

Interview with Basarab Nicolescu

Liviu Giosan: *Dr. Nicolescu, your name cannot be easily dissociated from the concept of “transdisciplinarity”. Let us start by citing from the Moral Project of the International Center for Transdisciplinary Research (<http://perso.club-internet.fr/nicol/ciret/>) that you co-founded in 1987: “its principal task is the elaboration of a new language, a new logic, and new concepts to permit the emergence of a real dialogue between the specialists in the different domains of knowledge...”. What was the trajectory that led you from physics to transdisciplinarity? Did your background as a scientist educated in a repressive communist society play any role in imagining and developing this project?*

Basarab Nicolescu: When I was a student, I followed the debates between the fathers of quantum mechanics: Werner Heisenberg, Wolfgang Pauli, Niels Bohr, Max Planck. It was then that I learned that in fact most metaphysical questions are not disconnected from scientific research. First I read their books and articles. After some years I discovered that their correspondence was much more down-to-earth than the published scientific works. It is there that one can follow the genesis of their ideas. Strikingly, there is an incredible link between the quantum world and our day-to-day, macrophysical world, although they might seem disconnected.

For a physicist, the quantum world is a real world; I work inside it and I know that we can test it, we can experiment with it. So my first big intuition, only a long time after I arrived at a certain formalization of it, was the idea of the discontinuity between general concepts in quantum mechanics, or I would say, by extension, in quantum physics, and classical physics. Discontinuity does not mean contradiction. It means simply that different laws are at work in each domain, in such a way that you cannot move in continuity, in the mathematical sense of the word, from the laws of quantum mechanics to the laws of classical mechanics. Now, of course, this was at the heart of the physicists’ quest at the beginning of the last century. In a sense, it is quite astonishing that almost all great personalities in physics were cultured people and they always tried to incorporate information from physics into their philosophical beliefs.

Early in my career, around 1975, I began to realize that science contributes new information to philosophy, but perhaps there is no philosophy that can integrate all new scientific ideas. Only by using concepts from various philosophical systems could you describe science. In this, I am in accordance with Bohr, Pauli, and Heisenberg’s ideas, expressed clearly in the latter’s Manuscript of 1942, that the main assumption of modern metaphysics is not valid in quantum physics. It is applicable in classical physics however. I use the word “metaphysics” in its academic sense, meaning the complete separation between subject and object. In the quantum world, we cannot reduce our study to either the subject or the object because we are faced with an interaction between the two. This idea is shared by philosophers like Husserl, Heidegger, or Cassirer. It is this interaction that leads us to the question of regions or levels of reality that are united through the coherence of our world. It might be called unity, but I prefer to use the word “coherence”. The coherence laws are not of a mathematical nature, that is the point. They are not quantitative, but law-like in the symbolic sense. Science alone is unable to describe this relationship due to the scientific methodology. Exact science by itself is imitation, it deals with that which can be replicated. It concerns not individual

events but collective ones, large number of individual events that can be described probabilistically. Humanistic sciences on the other hand deal with individual events. Unfortunately, contemporary humanistic sciences try to mimic exact science, and here is where they fail. This does not necessarily mean that science has limitations in itself, but there is a limitation of methodology. And this is normal, because exact science describes a well-defined region of reality. This region is accessible through this type of methodology, but others might not be. To believe that exact science can describe everything is equivalent to saying that what we think today was always thought in the same way!

Transdisciplinarity is imagined as a solution to these types of problems, because it is able to describe the relationship between fields, or levels, or disciplines, as a whole. We use the term “transdisciplinarity” as an attempt to provide a very general framework for discussing the relationship between these various discontinuous parts of our experience, and indeed of reality itself. The idea of levels of reality can be a pillar of this new type of knowledge, a starting point for any attempt at unifying different fields. The other principles include a new, non-classical logic and the principle of complexity. These three principles can be expressed as follows: 1. There are in Nature, and in our knowledge of Nature, different levels of Reality, and, correspondingly, different levels of perception; 2. The passage from one level of Reality to another is insured by the logic of the included middle; 3. The structure of the totality of levels of Reality or perception is a complex structure: every level is what it is, because all the levels exist at the same time. These three principles correspond to Galileo’s postulates for the modern science approach: 1. There are universal laws of a mathematical character; 2. These laws could be discovered by scientific experiment; 3. Such experiments could be perfectly replicated.

Coming to the second part of your question, I could say that indeed being educated in a repressive society influenced the development of my ideas. Repression generates a desire for transgression. And in fact, transdisciplinarity is a kind of generalized transgression. More generally, it is obvious for me that all great Romanian creators such as Brancusi, Eliade, Lupasco, Cioran, Tzara, Gherasim Luca, Andrei Serban went beyond boundaries between domains of knowledge and between cultures. Psychoanalyzing the Romanian soul is not the scope of our discussion, but I wonder if the cruelty of History did not push Romanians to “invent” a genius of transgression for settling the scores.

Razvan Florian: *Is the concept of “transdisciplinarity” applicable in education? What would be its benefits over more “classical” teaching and learning methods? Could this concept be of use in the day-to-day scientific research as well?*

Basarab Nicolescu: I studied this problem for a long time (see my “Manifesto of Transdisciplinarity” which will be published by SUNY Press in February 2002), and in spite of the vast diversity of the education systems from one country to another, the globalization of challenges in our times require global solutions for education problems. Periodic upheavals in education in various countries are symptoms of the same flaw: a disharmony that exists between values and realities of a planetary life in a process of change. The UNESCO report of the “Commission internationale sur l’éducation pour le vingt et unième siècle”, chaired by Jacques Delors, underlined four principles that we could use to build a new kind of education upon: learning to know, learning to do, learning to live together with, and learning to be. In this context, a transdisciplinary approach could make important contributions to reforms in the educational system.

First of all, “learning to know” involves training people to distinguish the real from the illusory. This simple ability, if learned properly, will provide the student with intelligent access to the fabulous knowledge of our age. The scientific spirit, one of the most important characteristic of the human spirit, is indispensable in this venture. It is not the assimilation of an enormous mass of scientific knowledge which gives access to the scientific spirit, but the quality of the scientific information acquired by the student that leads him or her into the very heart of the scientific approach: a permanent questioning in relation to facts, images, representations, and formalizations. “Learning to know” also includes learning the skill to build bridges – between different disciplines, between various meanings, and between all these and our inner abilities. A transdisciplinary approach is an indispensable complement to the disciplinary approach, because it leads to the emergence of continually connected human beings, that are able to adapt to changing demands of professional life, and who are endowed with flexibility in renewing their interior potential.

“Learning to do” certainly implies acquiring a profession, process which includes a phase of specialization. However, in our tumultuous world, where recent changes induced by the computer revolution are but the portent of large scale social changes to come, strict specialization can be dangerous. It could lead to unemployment, exclusion, or even to a debilitating alienation. If one truly wants to reconcile the demands of competition with the concern for equal opportunity, every profession should be woven into the whole of human occupations. Of course, this is not simply a question of learning different skills at the same time. A flexible, knowledge core that could quickly facilitate reorientation to another occupation should be accepted as a teaching philosophy. In this context, the transdisciplinary approach is invaluable. *In nuce*, “learning to do” is an apprenticeship in creativity. The emergence of authentically transdisciplinary individuals requires a favorable environment for a maximal realization of their creative potentialities. The social hierarchy, so frequently arbitrary and artificial, should be replaced by cooperation at new structural levels, for the advantage of personal creativity.

“To live together with” does not mean simply tolerating differences of opinion, skin color, and beliefs; submission to the exigencies of power; negotiating between the in's and out's of innumerable conflicts; definitively separating interior from exterior life. A transdisciplinary attitude can be learned, to the extent that each being possesses an innate, sacred, intangible core of transcultural, transreligious, transpolitical and transnational values. Yet, if this innate attitude is only potential, it can forever remain hidden, absent in act. To insure that community norms are respected, they must be validated by the interior experience of each being. In the end, the transdisciplinary attitude allows us to better understand our own culture, to better defend our national interests, to better respect our own religious or political convictions. As in all relationships between Nature and Knowledge, open unity and complex plurality are not antagonistic.

At first, “learning to be” seems an insoluble enigma. We exist, but how can we learn to be? Understanding this principle involves discovering our conditioning, the harmony or disharmony between our individual and social lives, and testing the foundations of our convictions. In short, it means to always question everything. In this quest, the scientific spirit is again a precious guide. “Learning to be” presumes a permanent two-way communication where the teacher enlightens the student as much as the student informs the teacher. Any training period inevitably passes through a transpersonal dimension and any disregard for this dimension goes a long way toward explaining the fundamental tension between the material and the spiritual realms, that is felt by our contemporaries.

There is one very obvious interrelation between the four principles of the new system of education: how to learn to do, while learning to know, and how to learn to be while learning to live together with? In the transdisciplinary view, there is a transrelation which connects the four principles. Any viable system of education should aim for an integral education that will activate all human potential and not just some of its components. At present, education favors the intellect relative to the body and sensibility. This was certainly fruitful in the past, leading to an upsurge in knowledge, but it cannot continue without sweeping us away in the mad logic of efficiency for efficiency's sake that could lead to self-destruction.

Experiments performed by the Nobel Prize-winning physicist Leon Lederman with children from disadvantaged neighborhoods of Chicago demonstrate this point: knowledge is assimilated faster and better when intellect, body, and feelings are all simultaneously addressed. This is a prototype of the new education that our modern society could use to reconcile effectiveness and affectivity. It is quite obvious that specific differences among knowledge fields and experiences call for a diversity of transdisciplinary methods. And because transdisciplinary education is a long-term, global process, it is important to establish institutions that will help initiate this process and insure its development. On the other hand, universal sharing of knowledge cannot be functional without the emergence of a new type of tolerance founded on a transdisciplinary attitude that implies an active use of the transcultural, transreligious, transpolitical, and transnational vision. Of course, if only to perform our everyday science, we do not need transdisciplinarity. On the other hand, transdisciplinarity, even if not identified as such, has always been an essential condition for great discoveries, for unified theories.

RF: *Taking into account that separation of disciplines results, in part, from cognitive constraints, do you believe that the cognitive sciences could play a role in a “transdisciplinary” approach to science?*

Basarab Nicolescu: A crucial role. I have in mind, for example, the extraordinary work of Francisco Varela who was a founding member of our Center for Transdisciplinary Research. Just before his death, he made an important step forward in the study of time. Is there a more transdisciplinary subject than time ?

At the macrophysical level, we perceive time as irreversible – the so-called arrow of time. We go from birth to death, from youth to old age. The reverse is not possible. The arrow of time is associated with entropy, with the growth of disorder. In contrast, at the microphysical level time is invariant, otherwise said time is reversible. In most cases, everything goes by as in a movie running backwards and producing exactly the same images again and again. In the microphysical world, some processes violate the temporal invariance. This difference between levels is intimately linked to the birth of the universe, more exactly to the prevalence of matter over antimatter. It is this small violation of temporal invariance that allowed the universe to be made up of matter and not antimatter. Notable efforts have been undertaken to introduce the concept of a time arrow at the microphysical level as well, but without much success. We have not been able to replace quantum mechanics with another theory with better predictive capabilities. Therefore the paradoxical coexistence of the reversibility and irreversibility of time should be acknowledged as merely a consequence of coexisting levels of Reality. Because time is governing our life, it is important to truly understand its meaning.

The definition of time used in physics is only a rough approximation of the philosophers' time. No philosopher has ever been able to properly define "the present". Saint Augustine writes: "As for the present time, if it were always present, and did not pass at all, it would no longer be time, but eternity. Therefore, if time is only time because it passes, how can one say that it is; it is, only because it is at the point of being no more. Therefore, it is not true to say that this is time, because it tends toward non-being." The present time of the philosophers is a living time. It contains both the past and the future, but is neither past nor future. Thought is powerless to apprehend all the richness of present time. Physics abolishes this essential difference between the present, on the one hand, and the future, on the other, by replacing time with a banal timeline on which the points are successively and indefinitely presented as past, present, and future moments. Time thus becomes a simple parameter, in the same way as a position in space, which can be perfectly comprehended by thought and perfectly described on the mathematical level. At the macrophysical level this timeline is marked with an arrow indicating the passage of the past toward the future. The arrowed timeline is therefore at once a simple mathematical representation and an anthropomorphic one.

Surprisingly even a mathematical, and thus rigorous representation of time which agrees with our senses is thrown into doubt at the quantum level. Does the time of the physicists retain some memory of the living time of philosophers after all, thanks to the always unexpected intervention of Nature? This paradoxical coexistence is not so surprising when we compare it with our own experience of life. Our own lifetime is living time, not merely the life of our times. Life, our own life, is more than an object that can be located in time and space. The surprise is that traces of the living time actually exist in Nature. Could it be that Nature is not a lifeless book which has been put at our disposal to decipher, but a living book, which is still in the process of being written?

LG: *Reforms in Romanian research have been implemented over the last decade without sizable overall results. If you were in a position to lead this effort where would you start? What principles would you follow in this daunting enterprise?*

Basarab Nicolescu: There are no miraculous recipes: everything is interconnected. What seems important to me for Romania is the European integration. This can open new vistas and help the reform. In this context, if Romania becomes a full member of CERN for example, Romanian physicists will have a very rich ground of work. Moreover, reforms in research are tied to reforms of teaching which involves, as my friend Edgar Morin often says, a politics of civilization.

Is it merely accidental that the new century begins with an act of horror that will forever imprint our imagination and that of generations to come? The human ability to forget is certainly infinite, but it does not apply to symbols. And it is precisely a symbol that was aimed at by the cold, implacable, esoteric-technological brain that conceived this castration act of the "untouchable" economic and financial power.

We cannot keep silent and accept what is at the end of the road: the self-destruction of our species. It is crucial to ask questions about the roots of this horror if one really wants to understand what is happening in our world.

One lesson I learned since September 11 is about the unfathomable pornography of binary thinking. This phenomenon is not new. Modernity invented all kinds of deaths and ends through binary thinking: the death of God, the death of man, the end of ideologies, the death of Nature, the end of history, and – probably in the near future – the end of science and the end of religions. The binary logic of absolute truth and absolute falsehood acts today with astonishing shamelessness. Slogans such as “The fight between Good and Evil” or “God is with us” enjoy a big popularity. It is amazing for this day and age to hear the Leninist slogan “Who is not with us is against us” in the mouth of a great liberal leader. Is it so difficult to see that binary thinking is precisely the favored ground for terrorists? Is it so difficult to see that violence always engenders violence? “An eye for an eye leaves the whole world blind” - said Mahatma Gandhi. There is a need for a new logic to be integrated in a new type of learning, both in a theoretical and in a practical way.

A second lesson for me, is the necessity to rethink the problem of the sacred. We eliminated the sacred as an act of freedom or emancipation of the human being. Thus appeared the reign of relativism in whose name one can assert everything and simultaneously its contrary. A terrorist acts “in the name of God (or Common Good)” and those who fight terrorism act in the same name. Whose God? Are there as many Gods as there are religions? I think that a new vision of learning must integrate the search for transcultural and transreligious attitudes. A transreligious way of life is not an utopian project – it is engraved in the very depths of our being. The “transcultural” (transreligious) designates the opening of all cultures (religions) to what cuts through them and transcends them. If the transcultural and transreligious attitudes will find their proper place in modernity, the war of civilizations could be avoided.

LG and RF: *If you were to start your career as a scientist now, would you prefer to do that in Romania or abroad? What are your arguments in making this choice? Can you provide advice for young Romanian scientists faced with this dilemma?*

Basarab Nicolescu: I would surely choose to work BOTH in Romania and abroad. Europe has become a small village. Physical transportation is not a problem anymore. University curricula are in a process of harmonization among different European countries. European laws have been formulated to allow for the mobility of people. On the other hand, Romania is a country where everything needs rebuilding. So my advice for young Romanian scientists is to study, or even work for a while in other countries, but return to Romania and build what needs to be built. For the émigrés of my generation it was impossible to return to communist Romania because the door would shut behind us. The situation now is very different: everybody can study or do research abroad. In France, bright young Romanian students are among the best, but they refuse to return because they believe that there are no prospects for them in Romania. But this is a terrible vicious circle! It is precisely these people who can change this situation, or nobody else will do that for them. And, in my opinion, this is a tragedy for Romania.

LG: *Let me point out however, that after a decade of freedom, there is still no policy in place in Romania that will allow for a mutually beneficial integration of specialists trained abroad into the Romanian academic community. And this is disconcerting to anybody that would like to return.*

One of Ad Astra’s objectives is therefore, to promote a dialogue between Romanians studying and working aboard and Romanian institutions involved in the reform of research and education. What role do you envision for a journal like ours in this context? What paths should be followed for such a dialogue to succeed?

Basarab Nicolescu: Frankly, I don't believe that a dialogue with the establishment itself is possible now. Institutions - in Romania or elsewhere - follow their own logic, their own rules of self-reproduction. They change only under huge external pressures, and not through dialogue. And this is even more true for Romania, where short-term economy issues are imperative. Ideas like “integration of specialists trained abroad into the Romanian academic community” might seem luxuries, even when in the long term there are

clear mutual benefits. Here we have a good example on how the concepts of levels of Reality and that of the included middle (or the included third) apply in practice. In the absence of the included third no dialogue is possible. You speak and the other speaks, but there is no communication. A dialogue is possible only when you could act on a different level of Reality than yours. Words like “science”, “education”, “reform”, “mutual benefit”, “globalization” have different meanings on different levels of Reality. Therefore I believe that one can change things only by persuading prominent personalities, who in turn, can act on institutions from the inside.

I am therefore convinced that your journal could play an important role in engaging a dialogue with NGOs and foundations that are most active now in Romania. I have in mind, for example, the “New Europe College” directed by the philosopher Andrei Plesu, the former Minister of Foreign Affairs. In other words, I recommend the dialogue with the civil society rather than with institutions. Such a dialogue can open the way for a deep and positive reform.