



Kant,¹ Scientific Pietism, and Scientific Naturalism

Kant, Pietismo Científico e Naturalismo Científico

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¹ For convenience, I refer to Kant's works internally, that is, infratextually in parentheses. The citations include both an abbreviation of the English title and also the corresponding volume and page numbers in the standard "Akademie" edition of Kant's works: *Kants gesammelte Schriften*, edited by the Königlich Preussischen (now Deutschen) Akademie der Wissenschaften (Berlin: G. Reimer [now de Gruyter], 1902-). For references to the first *Critique*, I follow the common practice of giving page numbers from the A (1781) and B (1787) German editions only. Because the Akademie edition contains only the B edition of the first *Critique*, I have also consulted the following German composite edition: *Kritik der reinen Vernunft*, ed. W. Weischedel, Immanuel Kant Werkausgabe III (Frankfurt: Suhrkamp, 1968). For references to Kant's *Reflexionen*, i.e., entries in *Kants handschriftlicher Nachlaß* — which I abbreviate as 'R' — I give the entry number in addition to the Akademie volume and page numbers. The translations from the *Reflexionen* are my own. I generally follow the standard English translations of the German texts, but have occasionally modified them where appropriate. Here is a list of the abbreviations and English translations of the works cited.

CPJ - *Critique of the Power of Judgment*. Trans. P. Guyer and E. Matthews. Cambridge: Cambridge Univ. Press, 2000.

CPR - *Critique of Pure Reason*. Trans. P. Guyer and A. Wood. Cambridge: Cambridge Univ. Press, 1997.

CPrR - *Critique of Practical Reason*. Trans. M. Gregor. In: *Immanuel Kant: Practical Philosophy*. Cambridge: Cambridge Univ. Press, 1996. p. 133-272.

DS - "Concerning the Ultimate Ground of the Differentiation of Directions in Space". In: *Immanuel Kant: Theoretical Philosophy, 1755-1770*. Trans. D. Walford and R. Meerbote. Cambridge: Cambridge Univ. Press, 1992. p. 361-372.

DSS - "Dreams of a Spirit Seer Elucidated by Dreams of Metaphysics". In: *Immanuel Kant: Theoretical Philosophy, 1755-1770*. p. 301-359.

GMM - *Groundwork of the Metaphysics of Morals*. Trans. M. Gregor. In: *Immanuel Kant: Practical Philosophy*. p. 37-108.

MFNS - *Metaphysical Foundations of Natural Science*. Trans. J. Ellington. Indianapolis, In: Bobbs-Merrill, 1970.

OP - *Opus postumum*. Trans. E. Förster and M. Rosen. Cambridge: Cambridge Univ. Press, 1993.

ProI - *Prolegomena to Any Future Metaphysics*. Trans. G. Hatfield. Cambridge: Cambridge Univ. Press, 2004.

Rel - *Religion within the Boundaries of Mere Reason*. Trans. A. Wood and G. di Giovanni. Cambridge: Cambridge Univ. Press, 1998.

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Abstract

The doctrine of *Kantian natural piety* says that rational human animals are essentially at home in physical nature. In this essay, I apply the doctrine of Kantian natural piety directly to the *natural sciences*, and especially physics, by showing how they have a cognitive, epistemic, metaphysical, practical/moral, aesthetic/artistic, religious, and sociocultural/political grounding in Kantian sensibility, both pure and empirical. This is what I call *Kantian scientific pietism*, and it is to be directly and radically opposed to *scientific naturalism*.

Keywords: Kant. Philosophy of science. Natural piety. Scientific pietism. Scientific naturalism.

Resumo

A doutrina da Piedade Natural Kantiana afirma que animais racionais humanos são essencialmente pertencentes à natureza física. Neste ensaio, aplico a doutrina da piedade natural kantiana diretamente às ciências naturais, e especialmente à física, demonstrando como elas estão fundadas em uma sensibilidade kantiana cognitiva, epistêmica, metafísica, prática/moral, estética/artística, religiosa e sociocultural/política, tanto pura quanto empiricamente. Isto é o que denomino de Pietismo Científico Kantiano e é direta e radicalmente oposto ao naturalismo científico.

Palavras-chave: Kant. Filosofia da ciência. Piedade natural. Pietismo científico. Naturalismo científico.

[T]wo things fill the mind with ever new and increasing admiration and reverence, the more often and more steadily one reflects on them: *the starry heavens above me and the moral law within me*. I do not need to search for them and merely conjecture them as though they were veiled in obscurity or on the transcendent region beyond my horizon; I see them before me and connect them immediately with the consciousness of my existence.
(CPrR 5: 161-162)

It is quite certain that we can never adequately come to know the organized beings and their internal possibility in accordance with merely mechanical principles of nature, let alone explain them; and this is so certain that we can boldly say that it would be absurd for humans to make an attempt or to hope that there could ever arise a Newton who could make comprehensible even the generation of a blade of grass according to natural laws that no intention has ordered; rather we must absolutely deny this insight to human beings. (*CPJ* 5: 400)

After days and nights of incredible labour and fatigue, I succeeded in discovering the cause of generation and life; nay, more, I became capable of bestowing animation upon lifeless matter.... I see by your eagerness, and the wonder and hope which your eyes express, my friend, that you expect to be informed of the secret with which I am acquainted; that cannot be; listen patiently until the end of my story, and you will easily perceive why I am so reserved upon that subject. I will not lead you on, unguarded and ardent as I then was, to your destruction and infallible misery. Learn from me, if not by my precepts, at least by my example, how dangerous is the acquirement of knowledge, and how much happier that man is who believes his native town to be the world, than he who aspires to become greater than his nature will allow.

M. Shelley²

My heart leaps up when I behold
 A rainbow in the sky:
 So was it when my life began;
 So is it now I am a man;
 So be it when I shall grow old,
 Or let me die!
 The Child is father of the Man;
 And I could wish my days to be
 Bound each to each by natural piety.

W. Wordsworth³

² M. Shelley, *Frankenstein; Or, the Modern Prometheus*, 1818 edn., available online at URL = <<http://www.rc.umd.edu/editions/frankenstein/>>, vol. 1, ch. 3.

³ W. Wordsworth, "My Heart Leaps Up," available online at URL = <<http://www.poets.org/poetsorg/poem/my-heart-leaps->>.

Introduction: Kantian pietism

Pietism was a European reformist religious movement of the 17th and 18th centuries, whose central emphasis was on religious feeling or sensibility, direct religious experience of the holy, and experiential faith, as the cognitive and practical grounds of religion and theology. Kant was raised in the Pietist tradition, but strongly rejected its mystical fideism, its dogmatic noumenal theology, and its sociocultural/political coercive moralism⁴.

Nevertheless, Kant retained a small-p but still fundamentally *pietistic* idea in his Critical philosophy, namely his thesis that all theoretical cognition, scientific knowledge, practical cognition and practical motivation, including specifically moral cognition and moral motivation, aesthetic cognition, artistic cognition, religious cognition, and sociocultural/political cognition are all primitively grounded on the faculty or innate mental power of *sensibility* (*Sinnlichkeit*), in a broad sense that includes our capacities for sense perception, imagination, feeling, desire, emotion, and volition.

This small-p pietistic way of thinking about Kant's theory of cognition, epistemology, and metaphysics in particular is what I have called *Kantian Non-Conceptualism*⁵, and correspondingly, this small-p pietistic way of thinking about Kant's ethics and practical philosophy in particular is what I have called *Kantian Non-Intellectualism*⁶. Moreover,

⁴ See, e.g., (*DSS* 2: 315-373), (*CPR* A567-704/B595-732), and (*Rel* 6: 151-202).

⁵ See, e.g., R. Hanna, "Kant and Nonconceptual Content," *European Journal of Philosophy* 13 (2005): 247-290; R. Hanna, "Kantian Non-Conceptualism," *Philosophical Studies*, 137 (2008): 41-64; R. Hanna, "Beyond the Myth of the Myth: A Kantian Theory of Non-Conceptual Content," *International Journal of Philosophical Studies*, 19 (2011): 323-398; R. Hanna, "Kant's Non-Conceptualism, Rogue Objects, and the Gap in the B Deduction," *International Journal of Philosophical Studies*, 19 (2011): 399-415; R. Hanna, "Kant's Theory of Judgment," *The Stanford Encyclopedia of Philosophy* (Fall 2013 Edition), E. N. Zalta (ed.), available online at URL = <<http://plato.stanford.edu/archives/fall2013/entries/kant-judgment/>>, supplement 1; R. Hanna, "Kant, Hegel, and the Fate of Non-Conceptual Content," *Hegel Society of Great Britain Bulletin* 34 (2013): 1-32; R. Hanna, "Blind Intuitions, Rogue Objects, and Categorical Anarchy" (Unpublished MS., Spring 2015 version), available online at URL <https://www.academia.edu/12100538/Blind_Intuitions_Essentially_Rogue_Objects_and_Categorical_Anarchy_Spring_2015_version_comments_welcomed_>; and R. Hanna, *Cognition, Content, and the A Priori* (Oxford: Oxford Univ. Press, 2015), ch. 2.

⁶ See R. Hanna, "Sensibility First: From Kantian Non-Conceptualism to Kantian Non-Intellectualism" (Unpublished MS, Spring 2015 version), available online at URL = <https://www.academia.edu/11942928/Sensibility_First_From_Kantian_Non-Conceptualism_to_Kantian_Non-Intellectualism_Spring_2015_version_comments_welcomed_>.

in order to give this new, unified approach to the interpretation of Kant's theoretical and practical philosophy a single, easy-to-remember label, I have called it the *Sensibility First* approach⁷.

As applied to the philosophy of nature and natural science, Kant's small-p pietism entails the anti-mechanistic, anti-physicalist (including both reductive and non-reductive physicalism), and natural-dynamicist (as opposed to ontological-vitalist or property-vitalist/supervenient-emergentist) epistemological, metaphysical, aesthetic/artistic, practical/moral, religious, and sociocultural/political attitude of *Kantian natural piety* towards nature itself, and also towards the natural sciences⁸.

Roughly speaking, and put in terms of the history of 17th, 18th, and early 19th century ideas, Kantian natural piety, as I am conceiving it, is what you get when (i) you start out with Spinoza's pantheistic monistic metaphysics of *deus sive natura* in the *Ethics*, i.e., the one universal dual-aspect substance that is the weak disjunction of god-or-nature, and classical Pietism, then (ii) rigorously apply the Critical philosophy and transcendental idealism to Spinozist pantheism and Pietism alike, then (iii) fuse that Critically-filtered result with Critically-filtered versions of the nature-romanticism and natural-religion-without-god-or-the-church of Rousseau, Byron, Percy Shelley, Mary Shelley, Coleridge, and Wordsworth, and then finally (iv) round it all off with Critically-filtered versions of Rousseau's, William Godwin's, and Mary Wollstonecraft's radical liberationist political philosophies⁹.

⁷ See Hanna, "Sensibility First: From Kantian Non-Conceptualism to Kantian Non-Intellectualism."

⁸ See R. Hanna, "Kant, Natural Piety, and the Limits of Science," (Unpublished MS, Fall 2015 version), available online at <https://www.academia.edu/17038961/Kant_Natural_Piety_and_the_Limits_of_Science_Fall_2015_version_comments_welcomed_>.

⁹ Christopher Bertram correctly notes that Rousseau's political philosophy is implicitly committed to "a posteriori philosophical anarchism"; correspondingly, if I am correct, then via his ethics, his writings on enlightenment, and his philosophy of religion — although *not* via his official political philosophy, which is statist — Kant is implicitly committed to a priori philosophical and political anarchism alike. See C. Bertram, Bertram, Christopher, "Jean Jacques Rousseau," *The Stanford Encyclopedia of Philosophy* (Winter 2012 Edition), E.N. Zalta (ed.), available online at URL = <<http://plato.stanford.edu/archives/win2012/entries/rousseau/>>; and R. Hanna and A. Chapman, *Kant, Agnosticism, and Anarchism: A Theological-Political Treatise* (Unpublished MS, Fall 2015 version), available online at URL = <https://www.academia.edu/15300656/Kant_Agnosticism_and_Anarchism_A_TheologicalPolitical_Treatise_Fall_2015_version_comments_welcomed_>. As to the Shelleys, Godwin, and Wollstonecraft: the connections-of-influence here are closely personal, as well as intellectual.

Otherwise and more briefly put, Kantian natural piety is Kant's transcendental-philosophical *Sentimental Journey*¹⁰, standing in essential complementarity with his *Copernican Revolution*.

In any case, what I want to do in this paper is to apply the doctrine of Kantian natural piety directly to the *natural sciences*, and especially physics, by showing how they have a cognitive, epistemic, metaphysical, practical/moral, aesthetic/artistic, religious, and sociocultural/political grounding in Kantian sensibility, both pure and empirical.

This is what I call *Kantian scientific pietism*, and it is to be directly and radically opposed to *scientific naturalism*, by which I mean the philosophical doctrine consisting of (i) universal deterministic or indeterministic natural mechanism¹¹, (ii) physicalism (whether reductive or non-reductive), and above all (iii) scientism, including (iiia) epistemic empiricism (whether classical empiricism, as per Locke, Hume, and Mill, or radical Quinean empiricism), (iiib) the Lockean epistemological "underlaborer" conception of the relation between natural science and philosophy, such that philosophy is the underlaborer of the sciences¹², which is also re-affirmed in Sellars's mid-20th century slogan that "science is the measure of all things,"¹³ and (iiib) the Baconian and Cartesian technocratic ideology according to which, as natural

Mary Shelley was married to Percy Shelley, also the daughter of Godwin and Wollstonecraft, and conceived the basic idea of *Frankenstein* on a visit to Byron's villa on Lake Lemman, near Geneva, in 1816.

¹⁰ See Laurence Sterne's eponymous novel, published in 1768, the same year as Kant's breakthrough proto-Critical essay, "Directions in Space." The "Directions in Space" essay, in turn, is essentially linked, by way of its basic philosophical content, to Kant's inaugural dissertation and the transcendental aesthetic. See R. Hanna, "Directions in space, non-conceptual form, and the foundations of transcendental idealism". Unpublished MS, Spring 2015 version. Available at: <https://www.academia.edu/12100555/Directions_in_Space_Non-Conceptual_Form_and_the_Foundations_of_Transcendental_Idealism_Spring_2015_version_comments_welcomed_>.

¹¹ For a detailed formulation, critique, and rejection of universal natural mechanism, see R. Hanna. *Deep freedom and real persons: a study in metaphysics*. Unpublished MS, Fall 2015 version. Available at: <https://www.academia.edu/14493090/Deep_Freedom_and_Real_Persons_A_Study_in_Metaphysics_Fall_2015_version_comments_welcomed_>, esp. chs. 2, 4, and 5.

¹² See J. Locke. *Essay concerning human understanding*. Oxford: Oxford Univ. Press, 1975. "Epistle to the Reader."

¹³ See W. Sellars, "Empiricism and the Philosophy of mind". In: SELLARS, W. *Science, perception, and reality*. New York: Humanities Press, 1963, p. 127-196, at p. 173.

scientists, we are “the lords and masters of nature”¹⁴. As the direct and radical philosophical opponent of scientific naturalism, Kantian scientific pietism entails the denial and rejection of natural mechanism, physicalism, and scientism alike.

In a word, Kantian scientific pietism entails a *thoroughly sensible approach to natural science*, in both basic senses of ‘sensible’, i.e., (1) essentially having to do with the complex faculty for sensibility, and (2) expressing a fundamentally healthy and sane common sense, hence it is consistently pro-natural-science, but without natural mechanism, physicalism, or scientism. In view of the deep, seemingly irreversible, and indeed hegemonic sociocultural/political and ideological connection between modern and contemporary natural science, the military-industrial complex, mastery-of-nature technology, global corporate capitalism in the post-Cold War age of neoliberalism, and the apocalyptic threat of permanent eco-disaster (whether by nuclear holocaust, biochemical holocaust, slow-moving global-warming-driven disasters, or whatever), it is not going too far to claim that the future of humanity itself is closely bound up with the philosophical fate of Kantian scientific pietism and natural piety¹⁵.

How to ground natural science on sensibility

The thesis of Kantian Non-Conceptualism says (i) that not all of the intentional or representational contents of our cognition are either necessarily or sufficiently determined by our conceptual capacities, housed in the understanding or *Verstand*, and (ii) that on the contrary, at least some of the intentional/representational contents of our cognition are both (iia) *concept-autonomous* = they are not necessarily

¹⁴ See, e.g., F. Bacon, *Novum Organum*, available online at URL = <<https://archive.org/stream/baconsnovumorgan00baconoof#page/n3/mode/2up>>; and R. Descartes, *Discourse on the Method of Rightly Conducting One's Reason and Seeking the Truth in the Sciences*, in R. Descartes, *The Philosophical Writings of Descartes*, 2 vols., trans. J. Cottingham et al. (Cambridge: Cambridge Univ. Press, 1984), part 6, p. 142/AT VI, 62.

¹⁵ See, e.g., B. Olivier, “Nature, Capitalism, and the Future of Humankind,” *South African Journal of Philosophy* 24 (2005): 121-135, available online at URL = <<http://www.tandfonline.com/doi/abs/10.4314/sajpem.v24i2.31420>>.

determined by our conceptual capacities = their existence and specific character are determined by our non-conceptual capacities housed in sensibility without any concepts whatsoever, e.g., the cognitions of pre-linguistic human children and other non-rational human cognizers, and non-human animals, and also (iib) *concept-independent* = they not sufficiently determined by our conceptual capacities = their existence and specific character are necessarily underdetermined by any and all concepts — e.g., our cognition of “incongruent counterparts” (*DS* 2: 378-383), and our cognition of the temporal ordering of the spontaneously-chosen, “entirely arbitrary” (*ganz beliebig*) subjective sequence of perceptions in inner sense (*CPR* A193-197/B238-243).

Indeed, as regards the point about the concept-independence of inner sense, in the Introduction to *Metaphysical Foundations* Kant explicitly denies that there could ever be a naturally mechanistic science of psychology (*MFNS* 4:471), because orderings in inner sense cannot be arithmetized, i.e., they cannot be reduced to primitive recursive functions like addition, subtraction, and so-on, i.e., they cannot be denumerably quantified or counted. If orderings in inner sense cannot be arithmetized, then they cannot be fully or objectively conceptualized either, since as the Axioms of Intuition and Anticipations of Perception show, arithmetization in terms of either extensive quantity or intensive quantity, i.e., in terms of natural or rational numbers, is a necessary condition of the application of objective science to nature (*CPR* A162-176/B202-218).

Now Kantian Non-Conceptualism closely corresponds to what I call *transcendental idealism for sensibility*¹⁶: necessarily, the manifestly real world that we cognize in an essentially non-conceptual way through sensory intuition or *Anschauung* structurally conforms to the specific formal character of our faculty for sensibility.

More precisely, then, transcendental idealism for sensibility says that the authentically apparent or manifestly real world fundamentally conforms to the essentially non-conceptual a priori forms of human sensibility, our representations of space and time.

¹⁶ See Hanna, “Directions in Space, Non-Conceptual Form, and the Foundations of Transcendental Idealism.”

Kant worked out explicit proofs for transcendental idealism for sensibility in the Inaugural Dissertation and again in the Transcendental Aesthetic in the first *Critique*.

The simplest version of the proof, provided in the Transcendental Aesthetic, goes like this:

Space and time are either (i) things in themselves, (ii) properties of/relations between things in themselves, or (iii) transcendently ideal.

If space and time were either things in themselves or properties of/relations between things in themselves, then a priori mathematical knowledge would be impossible.

But mathematical knowledge is actual, via our pure intuitions of space and time, and therefore really possible.

Therefore, space and time are transcendently ideal (*CPR* A 23/B37-38, A38-41/B55-58).

There is, of course, much more that can and should be said about this highly controversial argument. What is most crucial for our purposes here, however, is that this version of transcendental idealism relies *only* on essentially non-conceptual content and the nature of human sensibility, and *neither* relies on concepts and the nature of human understanding, *nor* does it entail that the authentically apparent or manifestly real world necessarily conforms to our concepts and the nature of human understanding.

Now what about natural science, and in particular, physics? In *Kant, Science and Human Nature*, part 1, I argue that for Kant, natural science knows the manifestly real essences of authentic appearances, given in direct perception, via natural science's synthetic a priori knowledge of the general and specific causal laws of nature, which in turn track strongly modal intrinsic spatiotemporal and dynamic structures of objects of actual or really possible human experience. Let us call this *scientific manifest realism*, or *scientific empirical realism*, as opposed to scientific noumenal realism, e.g., scientific essentialism.

In *Kant, Science, and Human Nature*, part 2, I also argue for the claim that Kant defends the primacy of practical reason over the theoretical reason, and in particular, *categorical epistemology*, i.e., non-instrumentally

normative and perfectionist epistemology¹⁷. According to Kant's categorical epistemology, as he spells it out in the Introduction to the *Metaphysical Foundations of Natural Science*, authentic science, including both a priori knowledge of the truths of mathematics and a priori knowledge of the most general causal laws of nature, is *synthetic a priori knowledge with objective certainty*, grounded on rational insight or *Einsicht*, and all such knowledge is in turn a categorically normative achievement, and a "perfection" of our normally more or less imperfect cognitive activity, by means of the transcendental imagination.

If Kantian Non-Conceptualism, Kantian transcendental idealism for sensibility, Kantian scientific manifest realism, and Kantian categorical epistemology are all true, then natural science is cognitive-semantically, metaphysically, and epistemically grounded on sensibility in the Kantian sense.

Sensible science I: natural science without mechanism

According to what I call *Kant's anti-mechanism*¹⁸, there is a fundamental ontological and metaphysical difference between (i) *natural mechanisms*, i.e., deterministic, mechanistic processes in nature, and (ii) *natural purposes*, i.e., spontaneous, teleological, self-organizing, living organismic processes in nature, including *mental* processes, all of which are *also* self-organizing, living, organismic processes:

[L]ife is the subjective condition of all our possible experience (*Prolegomena* 4: 335).

[T]he mind is for itself entirely life (the principle of life itself) (*CPJ* 5: 278).

¹⁷ I defend a contemporary Kantian version of categorical epistemology in *Cognition, Content, and the A Priori*, esp. chs. 3 and 6-8. Interestingly, and only 235 years later, contemporary analytic philosophers are now also rediscovering categorical epistemology. See, e.g., C. Littlejohn, "The right in the good: a defense of teleological non-consequentialism in epistemology". Available at: <https://www.academia.edu/16904384/The_Right_in_the_Good_A_Defense_of_Teleological_Non-Consequentialism_in_Epistemology>.

¹⁸ See R. Hanna, "Kant's anti-mechanism and Kantian anti-mechanism". *Studies in History and Philosophy of Biological and Biomedical Science* 45 (2014). Available at: <<http://www.sciencedirect.com/science/article/pii/S1369848614000107>>; and also Hanna, "Kant, natural piety, and the limits of science" section 2.

But although natural science can and actually does know natural mechanisms, it *cannot* know natural purposes:

It is quite certain that we can never adequately come to know the organized beings and their internal possibility in accordance with merely mechanical principles of nature, let alone explain them; and this is so certain that we can boldly say that it would be absurd for humans to make an attempt or to hope that there could ever arise a Newton who could make comprehensible even the generation of a blade of grass according to natural laws that no intention has ordered; rather we must absolutely deny this insight to human beings (*CPJ* 5: 400).

Hence, according to Kant in the second half of the third *Critique*, although natural science cannot know the difference between natural mechanisms and natural purposes, it must also investigate nature *as if there were a such a difference between them*, as a regulative Idea for the purposes of a coherent and progressive natural-scientific investigation of nature.

Now although this “regulative” (hypothetical-practical) conception of natural purposes is not “constitutive” (assertoric-theoretical), nevertheless it also directly entails the synthetic a priori subjunctive conditional truth that necessarily, *if* natural purposes *were to exist*, then universal natural mechanism *would be* false.

But since Kantian Non-Conceptualism is true, we can also advance from Kant’s necessary subjunctive conditional thesis to a corresponding assertoric thesis that I call *Kantian anti-mechanism*¹⁹.

According to Kantian anti-mechanism, although natural science cannot *know* either natural purposes or the difference between natural mechanisms and natural purposes, nevertheless we human cognizers can and actually do also have *veridical essentially non-conceptual cognition of natural purposes*, by means of the “feeling of life” in our aesthetic experience of the beautiful and the sublime in nature (*CPJ* 5: 204).

Therefore natural purposes actually exist in manifestly real nature, because *we* actually exist in manifestly real nature, and because *we veridically feel our own life* and *we are living organisms*: therefore not

¹⁹ See note 18 above.

everything in authentically apparent or manifestly real nature is a natural mechanism.

Now since we actually exist in authentically apparent or manifestly real nature, and we are natural purposes, and since it is *not only* the case, (i) according to the third section of the *Groundwork of the Metaphysics of Morals*, that we must conceive ourselves under a regulative Idea of our own free agency and act as if we were transcendently and practically free, and also *not only* the case (ii) according to the third Postulate of Pure Practical Reason in the *Critique of Practical Reason*, that we must have moral faith (*Glaube*) in our freedom, but ALSO the case, (iii) according to the “Fact of Reason” in the second *Critique*, that we have a direct essentially non-conceptual awareness of our own freedom.

Therefore, according to what I have called *Kant’s biological theory of freedom*²⁰ and have also called his *Embodied Agency Theory* of free will and practical agency, in chapter 8 of *Kant, Science and Human Nature*, then transcendental, practical, and autonomous freedom really and truly exist in the manifestly real world, as biological facts about our own lives, at the source of our self-determining, creative agency.

More specifically, just as conscious, intentional, affective, desiderative, volitional mind is essentially a mechanistically/deterministically and physicalistically *irreducible* form of life, so too our self-determining, creative, deeply free agentive sourcehood is essentially a mechanistically/deterministically and physicalistically irreducible form of life. Or in other words, according to Kant’s biological theory of freedom and Embodied Agency Theory of free will and practical agency, Kant is an anti-mechanistic *source incompatibilist*.

Now according to Kant in the first Critique and in the *Metaphysical Foundations of Natural Science*, matter is essentially a nomologically-governed totality of dynamic attractive and repulsive forces.

Moreover, in the unfinished *Transition from the Metaphysical Foundations of Natural Science to Physics* project contained in the *Opus postumum*, Kant argues in the so-called “Aether Deduction” that an a priori *material* condition of the possibility of experience is an actual

²⁰ See R. Hanna, “Freedom, Teleology, and Rational Causation,” *Kant Yearbook* 1 (2009): 99-142.

material correlate of the supersensible substrate, i.e., the universal dynamic aether, as the unified totality of attractive and repulsive forces, as the dual causal source of inert matter (natural mechanisms) and also natural purposes (living organisms) alike (*OP* 21: 206-233).

Kant's universal dynamic aether is, in effect, what we would now call "fields of force" or "energy flows." Indeed, viewed in this retrospective light, with 20-20 philosophical hindsight, it is clear that Kant's dynamic aether theory is fully compatible with contemporary quantum field theory, *modulo* the standard competing interpretations of the quantum phenomena and quantum mechanics.

In turn, the universal dynamic aether minimally obeys the Conservation Laws and Turing-computability, in the sense that it is universally compatible/consistent with the Conservation Laws, and also the basic constraints of Turing-computability, in that it can be simulated post hoc on a universal Turing-machine, given a complete set of discrete physical "digits" over which computation occurs, and holding all the general laws of nature fixed; and to the extent that natural processes are necessarily nomologically determined by the Conservation Laws, together with all the settled quantity-of-energy facts about the past, and also Turing-computable from those laws and facts, then those processes are natural mechanisms.

Nevertheless, just because X is metaphysically compatible/consistent with Y, it does NOT follow that Y necessarily determines X. Therefore, just because a natural process in the universal dynamic aether is metaphysically compatible/consistent with the Conservation Laws and Turing-computability, it does NOT follow that it is a natural mechanism.

A natural process in the universal dynamic aether is a natural mechanism if and only if it is necessarily determined by the Conservation Laws, together with all the settled quantity-of-energy facts about the past, and Turing-computable from those laws and facts. Or in other words, any natural process within the dynamic aether is a natural mechanism if and only if it is *inherently governed by* the Conservation Laws and Turing-computable algorithms.

But if the existence and specific character of any given natural process within the universal dynamic aether are minimally *in conformity with* the Conservation Laws and Turing-computability, then it need not be a natural mechanism. Indeed, it is really possible for that natural process to be a natural purpose, while still minimally obeying the Conservation Laws and the basic constraints of Turing-computability, i.e., post hoc simulation on a universal Turing-machine, given a complete set of discrete physical “digits” for computing over, and holding all the general laws of nature fixed.

A natural purpose, via its spontaneity, therefore, does *not* bring more matter or energy into the world, which would violate the Laws: on the contrary, it only brings *irreducibly new and uncomputable self-organizing forms of the universal dynamic aether* into the world, which is still minimally in conformity with the Conservation Laws, and post hoc simulation on a Turing-machine.

It increases the amount of structural “information” in the world in an uncomputable way, but does not increase the amount of matter or energy. This in turn suggests a Kantian anti-mechanist advertising slogan: *Reverse entropy!: just do it.*

Like an artistic genius, who “gives the law to nature,” spontaneous natural purposes, including especially including free minded animal intentional agents, *creatively self-organize*, but they are not *causa sui*.

We already know from the first section of the *Groundwork* that there is a categorical distinction between (i) choice and action that is minimally *in conformity with* the Categorical Imperative, and (ii) choice and action that is *inherently governed by* the Categorical Imperative.

Therefore the distinction between (i*) natural processes that are minimally *in conformity with causal natural laws*, and (ii*) natural processes that are *inherently governed by causal natural laws*, is simply a theoretical-nomic Kantian generalization of that Kantian practical-nomic distinction.

In any case, in the *Opus postumum*, as we just saw, according to Kant, the universal dynamic aether is *also* the synthetic a priori real metaphysical ground of organismic life, mind, and freedom, insofar as the irreducible structures of organismic life, mind, and freedom emerge in intrinsic-relational orientable space and through intrinsic-relational irreversible time.

Because the metaphysical grounding of life, mind, and freedom in the universal dynamic aether is synthetic a priori and based on natural purposes in intrinsic-relational orientable space and intrinsic-relational irreversible time, then, over and above their compatibility/consistency with the Conservation Laws and post hoc Turing-simulation, this is what I call *dynamic emergence*, as opposed to *supervenient emergence*, which, sharply unlike dynamic emergence, is inherently *insensitive* to manifest essence, spatiotemporal asymmetry, and spatiotemporal spread/duration, and also *fully open* to either physicalist reduction (logical supervenience) or causal-explanatory exclusion/epiphenomenalism (nomological supervenience)²¹.

In dynamic emergence, novel irreducible structure is *immanently integrated* with existing simpler structures, in essentially the same way that the irreducible but inherently more complex systems of the real numbers and complex numbers occur *between* the systems of the rational numbers and natural numbers, not “over and above” the rational numbers and natural numbers²².

By sharp contrast, superveniently emergent properties, as extrinsic properties, merely metaphysically “pop out” of their supervenience-bases, and dualistically-epiphenomenally exist “over and above” those bases.

Notice that in the mathematical analogy, Turing-computability operates via the primitive recursive functions characteristic of the rational and natural number systems: therefore Turing-computation *runs on top of* the novel integrated complex and real number structures, which are the deeper, “mathematically efficacious” structures. Or in other words, Turing-computation is “mathematically epiphenomenal” in relation to the complex and real number structures.

Hence, by analogy, in dynamic emergence it's the simpler pre-emergent natural processes and structures that are dualistic-epiphenomenal in the new complex thermodynamic system, “running on top of” everything else, NOT

²¹ See R. Hanna and M. Maiese, *Embodied Minds in Action* (Oxford: Oxford Univ. Press, 2009), ch. 8.

²² I owe this extremely insightful mathematical analogy to Tim Dolch, and also the basic idea of the non-reductive life-in-matter=energy metaphysical continuity.

the more complex novel integrated immanent structures, which are the causally efficacious structures in the new system.

In supervenient or “pop-out” emergence, it’s precisely the other way around.

Therefore, by the time of his post-Critical period after 1787, Kant is (more or less) explicitly committed to the following dual or two-part robustly non-reductive real-metaphysical continuity/grounding thesis:

(1) *mind-in-life* = mind is irreducibly metaphysically grounded in life = life metaphysically contains all that is needed for the dynamic emergence of mind, but in a less complex form — “mind is for itself entirely life (the principle of life itself),” and

(2) *life-in-universal-dynamic-aether* (aka *life-in-energy*) = life is irreducibly metaphysically grounded in the universal dynamic aether (energy) = the universal dynamic aether metaphysically contains all that is needed for the dynamic emergence of life, but in a less complex form.

We should explicitly compare and contrast, on the one hand, (i) Kant’s or Kantian dynamic emergentism, *mind-in-life*, and *life-in-universal-dynamic-aether* theses (aka *Kant’s dynamic world*), with (ii) hylozoism, which says that everything in nature is alive, and with (iii) panpsychism or panexperientialism, which says that everything in nature is conscious or protoconscious or has experiences of some primitive sort.

According to Kant’s dynamic world, (ia) *not* everything in nature is either alive or has consciousness/intentionality, or freedom, but also (ib) necessarily, there is nothing in nature that could not, in principle, become a part of life or conscious/intentional mind, or freedom, i.e., necessarily, everything in nature is *inherently open to the real possibility of life, conscious/intentional mind, and freedom*, and (ic) life, mind, and freedom dynamically emerge in orientable space and over irreversible time, as irreducible forms of the universal dynamic aether (energy), as dynamic complexity increases.

Now it should be noted, before moving on, that hylozoism and panpsychism/panexperientialism are *not* crazy theses: they are merely too strong. It seems fairly unlikely that rocks and beer bottles have life or consciousness or proto-consciousness, whether

macroscopically or microscopically. But hylozoism and panpsychism/panexperientialism are on the metaphysical side of the angels, because they acknowledge that the “conceptual dualisms” of (i) inherently-matter-excluding mind vs. inherently-mind-excluding matter, and (ii) inherently-matter-excluding life vs. inherently life-excluding matter, are metaphysically crazy.

So, diametrically on the contrary, only the dogmatic belief in scientific naturalism, especially including universal natural mechanism and physicalism, *make hylozoism and panpsychism/panexperientialism seem “crazy.”*

And what is even more directly to the point, since *we* are, phenomenologically self-evidently, minded AND alive AND essentially embodied beings, then *clearly it is actually scientific naturalism that is crazy*, since it denies what is phenomenologically self-evident: mind-in-life and life-in-matter/energy, hence mind-in-matter/energy.

Everything is thermodynamically energetic, potentially or actually: free agency is a complex form of life, mind is a complex form of life, and life is a complex form of energy.

What is phenomenologically self-evident is universal dynamism, and metaphysical continuity, all the way through nature, from free agency to matter = energy. Dualism and materialism/physicalism are phenomenologically self-evidently *bonkers*.

Or in other words, scientific naturalism fails the basic metaphysical evidential criterion of *phenomenological adequacy*²³.

Sensible science II: Natural science without physicalism

If transcendental idealism for sensibility is true, then it not only vindicates mathematics and natural science, but also entails the denial of physicalism, in two ways.

²³ On phenomenological adequacy as the evidential criterion for true metaphysical theories see R. Hanna, “Kant, the Copernican Devolution, and Real Metaphysics” (Unpublished MS, Fall 2015 version), available online at URL = <https://www.academia.edu/15428206/Kant_The_Copernican_Devolution_and_Real_Metaphysics>, section 6.

First, the vindication of mathematics, alone, is sufficient for the denial of reductive physicalism.

As against Mill, arithmetic is a priori, not empirical; as against Frege, arithmetic is synthetic a priori, not analytic; and natural science presupposes arithmetic. Hence natural science presupposes the synthetic a priori, and is grounded on pure sensibility and its forms of intuition, the a priori intuitional representation of time and the a priori intuitional representation of space.

But pure sensibility is neither reducible to the physical facts, because it is a priori, nor is it necessarily determined by/nomologically supervenient on the physical facts.

For example, there is no nomologically determined causal pairing relation that discriminates between the actual world effect E of a physical cause, and its mirror-reflected counterpart, or enantiomorph, E*. As Kant's "Directions in Space," Inaugural Dissertation, and the Transcendental Aesthetic collectively show, the non-physical a priori intuitional representation of space is required for recognizing the difference between incongruent counterparts.

Second, even a priori logical knowledge necessarily involves pure sensibility via the schematizing imagination and its cognitive phenomenology; and natural science presupposes pure general logic; but a priori knowledge of pure general logic is neither reducible to the physical facts, nor is it necessarily determined by/nomologically supervenient on the physical facts.

E.g., there is no nomologically determined relation from the physical facts that discriminates between proposition (i),
(P&Q)
and its De Morgan equivalent, proposition (ii),
 $\sim (\sim P \vee \sim Q)$

But (i) and (ii) are distinct propositions, because a priori knowledge that (P&Q) logically entails P is not the same as a priori knowledge that $\sim (\sim P \vee \sim Q)$ logically entails P, for a rational subject S who has not learned the De Morgan Equivalences yet.

Therefore in nomologically identical worlds, all the physical facts can exactly remain the same while proposition (i) is replaced by proposition (ii), or conversely, and thus the propositional difference between those worlds does not nomologically supervene on the physical.

Therefore, transcendental idealism for sensibility entails the denial of both reductive and non-reductive physicalism.

Sensible science III: natural science without scientism

If natural science is metaphysically grounded on pure sensibility, and transcendental idealism for sensibility is true, then at least *transcendental philosophy* is *not* the Lockean “underlaborer” of the natural sciences: on the contrary, transcendental philosophy is autonomous from science, epistemically and metaphysically prior to science, and transcendently presupposed by science, i.e., transcendental idealism for sensibility is *the condition of the real possibility of natural science*.

Moreover, given the truth of transcendental idealism for sensibility, perhaps very surprisingly, *we can also show that scientism is false on Kantian aesthetic and ethico-religious grounds alone*, in two steps.

First, given the truth of transcendental idealism for sensibility, since natural mechanism and physicalism are both false, then we can take fully seriously the sensibility-grounded, essentially non-conceptual evidence provided by the aesthetic experience of the beautiful in nature outside us, as veridically tracking natural purposive form, without a purpose, in a way that is inherently *disinterested* and therefore *divorced from all possible self-interest* (CPJ 5: 204-211).

In short, the experience of the beautiful shows us that beautiful nature outside us *cannot be and ought not to be regarded or treated purely instrumentally*, i.e., merely as a means, or exploited. *Second*, given the truth of transcendental idealism for sensibility, since natural mechanism and physicalism are both false, then we can take fully seriously the Romantic/natural-religious/natural-theological reverential experience of the mathematical sublime (“the starry heavens above me”), which, since nature outside us is thereby experienced as

having a specific character and normative value that is expressible only as a *transfinite* quantity, it inherently cannot be reduced to a denumerable quantity, no matter how great (CPJ 5: 244-260).

Hence nature outside us, experienced as sublime, *cannot have a "market price" and is experienced as beyond price, or priceless*, since all "market prices," or exchangeable economic values (say, monetary values) "related to general human interests and needs" (GMM 4: 434), are expressible only as denumerable (natural number, rational number) quantities, even infinite ones.

Thus the specific character and normative value of nature outside us inherently transcends any economic calculus.

This is what I will call *the proto-dignity of nature outside us*. Nature outside us is not itself a person, and therefore it does not have dignity. Nevertheless, nature outside us, as sublime, inherently cannot (without eco-disaster) and ought not (without moral scandal) to be merely exploited, or merely bought or sold, i.e., treated as a mere capitalist resource or commodity, aka *commodified*.

This, in turn, is precisely because our experience of the sublime in nature outside us ("the starry heavens above me") shows us that *nature outside us is the metaphysical real ground and "home" of persons and their dignity and autonomy* ("the moral law within me").

In that sense, to borrow Thornton Wilder's lovely phrase, sublime nature outside us is metaphysically *our town*. Or as Mary Shelley's tragic natural scientist, Victor Frankenstein, negatively formulates the same point:

Learn from me, if not by my precepts, at least by my example, how dangerous is the acquirement of knowledge, and how much happier that man is who believes his native town to be the world, than he who aspires to become greater than his nature will allow.

Therefore, on Kantian scientific pietistic grounds alone, it follows that the Baconian/Cartesian technocratic "mastery of nature" attitude towards the natural world outside us is not only deeply philosophically

mistaken and *wrongheaded*, but also deeply aesthetically, ethically, and natural-religiously *wronghearted*. Wrong, and wrong again.

Conclusion: Frankenscience, the future of humanity, and the future of science

If the Baconian/Cartesian technocratic “mastery of nature” attitude towards the natural world is deeply wrongheaded and wronghearted, then the all-too-familiar and all-too-intimate modern and contemporary sociocultural and political connection between natural science, the military-industrial complex, technocratic global corporate capitalism, and the apocalyptic threat of permanent eco-disaster — aka what I will call, collectively, *Frankenscience* — is completely broken.

Indeed, subverting and resisting and exiting the death-trap world of the military-industrial complex, technocratic global corporate capitalism, and the apocalyptic threat of permanent eco-disaster essentially depends on our philosophically accepting, “taking to heart,” and then freely acting on the basis of, Kant scientific pietism.

In this way, Kantian scientific pietism not only motivates and guides the salvation of nature and humanity, but it also saves *natural science itself* from “a fate worse than death,” i.e., from the senseless and insensible tragic transformation of natural science’s supposed endless rational human progress of knowledge and technology into an endless mechanistic, physicalist, and scientific devolution and regress, namely, the permanent *scientific night of the living dead*, Frankenscience.

So the bottom-line message of Kantian scientific pietism is not just that humanity needs to undertake a serious epistemological, metaphysical, aesthetic, ethical, and sociocultural-political critique of natural science in order to save nature and itself, but also that *natural science itself* needs to be critically saved and liberated from its own scientific naturalist ideology.

According to Kantian scientific pietism, freedom, mind, and life are *not* mysteriously metaphysically shot out of matter that is essentially mechanical, unminded, and inert. That way madness lies.

Free minded animals are not made out of fundamentally physical atoms, whether Democritean, Bohrian, or X-ian.

On the contrary, freedom, mind, and life are nothing more and nothing less than irreducibly novel dynamic immanent structurings and re-structurings of forward-directed energy flow in orientable space and irreversible time.

That being so, one can speculate that if contemporary physics were to incorporate Kantian scientific pietism fully into its own self-concept, then some amazing immanent structural integration of *phenomenologically-driven cognitive science* and *cognitive ethology, ecosystemic organismic biology*, and *quantum field-theory* should be really possible, by analogy with the amazing way that complex numbers and real numbers immanently structurally integrate with rational numbers and natural numbers²⁴.

Then the necessary prologemenon to Grand Unified Theory would be essentially *an attitude*: natural piety, not mastery.

In the essentially embodied mind or minds of some naturally pietistic mathematico-biophysical genius or geniuses, the required structure-integrating formalisms would be spontaneously created/discovered, and natural science could authentically move forward²⁵.

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²⁴ See note 22 above. Immanent structural integration can occur between theories as well as between worldly properties, facts, events, processes, systems, etc.

²⁵ For (what looks to me to be) a serious first step in this direction, see, I. Prigogine, *The End of Certainty: Time's Flow and the Laws of Nature* (New York: Free Press, 1997).