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ENDO NANO [PART 01]

The Internal Origin of Complexity In Evolution

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[George Kampis](#)

There is a common mistake, rooted in an innocent, everyday version of Platonism, induced by the stationary world of objects we are surrounded with. The mistake consists in thinking that everything has a well-definable origin: that everything comes from somewhere. More scientifically, the idea is that there are some conservation laws which are universal. This idea suggests a transformational philosophy of becoming, which we are ready to accept because it is applicable to many material bodies, which do not appear or disappear by themselves. If they do, we always go and find some lower-level components which don't. That is, there is always something immutable. Therefore, if something changes, we can always name something else which is responsible for it: we can identify a regular cause, expressible in terms of a given set of predefined primitives. Well, it is well known that every action can potentially bring forth new degrees of freedom. Every scientist knows this. A common mechanism by which this happens and new information is produced is by the change of context. For instance, one can always combine old components in new ways. The number of combinations is open-ended and cannot be mapped a priori; tape recorders could use knots tied on the tape rather than magnetized domains for recording information. This suggests that in general there is nothing "physical" about the information content per se. It depends entirely on relations, and the relations can change. In other words, besides material properties, we have to speak about informational properties now, or, going even beyond that, we may realize there exists only the latter, as perhaps the material properties themselves can be conceived as instances of some permanent relation or mode of interaction. In short, instead of single and well-defined causes and actions, we are left with an intricate web of modalities that jointly evoke or define a dominant trait or observed action. The two pictures outlined in these two paragraphs are seemingly quite incompatible. It is inevitable to ask, which one is correct?

Naturally, as we know, the world of predefined primitives invites a formal, mathematico-logical treatment. This latter amounts to having a closed system, in which conservation laws do exist. One of the ultimate conservation laws for formal systems is the one for information, an expression of which is known as the Kolmogorov-Chaitin complexity theory. In such a system, you don't have all the fancy things we spoke about. Of equal importance is that, in the reverse, formal systems always imply invariant representations: they are little universes of their own, universes into which everything is put once and forever, from the outside. Hence, it is proper to say that the logical world is not a creative but a created one, and it is always treated from the birds-eye perspective of an outsider. And here we find an answer to our original question. Science traditionally proceeds by models, and modeling in the classical style involves the use of formal constructs. The metaphysics of regular causation, therefore, is found to reflect our prevailing habit of projecting the models onto reality, and thereby viewing natural processes externally and freely, as if from an armchair.

However, there is another, an internal viewpoint, which is bound to constraints exerted by the very participation. From this viewpoint, phenomena like the modification of a system's very constitution become real. That is, it all depends on where you stand. And of course we know very well where we stand. Time, for instance, is an inexorable quality for an internal observer like us, and so is it for the observed process itself. This amounts to saying, the processual perspective, that is, the "own" perspective of a process, cannot use more information than is available from the current stage. Only what is already realized can be observed and acted upon. This information content is changing; and it changes irreducibly as we

understand that this is the way things, when closed to themselves, work.

We also understand how the first viewpoint comes about. If now a modeler artificially neglects the internal structural constraints of observation we spoke about, he or she will easily tend to construct an invariant model based on globalized knowledge (expressed sub specie eternitatis), which can be useful in some domain but which no longer reflects the actual state of the affairs. So it is better not to try too hard to save the face of science by promising, say, computational models for increase of complexity. What we should do instead is to become more modest and more contemplative. We should reject the principle of omniscience. Maybe we don't have to throw away all models, but we must now begin to grow together with the self-defined unfolding of the temporal becoming of processes.

In the lecture I will try to indicate why I think these thoughts are naturally related to problems of evolution and mentation, and why I believe that the whole story must in fact begin with biology and cognition.

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