



From the desk of Pierre Beaudry



SOME THOUGHTS ON VERNADSKY'S INVESTIGATION ON TIME.

by Pierre Beaudry 12/9/2009.



INTRODUCTION.

In his paper on *The Problem of Time in Contemporary Science* (1931), which is currently being translated by the Basement LYM, Vernadsky explicitly rejected the assumption of the entropic view of the universe indicating that the Biosphere and the Noosphere demonstrated the opposite anti-entropic tendency within a dynamic metastable pulsating universe. Because of the fact that both the Noosphere and the Biosphere dominate the universe from the vantage point of principles of a higher order than the principle of the Lithosphere, it became self-evident to Vernadsky that the Universe as a whole was anti-entropic and that the current scientific notions of space and time, both of which reflect entropic processes, were no longer valid and had to be changed according to a higher reality principle of the universe.

Vernadsky first developed a masterful overview of the different conceptions of space and time throughout history. He then made it very clear that the entropic form of time that had been used for understanding the universe up until today was no longer adequate to deal with the more profound phenomena of the Biosphere. For example, the

process of “aging” of the Lithosphere is an inevitable (unstoppable) and immutable (irreversible) process that he identified as a "polar-vectored time." He emphasized that the process of space and time determination inside of that domain appeared to be unchangeable either in their rate of progression and in their polar directionality.

Although Vernadsky wrongfully gave credit to Galileo, Newton and Descartes, among others, and discarded Leibniz out of hand for anti-protestant reasons, he nonetheless oriented his reader toward understanding the inevitable conclusion that he had rejected the entropic conception of the universe and the false axiomatic underlying assumption of a fixed universe that was winding down toward inevitable thermodynamic death. Vernadsky may have sinned as a result of his hesychastic orthodoxy, but he redeemed himself with his adoption of a anti-entropic conception of the universe.

THE CRUCIAL PHENOMENON OF REVERSIBILITY OF SPACE-TIME.

In the first half of his report, Vernadsky established that the Lithospherical cosmic time of the transitory nature of atoms was the shortest and the longest form of time in the physical universe, from minimum times such as 10 to the minus 11 per second for polonium in the very small to 50 billion years of lifespan for thorium in the very large. He further established that the main characteristic of such a linear time process was that it was immutable, that is, irreversible. Similarly, the Biosherical time of transitory nature of living individual organisms within the successive forms of evolutionary time of plant and animal species represented the second longest form of linear time in the universe which was also appeared to be characterized by irreversibility, or immutability.

However, the fact that the Biosphere and Noosphere both showed a quality of growth that was anti-entropic could not be ignored and had to be reflected in some sort of reversible mutation characteristic in both space and time. So, consequently, in the second and last part of his report, Vernadsky raised the question of the necessity of changing the way scientists considered the notion of space and time with respect to the anti-entropic requirement of living and cognitive processes. Here is how he formulated the problem:

“The time it takes for equilibrium to be established can be very prolonged, and nevertheless still be expressed geometrically by a polar vector. However, in a completed process, which has been established and is ongoing – in dynamic equilibrium – this property of time disappears. Equilibrium is expressed in reversible processes.

35. This same polar character of time makes itself known sharply and clearly in those phenomena of the transitory nature of atoms and the transitory nature of the indivisibles of life, about which I was speaking at the beginning of the speech.

In both cases, we have processes that are not reducible to entropy and are opposite to it in terms of time. Vectors of entropy and those of geochemical transitory nature are vectors of opposite direction and of a clearly different character. I cannot go into this here, but it is clear that, one way or another, this difference must be expressed geometrically.

The counterposition of the manifestation of time in entropy and in the phenomena of life must be recognized in science. Many people take entropy as the most fundamental generalization, one which is all-permeating and stands on its own. The way in which entropy is understood should change, with change in the understanding of time. Entering the domain of life, we again approach a deeper penetration of reality, than in other processes of nature; we approach a new understanding of time.” V. I. Vernadsky, *The Problem of Time in Contemporary Science*, # 34-35)

Vernadsky considered that the single irreversible direction of a polar vector of time expressed entropy and suggested the changes to make, but, as far as I could ascertain, he did not suggest any specific form of measure to replace entropic space or time with. My sense is that he was thinking of *Anti-entropic time-reversal*, as Lyn expressed as the form of creative time, but I have no proof that this is the case, except the fact that he pointed quite forcefully toward the idea of understanding the question of **reversibility**. It appears that the direction that Vernadsky was taking in his investigation of living and cognitive processes was in this form of **time-reversal**. In fact, the most important request of his entire paper was for philosophers to investigate thoroughly the geometrical question of symmetry as Pasteur treated the question with respect to the chirality (enantiomorphism) of asymmetrical crystals in living processes.

This point of chirality is very important because it is the crucial feature of physical space-time that expresses **reversibility** of space and time. Chirality can express both clockwise and counterclockwise motions in space, as well as right-handedness and left-handedness, but it can also express forward and backward reversibility of time in a process of transformation. In both cases of space and time, it is the **reversibility** of the change that is important to reflect on, and not only the right or left directionality.



Figure 1. Reversibility in small escargots.

However, before going into the Pasteur question, there are a few other forms of “**reversible processes**” that are worth mentioning, and that Vernadsky did not mention in his report. The most notable aspect of cognitive inversion processes, which has profound implications for the future of mankind, is the **geometric character of reversibility of space and time in a creative process**. Outside of Lyn, very little has been said about **inversion of space and time**, that is, about the forms of action of the future onto the present or of the present onto the past. There are two distinct but connected forms of inversions of time that have been emphasized by Schiller from the present onto the past, and by Lyn from the future onto the present. The first was articulated for the purpose of universal history and the latter for the purpose of long-term projects of future human development. They are the same process of **time-reversal** when viewed from the vantage point of creativity.

The form of **time-reversal** identified by Schiller in his first lesson on Universal History emphasized the fact that it is wrong to look at universal history starting from the past. Universal history is in the present. The function of universal history is to focus on the present, because it is the present that must be changed. It is the present that is the subject of universal history and it is universal history that leads the willing Promethean man to change his present society for the better, while it drags the unwilling and the poor fragmented souls trailing behind. The only true significance of the past is, therefore, for the purpose of understanding how the present world situation should be changed, modified, and be given new boundary conditions for the future. As Schiller said:

“Out of the entire sum of historical events, the universal historian selects those which have had an essential, irrefutable, and easily ascertainable influence upon the contemporary form of the world, and on the conditions of the generations now living. It is the relationship of an historical fact to the *present* constitution of the world, therefore, which must be seen in order to assemble material for world history. World history thus proceeds from a principle, which is exactly contrary to the becoming of the world. The real succession of events descends from the origin of objects down to their most recent ordering; the universal historian ascends from the most recent world situation, upwards towards the origin of things.” (Friedrich Schiller, {*Poet of Freedom, Volume II*}, Schiller Institute, 1988, Washington DC, 1988, p. 267.)

So, you see, universal history is not determined by a personal selection of events. There are precise events that shaped the world as it is and which have to be discovered. It is in that sense that history is determined by the will of man. There are very specific historical events that have established the current constitution of the world and they must be evaluated in every nation in the world, for better or for worse. As Schiller also noted, in addition to creating an “**enkindling light in your mind, and a charitable enthusiasm in your heart,**” universal history will also make you relive the great moments of axiomatic changes of human history in a manner such that the individual passes consciously from his individuality of physical space-time, from his own historical

specificity into the immortality of the species; but only for the explicit purpose of improving the coming generations. That is the most important form of cognitive **time-reversal** because it is only from this vantage point of the human will that the second form of **time-reversal, causality from the future**, can be understood. Lyn investigated this second form of **time-reversal** in 1996, in order to express his principle of hypothesis in dealing with the “**future as change**” for the science of physical economy. Lyn defined the “intention” of **time-reversal** in physics as follows:

In order to make clear the apparent paradox, I asked the audience to acknowledge the perplexity, the which this notion of “time-reversal” would pose to the ordinary professional mathematician. I state here, as then: *How might one represent, mathematically, a function in which an event in the future might serve as the apparent cause for an event in the present?* This was, in fact, being considered by the famous Soviet physicist Sakharov, as a formal problem in mathematical physics, during the later years of his life. The issue of the functional role of “time-reversal,” is the most important of the fundamental issues confronting mathematical physics today. It is also a key, axiomatic issue in the field of natural law, and, in a related way, important for cleansing theology of certain cultish, intrinsically pagan superstitions, which have no proper place in the teaching of Christianity, Judaism, and Islam. Here, all those issues are implicit; but, it is the decisive role of “time-reversal” in any competent economics teaching, which is the topic explicitly addressed in the following pages. [...]

A dog reaches for a bone; a dog hunts for prey not yet seen, heard, or smelled. How does human reaction to the idea of the future, differ from what an observer might attribute to the “intentions” controlling the dog’s action? In short, the difference is, that, except when a man is behaving with the simple-mindedness of a *macho*, materialist, or empiricist, the object of the relevant expression of human intent, is not the apprehension of a sensory object, but, rather, a desired *change* in the *axiomatic* characteristics of some referenced pattern of human behavior. That point may be stated otherwise: *What is desired is not a mere event, nor a mere change in opinion, but, rather, either a change in hypothesis, or theorem.*

The change which distinguishes characteristically human ideas of the future, from the bestial intent which might be expressed by a beast, or in a man’s moment of beastliness, is always of the *ontological* quality designated by the connotations of the term *Platonic idea*, rather than mere contemplation of a real, or merely desired object of sense-perception.”
(Lyndon H. LaRouche, Jr., *The Essential Role of ‘Time-Reversal’ in Mathematical Economics*, Fidelio, Vol. 5 No 4. Winter 1996.)

Don’t take me wrong. This is not an invitation to plunge into mathematics. As Lyn emphasized, often enough, there is no creativity in mathematics.

PASTEUR'S ENANTIOMORPHISM.

However, if we apply Lyn's idea of "**intention**" properly, we can also understand why Vernadsky also emphasized the question of investigating the connection between the psychological forms of time of "living duration" (*dleniye*) as developed by Bergson, and as expressed by Pasteur, in contrast with the reductionist entropic cosmic time in the assumption of Rudolph Clausius. This is what Vernadsky said about duration:

"New questions about time are arising, which are very closely connected with *dleniye* (duration). Can the polar vectors, corresponding to it be geometrically different and not comparable with entropy? Pasteur indicated that in space, in a number of life phenomena, these vectors must be enantiomorphic – right-handed or left-handed. Does this enantiomorphism, this right and left property of the vector, extend to the polar vector of time? In that case, how is it expressed? Enantiomorphism is expressed in the cognitive apparatus, in the brain. It should be found, or more accurately, may be found, also in effect, in *dleniye*." (Idem. #36)

This **enantiomorphism** (reversibility) question of inversion is the most exciting aspect of Vernadsky's hypothesis because it leads directly to understanding anti-entropic processes. With the falling of all entropic vectors, Vernadsky fertilized the soil for a new conception of measure to spring. However, once the right and left question is replaced by reversibility, the connection with the creative process can be made. It cannot be made otherwise.

For example, the Noospherical time-reversal of the simultaneity of eternity, as Lyn demonstrated, is not only the reversible everlasting creative form of time in the universe, but it is also the most anti-entropic form of action in the universe, which is **enantiomorphic**, that is, a self reflexive inversion of opposite form that appears asymmetrically as in a mirror image. This is what is implied in the Pasteur conception of chirality that he discovered in wine fermentation of tartaric acids after Jean Baptiste Biot had discovered rotational polarization. Things grow by being the same, but in opposition to themselves.

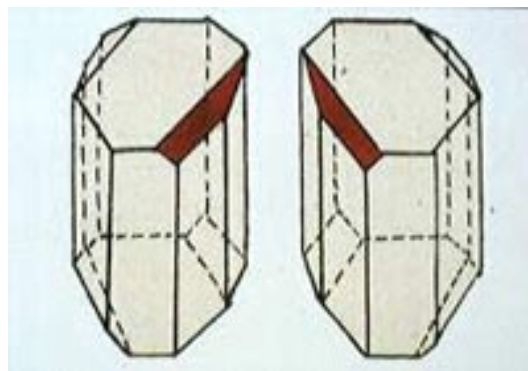


Figure 2. Reversible mirror image of isomorphous crystals.

What Pasteur had discovered and reported in his Doctoral dissertation in 1848, and what crystallographer Gabriel Delafosse had confirmed for him as shown in Figure 2, was that certain molecules expressed a unique character of chirality that reflected a growth process by inversion, that is, by **reversibility**. That characteristic also extends to processes of **time-reversibility**. **Reversibility** is not an adventitious physical process, it represents the footprint of the process of creativity by the fact that it has the unique characteristic of being mutable; that is, self-reflective in the form identified by Lyn as the character of *time-reversal*. For example, if you turn a glove inside out, you will see how **reversibility** physically happens by inversion, but this perception will not give you a sense of the creative process if you focus on the right and left-handedness. Concentrate on the inversion process instead. For example, if you construct a Catenary/Tractrix by **inversion of tangents**, you will be able to make a cognitive discovery of the process of **reversibility** that is appropriate and typical of the creative process by doing something that is entirely contrary to Euclidean geometry. The same thing also happens when you act contrary to public opinion.

Finally, the question that also has to be raised with respect to both Vernadsky and Einstein is the question of how to change the current inappropriate notion of time to a notion of *Space-Time as a Measure of Change*. I have proposed that hypothesis in a previous report because none of our measuring instruments are capable of accounting for processes of change, and especially not an axiomatic change. Therefore, I think that with this Vernadsky report, there are great possibilities for formulating such a new measuring instrument. Vernadsky formulated his own disenchantment about existing measurements in the last section of his report:

"In reality this change of conception above all poses before us the question of the accuracy of the basic unit of measurement of time, developed over centuries - the second, which is connected with uniform motion, with a linear, not a vectorial expression of time. [...] The centimeter and the second, which are connected with regular motion, are becoming less stable in our minds as inevitable and convenient measures of time and space." (Idem. p. # 40)

And, he noted that both of these units of measure, the second and the centimeter, lacked the living property of "duration" (*dleniye*) and also had the same entropic "**polarity**" which excludes life and cognition from the conception of science and the observation of phenomena. In other words, since we cannot simply say that the universe is only a "**little bit pregnant**" with life and creativity, the way that both of those units of measures are understood needs to be changed if we are to properly understand the crucial infectious ideas of **simultaneity of eternity** and of **time-reversal** that Lyn has developed.

The crucial ingredient for such an infection is to be found in the performative idea of **creative reversibility**. This is expressed in Lyn's emphasis of the three phase spaces of change: Lithosphere, Biosphere, and Noosphere, plus a binding fourth space of no

change, which is reality! The difference between the fourth space and the other three phase-spaces is that the “**physically real**,” as Einstein called it, is not affected by change, but is the process that affects all changes in the universe. The action of the fourth space is to overlap the interaction of the three first by inversion. In other words, change is the fourth binding principle of the universe, and that is what provides its finiteness in relative space-time. As Einstein put it, what is “**physically real ... has a physical effect, but is not itself influenced by physical conditions.**” (Albert Einstein, *The Meaning of Relativity*, Princeton University Press, Princeton New Jersey, 1956, p. 55)

Such a principle of change that Vernadsky referred to is not a speculative whim. Changes are observable phenomena in the small as well as in the large, and most emphatically observable in the self-conscious creative process of artistic composition. It is those changes in our creative processes that must now be investigated, in light of Vernadsky, if we are to discover a new way of understanding new units of measuring physical space-time that are no longer reduced to the centimeter and the second, but are expressed by some form of wavicle of change that is taking mankind into the future. It was with this thought in mind that Vernadsky concluded his paper.

“We are experiencing not a crisis that perturbs weak souls, but a tremendous watershed in the scientific thought of humanity, such as happens only once in a millennium; we are experiencing scientific achievements, the equal of which long generations of our ancestors never saw. Perhaps something similar took place in the epoch of the birth of Hellenic scientific thought, 600 years B.C.

Standing at this watershed, surveying the future that is opening up before us, we should be happy, that we are destined to live through this, and take part in the creation of such a future.”

We are only beginning to be conscious of the inexorable power of free scientific thought, of the tremendous creative force of Homo Sapiens, of the free human personality, and the greatest manifestation known to us of its Cosmic force, the reign of which lies ahead. With this watershed, it is approaching us faster than we can even imagine.” (Ibid. #43)

As Lyn pointed out, if the Biosphere is creating new isotope matter in the Lithosphere, it means that the universe as a whole is not only creative, but that it is also held together by creativity itself. That is reality. In the same vein, entirely new cultural isotopes will have to be created for the benefit of all the nations of the world and for the purpose of measuring the sort of change that will lift mankind upward into mastering the solar system.

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