



Commentary to “Practicing Dialectics of Technoscience During the Anthropocene” by Hub Zwart

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Abstract

Hub Zwart’s article is about the idea—and the practice—of an embedded philosophy of science, that is, a philosophy participating in and at the same time reflecting about the current state of the sciences facing the Anthropocene, to which I am very sympathetic. There are, however, two *caveats*. The first is that participation is always in danger to end up in a more or less uncritical eulogy, in the present case of synthetic biology. The second is that I have doubts about packing the historical path of scientific development into the Procrustes bed of Hegelian dialectics. This usually leads to one or the other form of teleology.

Keywords Historical epistemology · Philosophy and spontaneous philosophy of scientists (Althusser) · Natural contract (Serres) · Relation between philosophy and science

I am very sympathetic with the idea—and the practice—of an embedded philosophy of science, that is, a philosophy participating in and at the same time reflecting about the current state of the sciences and their position in what is now generally seen as the dawning era of the Anthropocene. The approach of anthropologists and ethnographers to the phenomenon of contemporary science has shown how fruitful such close observation can turn out to be. Why, then, not also philosophy? My approval stands, however, under two *caveats*. The first is that—and Zwart’s paper appears to me not to be completely free of it—participation is always in danger to end up in a more or less uncritical eulogy, in the present case of synthetic biology. The second is that I have doubts about packing the historical path of scientific development into the Procrustes bed of Hegelian dialectics, however flexible that bed might be. Even stripped of ontological connotations and more or less strictly remaining in the realm of the phenomenological, this brings us back, as it were, to a teleological perspective. This is very much in the self-image of technoscience—we achieve our goals—and not at all of its disruptive powers—things are brought about that no one did anticipate.

I will come back to these points. First, however, a few words on the strengths of the paper. What I find convincing is its consequent epistemological approach. Zwart pointedly characterizes it as follows: “Rather than in viruses, microbes, Higgs bosons or black holes, philosophers will be interested in the ways these entities are envisioned and addressed”

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(p. 5), that is, “analyzing and assessing how techniques, vocabularies, concepts, metaphors and research practices spread through research fields worldwide, infecting and inflaming the global societal life-world as well” (p. 4). Such a “conceptual epidemiology” (p. 4)—it could as well be called a historical epistemology—requires what Zwart calls an “oblique perspective” (p. 5), one that is informed by proximity and familiarity as well as by distance and estrangement with regard to the respective research processes. Ideally, such a heightened sense of obliquity should apply to both, philosophers of science as well as active scientists. Yet there is something that distinguishes them: Whereas the oblique perspective of the scientist is object-centered, the oblique perspective of the philosopher of science is technology- or practice-centered. This difference appears to be small, but it turns out to be decisive for a productive interaction between philosophers and scientists of the kind that Zwart propagates in his paper.

An anecdote might help to get a sense of this difference. When Bruno Latour was preparing, together with Peter Weibel, the big exhibition *Iconoclash: Beyond the Image Wars in Science, Religion, and Art* in Karlsruhe in 2002,¹ he asked me whether I might be interested to contribute. What I thought of was a video that would make manifest the immense technological network that extends behind the technology of radioactive tracing, a technology without which the rise of molecular biology around the second half of the twentieth century simply would have been impossible. I needed, however, a supportive and collaborative laboratory in order to produce it. Yet all my efforts in this direction failed. I was unable to make clear to the scientists that I was not interested in what could be or had been achieved by this technique—the scientific objects that were the result of its application—but the conditions of the existence of these objects as objects of scientific inquiry. I would thus be very much interested to hear the experiences of Hub Zwart in this respect, that is, to hear what his science colleagues are thinking about his conceptualizations, how they cope with them, and what they think how far these concepts could help them to better understand their own scientific practice. And from the perspective of a philosopher *in science*, that is, a philosopher interacting and *quasi* living with scientists, I would have very much liked to have heard about at least a few of the practical difficulties and the significant biological breakthroughs on the path to a synthetic cell. Unfortunately, the paper is written completely without any detail whatsoever in this respect.

A second point concerns what Zwart calls the “philosophemes” that scientists are usually not problematizing but acting out in their research practice. Quite some time ago, but also in the context of an engagement with molecular biology—with Jacques Monod and his *Chance and Necessity*² - Louis Althusser was addressing the phenomenon as the “spontaneous philosophy of the scientist.”³ Althusser describes it as an amalgam of two tendencies, idealist and materialist, one of them relating to the generally dematerialized view of an ideal of science propagated in the public and driven by political interests, the other connected to the material conditions of scientific work in the laboratory. Althusser sees it as the task of the professional philosopher of science, all while respecting the object-related conceptualizations of the scientist, to help letting get the latter tendency of the spontaneous philosophy of the scientist upper hand. There are a lot of difficulties implicated in

¹ Bruno Latour and Peter Weibel (eds.), *Iconoclash. Beyond the Image Wars in Science, Religion, and Art*. ZKM Center for Art and Media and MIT Press, Karlsruhe and Cambridge MA-London 2002.

² Jacques Monod, *Chance and Necessity. An Essay on the Natural Philosophy of Molecular Biology*. Knopf, New York 1971.

³ Louis Althusser, *Philosophie et philosophie spontanée des savants* (1967). Maspero, Paris 1974.

Althusser's conceptual framework back then laid out in the context of a course in philosophy for scientists, but it might be worth for Hub to have a new look at it.

A third point concerns the perspective of the Anthropocene. Here it might be worth to have recourse again to *The Natural Contract* of Michel Serres.⁴ In it, Serres characterizes science and technology, on the one hand, as the fabricators of what he calls those "world-objects," that is, those "artifacts that have at least one global-scale dimension (such as time, space, speed, or energy)."⁵ Of which he lists: "A satellite regarding speed, an atomic bomb for its energy, the internet with respect to space, atomic waste for time."⁶ We could add genetically modified organisms to that list. These are the objects standing in for the global effects of mankind on the planet that are today discussed under the label of the Anthropocene. At the same time, however, Serres sees science and technology, among the prevalent social forces, as the only one able to effectively intervene with the consequences of our impact on the planet. "To science," he states, "belong the only plans for the future we have left."⁷ And he sums up that "our collectivity can equally well die of the productions of reason or safeguard itself through them."⁸ I think it is important to insist on this ambiguity, in particular also with respect to the products of synthetic biology. And it is equally important to resist what could be called the self-proclaimed ideology of synthetic biology. That appears to me not to be always the case throughout Hub Zwart's paper.

Finally, as far as Hegelian dialectics is concerned, allow me to begin with a personal historical interjection. In the course of the 1970s, in the course thus of my own transition from philosophy of science to science, more precisely to molecular biology, I participated in a philosophers' reading group that was engaged, over a span of several years, in a close reading of Hegel's *Science of Logic* and parts of his *Encyclopedia*.⁹ The reading was intense, sometimes a page was enough for a whole session. Toward the end of that decade, when my studies of biology came to a closure and I entered a molecular biology laboratory for my dissertation, I drew a summary of these studies on the Thirteenth International Hegel Congress in Belgrade. The passage relevant for our concerns reads as follows—I translate from the German text:

Now, in light of the quest after time, one question in particular poses itself with respect to Hegel's *Science of Logic*: If it is to be seen—and this is in accord with its own aspiration—as the sketch of a general theory of development, or more precisely, a theory of development in general, then one has to look into how it deals with *time*, if one would like to examine that aspiration. [...] Insofar as at the turn from the 18th to the 19th century, theoretically oriented biology begins to envisage a temporalization of biological order, it appears essentially in the image of the ontogenesis of an individual organism: as the realization thus of a final state determined by original predispositions, as the historical stretching of an unwrapping procedure, as a sort of *temporalization of a metamorphosis*, as an expressive process. Hegel rejects such a temporalization as 'nebulous, basically

⁴ Michel Serres, *The Natural Contract*. The University of Michigan Press, Ann Arbor 1995.

⁵ Serres (1995, p. 15).

⁶ Michel Serres, *Retour au Contrat naturel*. Bibliothèque nationale de France, Paris (2000, p. 12).

⁷ Serres (1995, p. 30).

⁸ Serres (1995, p. 93).

⁹ Georg Wilhelm Friedrich Hegel, *Wissenschaft der Logik I & II*. Werkausgabe Band 5 & 6. Suhrkamp, Frankfurt am Main 1969; Georg Wilhelm Friedrich Hegel, *Enzyklopädie der philosophischen Wissenschaften I – III*. Werkausgabe Band 8–10. Suhrkamp, Frankfurt am Main 1970.

sensual imaginations.’¹⁰ Hegel clearly sees that the essence of an expressive process cannot be time. His process of the self-realization of the concept, conceived after the model of organismic metamorphosis, is timeless in its essence. [...] How, then, do we have to think *metamorphosis*, the *development* of the concept? ‘The *development* of the concept according to its destination, its purpose, or else, if one likes, its end, is to be conceived of as a positing of what it is in itself: that these determinations of its content come into existence, become manifest, yet be, at the same time, not as independent, autonomous ones, but as moments that remain in its unity, as ideal ones, that is, as posited. Such positing can thus be conceived of as an *expression*, *stepping out*, *exposition*, as *getting outside oneself* [...]’¹¹ Hence, development is essentially *manifestation* of determinations, in the sphere of [the spirit and] nature as well, and not *historical emergence* of determinations. [...] Time is no matter of moment for the principle that ‘passes on the stages,’ that is, the ‘dialectical concept’—for reasons of the logic of the system, so it appears.¹² [...] In the thought figure of metamorphosis, a thinking of processes as teleological realizations resumes itself.¹³

The idea that the history of scientific knowledge would realize itself in the form of dialectical tripartitions—position—negation—negation of negation, or “Aufhebung”—thus appeared to me increasingly suspect. Back then, what appealed to me much more than Hegel’s “logic of expression” was Louis Althusser’s “structural logic” underlying his conception of a historical materialism that did proper justice to contingency and openness toward the future.¹⁴ It brought me on the way of looking out for “shapes of time” - to speak with art historian George Kubler¹⁵ - that would be more adequate in view of a process that presented itself to me, the more as I pursued my forays into the history of the life sciences, as a deeply a-teleological one, as one in which chance plays a decisive role, and as one for which it is hard, if not impossible, to find a general form into which all possible—and actual—developments of the sciences would fit. In any case, it would be necessary to follow every particular case in the intricacy of its own details.

Hub Zwart’s “dialectics of technoscience” thus appears to me to be both too deterministic in its uniform movement and at the same time conceptually too indeterminate. The linguistic sign of the former is the abundance of the epithet “inevitable” in the text. It appears no less than ten times over these pages. As far as the latter is concerned, I have asked myself what the added knowledge value of Hegel’s language consists in, if it can be used for historical macro-movements such as that from mankind’s development from Neolithic agriculture through the industrial revolution to the Anthropocene, as well as for meso-movements such as from classical genetics through the culmination of molecular biology in the Human Genome Project to synthetic biology, as well as to micro-movements within each of these phases of the development of the life sciences. If in the end everything is reduced to thesis-antithesis-synthesis, the incredible richness in differences of the scientific research process does not become better visible, but rather tends to become obscured.

¹⁰ Hegel (1970, p. 31).

¹¹ Hegel (1970, p. 36), emphasis added.

¹² Hegel (1970, p. 31).

¹³ Hans-Jörg Rheinberger and Jörg Zeller, ‘Hegels dialektische Wissenschaftslogik im Lichte der modernen Wissenschaftsentwicklung’. In: *Hegel-Jahrbuch* 1980, edited by Wilhelm Raimund Beyer. Pahl-Rugenstein, Köln (1981, pp. 81–90).

¹⁴ Louis Althusser, *Reading Capital*. Pantheon Books, New York 1970.

¹⁵ George Kubler, *The Shape of Time. Remarks on the History of Things*. Yale University Press, New Haven 1962.

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Hans-Jörg Rheinberger born 1946 in Grabs (Switzerland), studied philosophy, linguistics, and biochemistry in Tübingen and Berlin, habilitation in molecular biology. Academic stations: Max Planck Institute for Molecular Genetics in Berlin, University of Lübeck and University of Salzburg. From 1997 to 2014, he was director at the Max Planck Institute for the History of Science in Berlin. Central in his research are the history and epistemology of experimentation as well as scientific and artistic research practices. His most recent book is *The Hands of the Engraver: Albert Flocon Meets Gaston Bachelard* (SUNY Press 2018).