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Can Scientific Agnosticism Be Rational?

Docta Ignorantia and the Crisis of the Academia in the Age of the Digital Transformation

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Abstract: The digital transformation reminds us of the limits of deductive, rule-based knowledge. This leads us back to the roots of the Abrahamic tradition. Originating in the critique of idolatrous attachments, the latter emphasized that epistemic limitations are not determinable based on reason alone. Modern scientists might be religiously indifferent. Yet it has become harder than ever before to rely on scientific systems of thought without committing oneself to ultimate constructs that raise the suspicion of idolatry. This paper builds on the speculative-realist turn of contemporary philosophy and related discussions in the Radical Orthodox movement. Starting from the anthropological triangle of nature, technology and culture, it introduces a metaphysics that conceptualizes the unifying center of rational thinking as a *constitutive theological dimension* of our scientific and prescientific engagement with the world. The immanentist idea of a "scientific naturalism" has lost its credibility.

Keywords: digitalisation, metaphysics, theory of science, naturalism, new realism, idolatry, Radical Orthodoxy

In 1644 René Descartes recapitulated his concept of scientific reasoning in the following words: "I have described this Earth, and indeed the whole visible universe, *as if it were a machine*"[1]. This concise summary marked the critical point of a paradigm shift that turned the image of a perfectly controllable machine into a root metaphor. As a culturally deep-rooted fiction, the metaphor of a law-governed, perfectly transparent and controllable cosmic clockwork did not only shape our modern ideal of scientific

[1] René Descartes, *Principles of Philosophy*, in: idem, The Philosophical Writings of Descartes, transl. by John Cottingham, Robert Stoothoff and Dugald Murdoch, Cambridge 1999, vol. 1, 177–292, at 279 (part 4, n. 188).

reasoning; it also inspired the powerful idea of a nation-state, governed by perfectly transparent and controllable laws, in contract theorists like Hobbes, Locke and Rousseau. It is no accident that Descartes associated his new method with an egalitarian utopia. He claimed that it permits us to treat even the most curious problems "in such a way that even persons who have never studied can understand them"[2].

Two generations later, inspired by Descartes's *Rules for the Direction of the Mind*,[3] Gottfried Wilhelm Leibniz extended this claim when he invented a universal language and logic. His *mathesis universalis* was supposed to suspend human beings from the effort of studying *tout court*. As Leibniz expressed it, it allows us to demonstrate everything "without the labor of having to think, or imagine anything"[4].

In this way the vision of a clockwork-like law-governed world invoked simultaneously the vision of a mechanization of the process of reasoning that was supposed to represent it in an egalitarian manner. Leibniz's stepped reckoner of 1672 was a first step in this direction.[5] The German polymath hesitated to compare the human mind with a computing machine.[6] The dismal performance of his brass and steel calculator presumably deterred him from doing so. However, in the following centuries Descartes's root metaphor gained in paradigm-shaping power up to the point at which the projection of computer metaphors on the intelligence of human beings was no longer perceived as ignominious, as the popular examples of Daniel Dennett and David Chalmers demonstrate.

From a cultural history perspective, this egalitarian automation-bias is not surprising: From Descartes up to the *deductive-nomological model* of

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[2] This was the originally planned title of Descartes' *Discourse*, cf. René Descartes, *Discourse and Essays*, in: idem, The Philosophical Writings of Descartes, vol. 1, 109–176, at 109.

[3] Cf. René Descartes, *Rules for the Direction of the Mind*, in: idem, The Philosophical Writings of Descartes, vol. 1, 7–78, at 66–70 (rule 16); cf. also Bernard Stiegler, *The Age of Disruption: Technology and Madness in Computational Capitalism*, followed by *A Conversation About Christianity* with Alain Jugnon, Jean-Luc Nancy and Bernard Stiegler, transl. by Daniel Ross, Cambridge 2019, 150–154.

[4] "[H]ac lingua [...] omnes posse demonstrari solo calculo, sive sola tractatione characterum secundum certam quandam formam, sine ullo imaginationis labore aut mentis nisu, prorsus quemadmodum fit in Arithmetica et Algebra." Gottfried Wilhelm Leibniz, *De Alphabeto cogitationum humanarum*, in: idem, Sämtliche Schriften und Briefe, 6th series: Philosophische Schriften, vol. 4: 1677–1690, part A, Göttingen 1999, 270–273, at 272. On the "Calculus Ratiocinator seu artificium facile et infallibiliter ratiocinandi" cf. also ibid., 274–296.

[5] Cf. Karen Gloy, *Das Verständnis der Natur*, vol. 1: Die Geschichte des wissenschaftlichen Denkens, München 1995, 163–286; cf. also Michael R. Williams, *Mechanical Calculating Machines: A History of Computing Technology*, Englewood Cliffs (N.J.) 1985, 122–158; Lorraine Daston, *Enlightenment Calculations*, in: Critical Inquiry 21 (1994), 182–202.

[6] Cf. Gloy, *Das Verständnis der Natur*, vol. 1, 167f.

scientific explanation,[7] liberal cultures associate the highest form of reasoning with more or less mechanical, algorithmic procedures of decision making. As a matter of fact, the last mentioned *deductive-nomological model* never offered more than a chimeric substitute for a missing concept of causation that fails to account for our pre-theoretical experience of causative events. However, it is still rarely questioned as a normative ideal of scientific explanation.

In the 20th century this metaphysical carelessness might have appeared as unproblematic. Yet, given the technological transformations of our present time, the pre-theoretical background-assumptions of scientific practices have become more powerful than ever before. It is no accident that popular-scientific movements, such as transhumanism, celebrate the early modern machine-bias as the hallmark of scientific progress. Descartes's root-metaphor has become culturally more influential than the academic discussions that unsuccessfully tried to escape the "world-picture" that kept them captive for more than 400 years. And this has far-reaching consequences in terms of the epochal break of our time: While the philosophically educated supervisors, who once ensured that theoretical and technological innovations move forward in rationally comprehensible and theoretically accountable ways, have lost the trust of the educated public, we have entered a historical phase of disorientation.

1 The Challenge of New Emerging Sciences and Technologies (NEST)

Given that pre-theoretical background-assumptions are always heavily shaped by pre-scientific narratives, it is no longer possible to reduce the investigation of their ideological impact to a matter of mere history of ideas.[8] Instead, the new situation draws our attention to what Charles Tayler called the "social imaginary" of (post-)secular societies:[9] Our scientific and pre-scientific perception and cognition is always shaped by

[7] For an introduction, cf. James Woodward / Lauren Ross, *Scientific Explanation*, in: The Stanford Encyclopedia of Philosophy, https://plato.stanford.edu/archives/sum2021/entries/scientific-explanation, as at 25 Aug 2024.

[8] Cf. Oliver Dürr, *Umstrittene Imagination: Zur Konfrontation von Christentum und Transhumanismus im säkularen Zeitalter*, in: idem / Ralph Kunz / Andreas Steingruber (eds.), „Wachet und Betet". Mystik, Spiritualität und Gebet in Zeiten politischer und gesellschaftlicher Unruhe, Münster 2021, 55–80; Oliver Dürr, *Homo Novus: Vollendlichkeit im Zeitalter des Transhumanismus: Beiträge zu einer Technikтheologie* (StOeFr 108), Münster 2021.

[9] Cf., for example, Charles Taylor, *A Secular Age*, Cambridge (Mass.) 2007, 146, 156, 171–176, 200–201, 323. For a critical assessment of Taylor's concept of the "cultural imaginary" in view of the broader horizon of objective value circumstances, cf. Johannes Hoff, *Verteidigung des Heiligen: Anthropologie der digitalen Transformation*, Freiburg i. Br. 2021, 432–442. In view of

socio-cultural background assumptions that assure both, their practical *and* theoretical validity. Surely it would be unwise to deny the explanatory significance of deductive procedures of reasoning. And it would be no less unwise to question the rule of law in digitized democratic societies.[10] However, if we take a sober look at the most recent technological innovations, it becomes difficult to sustain the "naturalist vision" that a clockwork-like *machina mundi* is a theoretical ideal that is worth striving for without a cautious assessment of the limitations of the pre-scientific metaphors that assured the credibility of this vision subsequent to the 16th century.

The critical point of the technological transformations we are currently undergoing might become more tangible if we consider the workings of deep learning technologies. As the example of *Generative* AI, like Chat-GPT, shows, we are in the position to engineer and deploy enormously powerful artificial neural networks whose architecture is easy to grasp. However, as soon as we have trained the relevant network models, based on big data sets, their inner working becomes opaque. Artificial neural networks encode comprehensible mathematical functions, yet it is impossible to fully comprehend how they solve the problems we prompt them to solve after we have trained them to do so.[11]

Technology scholars have called this phenomenon the "combination of technical mastery and explanatory mystery"[12]. And they emphasize that it is of more than technical significance—as becomes evident, if we look at scientific application examples such as in bioinformatics.[13]

If we want to understand the function of an organism, the relationship between the amino-acid sequences of its DNA and the three-dimensional structures of its proteins is decisive. However, given our limited understanding of how specific amino-acid sequences manifest themselves in

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the dead ends of Taylors later "realist turn" (together with Hubert Dreyfus), cf. also Catherine Pickstock, *Aspects of Truth: A New Religious Metaphysics*, Cambridge 2020, 158–176.

[10] Cf. Paul Nemitz / Matthias Pfeffer, *Prinzip Mensch: Macht, Freiheit und Demokratie im Zeitalter der Künstlichen Intelligenz*, Bonn 2020; for the limitations of the modern ideal, cf. Hoff, *Verteidigung des Heiligen*, 95–99, 299–318, 451–458.

[11] For an introduction to contemporary deep learning technologies, cf. Jan Segessenmann et al., *Assessing Deep Learning: A Work Program for the Humanities in the Age of Articial Intelligence*, in: Social Science Research Network (2023), 1–90, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4554234, as at 25 Aug 2024. The most recent discussion seems to plead for an integration of symbolic and neural network approaches, but this will not change the overall trajectory of the above transformation. Cf. Gary Marcus, *The Next Decade in AI: Four Steps Towards Robust Artificial Intelligence*, in: arXiv (2020), art. nr. 06177v3.

[12] Segessenmann et al., *Assessing Deep Learning*, 36.

[13] Cf. John Jumper et al., *Highly Accurate Protein Structure Prediction With AlphaFold*, in: Nature 596 (2021), 583–589.

specific protein structures, this relationship "has been a puzzle of the first order in biology for decades"[14]. Today, thanks to the targeted application of deep learning technologies, this problem has been solved for the majority of proteins. However, given the complexity of the data-sets involved, it is impossible to comprehend how the relevant technologies approximate their solutions. We have mastered the problem, but the solution will remain an explanatory mystery.

Representatives of *new emerging sciences and technologies*, usually abbreviated as NEST, tend to rely on statistical correlations. Statistical correlations enable them to make successful predictions. Yet they do not explain very much. And this has implications in terms of the philosophy of sciences. On the one hand, contrary to Chris Anderson's premature announcement of 2007, correlation-models are unsuitable to replace scientific theories and experimental methods.[15] On the other hand, they have become an irreducible constituent of NEST research. In the relevant, most innovative disciplines deep learning technologies might be considered reliable, presupposed the relevant experts have developed an understanding of their context-sensitive limitations and are able to take over responsibility for their purposeful use.

This technically induced upheaval represents only the tip of an iceberg,[16] but it might suffice to indicate how we have moved away from classical, naturalist strategies of securing the truth of scientific propositions and how this process has started to transform the cultural imaginary that governs technological and theoretical innovations. Instead of relying on theoretically approved lawlike approximations to causal chains, we have started to build our research on opaque statistical correlations that require us to set our trust in hermeneutically qualified, participatory and ideally democratic practices of *responsible research and innovation* (RRI).[17] The focus of innovative research has shifted away from generalizable rules and procedures to the actors and communities of actors who are responsible for technical and scientific innovations or capable of taking over responsibility.

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[14] Ibid., 583.

[15] This was suggested by Anderson in his famous *Wired* article *The End of Theory: The Data Deluge Makes the Scientific Method Obsolete* of 2008. For a critical discussion, cf. Bernard Stiegler, *The Neganthropocene*, ed., transl. and with an introduction by Daniel Ross, London 2018, 51f., 140f., 177–179, 267f.

[16] A philosophically more perplexing example is the phenomenon of "urgency and speed" in contemporary research communities, cf. Hoff, *Verteidigung des Heiligen*, 110–120.

[17] Cf. Armin Grunwald, *The Hermeneutic Side of Responsible Research and Innovation*, Hoboken (N.J.) 2016; Sarah Spiekermann, *Value-Based Engineering: A Guide to Building Ethical Technology for Humanity*, Berlin 2023.

This observation corresponds with theoretical discussions in the philosophy of sciences that question the ideal of a unified concept of causal explanation.[18] Yet theoretical discussions like these need to be evaluated in the light of the technologically induced breakdown of the "traditional boundary between technology-oriented applied science and cognition oriented basic research"[19]. Traditionally, basic researchers were only responsible for the methods they developed to validate their research results. This permitted them to leave application issues and related reflections on responsibilities to application-orientated researchers. By contrast, NEST research leads to "enabling technologies"[20], which are aligned to multiple application fields from the outset. This has far-reaching implications for our future coexistence and makes it necessary to assess their context-sensitive practical implications from the very beginning.

The last point brings a third transitional field of discussion into view: the epistemological transition from reliabilism to responsibilism. Reliabilist epistemologies focus on warranted rules and procedures of knowledge-accumulation. By contrast, responsibilist virtue epistemologies focus on the moral and intellectual character of the agents of scientific research.[21] If we want to assure good scientific practice in a techno-scientific world, this is the road we need to take. Instead of relying blindly on proven and tested rules we have to rely on the moral and cognitive virtues of the responsible actors, such as memory, understanding, intrinsic motivation, openness, attentiveness, tenacity, etc.

2 The Positedness of Human Knowledge and the Criticism of Idolatry

Against the background of this still ongoing transformation and its impact on the cultural imaginary of late-modern societies, it might be helpful to have a look on the larger lines of contemporary developments in terms of the philosophy of science and culture and the modern divide between continental and anglophone traditions. The anglophone discussion on virtue epistemology has shed a new light on the Aristotelian and Platonic

[18] Cf. Alexander Reutlinger / Juha Saatsi (eds.), *Explanation Beyond Causation: Philosophical Perspectives on Non-Causal Explanations*, Oxford 2018.

[19] Grunwald, *The Hermeneutic Side of Responsible Research and Innovation*, 13.

[20] Ibid., 14.

[21] Cf. Linda Trinkaus Zagzebski, *Virtues of the Mind: An Inquiry Into the Nature of Virtue and the Ethical Foundations of Knowledge*, Cambridge 1996; Michael DePaul / Linda Trinkaus Zagzebski (eds.), *Intellectual Virtue: Perspectives From Ethics and Epistemology*, Oxford 2007.

tradition of sapiential philosophy, although the significance of Plato was mostly overlooked.[22] Yet the new emphasis on the prudent engagement with context sensitive knowledge sheds also a new light on convergences between the anglophone analytic and the continental phenomenological respectively post-phenomenological tradition.

At this point I will confine myself to recalling the common denominator of this convergence.[23] In line with phenomenological and post-phenomenological thinkers like Maurice Merleau-Ponty, we might call this common denominator the *positedness* of human knowledge. If, as the virtue epistemologist Linda Zagzebski expressed it, knowledge is always based on "a state of cognitive contact with reality arising out of acts of intellectual virtue"[24], science is no longer reducible to a systematic representation of the world that permits us to adopt a view from nowhere. Rather, the positedness of human knowledge requires us to emphasize two basic features of the pre-theoretical foundations of human knowledge: Our ability to *understand*—and not only explain—the world that we inhabit in a hermeneutically qualified sense; and our natural sense for the limitations of context-sensitive knowledge, which includes, most importantly, a sense for the limitations of our ability to control what happens if, for example, we try to prompt a chain of causative events.

This challenge might be summarized starting from a technical term that goes back to two Christian representatives of the above virtue ethical tradition, Saint Augustine and Nicholas of Cusa: We need to develop a *docta ignorantia*—a new wisdom of unknowing.[25] Without neglecting the mastery of controlled, rule-based knowledge, a *docta ignorantia* considers the acquisition of scientific knowledge as a sapiential skill that needs to be exercised based on context-sensitive conjectures about the scope and limitations of creaturely knowledge. Immanuel Kant's classical modern project to define the boundaries of reason based on apriori principles of "pure reason" is no longer viable. Rather, as Kant's friend and harshest critic Georg Hamann anticipated in his famous "metacritique" of Kant's

[22] For a discussion of the Platonic dimension of Zagzebski's integrative concept of virtue ethics that overcomes Aristotle's questionable differentiation between theoretical and practical wisdom, cf. Alkis Kotsonis, *The Platonic Conception of Intellectual Virtues: Its Significance for Virtue Epistemology*, in: Synthese 198 (2021), 2045–2060.

[23] I have evaluated these convergences more thoroughly in my recent monograph on the digital transformation. Cf. Hoff, *Verteidigung des Heiligen*, 103–146, 432–458.

[24] Zagzebski, *Virtues of the Mind*, 270.

[25] Cf. Johannes Hoff, *Why We Need Nicholas of Cusa After the Representationalist Delusion of Modern Philosophy and Theology*, in: Enrico Peroli / Marco Moschini (eds.), Why We Need Cusanus / Warum wir Cusanus brauchen, Münster 2022, 91–120.

"purism",[26] the assessment of limits marks the point where the spiritual foundations of the tradition of Christian learning become relevant again. By recalling the unity of the true, the beautiful and the good, the context-sensitive wisdom of this tradition emphasized simultaneously the wholeness of human knowledge and the gift of discernment with regard to limitations that reveal our positedness as finite creatures of an infinite creator.

In this way, the technologically induced transformation of our time leads us back to the roots of the Abrahamic tradition. After all, the Abrahamic tradition did not originate in the theoretical elaboration of a monotheistic concept of God, but in the criticism of idolatrous attachments to self-made Gods.[27] The origin of the Christian *religio* paradoxically coincided with the criticism of religion, and this was, first of all, a practical problem: The rejection of idolatrous practices of veneration marked the litmus test of the attachment to an incomprehensible God. Seen from a contemporary point of view, this has implications for the concept of religion, given that human beings cannot but construe their being in the world and their knowledge of it in terms of an ultimate organizing principle or logic.[28] It is hard to exist or to engage with scientific evidences without an attachment to ultimate constructs, however much scientific "naturalists" might pretend that religious attachments can be ignored: We have never been secular.

I will come back to this point, since the modern belief in invariable laws of nature is an almost archetypical example of an idolatrous attachment. Yet, before I will do so, I want to introduce a holistic account of the relationship between nature, technology and culture in which the unifying scenter of scientific thinking is not an idolatrous theoretical construct but a constitutive metaphysical dimension of our scientific *and* prescientific engagement with the world.

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[26] Cf. Johann G. Hamann, *Metakritik über den Purismus der Vernunft*, in: idem, Sämtliche Werke, ed. by Josef Nadler, vol. 3, Wien 1951, 281–289. Cf. also Johannes Hoff, *Enlightenment Now! Overcoming the Functional Cognitivism of the Kantian Tradition*, in: Philosophy, Theology and the Sciences 11 (2024), 181–207.

[27] Cf. William T. Cavanaugh, *The Uses of Idolatry*, Cambridge (Mass.) 2023.

[28] This was already the thesis of John Milbanks magnum opus *Theology and Social Theory,* which has been critically evaluated most recently by Carmody Grey. Cf. Carmody Grey, *Theology, Science, Life*, London 2023. Cf. also John Milbank, *The Mystery of Reason*, in: Peter M. Candler Jr. / Conor Cunningham (eds.), The Grandeur of Reason: Religion, Tradition and Universalism, London 2010, 68–117; Pickstock, *Aspects of Truth*, 190–192, 196–198, 200f.

3 The Crisis of the Western Academia in the Digital Age

If a typical representative of the above-mentioned virtue ethical tradition, like Thomas Aquinas, had been asked to briefly explain the phenomenon of causation, he would have started with thick examples like acts of teaching and healing.[29] When a teacher introduces her student to Pythagoras' theorem, no doubt can arise that she is *not in complete control* of the effect she aims to cause in her student. The teacher can make herself heard, but she cannot expect that this will make him understand what has been said. Imponderables like these justified the choice of examples like teaching or healing as paradigm examples of the phenomenon of causation. More simple examples such as the movement of billiard balls, that give us ideally perfect control, would have been treated as special cases to be discussed after considering the more sophisticated ones. By contrast, when a modern scientist, educated in the tradition of Galilean and Newtonian physics, is asked to explain the phenomenon of causation, she will start unquestionably with the most elementary examples imaginable in her discipline, for instance fundamental particles, genes, or neurons that are supposed to work like Newton's billiard balls.[30] The discussion of thicker examples will be postponed until later. After all modern scientists are trained to assume that the standard of scientific research is set by *controlled* laboratory-experiments that can be *identically* and ideally mechanically reproduced *ceteris paribus*.

In terms of the genealogy of the cultural imaginary, which governs this modern habit, the dataist metaphysics of Galileo Galilei and John Locke might be considered as archetypical up to this present day. To be sure, the related modern "myth of the given" has become under severe attack subsequent to the decline of logical positivism in the 20th century. Yet given the impact of this myth on our modern imaginary, it comes as no surprise that the relevant philosophical movements, both continental and analytic, ultimately failed to overcome the word-picture that kept them captive, as the Cambridge philosopher and theologian Catherine Pickstock has pointed out most recently with overwhelming conceptual rigor.[31] Arguably, the dominating philosophical discussion of the 20th century successfully dissimulated every trace of the above positivistic myth. Yet this is ironic, since

[29] Cf. David B. Burrell, *Aquinas: God and Action*, Scranton (Pa.) 2008, 150–154.

[30] Cf. Stewart Umphrey, *The Aristotelian Tradition of Natural Kinds and Its Demise*, Washington D.C. 2018, 165–171.

[31] Cf. Pickstock, *Aspects of Truth*, 1–81; cf. in particular her disillusioning discussion of the analytic self-deconstruction of the "five dogmas of empiricism" (ibid., 10–24, 172–174) and her analysis of the convergence of this failed endeavor with continental attempts to overcome the phenomenological myth of givenness (ibid., 24–37).

it ultimately ended in the "naturalistic" confirmation of a metaphysics of atomic wights.[32] The mountain circled and gave birth to a perpetuation of the dataist metaphysics of the 17th century.

Seen from this angle, premodern metaphysicians were well advised to adopt a more holistic approach to the metaphysical basic concepts that guide our attempts to understand the temporalized, physical world that we inhabit. Up to a certain point, leading contemporary physicists, like Lee Smolin and Carlo Rovelli, unknowingly confirm the superiority of this holistic metaphysics when they argue that Newton's idea of doing controlled experiments in an "isolated box" was the upshot of a pragmatically useful theoretical idealization.[33] In and of itself, this is not an exciting assessment. Almost every educated scientist would admit that. Yet Smolin and Rovelli say more than that: Given that we are always part of the universe that we observe, Newton's idea of a "physics in the box" is not even applicable to the universe that we inhabit if we operate with idealized thought experiments that neglect the limitations of our measuring instruments. In other words, if generalized, Newtons ideal is not only simplistic but misleading since it fails to account for the paradoxical features of our spatio-temporal being in the world, as will be pointed out in more detail in the last part of this essay.

This leads us back to our starting point, the age of Descartes, but I will now adopt a more phenomenological perspective on the Cartesian paradigm shift that will help us to move beyond the modern *machina mundi*. The Cartesian break can be traced back to Galileo Galilei and was a consequence of disputable developments in early modern mathematics: Namely, the algebraization of rational procedures of decision-making in early modern arithmetic and geometry.[34] Based on a historically unprecedented, purified concept of mathematics, everything was turned into a quantifiable set of data that had no longer any connection to our everyday experience:

> [M]athematical objects are not the sort of thing that could be green or red, sour or sweet, or have any inner directedness or spontaneity. There is no place in Galilean physics for the concepts of right or wrong, good or bad, healthy or

[32] For a more forward-looking antithesis, cf. Ivan Illich, *H_2O and the Waters of Forgetfulness*, London 2005.

[33] Cf. Carlo Rovelli, *Seven Brief Lessons on Physics*, transl. by Simon Carnell and Erica Segre, London 2015; Lee Smolin, *Time Reborn: From the Crisis in Physics to the Future of the Universe*, London 2015, 37–45.

[34] Cf. Burt C. Hopkins, *The Origin of the Logic of Symbolic Mathematics: Edmund Husserl and Jacob Klein*, Bloomington (Ind.) 2011; Joseph K. Cosgrove, *Review: The Origin of the Logic of Symbolic Mathematics: Edmund Husserl and Jacob Klein by Burt C. Hopkins*, in: Notre Dame Philosophical Reviews (2022), https://ndpr.nd.edu/reviews/the-origin-of-the-logic-of-symbolic-mathematics-edmund-husserl-and-jacob-klein/, as at 27 Aug 2024.

> sick that could be green or red, sour or sweet [...] nor any place for opposites such as hot and cold, moist and dry, or natural and violent.[35]

According to Husserl's 1936 magnum opus on *The Crisis of European Sciences,* this paradigm-shift might be summarized as follows: Subsequent to thinkers like Galilei and Locke human cognition appeared more and more as a form of algorithmic data processing. Even philosophical minority views, such as René Descartes's, were ultimately reinterpreted in line with this assumption:[36] Supposedly elementary "sensual data"—or related mental equivalents of elementary sensations[37]—were foisted on our lived experience, which in turn were conceptualized in terms of the "mathematical-physical", based on well-defined formal languages and calculating functions.[38] The result was an epistemic data rationalism that turned the refinement of measurement instruments and the increase in the effectiveness of measuring functions into an end in itself. When Maurice Merleau-Ponty finally warned of the advent of a science that "manipulates things and gives up living in them" while its "thinking deliberately reduces itself to a set of data-collecting techniques which it has invented"[39] this might still have been interpreted as a reaction to the positivist trends of the 1950s by *his* contemporaries. However, given the dataist mind-set of *contemporary* high-tech professionals and related transhumanist opinion leaders, such as Yuval Noah-Harari, Merleau-Ponty's warning has become depressingly true—whatever philosophically educated professionals of the declining academia might say to the contrary.[40]

4 The Intertwinement of Nature, Technics and Culture

According to Husserl the dataist revolution of early modernity provoked an unhealthy assimilation of human cognition to the way mindless, me-

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[35] Umphrey, *The Aristotelian Tradition*, 147.

[36] In contrast to the standard-reading of Descartes, the latter did not share the view that material things impinge on the mind from without. Cf. Jean-Luc Marion, *Sur la pensée passive de Descartes*, Paris 2013, 261–269.

[37] Cf. Charles Taylor, *Sources of the Self: The Making of the Modern Identity*, Cambridge 1992, 159–176.

[38] Cf. Edmund Husserl, *Die Krisis der europäischen Wissenschaften und die transzendentale Phänomenologie: Eine Einleitung in die phänomenologische Philosophie*, ed. by Walter Biemel (Husserliana, Bd. 6), The Hague [2]1956, 18–68, 233–235.

[39] Maurice Merleau-Ponty, *Eye and Mind*, in: idem, The Primacy of Perception, ed. by James M. Edie, Evanston 1964, 159–190, at 159.

[40] Josef Pieper has anticipated this crisis already in 1952, cf. Josef Pieper, *Was heißt Akademisch? Zwei Versuche über die Chance der Universität heute,* in: idem, Werke in acht Bänden, vol. 6: Kulturphilosophische Schriften, ed. by Berthold Wald, Hamburg 1999, 72–131.

chanical procedures of reasoning are supposed to work. However, as the trained mathematician pointed out based on genealogical observations, even mathematical reasoning has to be grounded in our pre-theoretical experience. It has to be rooted in noetic intuitions that illuminate the "life world" that we inhabit.[41] If we neglect this vital dimension of human cognition, our scientific reasoning will lose touch with the world that we inhabit—if it has not already done so.

In 1936 this diagnosis of crisis was only a topic of discussion among intellectual elites. This situation has changed in the wake of the technological innovations of the after-war period. The new situation has first been analyzed by Jacques Derrida back in the early 1960s based on a philologically thorough analysis of Husserl's fragmentary last writings.[42] According to this analysis, human acts of cognition are always entangled with the (writing-)technologies we use to articulate our thoughts. A mathematician who mechanically scribbles on paper to recall a theorem that has slipped his vital understanding relies on a culturally habitualised procedure of desedimentation. However, while this process enables him to reactivate the original "sedimented meanings" ("sedimentierten Bedeutungen"), the process of reactivation resists the passive "handling" ("Bewirtschaftung") of the relevant carriers of meaning, as already Husserl emphatically pointed out.[43] Derrida built on this observation when he argued in his later writings that Husserl's diagnosis of the problem of mechanical reasoning applies to anyone who tries to cultivate the craftwork of thinking. Our living understanding cannot be put on a seamless, uninterrupted footing. No vital cognition without relying on the dead time of mechanical repetitions! Yet, as the example of Leibniz's stepped reckoner shows, it is easy to confuse the living and the dead—up to the point at which we consider our own nature as an image of the inanimate technologies we use to investigate it. The nature we observe is always entangled with the technologies and fictions that we create in order to approximate its regularities. And this can lead to confusions as the cultural constructivism of our present time shows in disturbing ways. However, the relativist conclusions that American postmodernists drew from Derrida's work are hard to reconcile with the anti-relativist impetus that

[41] Cf. Husserl, *Die Krisis der europäischen Wissenschaften*, 105–194, 365–386.

[42] Cf. Jacques Derrida, *Edmund Husserl's "Origin of Geometry": An Introduction*, transl. with a preface by John P. Leavey Jr., ed. by David B. Allison, Lincoln 1989; idem, *Of Grammatology*, transl. by Gayatri Chakravorty Spivak, Baltimore 1976.

[43] Cf. Husserl, *Die Krisis der europäischen Wissenschaften*, 23f., 371–373.

connected it to Edmund Husserl's vision of a "rigorous science" up to his last breath.[44]

This will become more evident if we look at the most recent reception of post-phenomenological thinkers, such as Derrida and Foucault, in the context of the philosophical discussion on theoretical physics following Karen Barad. Barad deepens their philosophical insights based on a conceptually thorough und philologically well-grounded reinterpretation of Niels Bohr.[45] Typical representatives of the "Copenhagen interpretation" of quantum physics, like Werner von Heisenberg, have been rightly interpreted as scientific allies of a Kantian mindset. It is no accident that Heisenberg coined the technical term "uncertainty principle" to name the indeterminacy of quantum physical properties, such as momentum and position. The noun "uncertainty" suggests that technically mediated measurements limit or disturb our knowledge of the "thing-in-itself". However, although Bohr is usually lumped together with Heisenberg as representative of the Copenhagen School, the former did not use this terminology and this had philosophical reasons, as Barad has convincingly pointed out.[46] Bohr's interpretation of quantum-physics insisted, as it were, that indeterminacy is not a bug, but a feature: phenomena such as the complementarity of momentum and position do not reveal an epistemic limitation of our knowledge, but rather an *ontic* indeterminacy that is due to the fact that the nature we observe is always shaped by the technologies we use in order to observe it. This led Bohr to the conclusion that the "phenomena" physicists observe are not reducible to the "appearances" of *things*; rather the material arrangements and the scientific concepts that enable physicists to make their observations are irreducibly part of the phenomena they describe: "phenomena constitute a non-dualistic whole, so that it makes no sense to talk about independently existing things as somehow behind or as the causes of phenomena"[47].

Barad takes this point and goes one step further when she argues that our observations of nature are always shaped by human technology *and culture*. This move does not lead her to a postmodern constructivism. Her feminist agenda, which builds on the gender-sophism of Judith Butler, might suggest the opposite, but it would equally be possible to interpret

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[44] Cf., for example: Jacques Derrida, *Antwort an Apel*, in: Zeitmitschrift 3 (1987), 79–85; cf. also Johannes Hoff, *Spiritualität und Sprachverlust: Theologie nach Foucault und Derrida*, Paderborn 1999.

[45] Cf. Karen Barad, *Meeting the Universe Halfway: Quantum Physics and the the Entanglement of Matter and Meaning*, Durham 2007.

[46] Cf. ibid., 115–118, 125–128.

[47] Ibid., 427.

her integrative account of the relationship between nature, technology and culture as a new kind of naturalism or realism. This becomes more understandable if we translate Barad's holistic account of human knowledge into the complementary language of Max Scheler's anthropology, who approached the project of a holistic account of scientific practices under the auspices of a phenomenological analysis of biological milieus.[48]

What we encounter as nature is always shaped by the milieu that we inhabit and our interactions with our environment. Given that other animals inhabit also milieus, this wording makes immediately clear why our culturally and technically mediated interaction with our natural environment is not reducible to a kind of cultural constructivism. In line with Barad's interpretation of the "experimental metaphysics"[49] of contemporary quantum physics, a holistic account of scientific interactions with our natural environment could express this as follows: The artefacts and laboratories physicists create and the cultural formation that guides their attention are always *part of the nature* which they aim to observe.

The critical point of this triangular, simultaneously natural, technical and cultural account of scientific knowledge lies in the fact that it blocks the classical modern inclination to adopt a disengaged "view from nowhere" at the world that we inhabit. Pope Francis makes a similar point in his 2023 exhortation *Laudate Deum* when he questions the instrumental attitude of modern scientism, which reduces the world that we inhabit to a stock of resources: "Contrary to this technocratic paradigm, [...] we are part of nature, included in it and thus in constant interaction with it and thus 'we [do] not look at the world from without but from within'."[50]

According to Barad's "Ethics of mattering",[51] the last point is literary decisive, if we want to understand what we do, when we do empirical research: The intertwinement of nature, technology and culture decides the question of what "matters" when we investigate the unlimited potentials of "matter". Despite significant differences in terms of metaphysical background-assumptions,[52] the above-mentioned cosmologists Rovelli and Smolin come

[48] Cf. Max Scheler, *Der Formalismus in der Ethik und die materiale Wertethik: Neuer Versuch der Grundlegung eines ethischen Personalismus*, Halle (Saale) ²1921, 139–161.

[49] Barad, *Meeting the Universe Halfway*, 247–352.

[50] Apostolic Exhortation *Laudate Deum* of the Holy Father Francis to All People of Good Will on the Climate Krisis (4 Oct 2023), n. 25.

[51] Cf. Barad, *Meeting the Universe Halfway*, 353–396.

[52] Similar to Einstein, de Broglie, and Bohm, Smolin considers quantum-theory as a placeholder for a more fundamental theory that is consistent with an observer-independent "naïve realism" – as distinct from the "magic realism" of many world's interpretations of quantum physics and related, highly speculative "multiverse theories", cf. Lee Smolin, *Einstein's Unfinished Revolution: The Search for What Lies Beyond the Quantum*, London 2019. Smolin rightly

to a similar conclusion when they question the spatialized metaphysics of Galilei, Newton and Einstein, which involuntarily or voluntarily denied the phenomenon of temporality. We inhabit a temporalized universe in which unpredictable turns, transformations and events take place and attract our attention. Such a dynamic world cannot be observed at a distance and rationalized based on predetermined goal-functions, like the para-scientific "utility function"[53] of neoclassical economics which represents an almost archetypical example of the above instrumental attitude toward the world that we inhabit. Based on a detached rationalization of utilitarian goals, it nurtures the illusion that we can know what "matters" independent of our ongoing, value sensitive interaction with the world.[54] In this way, utilitarian calculations feed the modern belief that we can use our time and the things it has on offer to optimize the pursuit of predetermined intentions and goals. By contrast, if the world is, as Smolin expresses it, "a dynamic network of relationships [...] subject to evolution"[55], then we cannot act on the world in order to pursue goals without the world acting on us, thereby

argues that speculations about parallel universes are of no explanatory value as long as they cannot be related to our observable world. However, the "request that it [the universe] not contain two identical objects" (ibid., 191) is equally idle given that we cannot even imagine anything twice without repeating it in a non-identical way. Abstract reasonings (including the symmetries posited by physicists) are always second order approximations to the real world that we encounter, in which nothing is precisely identical, as Smolin agrees (cf. ibid., 114–123). Given this observation, it suffices to insist on the priority of the actual world against speculative possible worlds, as ontological realists like Thomas Aquinas and Nicholas of Cusa did. The world that we inhabit here and now is per definition distinct from the infinite possibilities it opens up. Consequently, Smolin's use of Leibniz's principles of sufficient reason and the identity of indiscernibles to preclude infinite copying appears as the upshot of an idle speculation. We do not need Leibniz' overly speculative principles to avoid the extremes of anarchy and stereotypical repetition. Rather, giving priority to our responsive intra-activity with the actual world enables us to support concepts of vital creativity, as Whitehead and Bergson did earlier. Pierre Hadot expressed this point in view of the premodern philosophical tradition as follows: "Bergson was able to revive the ancient instinct that it is indeed the poet who is most in tune with and who most discerns the fundamental shaping processes of nature herself." Pierre Hadot, *The Veil of Isis: An Essay on the History of the Idea of Nature*, transl. by Michael Chase, Cambridge (Mass.) 2006, 201. Barad comes closer to this tradition, but Smolin does not engage with her groundbreaking re-interpretation of Bohr. For a similar critique of Smolin, cf. John Milbank, *Religion, Science and Magic*, in: Peter Harrison / John Milbank (eds.), After Science and Religion: Fresh Perspectives from Philosophy and Theology, Cambridge 2022, 74–143; for a critical assessment of Leibniz' principle of the identity of indiscernibles, cf. also Hoff, *Why We Need Nicholas of Cusa*.

[53] Cf. Smolin, *Time Reborn*, 252–272.

[54] Calculations like these ignore that self-referential dynamic systems can stabilize in different equilibrium states, which in the case of economic systems are incomparable in terms of value ethics. Cf. Hilary Putnam / Vivian Walsh, *The End of Value-Free Economics: With Comments by Harvey Gram, Martha Nussbaum and Amartya Sen*, London 2012.

[55] Cf. Smolin, *Time Reborn*, 157: "One of our principles of a new cosmology stipulates that nothing could act without being acted on. So, if the network tells the particles how to move, shouldn't the network also change because of where the particles are? [...] The world is a dynamical network of relationships [...] subject to evolution."

affecting the meanings and values we attribute to matters that matter and the goals we decide to pursue based on this attribution. In contrast to the utilitarian philosophies of the industrial age, our engagement with the world and the meanings and values we attribute to its "furniture" are always entangled in recursive loops that limit the predictability of our intentions and goals.[56]

Contemporary discussions on Human Computer Interaction (HCI) and related discussions in Science and Technology Studies (STS) build on such holistic accounts of our interaction with our natural, cultural and technical environment, and lead to similar conclusions in terms of goal oriented intentional acts, as the example of "persuasive technologies" illustrates.[57] The expression "persuasive" is revealing, since it tells us something about how persuasive technologies have changed in digital societies. If an old-fashioned computer game seduced me to immerse in a virtual environment, the act of persuasion might still have been considered the upshot of a strategically determined intentional act that anticipated my interaction with this technical environment. If, by contrast, I am persuaded to do unexpected things by a large language model like Chat-GPT, the persuasive act is no longer reducible to the intentional acts of human persons. To be sure, contemporary AIs are not able to perform intentional acts. However, they can be designed to act as "influencers" with high levels of autonomy and thereby become actors that structure our decisions in unpredictable ways.

Phenomena like these have made us realize that even less sophisticated artefacts and objects can silently order, enable and mediate human activities in ways that blur the modern dichotomy between predictable objective facts and goal oriented intentional acts. Persuasive artefacts do not work like physical causal chains, which are indifferent to our intentional acts. Rather they remind us that the line between the soft power of rhetorical persuasion and the cold determinism of physical causation is always (and has always been) blurred. The HCI-scholar Christopher Frauenberger summarizes the philosophical discussion of this phenomenon, quoting the philosopher of technology and founder of the "actor network theory"

[56] Premodern thinkers, like Thomas Aquinas, were aware of this problem, when they emphasized that we can never conceptualize the ultimate telos that we pursue. For this reason, consequentialist readings of Aquinas, which project our modern, spatialized concept of temporality back into the teleological ontology of the Aristotelian tradition, lead us astray. Cf. Hoff, *Verteidigung des Heiligen*, 468–478.

[57] See, for example, the following video on the AI-Dilemma by Tristan Harris and Aza Raskin: https://www.youtube.com/watch?v=xoVJKj8lcNQ&ab_channel=CenterforHumaneTechnology, and Harris' earlier testimonial before US Congress: https://youtu.be/ZRrguMdzXBw

(ANT) Bruno Latour: "there exist 'many metaphysical shades between full causality and sheer inexistence', or in other words there is a wide spectrum from strong ordering to weakly structuring to not affecting action."[58]

In the wake of Galilei and Newton, modern philosophers like Kant tried to convince us that we can draw a sharp demarcation line between objective, value-neutral facts, which are governed by deterministic laws of nature and autonomous subjects who are ideally able to control their acts of cognition and will, and to persuade each other by the gentle force of arguments.[59] This dualism has remained unquestioned up to John McDowell's softened polarity between a "logical space of nature" and a "logical space of reasons".[60] Yet in truth, we are relational agents in a network of agents, and every attempt to draw a univocal demarcation line between objects and subjects, or deterministic causal chains and goal oriented intentional acts is a pragmatic idealization like the above "physics in the box". It might be useful if the occasion arises, but it is not universalizable, even not as a regulative idea in the Kantian sense of this expression.

Seen from this angle, the situation in which we are entangled by contemporary persuasive technologies is more similar to a Tyrolian farmer who is moved every morning to pious action by the encounter with a wooden statue of the virgin Mary. Artefacts like these or natural entities like trees and dogs have the magic power to make us act, because we are part of a world in which things face, move and transform each other based on emotions that change our interactions, thereby potentially leading to unexpected insights and sometimes even to profound changes of who we are. Against this background, it comes as no surprise that the speculative realist turn of contemporary philosophy, to which Barad can be assigned, has questioned the epistemological and transcendental-philosophical dogma that our emotionally charged interaction with our physical environment sets

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[58] Bruno Latour, *Reassembling the Social*: *An Introduction to Actor-Network-Theory*, New York 2005, 72 (quoted by Christopher Frauenberger, *Entanglement HCI The Next Wave?*, in: ACM Transactions on Computer-Human Interaction 27/1 [2020], art. nr. 2, 1–27, at 5).

[59] In the continental tradition, the first edition of the "Transcendental Analytic" of Kant's first *Critique* turned out to be epoch-making in terms of the concept of subjective spontaneity, despite its notorious vagueness. Cf. Immanuel Kant, *Critique of Pure Reason*, transl. by Norman Kemp Smith with a new introduction by Howard Caygill, Basingstoke [2]2003, A95–A110. Bernard Stiegler has critically reappraised this tradition, culminating in a concise deconstruction of Kant's text. Cf. Bernard Stiegler, *Technics and Time 1: The fault of Epimetheus*, transl. by Richard Beardsworth and George Collins, Stanford (Calif.) 1998, 239–379; idem, *Technics and Time 2: Disorientation*, transl. by Stephen Barker, Stanford (Calif.) 2009, 188–243; idem, *Technics and Time 3: Cinematic Time and the Question of Malaise*, transl. by Stephen Barker, Stanford (Calif.) 2011, 35–73, 169–224. Cf. also Hoff, *Enlightenment Now!*

[60] Cf. John McDowell, *Mind and World*, Cambridge (Mass.) 1996. For a critical assessment of McDowell's residual Kantianism, cf. Pickstock, *Aspects of Truth*, 64f., 142–148.

us apart from other creatures.[61] In contrast to the dualist metaphysics of classical modern epistemology, the human mind participates in patterns of sensing and mattering that intensify the relationships in which non-human objects always already stand.

5 Metaphysical Holism and the Analogy of Being

At this point it will be helpful to introduce three concepts, elaborated by Barad, that are in line with ANT and related speculative realist discussions, and shed light on the differing positions physical entities and artefacts can adopt in our world. We might start with the concepts of *intra-activity* and *agential cut*.[62] Seen from a new realist point of view, entities like trees and dogs or artefacts like cell phones or wooden statues are always part of a complex network of "agents" that constitute each other through relational *intra-actions*. Unlike the *inter-action* with a given object, *intra-actions* do not permit us to determine in advance who or what plays the part of the active "subject" and who or what plays the part of the passive "object". Instead, since every agent is embedded in a dynamic and open-ended network of agents, the boundaries that fix the *agential cut* between active subjects on the one hand and passive objects on the other are permanently and continually negotiated or, as I would express it in view of a less competitive anthropological use of this concept, "received as a gift".

To shed light on this negotiation process, Barad introduces a third concept that helps us to understand the moment in time when an agential cut becomes manifest: the concept of *diffraction*. Barad defines this concept in deliberate opposition to the modern concept of reflection, which was prominent in the post-Kantian and transcendental philosophical tradition.[63] The concept of reflection means "mirroring" since it assumes that subjective acts mirror a pre-given objective reality, based on concepts that are ideally supposed to represent the world without interfering with it. By contrast, the concept of *diffraction* means that the *cut* between the passively given and the acting parts of a configuration of *intra-acting* actors has the character of a temporal event. Strictly speaking, the outcome of such

[61] For an introduction, cf. Peter Gratton, *Speculative Realism: Problems and Prospects*, London 2014; Tom Sparrow, *The End of Phenomenology: Metaphysics and the New Realism*, Edinburgh 2014; Markus Gabriel, *Der Neue Realismus*, Frankfurt a. M. 2014.

[62] Cf. Barad, *Meeting the Universe Halfway*, 137–185.

[63] Cf. ibid., 369–396.

an event is never precisely determinable in advance—even if we neglect the philosophical discussion on human freedom and focus exclusively on physical intra-actions.

In line with the most recent discussion of the phenomenon of time in contemporary cosmology, which rejects Einstein's denial of temporality, these concepts allow Barad to unfold a holistic concept of physical phenomena. *Physical phenomena* have always the character of an initially undetermined whole that includes the physical observer, the instruments she uses and the natural and cultural environment that she inhabits. Yet Barad's language use is not sufficiently clear, as her use of the technical term "discursive field" (which was coined by Foucault) illustrates. Barad considers every physical event as part of a "discursive field" that decides in a process of complex "negotiations" about what "matters" when we engage with matter. However, expressions like "discursive field" and the recurring formula that matter "matters" are somewhat equivocal. Physical objects do not discuss and negotiate with each other or do attention exercises.

If we want to make use of Barad's linguistic innovations without getting stuck in the equivocations of new realist attempts to overcome the modern divide of nature and culture, it is indispensable to distinguish between different modes of being. Up to a certain point this distinction can build on the metaphysical tradition subsequent to Aristotle and Thomas Aquinas, as the phenomenological discussion on fundamental categories of being and the related analytic discussion on "natural kinds" has shown.[64] The relevant Aristotelian tradition distinguished between at least four levels of being: inanimate things like rocks, living beings like trees, spontaneous acting animals, and thinking animals that are able to discuss physical and philosophical problems. In her already mentioned, groundbreaking monograph *Aspects of Truth*, Catherine Pickstock has shown that it is possible to build a bridge between this tradition, saturated with real-life experiences, and the speculative realist turn of contemporary philosophy,

[64] Cf. Nicolai Hartmann, *Die Anfänge des Schichtungsgedankens in der alten Philosophie* (APAW.PH 1943/3), Berlin 1943; idem, *Der Aufbau der realen Welt: Grundriß der allgemeinen Kategorienlehre*, Berlin [3]1964; Helmuth Plessner, *Die Stufen des Organischen und der Mensch: Einleitung in die philosophische Anthropologie*, Berlin [3]1975; Umphrey, *The Aristotelian Tradition*; Thomas Nagel, *Mind and Cosmos: Why the Materialist Neo-Darwinian Conception of Nature ist Almost Certainly False*, Oxford 2012; Hoff, *Verteidigung des Heiligen*, 341–346. In contrast to the majority of contemporary speculative realists, Tristan Garcia makes room for a classical hierarchy. Cf. Tristan Garcia, *Form and Object: A Tratise on Things*, Edinburgh 2014, 155–438 (Book II); cf. also Pickstock, *Aspects of Truth*, 224–230.

in which Barad participates.[65] Since we cannot discuss the philosophical implications of this clarifying move in detail, I will confine myself here to illustrating the critical point in terms of Barad's equivocal language use.

In the premodern metaphysical tradition, it was assumed to be evident that expressions like "this mineral attribute matters", "this tree enjoys the sun", or "my dog loves me" are not reducible to "anthropomorphic" descriptions for purely mechanical phenomena. The expressive features of physical entities are undeniably more than human projections: They reveal the intrinsic goodness and beauty of physical entities. This explains why my dog is able to persuade me to go for a sunny afternoon walk, instead of a dutiful evening stroll, without turning me in a "predictably irrational" animal. Modern philosophers made a lot of contortions to explain such "appearances" (for example, as a kind of "reifying perception").[66] Yet this was an idle undertaking. Dogs or trees do not receive the meanings and value qualities, that turn them into value carriers, from autonomous "subjects" which are extrinsic to their physical nature. Rather they reveal our connaturality to their nature and show that we inhabit the same world. Consequently, the sunbath of a tree is no more anthropomorphic than human sunbathing is dendromorphic.

However, it would be misleading to say (without a trace of irony) "his wife loves him like his dog". Expressions that refer, depending on the context, either to the genus of animals or to the genus of persons are only analogically related. To mix them up would be to commit a logical error in the medieval, ontologically saturated sense of this word—a *metábasis eis állo génos*. As the philosophical tradition would have expressed it, the above two uses of the word "love" are neither univocal (like the expressions "coronavirus" and "Covid-19"), nor equivocal (like "world bank" and "river bank"), but analogical.[67] They share a kind of "family resemblance" but not a unified core of meaning. Even if we tried to conceptualize the phenomenon of "love" structurally, for example by defining it as "wanting the good for someone", it is not possible to define what "good" means in this definition irrespective of the relevant "genus" of being (here animals and persons). For this reason, properties, like "being", "true", "good", and "beautiful" and related or derivative properties like "love" were considered as "trans-generic": There is no substantial intersection of meaning that is

[65] Cf. Pickstock, *Aspects of Truth*, 176–230, 141–157

[66] Cf. Axel Honneth, *Reification: A Recognition-Theoretical View*, in: The Tanner Lectures on Human Values 26 (2005), 91–135.

[67] Cf. Erich Przywara, *Analogia Entis: Metaphysics: Original Structure and Universal Rhythm*, transl. by John R. Betz and David Bentley Hart, Grand Rapids (Mich.) 2014.

univocally applicable to all "generic" levels on which these terms might be used. Something similar could be said with regard to Barad's use of the derivative technical term "discursive field": We can observe preliminary stages of meaningful intra-actions on the level of purely physical actors because physical phenomena have shape properties that are *analogous* to the intra-actions between living or truth-seeking beings.

In my above-mentioned research on the anthropology of cognition, I have built on this analogical tradition, starting from Nicholas of Cusa, whose metaphysics preserved the ontological hierarchy just outlined.[68] This permitted me to evade the reductionist fallacies and equivocations of late-modern thinkers. However, apart from this ontological refinement, Cusa's ontological holism is compatible with the speculative realist turn of the 21st century, as Pickstock has pointed out in her critical evaluation of this discussion.[69] Barad's concept of diffraction is a further example of this partial convergence, as the following quotation of my above monograph makes clear: "The most elementary psycho-physical phenomena have [...] the character of holistic, performative events that preempt the distinction between subject and object as well as the unfolding of temporally and spatially differentiated perspectives on the world as a whole."[70]

In the case of Barad's holism, diffractive events that structure "discursive fields" do not presuppose the visual perception of living beings. However, the relevant phenomenon recurs on higher levels of the above ontological hierarchy, as Maurice Merleau-Ponty has pointed out.[71] Before I can think about my world, I am already senso-motorically involved with my bodily environment in a way that resonates harmoniously with my own lived body. Moreover, this connatural involvement has paradoxical features: It posits me in a visual field that is simultaneously *my* visual field and *inclusive* of me.

For example, when I give a lecture, I see that my students see me. I even see that they see me looking at them—in the same way as I am able to see bubbling water or a hard punch without decomposing my perception into its visible and its invisible (here tactile and auditive) components. The

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[68] Cf. Hoff, *Verteidigung des Heiligen*, 264–269.

[69] For Cusa's holistic ontology, cf. Johannes Hoff, *The Analogical Turn: Re-Thinking Modernity With Nicholas of Cusa*, Grand Rapids (Mich.) 2013; cf. also Pickstock, *Aspects of Truth*, 93, 110f., 212.

[70] Hoff, *Verteidigung des Heiligen*, 268 (transl. by J.H.).

[71] Cf. Maurice Merleau-Ponty, *The Visible and the Invisible*, ed. by Claude Lefort, transl. by Alphonso Lingis, Evanston (Ill.) 1968; Merleau-Ponty, *Eye and Mind*.

holistic features of this phenomenon do not change in the absence of human beings watching me, as Paul Cezanne realized in the late 19th century starting from the famous example of the Mont Ventoux:[72] The landscape looks at me and positions me in my own field of vision, thereby enabling me to see myself seeing. Merleau-Ponty considered this chiasmus of the visible and the invisible as decisive when he wrote in explicit contradiction to his Cartesian antipode Jean-Paul Sartre: "That which looks at all things can also look at itself and recognize, in what it sees, the 'other side' of its power of looking. It sees itself seeing; it touches itself touching; it is visible and sensitive for itself."[73]

In line with Barad's terminology, introduced above, we might summarize the change of perspective that this holistic ontology requires as follows: Instead of focusing on fictional "neutral objects", that are "reflected" by detached scientific observers, we need to focus on the triangle connecting *agential objects*, *agential subjects* and the *meaning* that emerges in the complex *intra-action* between open-ended *networks of agents* and become attentive to diffractive events that structure physical fields as a whole. This holistic ontology applies, albeit in an analogical way, to all levels of the hierarchy of being: from purely physical phenomena such as ambient light,[74] via elementary life processes and responsive acts of animal-perception, to linguistic or cognitive acts in which the light of human insight becomes diffracted.[75] In all these four cases we deal with an energetic whole that becomes diffracted or—as Nicholas of Cusa would have expressed it—contracted.

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[72] Cf. Maurice Merleau-Ponty, *Cézanne's Doubt*, in: The Merleau-Ponty Aesthetics Reader: Philosophy and Painting, ed. with an introduction by Galen A. Johnson and Michael B. Smith, Evanston (Ill.) 1993, 59–75.

[73] Merleau-Ponty, *Eye and Mind*, 162.

[74] As David Grandy has pointed out, our visible world is always immersed in a holistic sphere of illuminated surfaces that is more than its variously illuminated and colored parts. Albert Einstein still supported the early modern reification of light. However, given the central position of light in his geometry of space-time, there is no empirical warrant to assume that light is a dataist ray of moving photons, i. e. a collection of things like the things it permits to locate. We might see a beam of illuminated dust particles in the air, but no one has ever seen freestanding, pure light. Rather, light is the ambience that throws an environment into a state of illumination, thereby becoming visible only as scattered, contracted or (as Barad would express it) diffracted light. "[L]ight is not another thing in the world but is, visually speaking, expressive of the world – expressive of its large-scale structure or geometry." David Grandy, *Gibson's Ambient Light and Light Speed Constancy*, in: Philosophical Psychology 25 (2012), 539–554, at 549.

[75] I have discussed this holistic account of cognition more extensively in a simultaneously written text that partially overlaps with this essay. Cf. Johannes Hoff, *The Gift of Intelligence and the Sacramentality of Real Presence: Overcoming the Dataist Metaphysics of Modern Cognitivism*, in: Modern Theology 40 (2024), 921–947.

6 After Finitude: The Collapse of Modern Epistemology

Merleau-Ponty was presumably the first philosopher who anticipated that we are dealing here with a hierarchy of paradoxical totalities when he noticed that the counterintuitive features of modern physics are not counterintuitive in the phenomenological sense of this word.[76] The early Renaissance discussion on perspectivity and the subsequent, representationalist world-view of early modern scientists like Galilei and Descartes suggested that we can hide behind a screen as disembodied, invisible observers of a world in which we are not involved.[77] In this way, the epistemic break of early modernity instilled in us the far from intuitive prejudice that we inhabit a homogenous, three-dimensional Euclidean space that can be observed by an detached autonomous subject.[78] Today the very scientific tradition that enforced the emergence of this cultural imaginary encourages us to question its metaphysical presuppositions. Instead of confirming the inattentive cognitive habits of the modern "age of the world picture"[79], it draws our attention to the strangeness of our "perceived world".[80]

Consider, for example, the complementarity of horizon phenomena: If you look on your elevated index finger, you can focus on your finger or you can focus on your surrounding environment, but you can never see both of them sharply. Like in quantum physics the measuring operation is complementary. Yet this is not a bug but a feature: That I perceive a "horizon phenomenon" when I focus on my finger is not the upshot of a subjective illusion but an objective property of the relevant physical field. It is a feature of the whole "phenomenon" in the sense of Niels Bohr. Seen from this angle, the fact that conservative physicists like Heisenberg considered the strangeness of quantum-phenomena as a byproduct of our experimental interference in the untouched reality of objective facts was not indicative of their physical rigor, but of their attachment to the subject-object-dualism of early modern metaphysics. In the late 1950s Merleau-Ponty characterized

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[76] Cf. Merleau-Ponty, *The Visible and the Invisible*, 16–18; cf. also ibid., 130–155; Maurice Merleau-Ponty, *La Nature: Course Notes From the Collège de France*, transl. by Robert Vallier, Evanston (Ill.) 2003, 81–122; Steven M. Rosen, *Bridging the "Two Cultures": Merleau-Ponty and the Crisis in Modern Physics*, in: Cosmos and History 9 (2013), 1–12.

[77] Cf. Johannes Hoff, *The Analogical Turn: Re-Thinking Modernity With Nicholas of Cusa*, Grand Rapids (Mich.) 2013, 44–57; Merleau-Ponty, *The Visible and the Invisible*, 210.

[78] Cf. Johannes Hoff, *Iconicity and the Anamorphosis of Social Space: Retrieving Nicholas of Cusa's Political Pneumatology*, in: Guido Vergauwen / Andreas Steingruber (eds.), Veni, Sancte Spiritus! Theologische Beiträge zur Sendung des Geistes (FS Barbara Hallensleben), Münster 2018, 424–470; Hoff, *The Analogical Turn*, part II.

[79] Cf. Heidegger, Martin. *Die Zeit des Weltbildes*, Frankfurt a. M. 1963.

[80] Cf. Merleau-Ponty, *La Nature*, 100: "Physics destroys certain prejudices of philosophical and non-philosophical thought […] [and] leads us to become aware of the perceived world."

this conservative attachment as follows, starting from a short enumeration of four physical paradoxes that were discussed in his time—the quantum-phenomena of complementarity, superposition (properties without carriers), entanglement (collective beings) and non-locality:

> The microphysical field is considered as a macroscopic field of very small dimensions, where the horizon phenomena, the properties without carriers, the collective beings or beings without absolute localization, are by right only 'subjective appearances' which the vision of some giant [would reduce to] the interaction of absolute physical individuals. Yet this is [...] to think them in the perspective of the in itself, at the very moment when there is a suggestion to renounce that perspective.[81]

This quotation leads us to the critical point of our attempt to deconstruct the cultural imaginary that undergirded (and still undergirds) the tradition of modern scientism and the failed attempts of the dominant strands of 20th century philosophy to overcome the modern "myth of the given". The modern concept of epistemology and related concepts of transcendental philosophy were governed by the idea that we can develop a conceptually precise, controlled account of our subjective access to the reality of observer neutral facts—up to the point at which physicists felt themselves forced to postulate that the "hard sciences" approximate a Kantian thing "in itself" that cannot be watched, given that "we cannot watch non-interference without interfering"[82]. By contrast, the above quantum-phenomena are "a suggestion to renounce that perspective": the emergence of undetermined, more or less paradoxical phenomena reveals an *ontic* feature of the world that we inhabit.

Seen from this angle, the subject-object dualism of early modern epistemologies might be considered as the byproduct of a temporarily successful attempt to prevent paradoxical phenomena from emerging. To begin with this had the methodologically beneficial effect of keeping metaphysical speculations about borderline phenomena, which blur the distinction between visible finite and invisible, indefinite or infinite realities, outside when we deal with the objects of "hard sciences". However, as leading representatives of the speculative realist turn of the 21st century confirm in various ways: it has become hard to draw clear and distinct boundaries if we take into consideration that we are not detached observers of a "physics in the box". The classical modern idea that we can clearly demarcate the boundaries that separate the visible realm of "hard sciences" from meta-

[81] Merleau-Ponty, *The Visible and the Invisible*, 16f.
[82] I owe this elegant formulation to one of my unknown peer reviewers.

physical speculations about the invisible is today not questioned by clerics but by the achievements of late-modern science, set-theory and logic.[83] If we take this seriously, we have to admit that Kant's project of drawing critical boundaries in order to "make room for faith"[84] has lost its formerly unquestioned credibility. It may seem fantastic or narrow-minded,[85] but we can no longer take for granted that human beings perceive themselves as "finite creatures"—although this does not make the situation easier in theological terms.[86]

As Pickstock has pointed out in her evaluation of this discussion, we have to reckon with a break-down of clear-cut logical boundaries wherever we have to do "with the interference of infinite recursion upon the finite, which is true also of finite reality itself, outside logical operation"[87]. The last point is decisive, if we want to recover a realist *ontology*: The recursive principle does not only apply to theoretical second-order considerations about scientific facts or mathematical sets of sets but also to finite facts, objects or substances and (*pace* Markus Gabriel[88]) to the world as a whole.

In the case of Merleau-Ponty's phenomenology of our perceived world, the paradoxical enclosure of our perceptual field was the archetypical example of such a recursive paradox: My visual field is centered on me as an embodied observer who is visible to others, yet I am simultaneously aware of the only partially visible field as a whole, including my (invisible) visibility to others. However, as indicated, the late Merleau-Ponty did no longer confine his research to pre-theoretical life-world experiences. Rather, by drawing our attention to the fact that similar paradoxes can be observed in subhuman spheres, such as in mathematically precise natural sciences, he started to question the modern dualism between "soft" and "hard sciences".

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[83] Cf. Quentin Meillassoux, *After Finitude: An Essay on the Necessity of Contingency*, transl. by Ray Brassier, London 2008. For a critical discussion of Meillassoux's rationally unwarranted attempts to evade the logical paradoxes that emerge when boundaries become blurred cf. Pickstock, *Aspects of Truth*, 192–202.

[84] Cf. Kant, *Critique of Pure Reason*, B XXX: "I have therefore found it necessary to deny knowledge, in order to make room for faith."

[85] Cf. Søren Kierkegaard, *The Sickness Unto Death: A Christian Psychological Exposition for Edification and Awakening by Anti-Climacus*, transl. by Alastair Hannay, London 1989.

[86] Cf. Hoff, *Verteidigung des Heiligen*, 505–508.

[87] Pickstock, *Aspects of Truth*, 93.

[88] Gabriel's famous thesis that the world does not exist – i. e. that a field of all fields of sense cannot appear in a particular field – is a consequence of his dogmatic use of the principle of non-contradiction. Cf. Filippo Casati / Naoya Fujikawa, *Against Gabriel: On the Non-Existence of the World*, in: Sara Bernstein / Tyron Goldschmidt (eds.), Non-Being: New Essays on the Metaphysics of Non-Existence, Oxford 2021, 69–81; cf. also Pickstock, *Aspects of Truth*, 218–224.

According to Merleau-Ponty, the twisted spaces of mathematical topology are exemplary for the paradoxes we run against if we face the scientific transformations of our time with ontologically alert eyes.[89] In more recent times the Klein bottle, which plays a significant role in contemporary physics, has been discussed as a typical example of such a paradox.[90] Similar to a Möbius loop, which is simultaneously turned to its inner and outer side, the Klein bottle is a vessel that is simultaneously open and closed—comparable to a water bottle that is contained in the water that it contains. Twisted objects like these are revealing because their structure is at odds with the modern metaphysics of space. This becomes evident if we compare them with ordinary geometric objects like a cube, a sphere or a donut. The shape of a donut is consistent with the Euclidian space of early modern painters and philosophers, like Leonardo da Vinci and Descartes: We can draw a clear distinction between its inner and outer side. Topological objects like the Klein bottle offend against this rule, although it is always possible to sidestep their paradoxical character in their mathematical description.[91] As with the proverbial "extra epicycles" of premodern cosmology, it is always possible to continue the dogmatic principles of an older world view. However, the re-emergence of analogous structures in our perceived world challenges evasive mathematical conventions and invites us to take seriously that we are dealing here with a recurring paradoxical structure of the hierarchically stratified universe as a whole.

7 Rethinking the Paradox: The Idolatrous Roots of Western Nihilism

The significance of the challenge to rethink *Gestalt*-paradoxes of this type will become more evident, if we take into consideration that paradoxical enclosures were already known in the pre-modern tradition. It might even be argued that the re-emergence of paradoxical structures in our present-

[89] In contrast to the Euclidian space, "[t]he topological space […] [is] a milieu in which are circumscribed relations of proximity, of envelopment, etc. […] that the regressive thought runs up against […]. It is encountered not only at the level of the physical world, but again it is constitutive of life, and finally it founds the wild principle of Logos – It is this wild or brute being that intervenes at all levels to overcome the problems of the classical ontology (mechanism, finalism, in every case: artificialism)." Merleau-Ponty, *The Visible and the Invisible*, 210f.

[90] Cf. Rosen, *Bridging the "Two Cultures"*, 11–14.

[91] As Rosen notes, the classical mathematical analysis of the above paradoxical structure sidesteps its potential to question the conventions of the modern metaphysics of space (cf. ibid.). However, this is part of the challenges modern sciences have to face, as he has demonstrated in more comprehensive publications on the above topology.

time draws our attention to the presumably most momentous break in the prehistory of modern nihilism: the emergence of a scientific culture that idolatrously divinized abstract organizing principles of the universe in the delusive assumption that it can evade the paradox as long as it deals with visible, finite objects.

In terms of the theological "genealogy of nihilism"[92] the most decisive break can be traced back to the turn of the 14th century, as has become evident subsequent to the more recent French speaking research on the history of late medieval philosophy and theology.[93] In the anglophone discussion the related research on Duns Scotus has been made prominent by Catherine Pickstock and John Milbank.[94] However, the latter overemphasized the significance of Duns Scotus's revision of the analogical ontology of Thomas Aquinas, outlined above, in a disputable way. Strictly speaking, Scotus's revision of Aquinas's analogical ontology was nothing but a follow-up problem. It was a consequence of a technical innovation: Subsequent to Duns Scotus, the Western tradition started subordinating the being of God to a standardized, univocal use of the law of non-contradiction.

Arguably, this innovation turned the formalized use of logical rules into a super-divine idol. Yet the introduction of this innovation had, to begin with, a startlingly simple technical reason:[95] Duns Scotus claimed that we need a univocal concept of being in order to make sure that the existence of God can be proofed with the help of logical syllogisms.[96] Scotus's famous postulate that the concept of "being" must be univocally applicable to creatures and to God was a logical presupposition of this move. Yet we

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[92] Conor Cunningham, *Genealogy of Nihilism: Philosophies of Nothing and the Difference of Theology*, London 2002.

[93] Cf. in particular Olivier Boulnois, *Être et représentation: Une généalogie de la métaphysique moderne à l'époque de Duns Scot (XIIIe–XIVe siècle)*, Paris 1999; idem, *Métaphysiques rebelles: Genèse et strucures d'une science au Moyen Âge*, Paris 2013.

[94] Cf. Catherine Pickstock, *Duns Scotus: His Historical and Contemporary Significance*, in: Simon Oliver / John Milbank (eds.), The Radical Orthodoxy Reader, London 2009, 116–148; John Milbank, *Beyond Secular Order*, Hoboken 2014, part I. Cf. also Johannes Hoff, *Review: Beyond the Secular Order: The Representation of Being and the Representation of the People by John Milbank*, in: Modern Theology 32 (2016), 379–383.

[95] As Catharina Duthil Novaes has pointed out, the formalistic reification of logical procedures of decision-making was considered highly problematic in the Aristotelian tradition. Even late medieval nominalists would have had problems with the modern practice of reducing logic to a formal discipline that refrains from the material content of linguistic statements. Cf. Catarina Duthil Novaes, *The Different Ways in Which Logic Is (Said to Be) Formal*, in: History and Philosophy of Logic 32 (2011), 302–332.

[96] Cf. John Duns Scotus, *Ordinatio*, 14 vols., vol. 2: liber primus, distinctio prima et secunda, ed. by Pacifico M. Perantoni and Carolus Baliæ, Vatican City 1950, I, d. 3, pars 1, q. 2, n. 26: „[U]nivocum conceptum dico qui ita est unus quod ejus unitas sufficit ad contradictionem affirmando et negando ipsum de eodem, sufficit etiam pro medio syllogistico, ut extrema unita in medio sic uno sine fallacia aequivocationis concludantur inter se uniri".

can leave open the question to what extent this innovation was in the forefront of his metaphysical rebellion. However his biographers might answer this question, his standardized use of logical syllogisms required him to postulate that the concept of being has to apply univocally both, to contingent created beings, which might exist or not, and the being of God, which is contradictorily opposed to non-being and in this sense (according to Duns Scotus) logically necessary. Hence, the "necessary being" of God was considered to be univocally definable, namely by its contradictory opposition to the absolute impossibility of non-being.

Logical exercises like these are compatible with the pantheism of the tradition of German idealism,[97] but they are incompatible with more orthodox thinkers like Denys the Areopagite and Thomas Aquinas. The latter subordinated the opposition of being and non-being to the *hyperessential* being of God. God, as the cause of being, was considered to be beyond being and nothing. Consequently, being was at best analogically predicable of God.

In contrast to this sapiential tradition, the simultaneously logical and metaphysical rebellion of Duns Scotus marked the genealogical turning point where theoretical speculations about logical possibilities and necessities, comparative possibilities or preference-decisions with regard to "theoretical possibilities" became more important than our intellectual intuition of the actual world that we inhabit. Scotus scholars might object that the doctor subtilis resisted the trends that his discourse-technological innovations had set in motion. Yet we can leave this question open as well. Suffice it to emphasize that technology assessment was not Duns Scotus's strength and that this had far-reaching consequences, as the use of modalist discourse-technologies in the following centuries shows.

Seen from a more traditional point of view, there is no need to discuss speculations about possibilist "theory options"—let alone "possible

[97] In contrast to the apophatic tradition, Schelling, for example, accepted a coincidence of contraria, but not a coincidence of contradictoria. This allowed him to apply the principle of identity to God. Creatural antagonisms are transcended here only in relation to their intentional content (their "essence") which is accessible to our cognition, but not in terms of their existence as opposed to their non-existence. Cf. Manfred Frank, *Reduplikative Identität: Der Schlüssel zu Schellings reifer Philosophie*, Stuttgart 2018, 172–180. This explains, according to Franks disputable reading of Schelling, the latter's proximity to Sartre's existentialism: "Existential being (actuality, being-there) precedes possibility (essence or being-what) […]. 'L'existence précède l'essence' […]: this is the thesis on which what we subsequently called 'existential philosophy' is based, which is rightly attributed to the late Schelling" (ibid., 199). According to this reading, Schelling's God is a mysterious x that transcends *only* our judgemental knowledge of predicatively qualified contrarieties, such as the contrariety between physical and mental phenomena and the related subject-object opposition, but not their *existence*. His "absolute being" represents an undetermined third, which can be defined formally in terms of the law of non-contradiction as something that is opposed to the absolute impossibility of "not-being".

worlds"—as long as we are not faced with justified doubts about the pretheoretical evidences that govern our theoretical reflections about the real world that we inhabit, such as the evidence that there is an ontological difference between inanimate and living beings.[98] In line with Aristotle, sapiential thinkers like Aquinas would have considered it absurd "to 'prove' things more evident by appeal to things less evident"[99]. Disputes about "options" that chart competing expert-pictures of the world can replace our first order experience only at the cost of an authoritarian disempowering of our engaged, pretheoretically informed judgement. The most dramatic philosophical consequences of the above epistemological break are related to this point: Our *being* as spiritual animals was no longer experienced as inherently related to the *real world* that we inhabit; our pretheoretical ability to recognize the paradoxical features of meaningful *Gestalt*-phenomena lost its realistic anchoring and appeared as a mere "theory option"—however much thinkers like Duns Scotus might have insisted that this was the right theory.

The scope of this initially inconspicuous historical break becomes strikingly evident if we look at exponents of the next generation of Franciscan thinkers, such as William of Ockham, whose nominalism paved the way to the dataism of Galileo Galilei. Once we have taken the first step and subordinated God to a scholastically standardized, univocal use of the law of non-contradiction, Ockham's second step becomes almost irresistible.[100] A simple handbook sentence might suffice to illustrate this point: "This is a man" (*iste est homo*). According to the *Gestalt*-ontology of the Aristotelian tradition, which captured our pretheoretical experience on the descriptive level, this sentence has two intrinsically related meanings:

1. This man is an instantiation of the *essential set* of man.
2. The essence of humanity is *inherent* in this man—that is, it is a "continuant" that changes and yet remains the same over time, as contemporary biological and ethological research on human and animal cognition confirms.[101]

We are meanwhile familiar with this paradox. The water of our essential being is contained (inherent) in the bottle of this man, and the bottle is contained in its essential water (the set of human things). However, since

[98] Cf. Hoff, *Verteidigung des Heiligen*, 332–340.
[99] Umphrey, *The Aristotelian Tradition*, 84.
[100] For the following, cf. Kurt Flasch, *Die Metaphysik des Einen bei Nikolaus von Kues: Problemgeschichtliche Stellung und systematische Bedeutung* (SPAMP 7), Leiden 1973, 84–104.
[101] Cf. Umphrey, *The Aristotelian Tradition*, 7–14, 107–117, 239–243.

Ockham takes Scotus's rebellion for granted, paradoxical enclosures are no longer theoretically admissible. They are incompatible with the above, standardized use of the law of non-contradiction. Hence, we have to deny the existence of universals and related *Gestalt*-phenomena or reduce universals to ontologically indifferent classificatory terms.

To be sure, Ockham knew better than anyone that theologians have to cope with what he considered to be a flagrant offence against the law of non-contradiction: The divine essence, which contains Father, Son and Spirit, is inherent in the Father, and the Son, and the Spirit, although they are not identical. But this paradox appears now as an inexplicable mystery that can be kept outside when we deal with individualized finite items. It has been reduced to a supernatural exception from the universal rules of reasoning. We are forced to confess this miracle, due to the authority of thescripture and the fathers, but it is no longer possible to make sense of it.[102] Hence Ockham is exemplary for the two most important features of modern nihilism: the fetishization of standardized, formal principles, and the readiness to accept authoritarian, more or less arbitrary exceptions from the rule, if something does not fit into the formalist framework of abstract "theory options".

8 Rethinking the Premodern Tradition of Radical Orthodoxy

Against this background, it is not surprising that philosophically more rigorous and theologically more radical orthodox thinkers, like Meister Eckhard, opposed the rebellion of their contemporaries. Without saying anything substantially different from Denis the Areopagite and his Paris predecessor Aquinas, Eckhart emphasized the paradoxical features of the Christian concept of God. This becomes most evident one century later with Nicholas of Cusa's famous teaching on the "coincidence of opposites". According to Cusa's *docta ignorantia* nothing was more delusive than the demand of "Aristotelian sects" (*Aristotelica secta*)[103] to misuse the name of God as the middle term of a syllogism. However, contrary to misrepresentations in modern handbooks, Cusa did not admit exceptions from or

[102] Vgl. Flasch, *Die Metaphysik des Einen*, 88: „Eine einzige Ausnahme von seiner Regel lässt Ockham zu, die Trinität. Sie bietet zwar dem philosophischen Denken eine Schwierigkeit, die der eines realen Universale genau entspricht: Die göttliche essentia ist die paternitas und die filiatio, dennoch sollen paternitas und filiatio nicht real identisch sein. Doch zu diesem Widerspruch zwinge die Lehre der Schrift und der Väter."

[103] Cf. Nicholas de Cusa, *Apologia doctae ignorantia* (Opera omnia 2), ed. by Raymond Klibansky, Leipzig 1932 (online: https://cusanus-portal.de/), 6,5 (lib. II, n. 7).

offences against the law of non-contradiction. To the contrary, he insisted that it is universally valid and concluded that, for this very reason, it cannot be used in a univocal way. The most revealing example of this thesis is the law of non-contradiction itself, which normally keeps contradictories apart. If we apply this law to itself, contradictories do no longer contradict each other. Rather the contradictories give way to *Gestalt*-principles that transcend the scope of rule governed rational calculations which move back and forth between opposites.[104]

This is the background of Cusa's famous claim that God is to be found not only "beyond" contraries but even beyond the coincidence of *contradictions*.[105] The critical point of this logic might become clearer if we consider contemporary discussions on paraconsistent and dialethic logics, such as in Graham Priest.[106] If we do not tolerate arbitrary restrictions on the use of the principle of non-contradiction, we have to admit that it applies to everything including, for example, the set of all sets that do not include itself—like in the case of the Barber who shaves all those and only those who do not shave themselves. As is known, our Barber is simultaneously outside and inside of the set of those to be shaved. Modern mainstream logic tries to sidestep such paradoxes by introducing conventions that prevent them from coming up. Yet, as Priest has pointed out, there is no

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[104] Cf. Nicholas of Cusa, *Directio speculantis seu De li non aliud* (Opera omnia 13), ed. by Ludwig Baur and Paul Wilpert, Leipzig 1944, 47,6f. (c. 19, n. 89): "[I]n contradicentibus contradictionem esse contradicentium contradictionem […]." For the following, cf. Johannes Hoff, *Kontingenz, Berührung, Überschreitung: Zur philosophischen Propädeutik christlicher Mystik nach Nikolaus von Kues*, Freiburg i. Br. 2007, 148–178.

[105] Cf. Nicholas de Cusa, *De visione dei* (Opera omnia 6), ed. by Heide Dorothea Riemann, Leipzig 2000, 34f. (c. 9, n. 37,5–12). Cusa's position is also illuminating in terms of contemporary discussions on the principle of identity. Similar to the above interpretation of quantum physics, Cusa insisted that we can only *conjecture* about the identity of contingent entities. Everything is in a non-identical state of flux. Cf. Egil A. Wyller, *Identität und Kontradiktion: Ein Weg zu Cusanus' Unendlichkeitsidee*, in: MFCG 15 (1982), 104–120; Jean-Michel Counet, *Mathématique et dialectique chez Nicolas de Cues*, Paris 2000, 96. Consequently, we can speak about contingent entities only in semantically *and* ontologically approximate ways. Nothing is *absolutely* identical. By contrast, the absolute is not an application case of this principle. Were we *transcend* the contingent fluctuations of created identities, we encounter a trinitarian God, who is not only beyond numbering, but also beyond (logical) positing and ablation, affirmation and negation. Cf. Nicholas de Cusa, *Directio speculantis seu De li non aliud*, 13 (c. 5, n. 19). For the more recent discussion on the principle of identity in quantum physics, cf. Steven French, *Identity and Individuality in Quantum Theory*, in: The Stanford Encyclopedia of Philosophy (2024), https://plato.stanford.edu/entries/qt-idind/, as at 28 Aug 2024.

[106] Graham Priest, *Beyond the Limits of Thought*, Oxford 2003. And with regard to the convergences of Eastern and Western traditions, cf. idem, *One: Being an Investigation Into the Unity of Reality and of Its Parts, Including the Singular Object Which Is Nothingness*, Oxford 2014. For a thorough evaluation of Priest that is in line with the above reading of Cusa, cf. Pickstock, *Aspects of Truth*, 69, 93–95, 231–240. In terms of the critical difference between Christian and Buddhist readings of the mystical paradox, cf. also Hoff, *Kontingenz, Berührung, Überschreitung*, 196–232.

need to do so. The set of all sets is just another example of a paradoxical inclusion. Similar to the Klein bottle, the containing set is simultaneously inside and outside of the limits that define the set—it is contained and not contained or neither contained nor not contained.

In Cusa's time the univocal use of the principle of non-contradiction already had the character of a widespread scholastic convention. This situation exacerbated subsequent to the early modern marginalization of the phenomenon of temporality. The Aristotelian formulation of the principle of non-contradiction still had a time index that would have allowed its univocal application to a supratemporal being only at the price of a grammatical violation of the rules.[107] By contrast, the modern denial of temporality in the name of the fiction of a formalized "logical space" encouraged the solidification of the above convention into a dogma that could be applied indifferently without attention to grammatical borderline cases—with disastrous consequences for the modern (miss-)conception of supratemporal phenomena which were regarded more and more as suprarational *superaddita*. Priest was one of the first modern logicians who broke with this rationally unjustified convention in the late 1990s, thereby returning to the philosophically more rigorous and spiritually more serious state of discussion that shaped thinkers like Eckhart and Cusa.

According to the tradition that culminates in Cusa, we are not justified to offend against the law of non-contradiction or to limit its scope based on arbitrary axiomatic conventions. However, if we apply this principle consistently it will transcend the limits that it normally sets up: Similar to the Klein bottle, it appears simultaneously inside and outside of the enclosure that it erects by defining limitations. According to Cusa, this is precisely the point where the human strive for scientific knowledge turns into a wisdom of unknowing. If scientists start to pretend that the paradox can be sidestepped, they will become trapped in arbitrary abstractions that usurp the position of the ultimate organizing principle of human reason. And this will be the starting point of a culture of carelessness with regard to the use of scientific knowledge, as pointed out at the beginning of this essay in view of the modern Cartesian machine. The highest organizing principle turns into a reliabilist idol.

Søren Kierkegaard was presumably the first modern rationalists to insist on the scientific significance of this problem. In his diaries he writes that reason should honour faith (*pistis*). "Faith is the skill with regard to the

[107] Cf. Hoff, *Why We Need Nicholas of Cusa*.

paradox"[108]. If the boundaries of rule-based knowledge cannot be defined based on apriori rules or conventions, we need this skill—otherwise reason will become hollow and inflated. In the relevant diary entry Kierkegaard refers in passing to the 12th century philosopher-theologian Hugh of Saint Victor. This is revealing, given that Hugh's disciple Richard of Saint Victor developed one of the most concise definitions of the orthodox concept of God. According to this definition, each person of the trinity is simultaneously unique and incommunicable in its existence *and* communicating the fullness of the one, common being of the Godhead.[109] In other words, each person *is* uniquely him- or herself by *being beyond* him- or herself.

According to Richard, this has a simple biblical reason: "God is love" (1 John 4:8).[110] The fullness of divine being is nothing but self-donating love that uniquely gives itself away such that the three "persons" together are no more than a unique, undivided mode of self-donation, being not numerically three but one beyond number (as in Augustine).[111] Every divine hypostasis is completely one with itself precisely insofar as it manifests the essence of divine love as a whole, being simultaneously in and beyond itself.[112] The same ecstatic structure can be discovered in the Christian concepts of light and intellect, following Nicholas of Cusa,[113] and the concept of life, as Carmody Grey has pointed out most recently in her critical evaluation of the metaphysical foundations of contemporary biosciences.[114]

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[108] Cf. Søren Kierkegaard, *Die Tagebücher: Eine Auswahl*, transl. and ed. by Hayo Gerdes, Düsseldorf 1980, 336f.: „Das Christentum, welches bei den Begriffen des natürlichen Menschen immer das unterste zu oberst kehrt und das Gegenteil herausbekommt, lässt pistis sich auf das Unwahrscheinliche beziehen. Dieser Begriff des Unwahrscheinlichen, des Absurden, sollte dann entwickelt werden; denn es ist nur Oberflächlichkeit zu meinen, das Absurde […] begreife allerhand absurda gleichermaßen in sich. Nein, der Begriff des Absurden ist eher der, dass man begreift, es könne und solle nicht begriffen werden. […]. Doch das versteht sich, schafft man den ‚Glauben' völlig ab […] so wird die Vernunft eingebildet, und dann schließt sie vielleicht: also ist das Paradox Unsinn. […]. Aber der Glaube ist der Kundige in Bezug auf das Paradox. Er glaubt das Paradox; und nun kann, um an jenes Wort Hugos de St. Victore zu erinnern, die Vernunft wohl bestimmt werden, den Glauben in Ehren zu halten […]. Die menschliche Vernunft hat Grenzen; da liegen die negativen Begriffe. Der Grenzstreit ist negativ, zurückdrängend."

[109] Cf. Richard of Saint Victor, *On the Trinity*, transl. and comm. by Ruben Angelici, Cambridge 2012, 146f. (c. IV, n. 6).

[110] Cf. ibid., III.

[111] Cf. Aurelius Augustinus, *De Trinitate Libri XV* (CCSL 50–50A), vol. 1, Turnhout 2018, lib. VII, c. 6.

[112] This apophatic dimension of the orthodox *Credo* has been lost in the tritheistic tendencies of contemporary theology. With regard to the anglophone branches of this *Holzweg*, cf. Karen Kilby, *Perichoresis and Projection: Problems With Social Doctrines of the Trinity*, in: NBf 81 (2000), 432–445; Matthew Levering, *Friendship and Trinitarian Theology: Response to Karen Kilby*, in: IJST 9 (2007), 39–54.

[113] Cf., for example, Nicholas of Cusa, *De apice theoriae* (Opera omnia 12), ed. by Raymond Klibansky and Hans Gerhard Senger, Hamburg 1982, 122f. (n. 8).

[114] Cf. Grey, *Theology, Science, Life*, 153–240.

Light, *Life,* and *Love* are three Johannine instantiations of the ultimate organizing principle of our being, living and thinking. In his monograph *No God, No Science?*, on which Grey builds, Michael Hanby has recapitulated the paradoxical features of this highest organizing principle—in line with the patristic metamorphosis of Greek natural philosophy[115]—as follows:

> Richard of St Victor […] argued […] the fullness of being […] must by definition include the fullness of goodness. The fullness of goodness, which is diffusive or generous by its very nature, must include the fullness of charity, absolute self-donation forever and without remainder. And the fullness of charity can only come to fruition when the lover and beloved transcend themselves and enjoy their love with a third […]. [Y]et each of the persons fully and completely is these attributes and this being such that each is the whole of the divine essence. One considered "alone" is no less than two together […]. [T]o say that each of the persons […] *is* love is to say that the persons are constituted as such precisely *as* acts of delf-donation, self-reception and delight and thus precisely as relations to one another.[116]

Zusammenfassung: Die digitale Transformation erinnert an die Grenzen deduktiv-regelbasierten Wissens und führt uns zurück zu den idolatriekritischen Wurzeln der abrahamitischen Tradition. Moderne Wissenschaftler mögen religiös indifferent sein. Doch es ist heute schwieriger als je zuvor, sich auf wissenschaftliche Denksysteme zu verlassen, ohne sich an ultimative Konstrukte zu binden, die den Idolatrieverdacht religiöser und weisheitlicher Traditionen wachrufen. Dieser Beitrag baut auf der spekulativ-realistischen Wende zeitgenössischer Philosophie und damit konvergierenden Diskussionen in der „radikal orthodoxen" Tradition auf. Ausgehend vom anthropologischen Dreieck von Natur, Technik und Kultur wird eine Metaphysik eingeführt, die das einende Zentrum rationalen Erkennens als konstitutiv theologische Dimension unseres wissenschaftlichen und vorwissenschaftlichen Weltverhältnisses begreift. Die immanentistische Idee eines „wissenschaftlichen Naturalismus" hat ihre Glaubwürdigkeit verloren.

Schlagwörter: Digitalisierung, Metaphysik, Wissenschaftstheorie, Neuer Realismus, Naturalismus, Ideologiekritik, Radikale Orthodoxie

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[115] Cf. Jaroslav Pelikan, *Christianity and Classical Culture: The Metamorphosis of Natural Theology in the Christian Encounter With Hellenism*, New Haven 1993.

[116] Michael Hanby, *No God, No Science? Theology, Cosmology, Biology*, Oxford 2013, 314f. This article was written as part of the research project "4E Cognition in Theological Anthropology", funded by the Austrian Science Fund (FWF), 10.55776/P36322. I would like to thank the two unknown reviewers of this essay for their thoughtful feedback on the manuscript.