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Perspective, Alienation, Escape: An Introduction

This short introduction to the 2012 discussion event with Giuseppe Longo and Benedict Singleton sketches out the theoretical positions of the two contributors and the common threads of the discussion

Just a brief glance at the titles of the many works that mark the course of Giuseppe Longo's distinguished career, spanning four decades and numerous disciplines, indicates immediately that he is a unique polymath whose contributions to knowledge cannot be inscribed within disciplinary boundaries. Former Professor of Mathematical Logic and, later, of Computer Science at the University of Pisa, he is currently Director of Research at the Centre Interdisciplinaire Cavaillès at the Ecole Normale Supérieure in Paris, and has spent time in the US at Berkeley, MIT, and Carnegie Mellon as researcher and visiting professor. Beginning his research with the study of the mathematical semantics of programming languages, Longo began to relate the common structures of these languages to mathematical notions of Category Theory. In the early- to mid-90s he worked under the auspices of the interdisciplinary Centre for the Study of Complex Systems and Cognition at the ENS, where his research took new directions which he continues to pursue and expand, in collaboration with researchers from other fields, notably biology: with Francis Bailly he coauthored the volume *Mathematics and the Natural Sciences: The Physical Singularity of Life*, published in 2011, which proposes a novel approach to cross-foundational analyses in mathematics, physics and Biology. The consequences of this work for theoretical perspectives in Biology are developed further in Longo's book with biologist Maël Montévil, *Perspectives on Organisms: Biological Time, Symmetries and Singularities*.

This groundbreaking collaborative work proposes a new dialogue between mathematics and biology: the understanding of biological systems is enriched through an approach which, rather than attempting to codify them in informational or computational terms, addresses their full complexity through morphological mathematical concepts.

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Moreover, the search for a new paradigm for modelling these *dynamic* systems converges with the epistemological task of accounting for our most stable form of cognition—mathematics. For the conceptual stability of mathematics itself emerges originally from the contingent development of animal *perspectives*—the perceptual organization of space to optimize survival, predation, and mating opportunities.

Between 1994 and 2003, in the seminars of the important Collège de France 'Geometry and Cognition'

working group, with colleagues from biology, physics, and philosophy, Longo pursued this new approach to the foundation of mathematical knowledge through cognitive phenomena, based on the contention that, in addressing the remarkable capability of mathematics to describe the universe – what has been called its 'unreasonable effectiveness'—one can't avoid investigation of the phenomenological relationship to space and time in the perceptual systems that originally organize—*geometrically*—our interaction with our environment.

What does geometry 'do', whether the geometry involved in the unconscious construction of space that serves biological imperatives, or that a complex mathematical theory? It generates structures that provide us with *usable* access to observable phenomena—i.e., *knowledge*—by way of an organization of perceptual information. The key questions then become: How do we access phenomena, particularly mobile phenomena, as objects? How do we gauge and measure them? Through which operators—that is, schemas of informational organization—do we structure them and enable ourselves act on them? These are questions that apply equally to unconscious cognitive behaviours and sophisticated theoretical constructions.

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Euclidean mathematics, for example, is a set of constructions that organises space in terms of rigid figures, and is obviously connected to the way in which human perceptual system unconsciously orders space. Whereas the intelligibility of microphysics, on the other hand, mediated by complex instruments—instruments that *themselves* are the embodiment of theoretical commitments based on hypotheses—obviously can't be grounded directly in our senses or in the gestures of the body. Of course, the history of mathematical science is a history of the superceding of intuitive certainty, with mathematical structures becoming increasingly disjoint from direct phenomenal experience. The twentieth-century axiomatic approach to mathematics, hugely productive in some respects, only exacerbated this isolation of the discipline from human experience and from the natural sciences. In turn, the great twentieth-century enterprise in philosophy of mathematics was to found mathematics on logical axioms entirely independent of our phenomenal experience of the world. And this quest for pure formalism in mathematics was to contribute toward the emergence of a computational paradigm according to which physical phenomena can be coded as pure information, a paradigm whose overextension into the natural sciences has been the target of a stringent critique on Longo's part.[1]

Longo has described his work as an attempt to reintroduce meaning into this picture, diverging from the enterprise of independent logical or computational foundation, and instead treating knowledge as the morphological *structuring and organization of data*, always in view of action. In his words, 'Mathematics is not grounded on arbitrary conventions, but upon the instrumental manipulation of environmental information'.[2] Thus, according to his paper *The Cognitive Foundations of Mathematics*, 'the geometric intelligibility of space poses a fundamental problem which is independent from (or additional to) those addressed by Logic'. Furthermore, 'any "informational content" also depends on the geometric structure which encodes the information, and on its context'.[3] It is only on the basis of repeated, memorized and operationalized gestalts that bear pragmatic meaning for a certain creature, that objective invariants are isolated in the world which will later become available for more complex conceptual constructions. The latter, in turn, will enable the construction within knowledge of new invariants unavailable to phenomenal perception, thereby enabling us to act on the world in novel ways.

This is where the genealogy of mathematical and scientific concepts, the question of generativity—in other words, the astonishing creativity of

1. See his 2009 paper 'Critique of Computational Reason', < http://www.di.ens.fr/users/longo/files/PhilosophyAndCognition/CritiqCompReason-engl.pdf>.

2. 'Space and Time in the Foundations of Mathematics, or Some Challenges in the Interactions with Other Sciences', < http://www.di.ens.fr/users/longo/files/PhilosophyAndCognition/space-time.pdf>.

3. Available at < http://www.di.ens.fr/users/longo/files/PhilosophyAndCognition/incompl-images.pdf>.

mathematics, its production of new knowledge—opens onto the more general question we would like to pose: By what pathways, through what orientations, does the human escape from the limitations of the perspective that evolution bequeaths it? Longo's project brings back to us an appreciation for the history of the concept as a complex pathway that leads from the objectivations inherent to the phenomenal world of the animal, to the high-level concepts of mathematics, for example—a journey that doesn't pass by way of an absolute cut, and which can't be appreciated through a reduction of knowledge to pure information disjoined from its pragmatic contexts.

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To place this in the language of ideas predominant in recent European philosophy and its reception in the US and elsewhere, which has stakes equally epistemological and political, Longo's work presents us with a crucial disruption of the dismal choice presented to us by a certain contemporary Platonism – an alternative unfortunately propagated, with champions on both sides, through ever more shrill professions of faith in miraculous 'thought-events' and, on the other side, retrenchments into nebulous vitalism: namely, what Badiou presents as the primordial choice facing the philosopher: either number or animal (in his own words: either Lautréamont's 'excessive coldness' of mathematics or else 'everything that makes us scurry about blindly on the desolate surface of the earth'.)

If Badiou seeks to generate revolutionary political discipline from a certain conception of discontinuity in the history of thought—descended from Bachelard's 'epistemological break'—it's worth noting that in the first half of the twentieth century, it was the injection of a revolutionary motif into the history of ideas which first gave rise to this concept, and which led, for example, to the not-so-subtle suppression of work such as that of Pierre Duhem, who had tried to demonstrate, between the apparently abstruse theological meditations of the scholastics and the Galilean dawn of modern science, the continuity of certain problem-situations, problematics that emerge from the confrontation of the mind and its environment, and which continue to be the motor for what are never merely scientific or mathematical hypotheses. A 'Platonism of the problem' has been kept alive, however, notably in the 30s and 40s by Albert Lautman, in the 60s and 70s by Deleuze, and in the 80s and 90s by Gilles Châtelet, who writes in *Les Enjeux du Mobile* that: '[T]wo different rhythms span the "history of ideas": the wholly discontinuous rhythm of "breaks", of "paradigms" and of their refutations, and that of the problematic latencies always available for reactivation and full of great treasures for one who knows how to awaken them'. Recently Sequence Press and Urbanomic have published Fernando Zalamea's *Synthetic Philosophy of Contemporary Mathematics*, a sweeping philosophical survey of (or rather *with*) contemporary mathematics in the spirit of this 'problematic' tradition and against the legacy of the various projects of logical foundationalism.

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Longo's great contribution here is to deepen our appreciation of both the provenance and the transformability of these 'problematic latencies' by welcoming into the epistemological picture, alongside the stellar achievements of mathematics and physics, the empirical researches of biology and cognitive science: if there are indeed 'catastrophic', non-differentiable breaks, points at which knowledge becomes unmoored from the animal vessel that was once its vehicle, they can't be understood apart from a pragmatic momentum that drives this continual opening up of new spaces of action. In other words, if there is 'escape' (and in my opinion, philosophy, at least, has never been about anything else), it's not in the form of a 'leap of faith' (even with the help of a transfinite trampoline), but that of a twisted path that leads uncertainly toward new fields, with the stabilisation of new invariants providing the basis for new modes of action, and, reciprocally, new

modes of action and new instruments for cognition enabling new perspectives; indeed, it is a dense and ramified history of the morphological manipulation of information that makes possible the startling clarity of new observables, new worlds. Ultimately, on the broadest level, this all-important project may ultimately promise to reincorporate the scientific image of the world back into the human adventure, and vice versa.

Action, one could say, is enabled by hypothetical perspectives, or what Peirce calls abductive reasoning. We do not have complete information; the perceptual system itself, as cognitive science reveals with ever more precision, operates on the basis of hypotheses drawn from this incomplete information, figuring space into a geometrical structure. The construction of objectivity – that is, the construction of a space of action—is hypothetical or abductive. And repeated successful action on the basis of such an hypothesis only enables further action and further construction. Mathematical perspectives on the world involve schemae which manipulate information to produce not only conceptual stability but also collectively communicable and actionable schemes. And escape from parochial limitations involves the relativization of a particular point of view in favor of experimental inhabitation of new constructions.

This brings us to Benedict Singleton's work. Benedict is a designer and theorist who has just completed his PhD thesis at the University of Northumbria in the UK.

Drawing out a language of scheming, crafting, and plotting that declares itself quite clearly in the vocabulary surrounding design, but which has been studiously ignored by a design theory rather too keen to ingratiate itself, Benedict's work seeks to elaborate a counter-history of design that affirms this plotting or manipulative mode of thought, and even its connotations of deception. His thesis draws on Detiene and Vernant's 1976 book *Cunning Intelligence in Greek Culture and Society*—a work which, in light of Benedict's analysis, seems strangely underappreciated. Detienne and Vernant's work unearthed the Greek notion of *mêtis*—roughly, 'cunning intelligence'—a term which, unlike its counterparts techne and poeisis, leaves no apparent trace either in our everyday language or in the theoretical framework deployed by design theories to describe the way in which humans shape their world; Singleton's work is an experiment in explicit advocacy and amplification of its subterranean influence.

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Mêtis has, since Plato, been either neglected, or viewed as a suspect mode of intelligence and action because it resists codification as an explicit procedure, and because of the consummately crafty, improvisational engagement with the environment that it connotes. As Benedict has suggested, it is exemplified in the trap, which, contrary to the honest, authentic contest of the hunt, sees the predator adopting the point of view of the prey so that its own behaviour is harnessed to ensure its extinction.

Singleton's work seeks to reactivate mêtis as the key to understanding the practice of design: a practice in which the adoption of hypothetical perspectives enables a transformation of the environment which, in turn, provides opportunities for further ruses—always under the auspices of mêtic intelligence, which, like the steersman of a ship or a trapper, seeks to power its advance by craftily harnessing the factors of the environment and its expected behaviors to its own advantage. A generalized mêtic view, Benedict suggests, would perturb even Machiavelli, opening onto an ever more convoluted vista of ruse and counter-ruse, of crafty creatures with designs upon each other; it also alters what we might understand by invention.

Like the abductive cognitive operations of mathematics, which manipulate geometrical information to create unprecedented new perspectives, the mêtic route to mastering the environment is ultimately a question of an escape from the rigid constraints of an imposed order of things. According to Benedict, the question of design, like the epistemological question of mathematics, seems to be: Through which operators, by means of which perspectival modes of organization, do we grasp the environment and

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enable ourselves to act upon it? Mêtis is also a hypothetical or abductive form of reasoning, a form of manipulation that seeks to recode the environment and thereby liberate new opportunities for construction.

In altering the parameters of the environment in order to create new spaces upon which yet more invention can be brought to bear, cunning intelligence gradually twists free of the conditions in which it finds itself 'naturally' ensnared, generating paths to an outside that does not conform to the infinite homothetism of 'more of the same' but instead opens up onto a series of convoluted plot twists. This unpredictable unfolding of hidden possibilities and new invariants emerging from Benedict's reactivation of mêtis enables him to construct not only a counterhistory of design, but also a new vision of what 'speculative design' might mean.

The connection with what we are calling 'escape' should be evident: If it is a matter of the construction of new perspectives which, in turn, give rise to new opportunities, then escape requires a certain amount of cunning, and to a certain extent an abduction of ourselves by perspectives that relativize our spontaneous phenomenal grasp of the environment. The organization of information and the search for invariants is not an intellectual matter, it always involves design and action; this approach unfolds the true dimensions of a pragmatic perspective on knowledge—or rather, as Zalamea has emphasized, not 'pragmatic' in the degraded popular sense ('the mere study of utilitarian correlations in practical contexts of action') but *pragmaticist* in an expanded, Peircian sense.

The discussion we propose between these two thinkers can therefore be called a 'pragmaticist thought-experiment': What we hope to explore here in this trans-anti-post-disciplinary—or, using Zalamea's word, transmodern—discussion, is the link between the hypothetical construction of perspectives, mathematical conceptualization, designing, and the question of the emancipatory aspect of knowledge. Can we think the history and the future of human knowledge as emancipatory, not through the leaps of genius or event, and not as magically 'emerging' from chaos or through the sheer acceleration of information processing, but by way of the construction of new perspectives, and the new modes of action that they make possible?