

Editorial

Challenges and blessings of the fourth stage

The first three stages are not Kierkegaard's

Welcome to the fourth stage. The space where spaces meet. The field of boundary crossing. This is indeed what the present journal proposes to do: to encourage steps beyond the safe area of well-defined domains; to stimulate handshakes over boundaries, professional or national. To foster explorations into the risky realm of interdisciplinarity.

I do not mean to suggest here that every border is a place of danger: however, a wealth of symbolic substance stands to warn the venturer into the strange region separating different domains¹. Wole Soyinka's discussion about the realm *between* the three stages² is probably one of the most powerful in suggesting both the risks involved and the fruit that such a journey may bear - not only for the daring hero, not only for the audience following the hero in his footsteps and in his heartbeats alike, but also for the community at large.

Indeed, the problem of the realms between the realms seems to be more than a matter of science's "internal affair". It may have wide range implications, touching upon our way to act in the world, whether as dedicated "searchers" or declared "researchers".

Who dares to look at the body as a whole?

Being exposed to a breathtaking process of change, we see how thought-space is shrinking, and is shrinking fast. Sometimes taken by the illusion of an expanding field of possible information handling, we may overlook an essential aspect: the "boxes" of our scientific inquiry become smaller every day, due to an accelerating domain fragmentation. Many things to read in a scientific field? Yes, but all those pieces often belong to one and the same box. In time, boxes get crowded, then they split into fragments again. And the space available for every new box becomes still smaller. The scope of acceptable inquiry keeps getting narrower. We are even encouraged to see this as scientific progress, as a maturation of the domain in question.

Our information providers help us in the process: not only do they produce journals having a more and more restricted scope. Nowadays, one may even subscribe to *subsections* of specialized publications. This way, one is safer from the danger of encountering a new idea from another, neighbouring field or research direction.

The ruthless rigour of disciplines as revealed by a Foucaultian perspective³ is well at work, the procedures for discourse control take their role seriously: they condemn to "inaudibility" every piece of knowledge that does not fit in the existing contours of disciplines. And new disciplines appear more often as subdivisions of old ones than as extensions into really new terrain.

As in a huge organism, the cells available for our exploration keep on dividing in a tremendous rhythm. However, rather unpleasant questions arise. What about the organism as a whole? What happens to that unseen something that should keep all parts together? The "patient" is - no doubt - alive. But is he recognizable as One any more?

The spun thread of "unity" would not withstand the comb of the Disentangler

The different "boxes" develop their own rules and they are merciless in their application. One can hardly find ways to communicate with people working in other (even neighbouring) boxes. The fragmentation is too obvious to be overlooked. Parts seem to have little, if anything, in common. Where is that "organism" then? It has been suggested that things may be put together using common properties they share with each other, and since certain groups share different features with different other groups, all are linked one way or another⁴: there is something like a

continuous, unique thread of wool made up of small pieces spun together. This view reminds me of the Persian sage called "the Carder" or "the Disentangler" who lived more than one thousand years ago: he was said to disentangle, by combing, the world of the spirit, like the fibres of wool. Any real attempt to apply a "comb" to today's "thread of unity" would have dramatic consequences: the thread would fall into pieces, despite the huge effort applied to put those pieces side by side.

This may lead us to the continuity of sound, in contrast to the fragmented character of images. While images possess an undeniable richness, the metaphor of a pervading sound, penetrating everything and linking all parts together, in a continuous flow rather than in a discrete succession, represents a strong support for different traditional cultures⁵. We have to emphasize in this context that "the listener" mentioned by various traditions is more than a metaphor for today's science: in a nonlinear approach, the researcher is well aware that cutting the object out of its context or perturbing it with "input signals" may obscure essential information about the studied system, which is better investigated by analysing its own "functional noise" and the "sound" of its interactions with the embedding environment⁶.

While the danger of interdisciplinarity is not fictitious, the best way to avoid it is not settled yet
Loud voices of the - still not so many - partisans of interdisciplinarity often maintain that the "others" ("disciplined" researchers) hesitate to embrace their "progressive" view just because they "fear the new, the unexpected", "lack an open mind", "got stuck in old mentalities" and "have rigid attitudes".

This position should be carefully questioned. One cannot help wondering, for instance, whether interdisciplinarity would not have also a demolishing effect upon the scientific edifice. Disciplinary boundaries, which seem to suffocate certain researchers, prove to have an essential guiding role for many others.

If disciplines and their mechanisms have a time confirmed role for the development of knowledge, if the hindrance their evolution represents for free progress is resented as an artificial, though powerful barrier that has to be shattered by a different type of attitude, a question necessarily rises: Is interdisciplinarity appropriate for everybody? Does it fit only some, and if so, whom? Does one have to go through a process of self-analysis in order to choose the one or the other, as one may do when choosing one's profession? 'Can we speak of an interdisciplinary *vocation*? Or is it something that everybody can - and should - learn, as certain scientists maintain?

We witness today different kinds of approach called "interdisciplinary".

Sometimes, one and the same person succeeds in grasping essential threads of different domains, thereby confronting the mind concomitantly with two different systems. Each system fights to impose its own rule and legitimate its own order. In its desperate search for meaning, the mind finds itself in a very uncomfortable situation, perceiving the differences as contradictions. While certainly painful, this situation may offer the chance for a leap towards something else: the mind may overcome the unbearable difficulties by rearranging all the incoming parts in a completely new manner, which would make sense, this time, together. The resulting arrangement may be very different from both incoming flows - and completely unexpected. It may represent a significant advance for knowledge - not a mere repositioning of parts, but a new system with new rules and new features, which overcome obstacles formerly resented in one or both of the initial incoming domains. The process described may not be very far from the situation Whitehead had in mind when he said that the clash of doctrines represents an opportunity (even if different views in the same domain, and not different domains, were meant).

On the other hand, there is a growing tendency towards interdisciplinary cooperation. People

from different disciplines mean to put together their experience and knowledge in order to face some phenomena that stubbornly resist the assaults of separate disciplines⁷. One of the best metaphors I know for this situation is found in an old Romanian fairy tale called Harap Alb⁸. The hero gathers for the accomplishment of his mission several men, each with his special power (one sees over large distances, another has the strength to bend trees and break them into pieces, another can drink huge quantities of water etc.). This worked very well and the mission was accomplished: while each participant played his role at the right time, the awareness of the mission belonged always to the hero, to Harap Alb. What about the guiding role in interdisciplinary research? I have witnessed almost amusing (though heated) arguments between representatives of different disciplines involved in common projects, about what discipline (not explicitly, though unavoidably, what person) should assume the leading role. The outcome of such debates - often settled according to criteria that are not scientific - may be crucial for the shape the whole research finally takes. In this case too, the clear definition of disciplinary boundaries plays a helpful role for many, who seem to feel better when they know when and how they (have to) cross such boundaries.

Despite the undeniable glitter of the land of interdisciplinarity, one cannot overlook the fact that, sometimes, mixing up different domains leads to questionable results. It is not only a problem of language (in fact, this still represents a challenge, for which this journal may be a concrete proof: different interpretations of the same terms in various disciplines could imply serious confusions). It is a matter of *implicit* (domain specific) assumptions that guide the researcher in each field, and these assumptions do not hesitate to betray their user once they are removed from their own realm and taken to a foreign land.

Fellows on a Babylonian building site dream of a nonlinear Esperanto

The different domains of today's culture are so "mature" that they that they have already developed their own language, well enough to make communication between sections almost impossible. We are far from a Saussurean *langue*, of which individual disciplines would be the *paroles*.

And yet, new hopes are announced by optimistic voices of nonlinear science⁹. The unifying character of strong variability (in structure and/or dynamic behaviour) puts various disciplines together, in the search for common roots of complexity in nature. A comprehensive and still developing methodology may lead now to a rigorous characterization of the most different complex natural systems, whether living cells or erupting volcanoes. Strongly heterogeneous groups are at work and nobody wonders anymore when hearing solid state physicists talking about the growth of human tissue or about social fluctuations. A memorable breakthrough in this direction was accomplished not very long ago in the church of the Santa Fe monastery: it was the place of the first conference gathering physicists, economists etc., part of the foundation process of the Santa Fe Institute, one of the most important institutions in complexity science research today (strange "circumstances" made precisely that location available for the conference, and the first fiery interdisciplinary crossings took place on a blackboard mounted in front of the altar, in a light filtered through old stained glass windows..).

One may naturally ask if this would be one more language to learn and whether its comprehension would lead to a better mutual understanding. I am inclined to answer "yes" to both questions. More than a supplementary branch of science, complexity (or nonlinear) science represents an attitude, a way to approach the research. It involves, for instance, a whole series of perspectives, a whole series of measurements at different scales, and the main outcome regards the correlation between the different results rather than the choice of a "best" perspective. In fact, it developed a powerful framework for grasping correlations, in space, in time, in terms of other parameters, being able to deal with strong fluctuations and to follow system dynamics both

across stable periods and important instabilities. In this context, interdisciplinary communication is well encouraged and it seems that learning from the other's discipline suddenly became easier and more fruitful since nonlinear science came into being.

And yet, the problem of the leading Harap Alb is not easy to solve. And this seems to be intimately linked with human nature.

Fragmentation and the fruit of marginality offer new perspectives

David Bohm gave probably the most dramatic expression to the worries of the thinker facing the avalanche-like fragmentation process in human thought, pointing towards its surprisingly deep roots¹⁰.

An unexpected effect of fragmentation was however left unnoticed until very late in this century, when Mattei Dogan revealed not only its extent, but also an unusual power emerging from the process. The basic idea is amazingly simple: fragmentation generates new boundaries. Coupled with the interesting observation that boundary regions are the most productive (resulting from a deep and comprehensive study¹¹), Dogan's idea led to a new vision in the history and the philosophy of science: we reach the encouraging conclusion that fragmentation itself provides a basis for progress. The abundance of boundaries represents an important potential for fruitful development, a kind of extension of the "fourth stage" in the state space of human exploration.

Qualities and nuances collapse to numbers, thus things become comparable and we can talk across boundaries

Numbers enjoy the remarkable property of being always the same, whatever their representation mode. We can only wonder why, after counting sticks, one feels like grasping them and using them to fight. This would be, however, another discussion, involving the relation between the reign of quantity and the value of force. There are no translation ambiguities regarding numbers, a feature which turns them into precious seeds for bridges between disciplines.

One can say - without any risk of exaggeration - that nonlinear science makes wonders when it comes to turn qualities into numbers. The most complicated shapes, the wildest irregularities can be associated with numbers, due to an already wide choice of methods¹². Lyotard has discussed the possible effectiveness of this capability rather early¹³. He showed that decision factors try to manage "sociality clouds" in the process of increasing their power, by operating upon elements that are made *measurable*. Their cry "Be measurable or disappear!" is more than a warning, betraying a certain despair in front of the growing power of "obscure forces"¹⁴. Nevertheless, the collapse of flavours and shades to numbers has wide range effects, far beyond the will to increase power. As Lyotard's intuition discovers, what he calls "postmodern knowledge" *refines our sensitivity for differences and increases our capacity to stand the immeasurable*, which sounds natural today if one replaces the quoted words with "nonlinear science".

Whether as a premise of communication between disciplines or not, people love to quantify things. This passion seems to have no limits¹⁵, being found in the most surprising circumstances. Take, for instance, a charming introduction to philosophy dedicated to the young generations, like Jostein's Gaarder's celebrated "Sofie's world". A subject treated by the author in terms of quantities is no other than... the mystic experience (Sofie is told that giving herself up, in order to experience the dissolution in God, is not a bad deal after all, since she *loses* something, true enough, but she *gets* much more in return). Turning a mystic moment into a problem of give and take was the last thing I would have expected in a book meant to guide the first steps of young people in the spiritual world. Nevertheless, the tendency towards quantitative comparison is so strong, that such an approach seems already "natural" even for the realms of religion and philosophy.

One may obviously ask whether numbers represent the one and only direct channel between different domains capable to avoid the traps of translation. Of course, there are other channels too. The extreme alternative may be that of sound: universally perceived, it is the most suggestive and yet the most "vague" way to communicate. In between, we find the world of visual signs.

Caught in the stream of today's changes, we can't help asking whether a development of a general science of signs would not play an important role for the future communication between disciplines (this reminds us the confidence in Deely's tone when proclaiming semiotics "a new framework and a new foundation for the human knowledge as a whole"¹⁶).

Tolerance might be a weapon against cross-cultural understanding

While "to tolerate" is generally considered a noble and peaceful concept, it often falls back to its other, widespread meaning; the objects of tolerance, the "tolerated", are perceived as "accepted" while they should have never been accepted at all. There is no wonder that sooner or later somebody suddenly asks: "for how long shall we tolerate them"?

Alternatively, one could try to understand and respect otherness. But here we face another problem. Some scholars express justified doubts regarding someone's capability to "really" understand another cultural framework, world view, religion etc.; at a recent meeting dedicated to these issues¹⁷ it was argued, however, that success in this enterprise would not be without dangers either. What happens after deep understanding of another universe (provided that one gets it)? Can such an experience leave one unchanged? What long range perturbations are implied by a "full contact" between deeply rooted value systems, ways of thinking etc.? Is a citizen of Blefuscu still a Blefuscan after understanding the way that people from Lilliput see things?

Globalization understood as uniformization, on the one hand, and an aggressive emphasis on group features on the other, represent frightening perspectives for many people today. And this - in a context in which both tendencies seem to gain more power than ever. Finding the way on the edge between such extreme alternatives may be at least as challenging as designing a path in the realm of interdisciplinarity. Both situations necessarily imply a kind of "experience of the fourth stage".

Dwellers of the fourth stage?

Boundary regions are promising enough to reward the risk of stepping in. Trespassing taboos slowly begin to be suppressed. And yet, the "risks" were not eliminated, on the contrary: they grow more manifest. While the world of the borders seems to attract many seekers, who get charmed by its landscape, amateurism is promptly sanctioned when it comes to interdisciplinarity. The domain between domains is a special kind of space, comprising its specific gifts and pitfalls; it is never - and could never be - a safe space to wander through.

On one hand, one cannot be exempt from mastering a certain domain ("box"), no matter how boldly one chooses to travel through the "meeting space". In all cases of "edge travelling" I know, the experience of the threshold is always temporary. There are no "dwellers of the fourth stage". There is a sum of (even repeatable) events, that make up the "adventure", and this "adventure" has a reason, a start, and an end, whatever the dimension of its outcome.

On the other hand, the one who chooses to walk into the realm between the realms has to adopt a special attitude, which would fit the new world - learning anew how to move among another kind of object and how to deal with them in the framework of a new kind of order, governed by a new type of rule.

On this strenuous voyage, in a land of challenge and of promise, there is one thing everybody needs for sure. This is communication, both interdisciplinary and cross-cultural. Its threads

would build a strong web, offering support to the seekers who enter this fourth stage, providing fresh power to those who meet in a Paideusian space to continue their own journey enriched in perspectives.

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Cristian Suteanu

Notes

¹ one of the well-known accounts of this issue is to be found in Mary Douglas' *Purity and danger*, Harmondsworth, Penguin, 1966.

² of the living, of the dead and of the unborn: Wole Soyinka, *Myth, literature and the African world*, Cambridge University Press, 1976.

³ already in his *Ordre du discours*, Paris, Gallimard, 1971.

⁴ as explicitly asserted by Wittgenstein in his *Tractatus Logico-Philosophicus* (first edition: Leipzig, 1921; issued in London one year later).

⁵ see for instance: K. C. Anyanwu, *The idea of art in African thought*, in: G. Floistad (ed.), *Contemporary Philosophy: a new survey*, vol. 5: *African Philosophy*, Dordrecht, Martinus Nijhoff, 1987, 235-260; also: LeAnne Howe, *Spaces and the production of the sacred*, in: Resita Lectures, Fractal'98 Summer Camp, Raul Alb, Romania, 1998.

⁶ Munteanu F., Ioana C., Suteanu C. and Zugravescu D. (1995), *Discriminating transient dynamics and critical states in active geodynamic areas*, *Studii si Cercetari de Geofizica (Research in Geophysics)*, 33, 1;

⁷ This metaphor of "assault", of the "conquering" researcher and the "vanquished" nature, is far from being new: it seems to remount to the early beginnings of what we call scientific attitude.

⁸ The name of the fairy tale (and of the hero) could be translated as "The white Arab", the Arab being a symbol of people with dark skin in popular language. The story makes no reference whatever to the "Arab" origin of the hero, the "coincidentia oppositorum" found in the name of the hero being the only striking (symbolic) significance of this otherwise strange

origin.

⁹ One of the most beautiful and suggestive views upon the "new science" is to be found in the early book by Ilya Prigogine and Isabelle Stengers, *La nouvelle alliance*, Paris, Gallimard, 1979 (widely translated). Well-known overviews are, for instance, James Gleick's and Richard Waldrop's.

¹⁰ D. Bohm (1983), *Wholeness and the implicate order*, London, Penguin.

¹¹ Mattei Dogan (1994), *Morcellement des sciences sociales et recomposition des specialites*, *Revue Internationale des Sciences Sociales*, 139, 37-54; id. (1996), *The hybridization of social science knowledge*, *Library Trends*, 45, 2, 296-314; id. (1997), *The new social sciences: cracks in the disciplinary walls*, *International Science Journal*, 153, 429-43; Mattei Dogan and Robert Pahre, *Creative marginality. Innovation at the intersection of social sciences*, Westview Press, 1990;

¹² for a good yet concise introduction, see Hideki Takayasu, *Fractals in the physical sciences*, New York, John Wiley, 1992.

¹³ J.-F. Lyotard, *La condition postmoderne. Rapport sur le savoir*, Paris, Les Editions de Minuit, 1979.

¹⁴ I.P. Culianu, *Religione e accrescimento del potere*, in: G. Romanato, M.G. Lombardo and I.P. Culianu, *Religione e potere*, Marietti, Genoa, 1981.

¹⁵ R. Steiner, *Goethe und der naturwissenschaftliche Illusionismus*, in: J.W. Goethe, *Farbenlehre*, Verlag Freies Geistesleben, 1984.

¹⁶ John Deely, *Basics of semiotics*, 1990.

¹⁷ *Cultural communication and the understanding of otherness*, Resita Lectures, Center for Complexity Studies, "Fractal'98" Summer Camp, Raul Alb, Romania (to appear in 1999).