perestroika*. In 1999, the year before the Anthropocene discussion started, Gorbachev wrote an introduction to an anthology entitled *The Biosphere and Noosphere Reader*, in which he discusses Vernadsky's writings.[64] Later, in his book *On My Country and the World* from 2000, Gorbachev went so far as to name Vernadsky a »co-author« of the *perestroika*.65 Kristian Petrov places the noosphere in the context of a long tradition of Russian thought on convergence and cosmism that thrived in the 1980s.[66] Petrov interprets the enthusiasm for and repeated references to Vernadsky as a part of Gorbachev's cos-

57 Ibid.
58 Teilhard de Chardin: *The Phenomenon of Man* (note 23), p. 304, 231.
59 Samson/Pitt (eds.): *The Biosphere and Noosphere Reader* (note 20), p. 53.
60 Robert Muller: *What War Taught Me about Peace*, New York 1985, quoted in: Samson/Pitt (eds.): *The Biosphere and Noosphere Reader* (note 20), p. 53.
61 Miguel d'Escoto Brockmann: »Upon Adoption of the Outcome Document of the United Nations Conference on the World Financial and Economic Crisis and Its Impact on Development, UN Headquarters, New York, 26 June 2009«, see www.un.org/ga/president/63/statements/closingconference260609.shtml (20.11.2014).
62 Samson/Pitt (eds.): *The Biosphere and Noosphere Reader* (note 20), p. 4.
63 Amy Mandelker: »Semiotizing the Sphere: Organicist Theory in Lotman, Bachtin, and Vernadsky«, in: *PMLA* 109 (1994) 3, p. 385–396, here p. 385.
64 Mikhail S. Gorbachev: »Foreword«, in: Samson/Pitt (eds.): *The Biosphere and Noosphere Reader* (note 20) p. 1–9, here p. 2.
65 Mikhail S. Gorbachev: *On My Country and the World*, New York 2000 quoted in: Petrov: »Russia in the European Home?« (note 18), p. 338.
66 Petrov: »Russia in the European Home?« (note 18), p. 343.

mopolitanism. This strategy marks another break between Gorbachev and the tradition of Soviet political thought.[67]

In the last two decades, the noosphere concept has also been pointed out as a forbearer of Internet theory and a certain line of media studies bordering on religious studies. Oliver Krüger suggests that contemporary ideas of the Internet (for example, as being a first step towards the development of a collective human mind) draw heavily on Teilhard de Chardin's teleological interpretation of evolution.[68]

A noospheric horizon of expectations in the Anthropocene?

In this article, I have argued that the temporality implied in the noosphere concept is evolutionary, epigenetic, vitalist, and generative. Furthermore, it implies a long-term optimistic horizon of expectations that promises, as a matter of natural law, convergence and greater harmony among humankind. It also forecasts leaps into a qualitatively different future, in forms yet unknown to us. Le Roy paints these possibilities as evolution »reaching a point of perfection where the noosphere would strain to detach itself from the biosphere as a butterfly sheds its cocoon.«[69] This temporality has been influential in numerous heterogeneous intellectual contexts.

As discussed in the beginning of this article, the noosphere concept has attracted a renewed interest in the rapidly growing literature spurred by the coining of the Anthropocene concept in 2000. That the similarities between the noosphere and Anthropocene concepts would go beyond the nominal might appear paradoxical. The Anthropocene concept is after all motivated by the extreme and even dangerous changes humanity imposes on the earth system, and its exponents often raise the eschatological question if these changes include the planet's ability to sustain human civilisation at all.[70] But alongside the science of climate change and other forms of resource over-use, the Anthropocene concept nevertheless seems to bundle more noospheric views on the future.

One example is the way Wolfgang Lucht and Rajendra K. Pachauri, the latter chair of the UN Intergovernmental Panel on Climate Change (IPCC), formulate the global environmental challenges posed to humanity:

> *Can the mental sphere evolve quickly and purposefully to a point where the future evolution of the system can be managed consciously toward a state of dynamic sustainability of the whole system?*[71]

The answer to this might be less reassuringly affirmative than in the noosphere discussion. Nevertheless, the temporality implied in the quote is reminiscent of the noosphere concept, it is evolutionary and directed towards a new stage of self-consciousness and wise judgement. Another example – this time explicitly evoking the noosphere discussion – is the wording of the same problem by the coiner of the Anthropocene concept Paul J. Crutzen (among others):

67 Gorbachev's use of the noosphere concept is discussed in further detail in Petrov: »Russia in the European Home?« (note 18), p. 339.

68 The influence from Teilhard de Cardin, Krüger argues, went via the US Jesuit and scholar of literature Walter Ong (1913–2003) to Canadian philosopher Marshall McLuhan (1911–1980), the latter central to the development of media theory. Oliver Krüger: »Gaia, God and the Internet« (note 23), here p. 2, 147, 150.

69 Le Roy: *Les origines humaines* (note 25), p. 50.

70 E.g., Steffen et al.: »The Anthropocene: Conceptual and Historical Perspectives« (note 1), p. 862.

71 Wolfgang Lucht/Rajendra K. Pachauri: »The Mental Component of the Eart System«, in: Hans J. Schellnhuber et al. (eds.): *Earth System Analysis for Sustainability*, Cambridge, MA 2004, pp. 341–365, here p. 343

> *Will the Anthropocene simply turn out to be a very short era in which humanity blindly careens forward, continuing to transform the Earth until the planet loses its capacity to support us? Or might humanity rise to the challenge posed by Vernadsky, becoming the reflective, thinking, and proactive agent that transforms the biosphere into a noösphere, and consciously striving to shape a niche for ourselves in a sustainable Anthropocene?*[72]

A proper examination of Anthropocene temporality has yet to be conducted; for now a preliminary hypothesis can be formulated: despite the threats identified by and incorporated in the Anthropocene concept, traces of a noospheric temporality and horizon of expectations can be discerned in the discourse surrounding it. These traces, along with other factors, merit closer examination as they might shape the Anthropocene discussion and influence the way we imagine the future and, ultimately, where we place our hopes.

72 William C. Clark et al.: »Science for Global Sustainability: Toward a New Paradigm«, in: Hans J. Schellnhuber et al. (eds.): *Earth System Analysis for Sustainability*, Cambridge, MA 2004, pp. 1–28, here p. 1

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