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Conferences conveying the Solvay spirit in emerging scientific fields: a remarkable boost to knowledge building

(or: Do you know what Physics said to Nursing Science?)

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Dear fellow nurses: I must start by thanking you for this great new opportunity to address you through this editorial. As in previous times, I will continue to follow the path of knowledge. In 2005[1], I discussed mainly the communication of knowledge and, in 2009[2] , its visibility and identity. This time, I will discuss its development and construction. However, as always, I must warn you that this is the perspective of an outsider, an alien's view on a field of knowledge that is not within his domain. This account might eventually bring some contribution to your science – if so, great – but it certainly can tell you the perception an outsider has about your *area of knowledge*. Please feel free to conclude that my alien's view is totally wrong. But should this happen, please refrain from loathing the author too much.

My view of nursing is that it is an extraordinarily important profession, but still emerging as a science. The latter condition is not exclusive of nursing. I have the same perception of accounting, management, psychology, and some other areas. This perception does not contain any value judgment – it merely reflects that the current (but different for each one) epistemological moment of those areas characterizes them as *a science in process of consolidation.* Going back in time, one notices that mathematics – such an abstract subject today – may have its roots in professions or technology, for example, wealth and trade. At the beginning of knowledge, mathematics enabled to anticipate the result of *quantity transactions*, i.e., the total size of the cow herd of a couple that was going to get married could be quantified to 20 heads without putting them all together and counting, just by knowing that the bride would pitch in with her personally owned three cows, the groom with his nine and the bride's father – as a dowry – with additional eight. Likewise, multiplication and subtraction could ensure that the final size of the herd would always be the same – 14 cows – no matter if the couple would sell *two cows three times* or *three cows twice*. Yes, mathematics, like physics, also used to be much more a technology than a science.

This context brings to mind the question: since there are examples of knowledge fields that have already moved from profession/technology to science/research, is there any lesson that could be learned from their development to speed up the corresponding process in emerging fields? My answer to that is *yes, no doubt there is*. But it must be pointed out since now that one should not hastily adopt the quantitative methodology, as can be widely seen in much of the literature available today. Setting up a clear, rigorous conceptual framework, which must be established, accepted, and shared by the entire research community in the specific field, must necessarily precede quantification – *if and when* such step becomes required. Without this, there is no way of telling how or why one should quantify it. How to measure something that, in fact, is not yet fully defined and whose nature is only loosely established? One cannot assign a value, a very accurate quantitative expression of information, to a qualitatively diffuse entity[3].

But the story I really wish to tell you is over 100 years old and dates back to 1911, when Physics, a science regarded as finished and fixed in the late nineteenth century, had actually *regressed*! Hitherto recent observations and discoveries, such as Planck's quantum hypothesis (and its application by Einstein to explain the photoelectric effect) and the (also by Einstein) theory of special relativity, as well as atomic modeling and its inconsistencies, simply did not fit within the at-the-time theoretical framework. As a field of knowledge, Physics had returned to its childhood. Indeed, it is perfectly legitimate to question if the understanding of the new context represented a continuation of existing physics or something new enough to become a novel field of study. As a precaution, before any adventurer took advantage of the new discoveries, physicists gained ownership of the field, labeling it *Modern Physics*, while the previously existing knowledge became *Classical Physics*.

Nonetheless, the childhood and teenage years of modern physics – especially quantum physics, one of its branches – were relatively brief. Some 15 years after its inception, modern physics had become a young and self-emancipated adult – a short time when compared to the evolution of classical physics, which, had undergone childhood and adolescence in previous centuries – steps, by the way, that all fields of knowledge must go through in their way to "adulthood".

It is reasonable to argue that the rapid evolution of modern physics was due to the fact that it had already embedded concepts and theories of classical physics, a generally unavailable resource when a new field of knowledge appears. But this argument does not apply here. On the contrary, attempts at using classical concepts – such as time, position, trajectory and velocity – slowed down rather than sped up the understanding of modern physics. One had to forego those concepts or review them to effectively reach a new, descriptive consensus on the observed phenomena. On the other hand, there is undoubtedly a decisive factor for the speed of such advancement – a unique and fertile conjunction of extraordinary minds. The list is too long to be included here, but you can check it out at http://en.wikipedia.org/wiki/Solvay_Conference.

Both conditions mentioned in the previous paragraphs – the consolidated conceptual framework and the combination of extraordinary minds – are no doubt important, but there is no guarantee that they will exist in a certain field of knowledge while it is still in its childhood and teenage years. A third important factor had or took an outstanding role during the development of modern Physics: the early *Solvay Conferences* were held, with three key differentiators – *a single, well-defined theme, the selection process of the participants,* and *the format*.

The main aspect of each new edition of the Solvay Conference was its theme. In a scenario of knowledge under construction, many were the doubts and uncertainties, concerning epistemology, conceptual framework, interpretation of results, as well as the architecture, integration and harmony of the whole. There was not even clarity about the nature of the subject matter. The theme of the Conference would always address one of those great doubts and uncertainties. *It was not an event to report the past, but rather to design the future, a moment of conception and not a moment of autopsy*. So it had to be a relevant issue within a particular field of study whose solution would create a positive rupture, a further step down the path to understanding and consolidation of fundamentals, principles, concepts and logical relationships between them, and their relationship with the "real world." So far with regard to the relevance of the theme; however, it had also to be tailor-made – neither too broad nor too narrow – to foster interest, while mobilizing and challenging the most outstanding researchers dedicated to it.

Once the theme was defined, the organizers selected and personally invited the *participants* of the Conference, respecting the profile presented at the end of the previous paragraph. There was no voluntary registration, as it was not a professional or student oriented event, not even for doctoral students. The Conference gathered together "the cream" of the vanguard of scientific research. The practice of meeting management says that maximum efficiency can be achieved from a meeting if the only attendees are persons engaged in either the formulation or the solution of the problem at hand. This was precisely the participant selection criterion for the Solvay Conferences.

Lastly, the Conference format. It consisted of a single plenary session throughout the duration of the event. It was a format very different from almost all of today's conferences, which are based on short sessions whereby participants stay together for a few minutes and those who express their opinion almost always do it without having actually delved into the subject matter under discussion. Think carefully and answer truthfully: How many presentations have you attended in which the audience is mostly composed of the session speakers and their guests, the latter often leaving the auditorium as soon as their friend's presentation ends? How often have you watched a talk where

the speaker just "got free of his/her charge" without real commitment to knowledge building? How many times have you been disappointed in most, if not all, of the works presented in a regular session? Evidently, *there are* advantages at running huge conferences. They certainly must exist, and it eventually occurs that some important and significant contribution to knowledge comes out of them. However, most contributions involve finished, "post mortem" research. Strictly speaking, rarely does a speaker expect his audience to come up with contributions for the continuity of his/her research, since it is presented as a finished project. The greater importance of this macro-conference format lies actually in the opportunity for junior and senior researchers to network and spend time together, thus contributing to the scientific maturity of young researchers. Knowledge building and future development are not the key issues there.

Compare this kind of context to that of a small group of senior researchers who get together for two or three consecutive days to address *only one* of the crucial and fundamental open problems in their field of knowledge, and go about designing the future, devising new approaches, new ways of thinking, new research. They plan their next encounters and exchanges: let us write an article, a chapter, or a book together; let us invite each other to attend the defense of our mentees' theses on the theme we are seeking to unveil; let us try to identify other problems in our field, related to that theme. Let us always look ahead into the future – and beyond.

The spirit of the approach described in the previous paragraph was preserved in Brazil for some time and in some fields at the events organized by the Brazilian Associations of Research and Graduate Studies (ANPPs). In principle, those events would only be attended by senior researchers, advisors for theses and dissertations, who would organize themselves into Work Groups (WGs), in accordance with their research interest, to discuss a specific problem within the scope of the latter. The WGs used to meet for at least two full days without any formal presentation of papers. They would rather address their problems, find solutions and design the future. In short, each WG was like a Solvay Conference! Unfortunately, in many cases, today's ANPPs are merely organizing "more of the same" kind of conference – events even with strong participations of undergraduate students – failing to realize that they should represent the cream of research in Brazil and that they are responsible for setting the guidelines and pointing the directions to foster the scientific development of their field of study.

So, in a nutshell, what is my message to you today? It is more than a message, it is rather a conviction: any field of knowledge, including nursing, besides regular meetings – *which are essential* – shall also hold a major event with GTs conforming the Solvay spirit, exclusively for researchers active at the graduate level. Doing so, this area will see a remarkable boost in their efforts towards consolidating a clearer and more solid scientific background for their already successful profession.

Oh, yes, my dear fellow nurses, I am almost finishing this editorial without answering the question I put in the title. After all, what did physics say – or what does it say – to the nursing, accounting sciences, and psychology?

I am you, tomorrow!

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