

## THOUGHT-SHAPERS

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**ABSTRACT:** This is a companion-piece to our recent essay, “This is the Way the World Ends: A Philosophy of Civilization Since 1900, and A Philosophy of the Future,” *Cosmos & History* 16, 2 (2020): 1-53. In this essay, we shift our focus from the philosophy of human civilization to the philosophy of human thinking. More precisely, we apply the categorical distinction between (i) mechanical (i.e., computable/recursive, entropic, and deterministic or indeterministic) systems and (ii) organic (i.e., uncomputable/non-recursive, processual, negentropic, purposive, and self-organizing) systems, to fundamental issues in the philosophy of mind and cognition, with general application to the nature of human thinking in the formal and natural sciences, the applied arts and fine arts, morality, and sociopolitics, as well as metaphysics and epistemology. By “thought-shapers,” we mean mental representations of any or all of the following: allegories, analogies, blueprints, catechisms, diagrams, displays, icons, images, lay-outs, metaphors, mnemonics, models, outlines, parables, pictures, scenarios, schemata, sketches, spreadsheets, stereotypes, symbols, tableaux, and templates. Correspondingly, we argue that human thinking is really possible only insofar as it’s partially causally determined, formed, and normatively guided by either (i) mechanical, constrictive thought-shapers in a bad, false, and wrong way, or (ii) organic, generative thought-shapers in a good, true, and right way.

**KEYWORDS:** Human thinking; Mental representation; Conceptual content vs. non-conceptual content; Mechanical systems vs. organic systems.

One thinks that one is tracing the outline of the thing’s nature over and over again, and one is merely tracing around the frame through which we look at it.... A *picture* held us captive. And we could not get outside it, for it lay in our language and language seemed to repeat it to us inexorably.<sup>1</sup>

What really comes before our mind when we understand a word—Isn’t it something like a picture?<sup>2</sup>

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<sup>1</sup> L. Wittgenstein, *Philosophical Investigations*, trans. G.E.M. Anscombe, New York, Macmillan, 1953, §§114-115, p. 48<sup>c</sup>, translation slightly modified.

<sup>2</sup> *Ibid.*, §139, p. 54<sup>c</sup>.

## INTRODUCTION

Plato's theory of 'images' or *eikones*, as presented in his famous analogy of The Cave in the *Republic*,<sup>3</sup> Bacon's theory of 'Idols which beset men's minds' in *The Novum Organum*,<sup>4</sup> Hegel's work on the 'movement of the Notion',<sup>5</sup> Marx's theory of ideology in *The German Ideology* and other works,<sup>6</sup> Gaston Bachelard's work on 'the dialectics of inside and outside',<sup>7</sup> Stephen Pepper's work on 'root metaphors' in metaphysics,<sup>8</sup> Gilles Deleuze's work on the 'image of thought',<sup>9</sup> Hans Blumenberg's work on prefiguration,<sup>10</sup> Jacques Rancière's work on political aesthetics,<sup>11</sup> Otto Neurath's ISOTYPE theory,<sup>12</sup> Wittgenstein's theory of linguistically-transmitted 'pictures' or *Bilder* and how they entrap philosophical thinking,<sup>13</sup> Philip Johnson-Laird's work on 'mental models', when taken together with that of other leading 'depictivists'—especially Roger Shepard and Stephen Kosslyn—in the late 20<sup>th</sup> century debate about mental imagery in cognitive neuroscience,<sup>14</sup> and recent work in cognitive psychology and social psychology

<sup>3</sup> See, e.g., A. Silverman, 'Plato's Middle Period Metaphysics and Epistemology', in E.N. Zalta (ed.), *The Stanford Encyclopedia of Philosophy* (Fall 2014 Edition), available online at URL = <<https://plato.stanford.edu/archives/fall2014/entries/plato-metaphysics/>>, esp. section 13, at sub-URL = <<https://plato.stanford.edu/entries/plato-metaphysics/#13>>.

<sup>4</sup> See, e.g., F. Bacon, 'The Four Idols', *Sophia Project* (2021), available online at URL = <[http://www.sophia-project.org/uploads/1/3/9/5/13955288/bacon\\_idols.pdf](http://www.sophia-project.org/uploads/1/3/9/5/13955288/bacon_idols.pdf)>.

<sup>5</sup> G.W.F. Hegel, *Phenomenology of Spirit*, trans. A.V. Miller, Oxford, Oxford Univ. Press, 1979.

<sup>6</sup> See, e.g., J. Wolff and D. Leopold, 'Karl Marx', in E.N. Zalta (ed.), *The Stanford Encyclopedia of Philosophy* (Spring 2021 Edition), available online at URL = <<https://plato.stanford.edu/archives/spr2021/entries/marx/>>, esp. section 6, at sub-URL = <<https://plato.stanford.edu/entries/marx/#Ideo>>.

<sup>7</sup> G. Bachelard, *The Poetics of Space*, trans. M. Jolas, Boston, Beacon Press, 1969.

<sup>8</sup> S.C. Pepper, *World Hypotheses*, Berkeley and Los Angeles, CA, Univ. of California Press, 1942, esp. ch V.

<sup>9</sup> G. Deleuze, *Difference and Repetition*, 2<sup>nd</sup> edn., London, Bloomsbury, 2014.

<sup>10</sup> A. Nicholls and F. Heidenreich (eds.), *H. Blumenberg, Präfiguration: Arbeit am Politischen Mythos*, Berlin, Suhrkamp, 2014.

<sup>11</sup> J. Rancière, *Dissensus: On Politics and Aesthetics*, trans. S. Corcoran, London, Continuum, 2010.

<sup>12</sup> O. Neurath, *International Picture Language. First Rules of Isotype*, London, Kegan Paul, Trench, Trubner and Co., 1936.

<sup>13</sup> See, e.g., Wittgenstein, *Philosophical Investigations* (as per the epigraphs at the head of our essay), §§114-115, p. 48<sup>e</sup>, and §139, p. 54<sup>e</sup>.

<sup>14</sup> See, e.g., R. Shepard and S. Chipman, 'Second Order Isomorphisms of Internal Representations: Shapes of States', *Cognitive Psychology*, 1, 1970, pp. 1-17; R. Shepard and J. Metzler, 'Mental Rotation of Three-Dimensional Objects', *Science*, 171, 1971, pp. 701-703; R. Shepard, 'The Mental Image', *American Psychologist*, 33, 1978, pp. 125-137; S. Kosslyn, *Image and Mind*, Cambridge, MA, Harvard Univ. Press, 1980;

on the persistence of false belief or misinformation and the ‘backfire effect’,<sup>15</sup> are all anticipations or preliminary versions of what we’re calling *the theory of thought-shapers*.

Thought-shapers include mental representations of allegories, analogies, blueprints, catechisms, diagrams, displays, icons, images, lay-outs, metaphors, mnemonics, models, outlines, parables, pictures, scenarios, schemata, sketches, spreadsheets, stereotypes, symbols, tableaux, and templates.<sup>16</sup> Indeed, Plato’s Cave analogy is especially notable in being not only part of an anticipatory or preliminary *theory* of thought-shapers, but also being, *as* an analogy, *itself* a thought-shaper. More generally, what the philosophers and cognitive scientists mentioned in the just-previous paragraph are telling us, in effect, is that necessarily, all human thinking is inherently *shaper-inflected*. And not only that. The King James version of the Bible’s Book of John begins, ‘In the beginning was the Word (*logos*)’. In the early 19<sup>th</sup> century, Goethe wrote in *Faust*: ‘In the beginning was the Deed’ (*Im Anfang war die Tat*).<sup>17</sup> And circa 1945, Wittgenstein wrote: ‘Words are deeds’ (*Wörter sind Taten*).<sup>18</sup> For our purposes in this essay, we’ll take ‘the Word’ and ‘words’ to mean *natural language*. Then, learning from all of these, and formulating our claim somewhat gnomically, in the style of the King James version and Goethe, in a nutshell, our claim is:

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R. Shepard and L. Cooper, *Mental Images and their Transformations*, Cambridge, MA, MIT Press, 1982; P. Johnson-Laird, *Mental Models*, Cambridge, MA, Harvard Univ. Press, 1983; and S. Kosslyn, *Image and Brain*, Cambridge, MA, Harvard Univ. Press, 1994. The debate about mental imagery was between the *depictivists*, who held that the representational content of images is essentially non-conceptual, and the *propositionalists*, who held that the representational content of images is essentially conceptual. See, e.g., N. Block (ed.), *Imagery*, Cambridge, MA, MIT Press, 1981.

<sup>15</sup> See, e.g., B. Nyhan and J. Reifler, ‘When Corrections Fail: The Persistence of Political Misperceptions’, *Journal of Political Behavior*, 32, 2010, pp. 303-330, available online at URL = <<https://www.unc.edu/~fbaum/teaching/articles/PolBehavior-2010-Nyhan.pdf>> and S. Lewandowsky et al., ‘Misinformation and Its Correction: Continued Influence and Successful Debiasing’, *Psychological Science in the Public Interest*, 13, 2012, pp. 106-131, available online at URL = <[https://dornsife.usc.edu/assets/sites/780/docs/12\\_pspi\\_lewandowsky\\_et\\_al\\_misinformation.pdf](https://dornsife.usc.edu/assets/sites/780/docs/12_pspi_lewandowsky_et_al_misinformation.pdf)>.

<sup>16</sup> This list isn’t intended to be complete, but instead only to be a working list of paradigm cases we’re aiming to connect in an essential way to the nature of human thinking, and more generally, to explain. After we’ve provided a more precise characterization of thought-shapers in sections 1 and 2, the list could in principle be extended according to those criteria. Moreover, allegories, catechisms, and parables differ slightly from the other items on the list, in a way that we’ll briefly describe in section 1.

<sup>17</sup> J.W. v. Goethe, *Faust I*, 1808/1828-1829.

<sup>18</sup> L. Wittgenstein, *Culture and Value*, trans. P. Winch, Chicago, IL, Univ. of Chicago Press, 1980, p. 46<sup>c</sup>.

In the beginning of all human thinking, there were human words and human deeds *only insofar as* there were *also* Thought-Shapers.

Our thesis, in turn, entails that all human *thoughts* are deeds too. Indeed, our theory of thought-shapers falls fully within the broad scope of the first three Es of the contemporary *4E approach to human cognition*, by affirming that all human thought is *embodied, embedded, and enacted*.<sup>19</sup>

Our argument has seven parts. **First**, we propose a *nonideal cognitive semantics* for thought-shapers that's grounded on the categorical distinction between *conceptual content* and *essentially non-conceptual content*. **Second**, we propose a *cognitive dynamics* for thought-shapers that's grounded on the *essential embodiment theory* of the mind-body relation. **Third**, we introduce a basic distinction between *constrictive* thought-shapers and *generative* thought-shapers. **Fourth**, we present some paradigmatic classical examples of constrictive thought-shapers *in metaphysics, epistemology and*—thereby demonstrating the pervasive influence of thought-shapers—*in morality or sociopolitics*, along with accompanying diagrams. **Fifth**, we explain the distinction between constrictive thought-shapers and generative thought-shapers in terms of the categorical difference between *mechanical* facts and phenomena, and *organic* facts and phenomena. **Sixth**, we explore *adverse cognitive effects* of mechanical, constrictive thought-shapers. **Seventh** and finally, we propose a strategy for acknowledging organic systems and organic, generative thought-shapers: by achieving all or any of the modes of a special organic *meta-cognitive* attitude or standpoint we call *creative piety*. We conclude by briefly applying our theory to Voltaire's classical organic, generative thought-shaper and its corresponding shaped thought: *Il faut cultiver notre jardin*, i.e., we must cultivate our

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<sup>19</sup> See, e.g., A. Newen, L. De Bruin, and S. Gallagher (eds.), *The Oxford Handbook of 4E Cognition*, Oxford, Oxford Univ. Press, 2018. The 4Es are: *embodied* (i.e., minds are necessarily realized in organismic animal bodies), *embedded* (i.e., mind are necessarily external-context-sensitive or indexical), *enacted* (i.e., minds are necessarily dynamically and practically implemented), and *extended* (i.e., minds necessarily have external vehicles of consciousness &/or intentionality, aka 'the extended mind'). We reject the extended-mind component, for reasons explained in R. Hanna, 'Minding the Body', *Philosophical Topics*, 39, 2011, pp. 15-40, also available online in preview <[https://www.academia.edu/4458670/Minding\\_the\\_Body](https://www.academia.edu/4458670/Minding_the_Body)>. Moreover, although many 4E theorists are *anti-representationalists*, by contrast we affirm a dual-content version of representationalism, for reasons explained in R. Hanna, *Cognition, Content, and the A Priori: A Study in the Philosophy of Mind and Knowledge*, THE RATIONAL HUMAN CONDITION, Vol. 5, Oxford, Oxford Univ. Press, 2015, esp. chs. 1-3, also available online in preview at URL = <[https://www.academia.edu/35801833/The\\_Rational\\_Human\\_Condition\\_5\\_Cognition\\_Content\\_and\\_the\\_A\\_Priori\\_A\\_Study\\_in\\_the\\_Philosophy\\_of\\_Mind\\_and\\_Knowledge\\_OUP\\_2015](https://www.academia.edu/35801833/The_Rational_Human_Condition_5_Cognition_Content_and_the_A_Priori_A_Study_in_the_Philosophy_of_Mind_and_Knowledge_OUP_2015)>.

garden.

#### I. A DUAL-CONTENT NONIDEAL COGNITIVE SEMANTICS FOR THOUGHT-SHAPERS

*Nonideal moral or political theory* is moral or political theory that's designed to capture these two manifestly real and widespread facts about our 'human-all-too-human' world: (i) that compliance with the normative principles and rules of any theory of human morality or human politics is not always or even normally ideally strict, and (ii) that context-sensitivity or indexicality is a pervasive phenomenon in our moral and political life.<sup>20</sup> Correspondingly, *nonideal cognitive semantics* is cognitive semantic theory that's specifically designed to capture the corresponding facts (i) that compliance with the normative principles and rules of any theory of human cognitive content or human intentionality is not always or even normally ideally strict, and (ii) that context-sensitivity or indexicality is a pervasive phenomenon in human cognition and intentionality.

The cognitive semantics of thought-shapers is a nonideal cognitive semantic theory. The notion of *shaping*, which is of course itself an analogy or metaphor, in this context more precisely means 'partial but not complete determination, formation, and guidance, in a way that's not only causal but also irreducibly normative'. As applied to human thinking, this notion of shaping has two crucial implications.

**First**, thought-shaping is how human thinking is partially—but not completely—causally determined, formed, and normatively guided by mental representations of allegories, analogies, blueprints, catechisms, diagrams, displays, icons, images, lay-outs, metaphors, mnemonics, models, outlines, parables, pictures, scenarios, schemata, sketches, spreadsheets, stereotypes, symbols, tableaux, and templates,<sup>21</sup> for better or worse. We emphasize and re-emphasize that this *partially* determinative, formative, and guiding human cognitive process is *not only* causal *but also* irreducibly normative.

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<sup>20</sup> For a nonideal Kantian moral theory, see R. Hanna, *Kantian Ethics and Human Existence: A Study in Moral Philosophy*, THE RATIONAL HUMAN CONDITION, Vol. 2, New York, Nova Science, 2018, also available online in preview at URL = [https://www.academia.edu/36359647/The\\_Rational\\_Human\\_Condition\\_3\\_Kantian\\_Ethics\\_and\\_Human\\_Existence\\_A\\_Study\\_in\\_Moral\\_Philosophy\\_Nova\\_Science\\_2018](https://www.academia.edu/36359647/The_Rational_Human_Condition_3_Kantian_Ethics_and_Human_Existence_A_Study_in_Moral_Philosophy_Nova_Science_2018).

<sup>21</sup> See also the qualifications spelled out in note 16 above.

**Second**, thought-shaping creates a new cognitive item, *the shaped thought*, while at the same time both expressing and also modifying various features of the thinking subject's external context. So thought-shapers are not only causal and irreducibly normative (as per the first point), but also necessarily *external-context-sensitive or indexical* (i.e., 'embedded') and therefore they cannot be adequately or fully characterized apart from the actual sets of external circumstances in which they arise, although they are not in any way either reducible to or wholly determined by those circumstances.

Our dual-content nonideal cognitive semantics is closely related to a philosophical controversy that saliently emerged in philosophy of mind in the mid-1990s, but in fact stretches all the way back to Kant: the so-called *debate about non-conceptual content*.<sup>22</sup> More specifically, there are two basic questions at issue between the contrary theses of *Conceptualism* and *Non-Conceptualism* in the philosophy of cognition and cognitive semantics: (i) whether human cognition is necessarily, solely, and wholly determined by our concepts and our conceptual capacities, yes or no, and (ii) whether human cognizers share a fundamental pre-conceptual/pre-intellectual or 'essentially sensible' capacity—or a set of such capacities—with non-rational or non-human animals, that operates in some substantive way independently of our intellectual/logical capacity for conceptualization, believing, judging, etc., while still also being able to combine substantively with those latter capacities for the purposes of socially and linguistically-mediated rational cognition, yes or no. Conceptualists, i.e., *intellectualists* about human cognition, say *yes* to (i) and *no* to (ii); but Strong Non-Conceptualists, i.e., *non-intellectualists* about human cognition, say *no* to (i) and *yes* to (ii). In short, for intellectualists, self-conscious rational, conceptual, and inferential thinking—discursivity—determines the content and specific character of all human cognition, whereas for non-intellectualists, discursivity is just one cognitive capacity that's categorically distinct from, but also interactive with, a set

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<sup>22</sup> See, e.g., R. Hanna, "The Debate About Non-Conceptual Content Revisited: On Corijn van Mazijk's *Perception and Reality in Kant, Husserl, and McDowell*", *International Journal of Philosophical Studies*, 29, 2021, pp. 90-115, available online at URL = <<https://www.tandfonline.com/doi/abs/10.1080/09672559.2021.1873543>>, and also in preview at URL = <[https://www.academia.edu/44732474/The\\_Debate\\_About\\_Non\\_Conceptual\\_Content\\_Revisited\\_A\\_Critical\\_Notice\\_of\\_Corijn\\_van\\_Mazijks\\_Perception\\_and\\_Reality\\_in\\_Kant\\_Husserl\\_and\\_McDowell\\_International\\_Journal\\_of\\_Philosophical\\_Studies\\_29\\_2021\\_90\\_115\\_published\\_version](https://www.academia.edu/44732474/The_Debate_About_Non_Conceptual_Content_Revisited_A_Critical_Notice_of_Corijn_van_Mazijks_Perception_and_Reality_in_Kant_Husserl_and_McDowell_International_Journal_of_Philosophical_Studies_29_2021_90_115_published_version)>.

of inherently non-discursive *sensible* capacities, including essentially non-conceptual perception, essentially non-conceptual memory, pre-reflective consciousness, essentially non-conceptual imagination, emotion, and intentional agency.<sup>23</sup>

In defense of Strong Non-Conceptualism, Robert Hanna has worked out a detailed, systematic version of this dual-content cognitive semantics, which deploys a basic distinction between (i) *conceptual* capacities and *conceptual* content, and (ii) *essentially non-conceptual* capacities and *essentially non-conceptual* content, along with a basic sub-distinction between: (iii) *formal* content (i.e., non-empirical or *a priori* content, i.e., content that's necessarily *underdetermined* in its specific character by all actual and possible contingent, sensory facts) whether conceptual or essentially non-conceptual, and (iv) *material* content (i.e., empirical or *a posteriori* content, i.e., content that's necessarily *determined* in its specific character by all or some actual or possible contingent, sensory facts), whether conceptual or essentially non-conceptual.<sup>24</sup>

We'll take those distinctions as starting points.

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<sup>23</sup> In this sense, our nonideal cognitive semantics of thought-shaping is *broadly* Kantian, in that we accept Kant's fundamental distinction between the faculties of understanding (*Verstand*) and sensibility (*Sinnlichkeit*), but *without* being committed either to all the details of Kant's views or to any of his philosophical mistakes. Moreover, RH and OP differ slightly in precisely how we characterize the interaction between non-conceptual and conceptual content. RH's view is presented in R. Hanna and M. Maiese, *Embodied Minds in Action*, Oxford, Oxford Univ. Press, 2009, esp. chs. 3-8; R. Hanna, 'Beyond the Myth of the Myth: A Kantian Theory of Non-Conceptual Content', *International Journal of Philosophical Studies*, 19, 2011, pp. 321–396; Hanna, *Cognition, Content, and the A Priori: A Study in the Philosophy of Mind and Knowledge*, THE RATIONAL HUMAN CONDITION, Vol. 5, esp. chs. 2-3; J. Russell and R. Hanna, 'A Minimalist Approach to the Development of Episodic Memory', *Mind and Language*, 27, 2012, pp. 29-54; R. Hanna, 'Memory, "Alternative Facts", and the Political Philosophy of Cognition', *Borderless Philosophy*, 1, 2018, available online at URL =

<<https://www.cckp.space/single-post/2018/06/16/BP1-2018-Memory-Alternative-Facts-and-the-Political-Philosophy-of-Cognition>>; and R. Hanna, 'The Essential Non-Conceptuality of the Imagination', *Contemporary Studies in Kantian Philosophy* 5 (2020): 53-72, available online at URL = <<https://www.cckp.space/single-post/2020/06/15/CSKP5-2020-The-Essential-Non-Conceptuality-of-the-Imagination>>. And OP's view is presented in O. Paans, 'The Imaginative Spectrum: Kantian Imagination and Nonconceptual/Conceptual Interactions', *Contemporary Studies in Kantian Philosophy*, 5, 2020, pp. 95–115. <https://www.cckp.space/single-post/2020/06/15/cskp5-2020-the-imaginative-spectrum-kantian-imagination-and-non-conceptualconceptual-inte>

<sup>24</sup> See, e.g., Hanna, *Cognition, Content, and the A Priori: A Study in the Philosophy of Mind and Knowledge*, THE RATIONAL HUMAN CONDITION, Vol. 5, esp. chs. 1, 2, and 4.

Then, according to our dual-content nonideal cognitive semantics, by *conceptual content*, we mean the inherently general, descriptive information that's expressed by (i) one-place predicates in natural language, picking out properties and ranging over domains of individual objects, (ii) n-place relational predicates in natural language, picking out relations and ranging over domains of ordered n-tuples of individual objects, or (iii) syncategorematic terms in natural language, picking out logical constants and other logical forms that unify individual propositions (judgments, predications, statements, etc.) and also capture truth-functional or other relations between complexes of propositions.

Correspondingly, by *thoughts* we mean either (i) ideally well-formed, logically-unified complexes of concepts and/or directly referential terms, that express propositions in the strict sense<sup>25</sup> and inherently bear truth-values (*type-1 thoughts*), or (ii) less-than-ideally-well-formed and less-than-ideally-logically-unified complexes of concepts *and* essentially non-conceptual contents (including directly referential terms) that might or might not express propositions in the strict sense—and if not, they'll express propositions in a *non-strict* sense—and therefore might or might not inherently bear truth-values (*type-2 thoughts*). The category of type-2 thoughts captures the widespread 'human-all-too-human' fact of confused thoughts, fuzzy thoughts, half-formed thoughts, hasty thoughts, muddled thoughts, vague thoughts, and so-on.

And finally, by *beliefs* we mean either type-1 thoughts or type-2 thoughts that are asserted to be true by the conscious, self-conscious, and rational human subjects of those thoughts.

In this way, conceptual content is semantic content that's *propositional in either the strict or the non-strict sense*, since all propositions are built out of concepts, *inferential*,<sup>26</sup> since all strict or non-strict propositions correspondingly can enter into strict or non-strict inferences, and *logico-linguistic*, since all strict or non-strict propositions and strict or non-strict inferences are strictly or non-strictly governed *at least to some non-trivial extent* by laws of logic and formal rules of natural

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<sup>25</sup> See, e.g., M. McGrath and D. Frank, 'Propositions', in E.N. Zalta (ed.), *The Stanford Encyclopedia of Philosophy*, Winter 2020 Edition, available online at URL = <<https://plato.stanford.edu/archives/win2020/entries/propositions/>>.

<sup>26</sup> See, e.g., R. Hanna, 'What is the Nature of Inference?', in V. Hösle (ed.), *Forms of Truth*, Notre Dame, IN, Univ. of Notre Dame Press, 2014, pp. 89-101.



language.<sup>27</sup> Contrariwise, essentially non-conceptual content is *sub*-propositional (in either the strict or non-strict sense), and therefore *non*-inferential (in either the strict or non-strict sense), and *non*-logico-linguistic (in either the strict or non-strict sense) semantic content.

Moreover, according to our view, conceptual content and essentially non-conceptual content alike can be either *formal* (i.e., non-empirical or a priori) or *material* (i.e., empirical or a posteriori). But whether they're formal or material, sharply unlike conceptual contents, which are normally cognized self-consciously, logically, theoretically, and rationally, essentially non-conceptual contents are instead normally cognized in a *pre-reflectively* conscious, *emotive* (where 'emotion' includes desires, feelings, and passions, and our affective capacities more generally), *practical*, and *proto*-rational way that's poised for intentional action of various kinds.

Assuming those distinctions and working definitions, and in Hanna's words, here's a brief summary of the theory of essentially non-conceptual content:

The theory of rational human cognition, content, and knowledge that I am proposing ... is, in part, a "bottom-up" theory about the nature of minded animals that anchors conceptual content in the primitive fact of essentially non-conceptual content. Essentially non-conceptual content ... is a kind of mental content that is categorically different from conceptual content, in the sense that both its underlying semantic structure and also its characteristic psychological function or role are inherently distinct from those of conceptual content. Furthermore, essentially non-conceptual content is a kind of mental content that rational human animals or real human persons share with non-rational minded animals, whether non-human (e.g., cats) or human (e.g., infants), who, it seems, do not possess conceptual capacities. So essentially non-conceptual content epitomizes the specifically non-intellectual or *sensible*, embodied, perception-based, phenomenally conscious side of human mindedness, whereas conceptual content epitomizes the specifically *intellectual* or discursive, reflective, judgment-based, self-conscious side of human mindedness.... [B]y way of a preliminary or working characterization to have in front of us, I will say that essentially non-conceptual content is mental content that necessarily includes essentially indexical formal spatiotemporal and dynamic representations that are fully sensitive to complex thermodynamic asymmetries in perceptually manifest natural objects and processes, and also that

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<sup>27</sup> See, e.g., R. Hanna, *Rationality and Logic*, Cambridge, MA, MIT Press, 2006, esp. chs. 4 and 7.

the primary psychological function or role of essentially non-conceptual content is to account for directly referential cognition, and to guide and mediate the sensorimotor processes constitutive of finegrained intentional body movements in rational minded [human] animals.<sup>28</sup>

Granting the theoretical backdrop of our dual-content nonideal cognitive semantics for thought-shapers, it follows that the theory of thought-shapers focuses on cognitive processes inherently involving the interplay between (i) various kinds of formal or material essentially non-conceptual cognitive activities and representations, with egocentrically-centered, action-poised *spatial* representations and *temporal* representations as fundamental, operating as the cognitive *shapers*, and (ii) various kinds of formal or material conceptual thinking and conceptual thought-content more generally, as what's cognitively *shaped* by the various kinds of formal or material essentially non-conceptual cognitive activities and representations, in an inherently external-context-sensitive or indexical way. In view of (i) and (ii) these cognitive processes produce *shaped thoughts* as their cognitive products. These shaped thoughts are *holistically configured or patterned mental representations*, therefore bearing some important similarities to the *Gestalten* described by the early Gestalt psychologists Kurt Koffka, Wolfgang Köhler, and Max Wertheimer, although also, as we mentioned above, only within the broad scope of the first three Es (i.e., embodied, embedded, enacted) of the contemporary 4E approach to human cognition. And as we also noted above, this cognitive process normally occurs in a pre-reflectively conscious mode, which typically makes it very difficult to catch thought-shapers 'at work' self-consciously. Indeed, thought-shapers *almost invisibly* yet nevertheless *continuously* bridge and fuse the sensible and discursive domains. In retrospective reflection on our thought-shaping processes, it's very hard to see precisely when and how thought-shapers have exerted their influence. In this way, thought-shapers provide an all-pervasive, obvious background for human thinking, for which no special rational justification is required.

One important consequence of how thought-shapers almost invisibly continuously bridge the sensible and discursive domains, is that in the actual-world external contexts of our everyday cognitive life, the distinction between the

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<sup>28</sup> Hanna, *Cognition, Content, and the A Priori: A Study in the Philosophy of Mind and Knowledge*, THE RATIONAL HUMAN CONDITION, Vol. 5, p. 25, underlining added.

semantic content of thought-shapers (as essentially sensible) and the semantic content of shaped thoughts (as a fusion of sensible/essentially non-conceptual content and discursive/conceptual content) will often not be perfectly sharp, but instead a relative matter of degree. For example, looking back now at our working list of paradigmatic thought-shapers—mental representations of allegories, analogies, blueprints, catechisms, diagrams, displays, icons, images, lay-outs, metaphors, mnemonics, models, outlines, parables, pictures, scenarios, schemata, sketches, spreadsheets, stereotypes, symbols, tableaux, and templates—amongst these, allegories, catechisms, and parables differ slightly from the others in containing a relatively greater amount and degree of conceptual content, even though the essentially non-conceptual content of the thought-shaping component is what determines the overall semantic specific character of those mental representations.

Relatedly, and insofar as the so-called debate about non-conceptual content goes all the way back to Kant, it's not surprising that there are some important similarities between the theory of thought-shapers, and Kant's theory of the imagination-driven capacity for *schematism*.<sup>29</sup> And although Kant never fully explicitly extended the theory of schematism either to metaphilosophy or to a theory of cognitive 'idols' or ideology, there are some importantly suggestive hints about how he might have done that, in (i) his 'fragment of a moral catechism'—itself cognitively modelled on the 1563 Heidelberg Catechism, no doubt—in The Doctrine of Virtue part of the *Metaphysics of Morals*,<sup>30</sup> and (ii) his remarks about the general and particular 'culture of the powers of the mind' in the *Lectures on Pedagogy*:

[A]s concerns the higher powers of understanding, they include the culture of the understanding [i.e., the power for conceptualization and thinking], the power of judgment, and of reason. In the beginning, the understanding, too, can be

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<sup>29</sup> See, e.g., I. Kant, *Critique of Pure Reason*, trans. P. Guyer and A. Wood, Cambridge, Cambridge Univ. Press, 1998, pp. 271-277, A137-147/B176-187.

<sup>30</sup> I. Kant, *Metaphysics of Morals*, trans. M. Gregor, in I. Kant, *Immanuel Kant: Practical Philosophy*, Cambridge, Cambridge Univ. Press, 1996, pp. 365-603, Ak 6: 205-493, at pp. 593-597, Ak 6: 480-484. The Heidelberg Catechism is a religious document that was central to Protestantism. It was written in Heidelberg in 1563 by Zacharias Ursinus, although it's likely that a number of other theologians also contributed. The Catechism consists of a series of questions and answers, intended to teach the moral and theological fundamentals of Protestant Christianity and instill 'moral habits'.

formed passively, as it were, by referring to examples for the rule, or, conversely, by discerning the rule for the individual cases. The power of judgment indicates what use is to be made of the understanding. It is required in order to understand what one learns or says, in order not to repeat things without understanding them. How many read and hear something without understanding it, even though they believe they do! This [also] holds for images (*Bilder*)....<sup>31</sup>

We can creatively generalize from Kant's scattered remarks and assert in agreement with him that applying schemata to various metaphysical and epistemological, but equally also to moral or sociopolitical doctrines, especially in the form of allegories or parables, significantly shapes moral and sociopolitical thinking. If we extend this line of thought still further, we can see that a 'culture of education' or educational practice, shapes the minds of its recipients. This applies to all 'epistemic cultures',<sup>32</sup> and therefore also equally to 'the shaping of the scientific identity' in social institutions of higher education.<sup>33</sup> As an excellent recent example, consider the novelist David Foster Wallace's famous and highly influential deployment of 'the-fish-&-the-water' allegory/parable, in his 2005 graduation address at Kenyon College, 'This is Water':

There are these two young fish swimming along and they happen to meet an older fish swimming the other way, who nods at them and says "Morning, boys. How's the water?" And the two young fish swim on for a bit, and then eventually one of them looks over at the other and goes "What the hell is water?"<sup>34</sup>

Just like the water in Foster Wallace's allegory/parable, thought-shapers operate almost invisibly and yet also omnipresently in human thinking. Moreover, and also harking back to Wittgenstein in this connection, thought-shapers partially pre-determine and pre-structure our forms of thoughtful and linguistic expression to such an extent that it's almost impossible to analyze them self-consciously, if only because the thoughts and language we use for this purpose have *already* been shaped by them. Hence very often, when we come to philosophize, we are thinking only *through* the pictures that we created by

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<sup>31</sup> I. Kant, *Lectures on Pedagogy*, trans. R. Loudon, in I. Kant, *Anthropology, History, and Education*, Cambridge, Cambridge Univ. Press, 2007, pp. 437-485, Ak 9: 437-499, at p. 469, Ak 9: 476.

<sup>32</sup> K. Knorr-Cetina, *Epistemic Cultures: How the Sciences Make Knowledge*, Cambridge, MA, Harvard Univ. Press, 1999.

<sup>33</sup> S. Turkle, *Simulation and its Discontents*, Cambridge, MA, The MIT Press, 2009.

<sup>34</sup> D.F. Wallace, 'This is Water', *farnam street/fs blog*, April 2014, available online at URL = <<https://fs.blog/2012/04/david-foster-wallace-this-is-water/>>.

philosophizing in the first place, and thereby thinking only *via* ‘as it were, illustrated turns of speech.’<sup>35</sup>

## 2. A COGNITIVE DYNAMICS FOR THOUGHT-SHAPERS

In view of the dual-content nonideal cognitive semantics for thought-shapers we described in section 1, our theory of thought-shapers naturally focuses on the *cognitive dynamics* of human conceptual thinking and conceptual thought-content, insofar as it’s partially determined, formed, and guided by essentially non-conceptual mental representations of allegories, analogies, blueprints, catechisms, diagrams, displays, icons, images, lay-outs, metaphors, mnemonics, models, outlines, parables, pictures, scenarios, schemata, sketches, spreadsheets, stereotypes, symbols, tableaux, and templates,<sup>36</sup> featuring egocentrically-centered, action-poised temporal representations and spatial representations as fundamental, in a way that’s not only causal but also irreducibly normative, and inherently external-context-sensitive or indexical, for better or worse.

As the metaphorical term ‘shapers’ itself implies, all thought-shapers are characterized by *temporal dynamics* and *spatial dynamics*. The temporal dynamics of thought-shapers is captured by formal or material representations of *processes* of various kinds, for example, either the classical, non-complex, entropic, time-reversible, equilibrium, linear thermodynamics of mechanical motion through space or in place (for example, rotation, vibration, etc.), or the non-classical, complex, dissipative/ negentropic, time-irreversible, non-equilibrium, self-organizing thermodynamics of non-mechanical motion (for example, weather systems and organisms). In turn, the spatial dynamics of thought-shapers is captured by formal or material representations in *topology*, the mathematical theory of the continuous deformation and transformation of shapes, surfaces, etc., in a multi-dimensional (for example, two-dimensional, three-dimensional, four-dimensional, and so-on) framework, and of their universal interconnectedness, with a special focus on *egocentrically-centered* (i.e., first-person perspectival), *orientable* (i.e., inherently directional), *three-dimensional* spaces in which our own minded living rational human animal bodies, and human or non-human organisms more

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<sup>35</sup> Wittgenstein, *Philosophical Investigations*, §295, p. 101<sup>c</sup>.

<sup>36</sup> See also the qualifications spelled out in note 16 above.

generally, are embedded, and in which we and they all live, move, and have our being. Hence, all thought-shapers have *processual* and/or *topological* properties that are represented by formal or material essentially non-conceptual cognition and essentially non-conceptual content, to which formal or material conceptual thinking and conceptual content naturally adheres or attaches itself, and by which they are inherently causally and irreducibly normatively partially causally determined, formed, and normatively guided, in an inherently external-context-sensitive or indexical way, for better or worse. Given this inherently causal, normative, action-poised, context-sensitive/indexical, processual, and topological profile, as we've mentioned, essentially non-conceptual thought-shapers play a pre-reflectively conscious and almost invisible role in human thinking, yet they also and perhaps above all create a necessary cognitive substrate for conceptual capacities and conceptualization that contributes *diachronic and synchronic applicability, articulation, concreteness, depth, friction, thickness, scope, traction, and torque* to human thought, for better or worse.

We can illustrate this point by means of an example taken from a seminal book on diagramming by the architects Ben van Berkel and C. Bos, *Move*, based on work done at their office UNStudio. If we simply replace the word 'diagram' and its variants with 'thought-shaper' and its variants, we end up with a surprisingly accurate account of thought-shapers more generally:

[Thought-shaping] practices relate to time and duration in two ways: [thought-shaping] time is understood as a structure informing the design and as an internal measurement punctuating the design process. (...) [T]he [thought-shaper] presents itself as a trajectory, which is the sediment of the simultaneous duration of movement and time, run within rigid structural situation.<sup>37</sup>

The [thought-shaper] or abstract machine .... does not represent an existing object or situation, but it is instrumental in the production of new ones.<sup>38</sup>

There is a lot going on in these remarks, but we'll gloss them as follows. **First**, the diagram or thought-shaper condenses time—in the form of accumulated cognitive insights—into its structure and can be smoothly applied to a variety of domains of content. This is manifestly an advantage from a designer's point of

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<sup>37</sup> B. van Berkel and C. Bos, *Move: Imagination, Techniques, Effects*, Amsterdam, UNStudio/Goose Press, 2008, p. 374.

<sup>38</sup> *Ibid.*, p. 325.

view. **Second**, nevertheless, we must also keep in mind that a cognitive instrument, whenever it's effectively applied to a certain specific domain of content, then typically also shapes many other domains of content. It's an instance of the saying, 'when you have only a hammer, everything looks like a nail.' So, when applying the same set of cognitive equipment to new domains of content, then it's no wonder that these domains start to look very similar. **Third**, the phrase 'production of new situations' in the second quote is therefore relative, not absolute. It's relative with regard to the diagram or thought-shaper that's applied to it. The 'abstract machine' is still a cognitive machine, a cognitive mechanical invention that operates according to the same logic as a typewriter or printing press, even if it presents itself as more flexible and open-textured than the latter.

As we've asserted, thought-shapers are inherently *dual-content entities*: they inherently combine the essentially non-conceptual and the conceptual. At the same time, however, they're also inherently action-poised and enacted,<sup>39</sup> that is—like the architectural diagrams—they're also inherently *dynamically and practically implemented*.<sup>40</sup> The application of projection techniques is an excellent example of this, as per the following illustration:

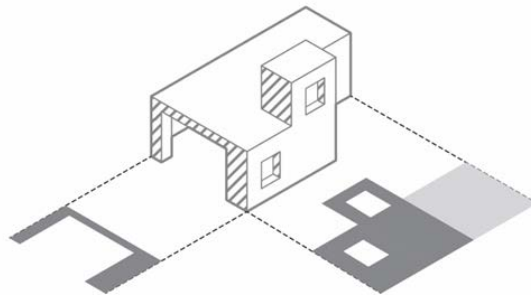


Figure 1: Architectural projection from isometric view to elevations.<sup>41</sup>

<sup>39</sup> See, e.g., S. Ammon and R. Capdevila-Werning (eds.), *The Active Image: Architecture and Engineering in the Age of Modeling*, Cham, Springer, 2017.

<sup>40</sup> For an account of the composite nature of imagery as applied in architectural design, see, e.g., B. Nigianni, 'Architecture as Image-Space-Text', in M. Frascari, J. Hale, and B. Starkey (eds.), *From Models to Drawings*, London, Routledge 2007, pp. 253–260.

<sup>41</sup> The process of projection is rule-bound, but each resulting representation contains a new network of conceptual and non-conceptual properties.

Once we transpose the outline of a plan into section, elevations, and/or isometric projections, the processes of transposing an image from 2D into 3D or conversely are bound by certain rules and laws. The rule-bound act of translating the image not only includes a conceptual grasp of the object, but also it simultaneously opens out into the essentially non-conceptual domain. This is why designers routinely ‘switch perspectives’ in dealing with the objects they envision.<sup>42</sup> While the process of projection is inherently conceptual and rule-bound, essentially non-conceptual thought-shapers contribute new processual and topological properties in the process of translation. It’s not only that things are *lost* in translation: they’re also *added*.

The resulting dual-content mental representations—shaped thoughts—as action-poised, are always used with some explicit/self-conscious or implicit/pre-reflectively conscious purpose in mind.<sup>43</sup> And this brings us to another general point about thought-shapers: the purposes for which they are used are an integral part of their cognitively dynamic nature. Indeed, the pervasive influence of thought-shapers stems from the fact that they’re *templates* for the spatial and temporal cognitive dynamics of human intentional action.<sup>44</sup> Template-guided intentional action makes rational sense only when the template for performance in a given actual-world context bears some meaningful relation to that context.<sup>45</sup> The mechanical, uncritical, and narrowly-focused (see sections 4 and 5 below)—and usually only pre-reflectively conscious—application of a template is an

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<sup>42</sup> See, for an exposition of this theme, S. Krämer, *Figuration, Anschauung, Erkenntnis: Grundlinien einer Diagrammatologie*, Berlin, Suhrkamp Verlag, 2016, pp. 296–298, and 312. And for an account of switching perspectives in research practices, see also K. Knorr-Cetina, ‘Objectual Practice’, in T. R. Schatzki, K. Knorr-Cetina, and E. Von Savigny (eds.), *The Practical Turn in Contemporary Theory*, London, Routledge, 2006, pp. 175–188; and O. Paans and R. Pasel, ‘The Simulative Stance: Architectural Design as Epistemic Enactment’, in R. Christensen, E. Drach, L. Gasperoni, D. Hallama, A. Hougaard, and R. Liptau (eds.), *Artefakte des Entwerfens: Skizzieren, Zeichnen, Skripten, Modellieren*, Berlin, Universitätsverlag der TU Berlin, 2020, pp. 58–74.

<sup>43</sup> Krämer, *Figuration, Anschauung, Erkenntnis: Grundlinien einer Diagrammatologie*, p. 298.

<sup>44</sup> See e.g., Hanna and Maiese, *Embodied Minds in Action*, esp. chs. 3-8; and R. Hanna, *Deep Freedom and Real Persons: A Study in Metaphysics*, THE RATIONAL HUMAN CONDITION, Vol. 2, New York, Nova Science, 2018, also available online in preview at URL =

[https://www.academia.edu/35801857/The\\_Rational\\_Human\\_Condition\\_2\\_Deep\\_Freedom\\_and\\_Real\\_Persons\\_A\\_Study\\_in\\_Metaphysics\\_Nova\\_Science\\_2018\\_](https://www.academia.edu/35801857/The_Rational_Human_Condition_2_Deep_Freedom_and_Real_Persons_A_Study_in_Metaphysics_Nova_Science_2018_).

<sup>45</sup> O.R. Scholz, ‘Abbilder und Entwürfe: Bilder und die Strukturen der menschlichen Intentionalität’, in K. Sachs-Hombach (ed.), *Bildtheorien: Anthropologische und kulturelle Grundlagen des Visualistic Turn*, Berlin, Suhrkamp, 2009, pp. 146–162, at p. 156.



automated or habituated response, or what we'll call a thought-*drill* in Gilbert Ryle's sense of the term.<sup>46</sup> It has little or nothing to do with the actual-world situation in which and to which the thought-shaper is originally applied. A drill is the rote application of a routine in a situation that seems appropriate to it. By a diametric contrast, a thought-*skill* is the application of a routine that's naturally required by the actual-world situation, and yields a close 'fit' to it.

Yet another way in which we can illuminate how thought-shapers function is by way of a short detour into *image theory*. In an informative and influential article, W.J.T. Mitchell describes a model that has been used for thinking about visual perception for centuries: the idea that somewhere in our brains, an image is formed that is a veridical representation of what is being perceived.<sup>47</sup> From Aristotle onwards—and with a respectable pedigree in the development of perspective—this idea divides the world into an inner and outer domain. Correspondingly, the inner domain 'mirrors' the outer domain in all respects but one, namely its physicality. We'll call this view *naïve realism about conceptualized perception*.<sup>48</sup> Contrariwise, thought-shapers operate via the construction of essentially non-conceptual contents—which Mitchell calls 'images'—as mental representations, and they do so by enactively representing topological and/or processual properties, and subsequently exaggerating or diminishing their presence. Here is a simple diagram depicting the fundamental difference between naïve realism about conceptualized perception and thought-shaping:

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<sup>46</sup> G. Ryle, *The Concept of Mind*, London, Hutchinson, 1949, pp. 41-44.

<sup>47</sup> W.J.T. Mitchell, 'What is an Image?', in *New Literary History*, 15, 1984, pp. 503-537, at pp. 508-509.

<sup>48</sup> It's important to distinguish (i) naïve realism with respect to *conceptualized perception*, from (ii) naïve realism with respect to *essentially non-conceptual sense perception*. Indeed, it's perfectly consistent and plausible to reject the former, and also affirm the latter. See, e.g., Hanna, *Cognition, Content, and the A Priori: A Study in the Philosophy of Mind and Knowledge*, THE RATIONAL HUMAN CONDITION, Vol. 5, ch. 3.

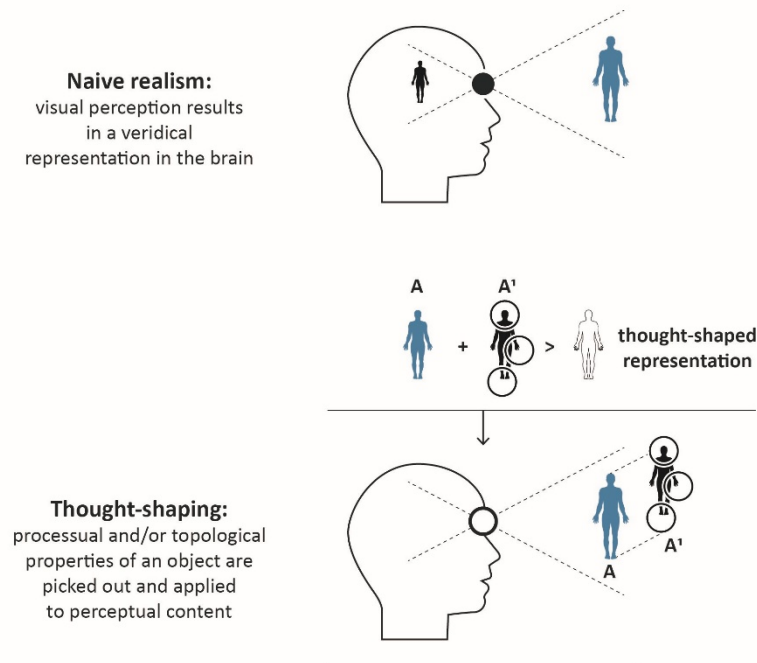


Figure 2: Naive realism about conceptualized perception *vs.* thought-shaping<sup>49</sup>

Suppose that the concept of an object A, via spatial or temporal representational properties, is converted into a shaped conceptual representation A'. A' is then applied to all cases such that an object A or anything resembling A is perceived, and it likewise inherently inflects the shaped thoughts and beliefs that are formed and asserted about them. In view of our commitment to the first 3 Es of the 4E approach to cognition, we know that the so-called 'image in the head' is in itself a fiction, and it gives rise to a deeply naïve account of how we judge the world around us. Therefore, we must resist the temptation to slip into some or another version of internalism or Cartesian dualism. Instead, we should always be critically vigilant when it comes to our most familiar or trusted habits of thought.

Mitchell correctly notes that the seeds of 'naïve realism' about conceptualized sense perception were sown during the Renaissance and the early development of perspective drawing:

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<sup>49</sup> The theory that we have 'pictures in our heads' is a mistaken theory, and should be replaced by the theory of thought-shapers, which enactively represent processual and/or topological properties.

The best index to the hegemony of artificial perspective is the way it denies its own artificiality and lays claims to being a “natural” representation of “the way things look,” “the way we see,” [and] “the way things really are.” Aided by the political and economic ascendance of Western Europe, artificial perspective conquered the world of representation under the banner of reason, science, and objectivity.<sup>50</sup>

Mitchell’s ‘natural’ representation, when combined with the 17th-century Cartesian idea of an objective space in which we can represent by means of coordinates, together with various contemporary 17<sup>th</sup> century social-institutional facts about Western Europe, contributed significantly to the emergence of the set of cultural ideas we call *the mechanistic worldview* (see section 5 below). Every culture is partially constituted by its own repertoire of thought-shapers, and the idea that the instruments of the Scientific Revolution of the 17<sup>th</sup> and 18<sup>th</sup> centuries were the final answer to the problem of representation has proven a remarkably persistent myth. —So much so, that one is inclined *not* to put the burden of proof on the person advancing their favorite thought-shaper and corresponding shaped thought. The misleading, slippery potential of thought-shapers is that they can disappear behind the myth of ‘natural’ representation. After all, if the world is presented to me in exactly the way I represent it by means of concepts, then the thought-shaper itself cannot exist! Where would it be located if the world is as it were ‘nakedly’ causally directly delivered to my thinking in all its manifest reality?

Summarizing so far, we’ve made the following seven claims about thought-shapers:

**First**, human cognition and intentionality are *equally* top-down (i.e., formally, non-empirically, or *a priori*, and non-contextually) and bottom-up (i.e., materially, empirically, or *a posteriori*, and inherently externally-contextually or indexically) constituted and structured; essentially non-conceptual capacities are shared by human and non-human, rational or non-rational animals alike; and conceptual capacities are grounded on this essentially non-conceptual foundation, although

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<sup>50</sup> Ibid., p. 524. For a more detailed discussion of the topic of ‘naturalness’ of representations, see also W.J.T. Mitchell, *Iconology: Image, Text, Ideology*, Chicago, Univ. of Chicago Press, 1980, esp. ch. 3. A similar point has also been made by M. Suwa and B. Tversky, ‘Constructive Perception: A Metacognitive Skill for Coordination and Perception’, *Proceedings of the Annual Meetings of the Cognitive Science Society*, 25, 2003, pp. 1140–1145.

conceptual content is categorically different from essentially non-conceptual content.

**Second**, since conceptual content generally presupposes and is grounded on essentially non-conceptual content, and since thought-shapers are essentially non-conceptual contents, then thought-shapers necessarily constitute, inflect, structure, and guide all human conceptualization and propositional thinking (including belief, judgment, statement-making, and inference) in a causal, partially-determining, and also irreducibly normative, action-poised way, that's external-context-sensitive or indexical, for better or worse; and normally, the essentially non-conceptual part pre-reflectively, non-self-consciously, and almost invisibly governs conceptualization and thinking.

**Third**, in the shaped thought (whether type-1, i.e., ideally logico-semantically formed, or type-2, i.e., not ideally logico-semantically formed) that's the product of the process of thought-shaping, there's a *mutual interpenetration*, *mutual co-determination*, and *fusion* of conceptual content and essentially non-conceptual content into holistically configured or patterned mental representations (roughly, *Gestalten*); indeed, it's precisely this feature makes thought-shapers so cognitively compelling and powerful: they continuously establish links between the essentially non-conceptual and conceptual contents, but do so normally only in pre-reflectively conscious, non-self-conscious mode, whereby it's almost impossible to catch them 'at work', insofar as they almost invisibly bridge the sensible and discursive domains; indeed, Wittgenstein's insight that

[o]ne thinks that one is tracing the outline of the thing's nature over and over again, and one is merely tracing around the frame through which we look at it,

and his incisive remark that

[e]ven if [an exclamation] gives no information, still, it is a picture; and why should we not want to call up such a picture before our mind? Imagine an allegorical painting taking the place of those words,<sup>51</sup>

aptly capture this feature of thought-shapers.

**Fourth**, thought-shapers inherently contain action-poised temporal dynamics and spatial dynamics, and therefore *enact* inherently processual and topological properties in all shaped thoughts.

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<sup>51</sup> Wittgenstein, *Philosophical Investigations*, §295, p. 107°.

**Fifth**, the action-poised purposiveness with which thought-shapers are used is an integral part of their cognitive dynamics.

**Sixth**, thought-shapers are templates for intentional action, but template-led acting makes rational sense only when a template for action in a given actual-world external situation bears some meaningful relation to that situation.

**Seventh** and finally, although thought-shaping is a necessary feature of all human thinking, what makes thought-shapers especially difficult to identify and recognize self-consciously is the twofold fact (i) that as per the second and third points above, the partially constituting, inflecting, and structuring activity of thought-shapers normally takes place in a pre-reflectively conscious and therefore *non*-self-conscious mode, and (ii) that as per the fourth, fifth, and sixth points above, in relation to the holistically patterned or configured shaped thought and its external-context-sensitive/indexical action-poised purposiveness, due to its categorically distinct essentially non-conceptual processual and topological content-properties, which as it were *install* human thinking in a rich cognitive substrate so that it runs along specific *grooves*, the thought-shaper, *on its own*, appears to provide a justification for various beliefs. Indeed, it's precisely this characteristically 'installed' and 'grooved' cognitive dynamics of shaped thoughts, for better or worse, via essentially non-conceptual thought-shaping, as per (ii), that's our focus in the next section.

### 3. CONSTRICTIVE THOUGHT-SHAPERS *VS.* GENERATIVE THOUGHT-SHAPERS

The theory of thought-shapers is continuous with and an extension of the theory of *social-institutional mind-shaping and life-shaping* that Michelle Maiese and Robert Hanna presented in their 2019 book, *The Mind-Body Politic*. In that book, they argue (i) that mind-shaping and life-shaping in human social institutions is essentially embodied and directly revealed in bodily comportment, and (ii) that there's a crucial distinction between (iia) social institutions that shape our essentially embodied minds/lives in destructive, deforming ways, and (iib) social institutions that shape our essentially embodied minds/lives in constructive, enabling ways, where the difference between destructive, deforming ways and constructive, enabling ways is cashed out in terms of either frustrating and undermining, or else promoting and sustaining, the satisfaction of true human

needs.<sup>52</sup>

As regards their thesis (i) and the theory of thought-shapers, Maiese and Hanna are building on what they call *the essential embodiment theory* of the mind-body relation, aka EET, that they presented in their 2009 book, *Embodied Minds in Action*. According to EET, the mental-physical relation is a *two-way necessary complementarity*, that is, a mental-to-physical and physical-to-mental necessary equivalence that captures the manifestly real essence of minded animals like us. In a nutshell, EET says that the conscious minds of animals are *necessarily* and *completely* embodied in those animals, and that the conscious mind of an animal is the global dynamic immanent structure of the living organismic body of that very animal, a structure that inherently activates and guides the animal's causally efficacious biological powers—or as Aristotle puts it in his own terminology: ‘the soul (*anima*) is the first actuality of a natural body that has life potentially’.<sup>53</sup> Hence EET is committed to a dynamicist, organicist, and processualist version of *neo-Aristotelian hylomorphism* about the mind-body relation.<sup>54</sup>

The direct implication of applying EET to thought-shapers, via the cognitive semantics of essentially non-conceptual content, is that *thought-shapers are directly revealed in action-poised bodily comportment*.<sup>55</sup> In this connection, there are significant parallels between the theory of thought-shapers and the breakthrough work of Mark Johnson and George Lakoff, in Johnson's 1990 *The Body in the Mind*,<sup>56</sup> and also in Lakoff's and Johnson's 2003 *Metaphors We Live By*.<sup>57</sup>

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<sup>52</sup> M. Maiese and R. Hanna, *The Mind-Body Politic*, London, Palgrave Macmillan, 2019, esp. chs. 1-3 and 6-8, also available online in preview at URL = <[https://www.academia.edu/38764188/The\\_Mind-Body\\_Politic\\_Preview\\_Co-authored\\_with\\_Michelle\\_Maiese\\_forthcoming\\_from\\_Palgrave\\_Macmillan\\_in\\_July\\_2019](https://www.academia.edu/38764188/The_Mind-Body_Politic_Preview_Co-authored_with_Michelle_Maiese_forthcoming_from_Palgrave_Macmillan_in_July_2019)>.

<sup>53</sup> Aristotle, *De Anima*, II.i.412a22.

<sup>54</sup> Hanna and Maiese, *Embodied Minds in Action*, esp. chs. 1-2 and 6-8.

<sup>55</sup> Since thought-shapers are immediately manifested in action-poised bodily comportment, then they're essentially *not* hidden like a ghostly beetle inside an inner Cartesian box, accessible only to infallible introspection. In other words, via the essential embodiment of the human mind, *thought-shapers are intersubjectively observable, as well as being phenomenologically observable*. This is an extremely important point in relation to the history of empirical psychology, and in particular to the in-principle unresolvable ‘imageless thought’ controversy that significantly motivated the overthrow of classical 19<sup>th</sup> century introspectionist psychology by behaviorism in the early 20<sup>th</sup> century. See, e.g., M. Kusch, *Psychological Knowledge: A Social History and Philosophy*, London, Routledge, 1999.

<sup>56</sup> M. Johnson, *The Body in the Mind: The Bodily Basis of Meaning, Imagination, and Reason*, Chicago, IL, Univ. of Chicago Press, 1990.

<sup>57</sup> G. Lakoff and M. Johnson, *Metaphors We Live By*, Chicago, IL, Univ. of Chicago Press, 2003.

Mirroring and extending Maiese's and Hanna's thesis (ii) in *The Mind-Body Politic*, there's a corresponding basic distinction in our theory of thought-shapers between: (i) thought-shapers that shape our conceptual thinking in destructive, deforming ways, which we call *constrictive* thought-shapers, and (ii) thought-shapers that shape our conceptual thinking in constructive, enabling ways, which we call *generative* thought-shapers. But what, more precisely, is the difference between constrictive and generative thought-shapers?

A starting point for explaining this difference is that Platonic images, Baconian Idols, Marxian ideology, Wittgensteinian pictures, at least some Pepperian root metaphors for metaphysical worldviews,<sup>58</sup> and persistent false beliefs and misinformation, are all vivid examples of *constrictive* thought-shapers. In this way, constrictive thought-shapers typically 'install' and 'groove' people's thinking not only pre-reflectively and non-self-consciously, but also, and above all, by operating essentially as what William Blake called *mind-forg'd manacles*:

In every cry of every Man,  
In every Infants cry of fear,  
In every voice: in every ban,  
The mind-forg'd manacles I hear.<sup>59</sup>

More specifically, then, constrictive thought-shapers, in a mostly pre-reflective and non-self-conscious way, *lock* human thinking into false dogmatic assumptions and presuppositions, and into repetitive, uncreative, and unproductive routines, that inevitably lead to contradictions, dilemmas, paradoxes, and vicious circles in philosophical, formal-scientific, and natural-scientific thinking (aka *dialetheias*),<sup>60</sup> and to conflicts, crashes, crises, and *cul de sacs* (aka *disasters*) in artistic, moral, and sociopolitical thinking. To return to an earlier example, this means that Kant's idea of a moral catechism (or, more broadly, moral education) was in itself a fine

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<sup>58</sup> Pepper identifies at least six different worldviews or 'world hypotheses': animism, mysticism, formism, mechanism, contextualism, and organicism; see *World Hypotheses*, chs. VI to XI. In our view, *only* organicism is a philosophically, scientifically, artistically, morally, and sociopolitically *fully adequate worldview*, and therefore only *its* root metaphor—the organism—is a *fully generative thought-shaper*. As a consequence, the root metaphors associated with animism, mysticism, formism, mechanism, and contextualism are all, to some degree, constrictive thought-shapers; and the natural automaton or natural machine, the root metaphor associated with the mechanistic worldview, is the *most* constrictive.

<sup>59</sup> W. Blake, 'London', in W. Blake, *Songs of Experience* (1794), lines 5-8.

<sup>60</sup> There are some important similarities between the theory of dialetheic thought-shapers and Kant's theory of *dialectic* in the first *Critique*; see *Critique of Pure Reason*, pp. 384-623, A293-704/B249-732.

idea, but that it *also* runs the risk of *imposing* a set of views on students, instead of priming their capacities for generative thinking and free agency.

By a diametrically opposed contrast to constrictive thought-shapers, generative thought-shapers, by ‘installing’ human thinking in inherently *re-configurable* and *re-patternable* ‘grooves’,<sup>61</sup> self-consciously unlock, liberate, and sustain creative and productive human thinking. A characteristic feature of generative thought-shapers is that they possess not only effective, true, flexible application to a proper domain of content, but also effective, true, flexible *re-application* or *repurposing*, across several or even unrestrictedly many *different* domains of content, yet *without* being infinitely malleable, ambiguous, or vague. We’ve already proposed that the mental representation of David Foster Wallace’s ‘the-fish-&-the-water’ allegory/parable is a paradigmatic generative thought-shaper in recent and contemporary moral or sociopolitical culture, and we’ll come back again to this allegory/parable briefly at the end of section 7. In the meantime, here are three other more detailed examples of generative thought-shapers, taken from two instructively different areas of cognitive activity and different domains of content—namely, mathematics or mathematical logic, and architecture—including variations across non-empirical (formal, *a priori*) and empirical (material, *a posteriori*) cognition.

#### 1. Cantor’s Diagonalization Argument

A paradigmatic classical example of a generative thought-shaper in the formal sciences is Georg Cantor’s famous *diagonalization argument* (aka Cantor’s *topological proof*) for the existence of transfinite numbers, i.e., non-denumerable infinities, i.e., infinite sets that *cannot* be put into a 1-1 correspondence with the infinite set of natural numbers.<sup>62</sup> How did Cantor do this? Let’s assume that the set of natural numbers (i.e., 1, 2, 3 ...) is infinite: then a set of numbers is *denumerably infinite* if and only if it can be put into a 1-1 correspondence with the set of natural numbers. It turns out, perhaps surprisingly, that the whole numbers (0, 1, 2, 3 ...) and also

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<sup>61</sup> It’s initially tempting to use the term ‘reprogrammable’ as an analogy or metaphor here, because it’s so familiar and vivid from our contemporary ubiquitous use of digital technology. But that term falsely implies *the computational theory of mind*, which actually applies only to *mechanical thought-shapers*, as we’ll see in section 5 below.

<sup>62</sup> See G. Cantor, ‘Ueber eine elementare Frage der Mannigfaltigkeitslehre’, *Jahresbericht der Deutschen Mathematiker-Vereinigung*, 1, 1891, 75–78.



the integers (the whole numbers and their negative mirror) and rational numbers (integers plus all repeating and terminating decimals), and all sets of numbers based on basic (primitive recursive) mathematical operations over the rationals, have the same *cardinality* (i.e., counting-number-osity) as the natural numbers, because they can be paired 1-1 with the natural numbers. Basically, Cantor created a method for displaying a top-down vertical list of all the number sequences in the system of positive rational numbers (and since the negative numbers are just a mirror of the positive ones, they don't differ except in their being marked as negative). Then he constructed or 'drew' a diagonal line across the list. Since, by hypothesis, a complete list contains *all* the rationals, and there are infinitely many rationals, then the infinite number picked out by the diagonal *isn't* on the list, hence its cardinality is *non*-denumerable but still infinite, aka transfinite. Moreover, because the list is a two-dimensional array, and since the constructed diagonal line that runs across it systematically picks out a number that is *not* displayed within the two-dimensional space of the array, then it in effect *represents a third and higher spatial dimension* over and above the two-dimensional array. So, in effect, transfinite numbers *are higher-dimensional numbers*.

Decisive positive evidence for the generativity of Cantor's diagonalization thought-shaper is Kurt Gödel's famous 1931 argument for the incompleteness of mathematical logic,<sup>63</sup> where 'mathematical logic' is understood as per A.N. Whitehead's and Bertrand Russell's *Principia Mathematica*, and essentially similar systems, which include the basic axioms of Peano arithmetic, together with the primitive recursive functions over the natural numbers. Gödel brilliantly repurposes Cantor's topological proof strategy in demonstrating the existence of undecidable/unprovable sentences in mathematical logic, via the method of *Gödel-numbering*.

## 2. Architectural Sketching

Another example of an organic, generative thought-shaper is the mental representation of a rough architectural sketch. Seen from the viewpoint of intellectualism, the sketch is vague, indeterminate, and incomplete. It does not bear a one-to-one correspondence to what it intends to represent. Again, if we

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<sup>63</sup> See K. Gödel, 'On Formally Undecidable Propositions of *Principia Mathematica* and Related Systems', in J. Van Heijenoort (ed.), *From Frege to Gödel*, Cambridge, MA, Harvard Univ. Press, 1967, pp. 596-617.

fall back on the language of idealized, strict propositional thinking, the sketch cannot but be incomplete and lacking in multiple respects. However, the mistake lies in misconstruing what a sketch actually is. **First**, it's not a proposition. **Second**, it's not a faithful, figurative representation of a building or other object that's either realized or is yet-to-come. Contrariwise to both of these, it's a dynamic diagram that traces various aspects that might at some point belong to the building or that stand out. By playing around with the aspects that are included and those that are excluded, a new picture emerges in which the present elements enter into a new dialectical relationship. They offset and illuminate each other, as well as the voids and blanks between them. As such, they are *apposites*, setting of new causal and normative chains of reasoning in the observer.<sup>64</sup> We can also call this 'presence' or 'making visible'.<sup>65</sup> Observers have to take the drawing 'into their possession', in the sense that they must explore the drawing, and takes its representational contents as point of departure for forming beliefs.<sup>66</sup> This relationship is not merely or even primarily intellectual or ratiocinative: it's just as much, or even moreso, essentially embodied, emotive, and agential, as immersing oneself in a movie or other narrative artwork. One must 'dwell' in the drawing to tease out its hidden potentials, and to allow it to become a thought-shaper, partially causing, forming, and guiding one's thinking on a given subject.<sup>67</sup> The sketch—like the architectural diagrams discussed earlier and also directly below—has processual and topological properties: it allows one to 'freeze time' and retain some aspects while deleting others; simultaneously, its topology can constantly be reworked, reversed, and modified.<sup>68</sup> More generally, the mental representation of a sketch is as much a *processual instrument* as it is a static representation.

### 3. Architectural Diagrams

Another—this time, digital—example of generative thought-shapers is the use of

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<sup>64</sup> For a systematic treatment of appositional logic and its application in design activity, see N. Cross, *Designerly Ways of Knowing*, Basel, Birkhäuser, 2007.

<sup>65</sup> A. Noë, *Varieties of Presence*, Cambridge, MA, Harvard Univ. Press, 2012.

<sup>66</sup> P. Zumthor, *Architektur Denken*, Basel, Birkhäuser, 2014.

<sup>67</sup> M. Polanyi, *The Tacit Dimension*, New York, Anchor Books, 1967.

<sup>68</sup> J. Whyte and B. Ewenstein, 'Wissenspraktiken im Design: Die Rolle Visueller Repräsentationen als "Epistemische Objekte"', in C. Mareis, G. Joost, K. Kimpel (eds.), *Entwerfen, Wissen, Produzieren: Designforschung im Anwendungskontext*, Bielefeld, Transcript Verlag, 2010, pp. 47–80.

mental representations of external context-sensitive/indexical architectural diagrams, although their parameters remain largely the same across contexts. The architectural diagrams utilized by UNStudio and Zaha Hadid architects are examples of images that are malleable without being vague. On the one hand, they contain a package of principles and relations. But on the other, they can also be adapted to almost any actual-world context. Architectural diagrams hold certain topological relations fixed, but these relations are so fluid that they do not seem to exist at all. As such, the diagram typically hides the part of its content that would reveal it to be a thought-shaper. It appears as a handy and flexible tool that can be applied to a host of situations, but its very internal structure almost invisibly pre-structures the domains of content to which it is applied. We can see some of the ideological surplus in one of the remarks that Van Berkel and Bos make about diagrams:

The design model integrates several elements, rather than providing the designer with one important paradigm. It does not simply state ‘surface’ or ‘fold’, but instrumentalizes such concepts to incorporate the real ingredients of a real work in architecture.<sup>69</sup>

To appear neutral is ingrained in its very nature as a generative thought-shaping diagram; yet it’s precisely this characteristic that’s also responsible for its efficacy in practice.

As we’ll see in the next two sections, however, thought-shapers always *also* assume a worldview and an associated Pepperian “root-metaphor”—even if they themselves typically hide the premises, origins, and presuppositions of the worldview/root metaphor they covertly assume. An illustration of this feature can be found in a description of Peter Eisenmann’s architectural design procedures:

[P]eter’s notion of form generation was a kind of iterative—one might even say, although actually I don’t think he would say this—recursive process. It’s really more additive, where you begin with a geometric primitive and then through a series of geometrical operation of displacements and slippages, over the course of these different iterations the objects gains greater complexity, such that all the information from the previous stages is embedded in the object.<sup>70</sup>

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<sup>69</sup> B. van Berkel and C. Bos, *UNStudio Design Models: Architecture, Urbanism, Infrastructure*, London, Thames and Hudson, 2008, p. 21.

<sup>70</sup> S. Allen, ‘The Paperless Studio in Context’, in A. Goodhouse (ed.), *When is the Digital in Architecture?*, Berlin & Cambridge MA, Sternberg Press/MIT Press, 2017, pp. 383–404, at p. 395.

Although Eisenmann's diagrams are generated by Turing-computable operations, they *look* as if they transcend computability and extend into some kind of new architectural creativity (i.e. a “new ontological domain” of creativity only accessible to the designing mind), and to that extent, they hide their inherently mechanical nature. An even more striking case of the same phenomenon is the fluid-and-organic-looking yet also computer-generated diagrams by Zaha Hadid Architects:

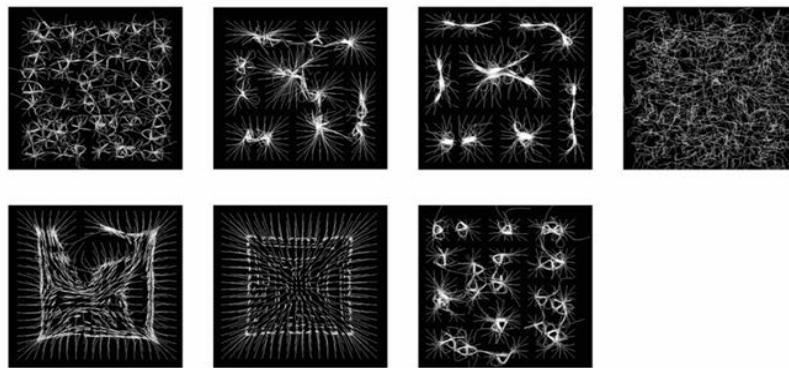


Figure 3: Some stills from the abstract animation film ‘Parametricism’, by P. Schumacher and R. Chan<sup>71</sup>

These diagrams present an interesting borderline case. They look organic, and their curvature and morphing shapes suggests a natural evolution. Yet, they are computer-generated through parametric design. Yet, they represent the latest advance in mechanistic thought. Only this time, the aesthetic that results seems to be rooted in organic processes. The fact that such diagrams are highly adaptable to different contexts suggests that they naturally grow into their surroundings, but again, this is a subtle deception. So, although they look organic, they are mechanistic; but at the same time, they are so highly flexible and integrative that it is hard to believe.

<sup>71</sup> P. Schumacher and R. Chan, ‘Parametricism’, (Harlem Film Festival 2013), video available online at URL =

<[https://www.youtube.com/watch?v=yVJPeo\\_Vc5c](https://www.youtube.com/watch?v=yVJPeo_Vc5c)>. The shapes are parametrically defined and can be transformed infinitely. Each visual representation gives rise to a new foreground/background relationship in the perceived object, yielding an oscillation between determination and reflection.

#### 4. SOME PARADIGMATIC CLASSICAL EXAMPLES OF PHILOSOPHICAL AND MORAL OR SOCIOPOLITICAL CONSTRICTIVE THOUGHT-SHAPERS, WITH ACCOMPANYING DIAGRAMS

A paradigmatic classical example, drawn from philosophy, of a constrictive thought-shaper, is the doctrine of *epistemic foundationalism*. A necessary element of the doctrine is how the thought-shaping mental representation of an analogy, image, or picture of a *well-constructed pyramid* carries a highly convincing impact on belief that's, to borrow a famous distinction from Wittgenstein's *Tractatus Logico-Philosophicus*, not *said* but rather only *shown*:

4.1212 What *can* be shown *cannot* be said.<sup>72</sup>

Since pyramids are constructed from the ground up, so too it's *shown* by the thought-shaper, and then carried over directly into the corresponding shaped thought, that human knowledge must bottom out in cognitive items that provide sufficient support for every higher level of the pyramid. In this way, conforming itself to—i.e., 'installed' and 'grooved' by—the thought-shaper, but expressing it in categorically different semantic content, the shaped thought of epistemic foundationalism then *says* that knowledge is grounded solely on some non-normative primitive facts, whether internal or external, that somehow fully justify corresponding foundational beliefs by means of causing, or otherwise strictly determining, those beliefs, thereby stop any vicious skeptical regress of inferential reasons for belief.

But there's a self-contradictory, self-undermining problem with epistemic foundationalism: *non-normative* primitive facts simply *cannot* normatively support, i.e., justify, beliefs. The non-normative, primitive, causal/strictly determining facts are just like the foundations of a pyramid: they are 'below grade' and anchored in the earth, hence they causally hold up everything that's built on top of them, but non-normative primitive *causes* are not normative *reasons*. This thought-shaper of a pyramid supported by a stable, immovable, hidden, earthy base is so powerful for the corresponding shaped thought of epistemic foundationalism, that the legitimacy of the very idea of epistemic foundations is seldom questioned at all. The essentially non-conceptual topological dynamics of the thought-shaper pre-reflectively and non-self-consciously induces a certainty

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<sup>72</sup> L. Wittgenstein, *Tractatus Logico-Philosophicus*, trans. C.K. Ogden, London, Routledge & Kegan Paul, 1981, p. 79.

or conviction about the naturalness of epistemic foundationalism, whereas in fact it's altogether incoherent and self-stultifying. Many contemporary philosophers, heavily influenced by what's now called 'The Pittsburgh School of Philosophy', initiated by Wilfrid Sellars, have critically called attention to 'The Myth of The Given';<sup>73</sup> but fewer, if any—since a core dogma of The Pittsburgh School is conceptualism—have noted The Myth's grounding in the dual-content nonideal cognitive semantics and cognitive dynamics of thought-shapers.

A closely-related paradigmatic classical constrictive thought-shaper plays a crucial role in the philosophy of physics, chemistry, and biology, and more generally in the metaphysics and/or ontology of the natural or physical world: *the levels picture*, which depicts the all-inclusive natural or physical world, aka *the cosmos*, as a vertical stack of layers or strata with strictly lawlike upwards and downwards arrows necessarily linking the layers. Thus *shown*, the levels picture of the cosmos, in its corresponding shaped thought, then *says* that the cosmos is strictly, solely, and wholly constituted by a bottom layer/stratum of fundamentally physical facts about fundamentally physical particles, forces, waves, or whatever, and also that every other higher layer or stratum (for example, chemical, biological, mental, social) is strictly, solely, and wholly determined by the bottom layer or stratum in the dual sense (i) that it's literally made out of the stuff in the bottom layer (i.e., mereological identity), and (ii) that facts about the bottom layer necessitate all the facts about every other layer, and no fact about any higher layer or stratum can change without a strictly natural-law-governed or strictly logical-law-governed corresponding change in the facts about the bottom layer (i.e., either natural/nomological or logical strong supervenience<sup>74</sup>). Nevertheless, the self-contradictory, self-undermining problems about the levels picture of nature are (iii) that it's impossible to explain

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<sup>73</sup> See, e.g., R. Hanna, 'Zero for Conduct at The Pittsburgh School: Three Dogmas and Three Radical Kantian Alternatives', in A. Ciatello, A. Di Riccio, and D. Manca (eds.), *The Metaphysics of The Pittsburgh School and its Kantian Legacy*, forthcoming, also available online in preview at URL =

<[https://www.academia.edu/45477141/Zero for Conduct at The Pittsburgh School Three Dogmas and Three Radical Kantian Alternatives Full length version May 2021 compact version forthcoming in A Ciatello A Di Riccio and D Manca eds The Metaphysics of The Pittsburgh School and its Kantian Legacy 2021](https://www.academia.edu/45477141/Zero_for_Conduct_at_The_Pittsburgh_School_Three_Dogmas_and_Three_Radical_Kantian_Alternatives_Full_length_version_May_2021_compact_version_forthcoming_in_A_Ciatello_A_Di_Riccio_and_D_Manca_ed_The_Metaphysics_of_The_Pittsburgh_School_and_its_Kantian_Legacy_2021)>.

<sup>74</sup> For explicit definitions of strong supervenience, natural or nomological strong supervenience, and logical strong supervenience, see section 6 below.

why all the higher layers don't metaphysically and/or ontologically collapse into the bottom layer (i.e., strict type-type reduction), but (iv) if the higher layers *don't* collapse downwards, then none of the layers above the bottom layer has any efficacious causal powers of its own (i.e., epiphenomenalism). Just like epistemological foundationalism, the levels picture of nature is altogether incoherent and self-stultifying: physics + the levels picture purports to explain the cosmos, *yet physics cannot itself explain physics*, therefore physics + the levels picture is inherently explanatorily incomplete.<sup>75</sup>

The 'foundational' constrictive thought-shaper described above, whether in epistemic foundationalism or in the metaphysical and/or ontological levels picture of the cosmos, is a paradigmatic classical example of how the thought-shaping mentally represented picture (the sturdy and primitive foundation) pre-reflectively and non-self-consciously smuggles essentially non-conceptual false presuppositions into shaped philosophical thinking ('there must be *Ur*-facts that support everything'). But such constrictive thought-shapers are by no means restricted to philosophy. A paradigmatic classical example from social thinking and politics is the shaped thought of *the outsider*, obviously grounded on a constrictive thought-shaper that spatiotemporally dynamically separates an *inner space* (where 'The We' or 'The Us' lives) from an *outer space* (where 'The They' or 'The Other' lives). For example, the extremely powerful effect of constrictive thought-shaping and its spatiotemporal dynamics, when framed as 'the inhabitants of inner space, The We *versus* the inhabitants of outer space, The Other', which is then captured as a system of shaped thoughts in the form of bad, false, and wrong ideological beliefs, is brilliantly depicted in Neill Blomkamp's 2009 science fiction movie, *District 9*. More generally, identitarian, 'populist', and especially fascist or neo-fascist politicians can rally their voters by proclaiming that all the members of certain ethnic, foreign, or racial minority group are dirty, lazy, untrustworthy, etc. These adverse moral or sociopolitical beliefs then pre-reflectively attach themselves to every perception, memory, or forward-looking

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<sup>75</sup> See, e.g., R. Hanna, 'Can Physics Explain Physics? Anthropic Principles and Transcendental Idealism', in L. Caranti (ed.), *Kant and The Problem of Knowledge in the Contemporary World*, London, Routledge, forthcoming, also available online in preview at URL = [https://www.academia.edu/45586285/Can\\_Physics\\_Explain\\_Physics\\_Anthropic\\_Principles\\_and\\_Transcendental\\_Idealism\\_Forthcoming\\_in\\_L\\_Caranti\\_ed\\_Kant\\_and\\_The\\_Problem\\_of\\_Knowledge\\_in\\_the\\_Contemporary\\_World\\_Routledge\\_2021](https://www.academia.edu/45586285/Can_Physics_Explain_Physics_Anthropic_Principles_and_Transcendental_Idealism_Forthcoming_in_L_Caranti_ed_Kant_and_The_Problem_of_Knowledge_in_the_Contemporary_World_Routledge_2021).

mental representation of every member of that group. Consequently, it very often happens that people belonging to some or another outsider ethnic, foreign, or racial minority group, once they've been placed in spatial opposition to the 'insiders, are then *systematically treated as if they were* are dirty, lazy, untrustworthy, etc. In such cases—which can be generalized to identity-based discrimination of all kinds—the constrictive thought-shaper 'installs' and 'grooves' human thinking in the corresponding ideological shaped thought as a *defamatory stereotype* that essentially non-conceptually spatially structures conceptual thinking about people, and *thereby*, by showing and not by saying, and almost always pre-reflectively, it cranks out<sup>76</sup> highly inflammatory, bad, false, wrong, and indeed immoral emotional (i.e., desiderative, felt, and passionate) and practical content in human beliefs.

Of course, we all use stereotypes all the time, in order to mediate, simplify, and speed-up various processes and routines of thinking. Seldom, if ever, do human thinkers encounter as situation that is bewilderingly novel. And evolutionary speaking, the habitual application of stereotypical representations of sets of past experiences to new situations is entirely natural and well-supported. Nevertheless, the cognitive problem of defamatory stereotypes in particular, and constrictive thought-shapers more generally, occurs when and just insofar as thought-shapers frame conceptual content in corresponding shaped thoughts, in the form of bad, false, and wrong ideological beliefs, whose formats are habituated or routinized into intentional actions in a ways that are extremely difficult to dislodge or transform for the better, even when confronted with overwhelming evidence to the contrary. Indeed, as has been empirically well-documented, such a confrontation by overwhelming contrary evidence even reliably produces a *backfire effect*, whereby existing entrenched bad, false, and wrong beliefs are 're-installed' and 're-grooved' even *more* fixedly and *more* intransigently.<sup>77</sup>

Again, we encounter here the built-in limitation of template-led intentional

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<sup>76</sup> This mechanical metaphor provides a thought-shaping segue to our explanation of constrictive thought-shapers in terms of inherently mechanical processes and structures, in section 5.

<sup>77</sup> See, e.g., Nyhan and Reifler, 'When Corrections Fail: The Persistence of Political Misperceptions'; and Lewandowsky et al., 'Misinformation and Its Correction: Continued Influence and Successful Debiasing'.



action: the application of a template to a given domain of content is meaningful or rational only insofar as the template matches that domain of content in its actual-world external context, and yields an appropriate response to it. But constrictive thought-shapers are always applied arbitrarily, haphazardly, and inappropriately, thereby producing salient mismatches between the shaped thought and the relevant domain of content in its actual world context, and therefore they yield bad, false, or wrong beliefs, whether theoretical, emotional, or practical. Yet, alarmingly and often even catastrophically or tragically, these bad, false, and wrong shaped thoughts *persist* as beliefs, and are highly resistant to modification or replacement, precisely because of the normally non-self-conscious character of all thought-shaping, which makes them almost invisible, together with the cognitive efficacy and impact that's also characteristic of all thought-shapers, and above all together with another and indeed essential feature of all and only specifically *constrictive* thought-shapers that we'll explore in section 5 below: their inherently mechanical, recursive character.


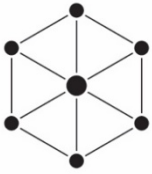

Over and above constrictive thought-shapers themselves, one vitally important contributing factor to the persistence of bad, false, and wrong beliefs, and to the re-entrenchment of these beliefs via the backfire effect, is the larger *social-institutional environment of human thinking*, and especially the impact of what (as we noted earlier) Maiese and Hanna call “destructive, deforming social institutions”<sup>78</sup>—for example, the social institutions of “structural” or “systemic” racism, and fascist/neo-fascist political systems. In this connection, it's crucial to remember that the theory of essentially embodied thought-shapers, and the theory of essentially mind-shaping and life-shaping in social institutions, are continuously related to one another.


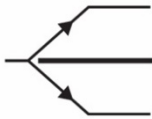

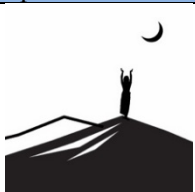
But coming back to thought-shapers themselves again, and before we proceed to a discussion of the inherently mechanical, recursive of constrictive thought-shapers, here's a table describing some paradigmatic classical philosophical constrictive thought-shapers and moral or sociopolitical constrictive thought-shapers, with accompanying diagrams. We're not claiming that the diagrams we've provided are the *only* thought-shapers that could be used to capture the corresponding constrictively-shaped metaphysical, epistemic, moral, or


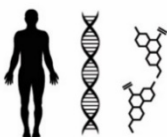
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<sup>78</sup> See Maiese and Hanna, *The Mind-Body Politic*, esp. chs. 2-3.


sociopolitical thoughts, but rather simply that the diagrams we've provided are *characteristic* or *typical* examples of such constrictive thought-shaping; the reader is of course free to re-draw, refine, or revise the diagrams as appropriate or desired.

Philosophical &/or Moral or Sociopolitical Doctrine	Structural metaphor/analogy	Conceptual problems
<p>Epistemic foundationalism, and the levels picture of the cosmos</p> 	<p>'like a pyramid, there must be secure foundations for knowledge, and the cosmos must bottom out in fundamentally physical facts and entities'</p>	<p><i>Non</i>-normative primitive facts <i>cannot</i> normatively support (i.e., justify) beliefs. This picture gives also rise to the 'layers' picture of nature: but if it's true, then (i) it's impossible to explain why all the higher layers don't metaphysically and/or ontologically collapse into the bottom layer (strict type-type reduction), but (ii) if all the higher layers <i>don't</i> collapse downwards, then none of them has any efficacious causal powers of its own (epiphenomenalism).</p>
<p>Epistemic coherentism</p> 	<p>'like a spider's web, the web of belief is self-justifying'</p>	<p>Compatibility-relations and inferential networks of beliefs on their own do not guarantee correspondence with actual-world facts beyond beliefs.</p>
<p>Internalism about justification</p> 	<p>'justification is inside the head'</p>	<p>The relationship, if any, between inner content facts and the external world is essentially mysterious, and it's fully open to radical skepticism about how inner content-facts are verified in the absence of any intersubjective evidence.</p>

Externalism about justification	'justification is outside the head'	The relationship between outer content facts and conscious minds, if any, is essentially mysterious, and it's fully open to radical skepticism about how outer content-facts are verified in the absence of any conscious evidence.
		
Ontological dualism	'like forking paths, fundamentally physical facts and fundamentally mental facts are mutually exclusive'	Causal relations between the fundamentally mental things or properties and the fundamentally physical things or properties are then essentially mysterious: it's metaphysically possible for all the facts about fundamentally physical things or properties to exist or stay the same, while all the facts about fundamentally mental things or properties <i>either fail to exist or completely change</i> .
		
Hobbesian pessimism	'like beasts or decision-theoretic robots, without coercive authoritarian governments/laws to stop us, we'll naturally regress to the state of nature and total war'	Treating people as egoistic and mutually antagonistic beasts or biological machines operating according to decision-theoretic algorithms, actually operates as a <i>nocebo</i> priming people, in society, to choose and act collectively in essentially <i>worse</i> ways.
		
Rousseauian optimism	'like noble savages, if people are left alone and free, then they'll flourish'	Treating people as essentially free, virtuous, and happy as individuals in the state of nature, yet also essentially enslaved, corrupted, and made unhappy by society, actually operates as a <i>nocebo</i> priming people, in society, to choose and act collectively in essentially <i>worse</i> ways.
		

<p>Leibnizian theological optimism</p>	<p>'like a fairy tale, all is for the best in this, the best of all possible worlds, because it's created by an omnipotent, omniscient, and omnibenevolent God'</p>	<p>Since natural evil and moral evil do actually exist, then either (i) God could not have prevented this evil (hence God is <i>not</i> omnipotent), or (ii) God could not have foreseen this evil (hence God is <i>not omniscient</i>), or (iii) God either created or foresaw this evil and therefore is Himself evil (hence God is <i>not omnibenevolent</i>): so, given the fact of evil, theological optimism is self-refuting.</p>
	<p>'like someone carrying an immense burden, human existence is a vale of tears, therefore it's meaningless'</p>	<p>A universal human condition of suffering and unhappiness, even if it were true, would still be meaningful, otherwise we wouldn't care about our suffering and our unhappiness and prefer the opposite: so existential pessimism is self-refuting.</p>
<p>Reductive physicalism</p>	<p>'like a tinker-toy model, everything is reducible to fundamentally physical, contingent facts'</p>	<p>If everything is reducible to fundamentally physical, contingent facts, then since the reducibility relation is logical strong supervenience,<sup>79</sup> but logical strong supervenience is itself a <i>non-contingent, non-physical</i> strong modal relation, therefore reductive materialism/physicalism is self-refuting.</p>
		

<sup>79</sup> For explicit definitions of strong supervenience, natural or nomological strong supervenience, and logical strong supervenience, see section 6 below.

Post-modern relativism	'like a magnifying glass focused at a single point, all truth is relative, and no truth is universal'	If all truth is relative, and no truth is universal, then it cannot be universally true that all truth is relative and no truth is universal: so post-modern relativism is self-refuting.
		

## 5. THOUGHT-SHAPERS, MECHANISM, AND ORGANICISM

Using the paradigmatic classical examples of constrictive thought-shapers presented in section 4 as initial data, and also looking for an inference-to-the-best-explanation of constrictive and generative thought-shapers alike, how can we explain the difference between constrictive and generative thought-shapers? Our view is that (i) constrictive thought-shapers are inherently *mechanical* and *non-organic* in structure, and also inherently *computational*, hence inherently captured by Turing-style algorithms and by the Standard Models of particle physics and cosmology, whereas (ii) generative thought-shapers are inherently *non-mechanical* and *organic* in structure, and also inherently *non-computational*, hence inherently *not* captured by Turing-computable algorithms, but instead and on the contrary, inherently captured only by complex systems dynamics and organismic evolutionary biology, but also (iii) mechanicity/ constriction and organicity/generativity in thought-shapers, alike, allow for a *range of degrees* in each of their occurrences, in the sense that although mechanicity/constriction and organicity/generativity are strict contraries and mutually exclusive, each of those properties is instantiated or realized *to a greater or lesser degree in any given thought-shaper*, hence any given thought-shaper can be either more-or-less mechanical/ constrictive or more-or-less organic/generative, although *never* simultaneously *both* mechanical/constrictive *and also* organic/generative.

Here's a fairly precise definition we'll need as we go forward. Anything **X** is a *natural automaton*, or *natural machine*, if and only if (i) **X** is constituted by an ordered set of causally-efficacious behaviors, functions, and operations (aka 'causal powers'), (ii) the causal powers of **X** are necessarily determined by all the settled quantity-of-matter-and/or-energy facts about the past, especially including The Big Bang, together with all the general deterministic or indeterministic causal

laws of nature, especially including the Conservation Laws and The 2<sup>nd</sup> Law of Thermodynamics, and (iii) X's causal powers and their quantitative properties are all inherently effectively decidable, recursive, or Turing-computable, given two further plausible assumptions to the effect that (iiia) the causal powers of any real-world Turing machine are held fixed under our general causal laws of nature, and (iiib) the 'digits' over which the real-world Turing machine computes constitute a complete set of mathematically denumerable (that is, non-real-number, non-complex-number, non-transfinite) quantities, that is, spatiotemporally discrete, physical objects. Otherwise put, anything is a natural automaton or natural machine if and only if it is necessarily determined by the Conservation Laws and The 2<sup>nd</sup> Law of Thermodynamics, together with all the settled quantity-of-energy facts about the past, and its quantitative properties are all entropic and Turing-computable from those laws and facts. So anything, *especially including* human thinking, that is at least partially caused and guided by constrictive thought-shapers, is a natural automaton or natural machine if and only if it is *inherently governed by* the Conservation Laws, entropy, and Turing-computable algorithms.

By a diametric oppositional contrast, anything is *organic* if and only if it's *not* a natural mechanism, and has an inherently *uncomputable/non-recursive processual, purposive, and self-organizing* dynamics that dissipates entropy (i.e., creates negentropy by spontaneously restructuring matter and energy), running from The Big Bang Singularity forward, via temporally asymmetric or unidirectional energy flows, to organismic life, and then on to conscious mind in general and to rational human conscious mind in particular. Correspondingly, our thesis is that there is a single, unbroken metaphysical continuity between The Big Bang Singularity, temporally asymmetric/unidirectional energy flows, organismic life, conscious mind in general, and rational human conscious mind in particular, and that anything inherently belonging to this continuity is organic in structure, *especially including* human thinking that's at least partially caused, normatively guided, and contextually enabled by generative thought-shapers.

Constrictive thought-shapers generally presuppose what we'll call *the mechanistic worldview*, according to which everything whatsoever in the world, including all human activity, is fully and ultimately explicable by mechanical principles alone (including principles of computability and/or mathematical

physics, including chemistry, and biology insofar as it is reducible to physics and chemistry). In turn, and more specifically, the mechanistic worldview consists in the conjunction of three somewhat distinct but logically nested theses: (i) *formal mechanism*, applied to mathematics, logic, truth, and knowledge more generally, namely the theory of computability and recursive functions, including decidability,<sup>80</sup> (ii) *natural mechanism*, which applies the notion of a natural automaton or natural machine, as per the description immediately above, to everything in the material or physical world,<sup>81</sup> and (iii) *scientific naturalism*, applied to everything in the world, including all human activity, which includes formal and natural mechanism, scientism (i.e., the valorization of the formal and/or natural sciences and their methods), empiricism, and materialist/ physicalist metaphysics (i.e., everything in the world is either identical to or necessarily dependent on fundamentally physical contingent facts).<sup>82</sup> Of course, the root metaphor for the mechanistic worldview is the *natural automaton* or *natural machine*.

By another diametric oppositional contrast, generative thought-shapers generally presuppose what we'll call *the organicist worldview*. The *Oxford Encyclopedic English Dictionary* defines 'organism' as follows:

**1** a living individual consisting of a single cell or of a group of interdependent parts sharing the life processes. **2a** an individual live plant or animal. **2b** the material structure of this. **3** a whole with interdependent parts compared to a living being.<sup>83</sup>

Correspondingly, and consistently with that, by an *organism* we mean an inherently uncomputable/non-recursive processual, purposive, and self-organizing entity with any of the basic features listed in the three-part *OEDD* definition. Then, according to the organicist worldview, everything whatsoever

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<sup>80</sup> See, e.g., A. Turing, 'On Computable Numbers, with an Application to the Entscheidungsproblem', *Proceedings of the London Mathematical Society*, series 2, 42, 1936), pp. 230-265, with corrections in 43, 1937, pp. 644-546; and G. Boolos and R. Jeffrey, *Computability and Logic*, 3<sup>rd</sup> edn., Cambridge, Cambridge Univ. Press, 1989.

<sup>81</sup> See, e.g., Hanna, *Deep Freedom and Real Persons: A Study in Metaphysics*, THE RATIONAL HUMAN CONDITION, Vol. 2, esp. ch. 2.

<sup>82</sup> See, e.g., W. Sellars, 'Empiricism and the Philosophy of Mind', in W. Sellars, *Science, Perception, and Reality*, London, Routledge & Kegan Paul, 1963, pp. 127-196; and W. Sellars, 'Philosophy and the Scientific Image of Man', in Sellars, *Science, Perception, and Reality*, pp. 1-40.

<sup>83</sup> J.M. Hawkins and R. Allen (eds.), *The Oxford Encyclopedic English Dictionary*, Oxford, Clarendon/Oxford Univ. Press, 1991, p. 1024.

in the manifestly real world, including ourselves, is either (i) a *simple or complex* organism, or (ii) a *society* of organisms, or (iii) a *proper part* of an organism or a society of organisms, or (iv) an *immanent or intrinsic structural property* of an organism or society of organisms, or (v) a *causal product or byproduct* of an organism or society of organisms, or (vi) *necessarily dependent on* (i.e., either naturally/ nomologically or logically strongly supervenient on<sup>84</sup>) an organism or a society of organisms, or (vii) *ecosystemic or proto-organismic* in that it belongs to the set of actual conditions under which an organism or society of organisms emerges or operates, or (viii) *inherently analogous or homologous to* an organism or society of organisms. Obviously, the root metaphor for the organicist worldview is *the organism*.

In this connection, there are some important similarities between, *on the one hand*, the theory of thought-shapers, including the categorical difference between mechanical, constrictive thought-shapers and organic, generative thought-shapers, against the backdrop of the categorical difference between the mechanistic worldview and the organicist worldview, and *on the other hand*, Henri Bergson's classical organicist applications of the distinction between (i) the spatial/mechanical/static/dead or moribund/bad, *versus* (ii) the temporal/organismic/dynamic/living or vital/good.<sup>85</sup>

Indeed, Bergson's critique of what he calls 'the cinematographical mechanism of thought and the mechanistic illusion' in *Creative Evolution* runs parallel in some important ways to our claim about the inherently mechanical character of constrictive thought-shapers.<sup>86</sup> Moreover, Bergson's analogy or metaphor, 'the cinematographical mechanism of thought', has also proved to be a philosophically generative thought-shaper, for example in the work of Gilles Deleuze, and in particular in his notions of 'smooth space' and 'molar space'.<sup>87</sup> Nevertheless, we also think that Bergson's metaphysics is in certain respects oversimplified, especially in that he over-emphasizes *temporal, processual* dynamics and doesn't pay sufficient attention to *spatial, topological* dynamics. Hence, he tends to identify all spatial representation and spatial structure with the

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<sup>84</sup> For explicit definitions of strong supervenience, natural or nomological strong supervenience, and logical strong supervenience, see section 6 below.

<sup>85</sup> See, e.g., M. Sinclair, *Bergson*, London, Routledge, 2020.

<sup>86</sup> See H. Bergson, *Creative Evolution*, trans. A. Mitchell, New York, Random House, 1944, ch. IV.

<sup>87</sup> See G. Deleuze and F. Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, trans. B. Massumi, Minneapolis, MN, Univ. of Minnesota Press, 1987.



mechanical/static/dead or moribund/bad, which is a significant mistake. On the contrary, all organic systems and organic, generative thought-shapers have *not only* temporal, processual dynamics *but also* spatial, topological dynamics. In a closely related way, Bergson also mistakenly tended to identify the mechanistic with *the static*, whereas in fact mechanism is all about deterministic or indeterministic Turing-computable dynamics that are fully within the heat-death-grip of the Conservation Laws, The 2<sup>nd</sup> Law of Thermodynamics, and entropy. So, the static, in fact, is just a limiting case of mechanism, achieved when a mechanical dynamic system has reached equilibrium, heat-death, and temporal reversibility. Diametrically contrariwise, the organism is the paradigm of a thermodynamic system that dissipates entropy (creates negentropy) in asymmetric/unidirectional, irreversible time and advances creatively in a self-determining, self-organizing way.

Here's an extremely important further point about the diametric oppositional contrast we've been developing between mechanical, constrictive thought-shapers and organic, generative thought-shapers. In principle, there's absolutely nothing bad, false, or wrong *with applying mechanical thought-shapers to inherently mechanical facts*: for example, when we use stroke diagrams to achieve rationally intuitive a priori knowledge in basic arithmetic, as per this—

$$3+4=7, \text{ i.e., } ||| + |||| = |||||$$

or when we represent complicated inherently mechanical facts via simplifying elucidatory diagrams, as per Otto Neurath's highly influential ISOTYPE (an acronym for 'International System Of TYpographic Picture Education') project, which began in the late 1920s and continued throughout the 1930s, paralleling the rise and fall of The Vienna Circle.<sup>88</sup> Neurath had a long-standing interest in the depiction of information, yet in a way that was alien to the artistic climate of the *Wiener Sezession*. In contrast to the ornate and elaborate style of the Viennese establishment, Neurath's style was more closely affiliated with the reductive, modernist *Bauhaus* approach. The resulting visual language combined pictorial

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<sup>88</sup> See, e.g., D. Edmonds, *The Murder of Professor Schlick: The Rise and Fall of the Vienna Circle*, Princeton, NJ, Princeton Univ. Press, 2020.

elements of German expressionism pioneered at the *Bauhaus* with the order, abstraction and geometrization commonly found in Russian constructivism. Moreover, its relation to the emerging mechanistic philosophy of The Vienna Circle is clear:

Neurath's displays at the GESOLEI exhibition (*Große Ausstellung für Gesundheit, soziale Fürsorge und Leibesübungen*) in Düsseldorf in 1926 provided the occasion for Neurath's acquaintance with the Cologne artist Gerd Arntz. Arntz had held similar revolutionary socialist views in Germany after 1918. He published his expressive modernist clear-cut figures combining the dramatic contrast and simplicity of the woodcut and linocut techniques of German expressionism and the geometrical clarity, order and simplicity of Russian Constructivism. Neurath hired him in 1928 to begin the professional design of a visual language for the public communication of historical and statistical information (see Figures 1 and 2 below):<sup>89</sup>

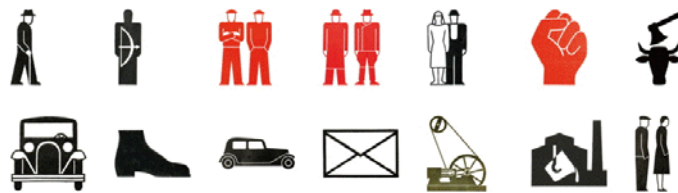


Figure 1

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<sup>89</sup> See also, e.g., the *Gerd Arntz Web Archive*, available online at URL = <http://www.gerdarntz.org/isotype>.

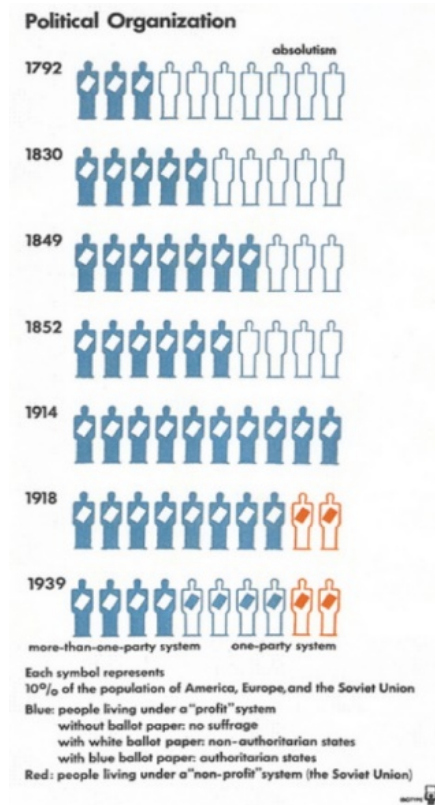


Figure 2

The emphasis on a unified ‘visual language’ is not altogether coincidental. In keeping with modernist’s universalist ambitions, it was not surprising that the artistic explorations of its champions leaned towards symbols and artistic expression that would be understandable apart from cultural or historical contexts. So, while the Bauhaus was focused on finding a universal language for product design, theatre, and architecture, and De Stijl looked for ‘objectivity’ in artistic expression, Neurath championed a visual universalism:

[Neurath’s international picture language] had an abstracted, simplified, elemental and Gestalt-like conventional quality intended to convey a concept through the constructed representation of a typical individual—also similar to Bauhaus ‘essential types’, a graphic product of the same German intellectual culture of typology which included taxonomy, morphology, physiognomics (discussed by Neurath in 1921), eugenics and Hempel and Oppenheim’s logical analysis of types.... The resulting symbol was both an index and an icon, in Peirce’s semiotics, adopted by Neurath’s American intellectual ally and

encyclopedia co-editor, Charles Morris (Lupton 1986).<sup>90</sup>

A contemporary example, falling within the broadly Neurathian, ISOTYPE tradition is this—

strategy	resource	current consumption	Ecosolar consumption	savings
recycling Argon gas	sc-Si Ar <sup>18</sup> Argon gas	9.3 kg	0.46 kg	95%
recycling Argon gas	mc-Si Ar <sup>18</sup> Argon gas	0.43 kg	0.02 kg	95%
re-using crucibles	crucibles	0.5 kg	0.06 kg	88%
utilizing Si kerfloss	Si silicon	1.25 kg	0.88 kg	70%
recycling DI water	DI water	200 liter	14 liter	93%
	Al <sup>13</sup> Aluminium	2.5 kg	1 kg	60%
process efficiency	Ag <sup>47</sup> Silver	8.5 gram	2.9 gram	66%
	process chemicals	1.84 kg	0.2 kg	89%

Figure 4

Illustration created for the European H2020 project Ecosolar by Otto Paans<sup>91</sup>

Neurath's mechanistic approach is fully successful when it comes to depicting certain types of facts. Again, it is no coincidence that the ISOTYPE visuals were readily adopted by the Dutch Central Bureau for Statistics (CBS). Nor is it surprising to see that broadly Neurathian concepts have been adopted in designing signage and icons everywhere, from traffic signs and airport signs to iPhone interfaces and social media. Indeed, thinking mathematically by using stroke-diagrams for representing basic arithmetic as per the above, many uses of

<sup>90</sup> J. Cat, 'Otto Neurath', in E.N. Zalta, (ed.), *The Stanford Encyclopedia of Philosophy*, Spring 2021 Edition, available online at URL = <<https://plato.stanford.edu/archives/spr2021/entries/neurath/>>, supplement on 'Visual Education', available online at sub-URL = <<https://plato.stanford.edu/entries/neurath/visual-education.html>>.

<sup>91</sup> Contemporary graphic design still utilizes refined variations of the Neurathian approach.

Neurath's 'international picture language' by the ISOTYPE project,<sup>92</sup> and also the use of the contemporary ISOTYPE-style visualization diagram displayed directly above, are all lower-bound, limiting cases of *generative thought-shapers*, in that they do indeed self-consciously unlock, liberate, and sustain creative and productive *mechanical* human thinking in mathematics and in technological applications of natural science or social science. And, as we mentioned above, Bergson's 'cinematographic' analogy or metaphor for mechanical thinking is itself a philosophically *generative* thought-shaper. Therefore, *not* all mechanical thought-shapers are constrictive, even though *all* constrictive thought-shapers are mechanical thought-shapers.

Here's another slightly different way of making essentially the same point. Recursion is a logico-mathematical operation whereby, starting with a 'ground level' or 'zero-th' case as input, the same operation is successively applied to the result of each prior application until a certain desired output is constructed as the result of input delivered by the *n*th case. So, for example, the arithmetic principle that determines counting to ten in the natural number series is recursive, and so is the principle that governs the operations of film- or video-technology in either analogue or digital cinema. Now, the Church-Turing Thesis tells us that Turing-computability and recursion are necessarily equivalent: necessarily, every Turing-computable algorithm is a recursive function, and conversely. And all mechanical operations and mechanical thinking are Turing-computable, hence recursive. So there's absolutely nothing bad, false, or wrong about recursive operations and recursive thinking *as applied to their proper domains of content*. But, because all generative operations and generative thinking inherently include *flexibility* and *repurposing*, but recursion is *not* inherently flexible and repurposive, then *except* at the lower-bound limit of generative thought-shaping where mechanical/recursive thinking is properly applied to mechanical/ recursive facts, *mechanical recursion just ain't organic generativity*. (That's a new game-changing global slogan for bumper-stickers, lawn signs, and T-shirts:<sup>93</sup> see the Conclusion below.)

Moreover, and now moving on to the crucial point, what *is* inherently problematic, and what *is* the quintessence of bad, false, and wrong human

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<sup>92</sup> See, e.g., Neurath, *International Picture Language: The First Rules of ISOTYPE*.

<sup>93</sup> Of course, we're joking about the slogan and bumper-stickers, lawn signs, and T-shirts—or at least, half-joking.

thinking via mechanical, constrictive thought-shapers, is when inherently mechanical, recursive thought-shapers are applied to inherently *non-mechanical*, *non-recursive* organic facts. To return to our examples from the formal and natural sciences, if we tried to apply Turing-computable algorithms to Cantor's higher dimensional infinities, to truth in *Principia*-style systems of mathematical logic, or to causally efficacious processes in complex, non-equilibrium thermodynamic physical systems, then *not only* would we be essentially falsifying the manifestly real mathematical, logico-semantic, or natural-world facts, but *also* we'd be inevitably led into contradictions, dilemmas, paradoxes, and vicious circles in the corresponding shaped thoughts, in the form of bad, false, and wrong beliefs. Indeed, that's *precisely* what Cantor's and Russell's paradoxes about impredicative infinite totalities, especially including the Set-Theoretic Paradox and the Liar Paradox, Gödel's incompleteness theorems, and the paradoxes of relativity and quantum mechanics, are all about.

Those dialethic explosions are bad, false, and wrong *enough*. Nevertheless, the badness, falsity, and wrongness of applying inherently mechanical, recursive thought-shapers to inherently non-mechanical, non-recursive organic facts are *supercharged* in artistic, moral, and sociopolitical contexts—and *especially* in moral and sociopolitical contexts. Thus, Neurath's famous slogan about ISOTYPE, 'Words divide, pictures unite' (*Worte trennen, Bilder verbinden*),<sup>94</sup> intended as a strictly *universal* moral and/or sociopolitical truth about thought-shapers, is obviously falsified by many real-world counterexamples. Sometimes, indeed, words *do* divide people, whereas pictures *do* unite people. But when pictures are inherently mechanical, recursive thought-shapers, with a highly-restricted validity of application and highly simplified internal structures, then they can be just as easily used to *close* and *mechanize* people's minds (i.e., mechanical, constrictive thought-shaping), as to *open* and *organicize* them (i.e., generative thought-shaping as a lower-bound, limiting case), depending on the specific domains of content to which the pictures are applied. Indeed, in this specifically thought-shaping respect, the influence of The Vienna Circle in general and of Neurath's ISOTYPE project in particular, has been a mixed blessing, to say the least. The Circle's overall direct or indirect impact is indisputable:

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<sup>94</sup> See, e.g., Edmonds, *The Murder of Professor Schlick: The Rise and Fall of the Vienna Circle*, pp. 60-63.

Some of the work of individual members and associates [of The Vienna Circle] has had important indirect impact. Gödel was never involved with designing computers, but his work in symbolic logic helped in the development of computers. The influence of Neurath's Isotype is disputed, but he has a parental claim to the everyday iconography that we now take for granted—the male/female symbols on toilet doors, the standardization of road signs internationally. Menger's mathematical treatment of ethics was a seed from which the former member of his mathematical colloquium, Oskar Morgenstern [together with John Von Neumann, in their co-authored 1944 book, *Theory of Games and Economic Behavior*] developed game theory, now so central to a host of disciplines, especially economics.<sup>95</sup>

But when inherently mechanical, recursive thought-shapers, in economics, social theory, or political theory—for example, *Prisoner's Dilemma* matrices, as a core thought-shaper in game theory—are systematically misapplied to inherently complex, organic real-world moral and sociopolitical facts and decision-making, then real-world conflicts, crashes, crises, and *cul de sacs*—real-world *disasters*—result in and through the corresponding shaped thoughts: namely, bad, false, and wrong ideological beliefs. A paradigmatic recent example of this is Garrett Hardin's spectacularly influential 1968 essay, 'The Tragedy of the Commons'.<sup>96</sup> As Rutger Bregman cogently and crisply remarks:

"Picture a pasture open to all," Hardin wrote. "It is to be expected that each herdsman will try to keep as many cattle as possible on the commons." But what makes sense at the individual level [i.e., essentially egoistic, decision-theoretic thinking] results in collective disaster, with overgrazing leaving nothing but barren wasteland. Hardin used the term "tragedy" in the Greek sense, to mean a regrettable but inevitable event: "Freedom in a commons," he said, "brings ruin to all"... It's hard to overstate the impact of Hardin's paper, which went on to become the most widely reprinted ever published in a scientific journal, read by millions across the world.... "It should be required reading for all students," declared an American biologist in the 1980s, "and, if I had my way, for all human beings"... Ultimately, "The Tragedy of the Commons" would prove to be among the most powerful endorsements for the growth of the market and the state. Since common property was tragically doomed to fail, we needed either the visible hand of the state to do its salutary work, or the invisible hand of the market to save us. It seemed that these two flavours—the Kremlin or Wall Street—were the only options available. Then, after the Berlin Wall came down in 1989, only

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<sup>95</sup> Edmonds, *The Murder of Professor Schlick: The Rise and Fall of the Vienna Circle*, p. 259.

<sup>96</sup> G. Hardin, 'The Tragedy of the Commons', *Science*, 162, 13 December 1968, pp. 1243-1248, also available online at URL = <<https://science.sciencemag.org/content/sci/162/3859/1243.full.pdf>>.

one remained. Capitalism had won, and we became *homo economicus*.<sup>97</sup>

In other words, the *real* tragedy of the commons is how Hardin's spectacularly wrongheaded argument in 'The Tragedy of the Commons' has operated in morality and sociopolitics since the late 1960s, worldwide, as a spectacularly disastrous mechanical, constrictive thought-shaper.<sup>98</sup> Again, the problem lies not in the mechanical, recursive structure of the thought-shaper *per se* and its corresponding mechanical, recursive shaped thoughts *itself*—no doubt, Prisoner's Dilemma matrices and game theory fairly accurately capture the behavior of people playing *Monopoly*, *Risk*, video games, online poker, cruising the casinos at Las Vegas, or engaged in gambling more generally—but instead in its altogether bad, false, and wrong misapplication to the nonideal organic complexities of 'human, all-too-human' moral and sociopolitical free agency 'in the wild', in the larger manifestly real world.

## 6. ADVERSE COGNITIVE EFFECTS OF MECHANICAL, CONSTRICTIVE THOUGHT-SHAPERS

What philosophical insights can we derive from the paradigmatic classical examples of dialethic and disastrous mechanical, constrictive thought-shapers that we described in section 4 and from our explanation of the nature of constrictive thought-shapers in section 5? In our view, the philosophical take-away is fourfold.

**First**, all mechanical thought-shapers *inherently hide* their own origins and presuppositions. This, in turn is essentially connected with the metaphysics of formal and natural mechanisms. According to our view, all formal and natural mechanisms are (either logically or naturally/nomologically) *strongly supervenient on* the fundamentally processual and purposive (aka organic) nature of the manifestly real world.

To make this point clearly and distinctly, here are more fairly precise

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<sup>97</sup> R. Bregman, *Humankind: A Hopeful History*, trans. E. Manton and E. Moore, New York, Little, Brown and Company, 2020, p. 311.

<sup>98</sup> For a direct, sharply critical, and philosophically creative response to Hardin's view and to Hardin-constricted thinking more generally, see E. Ostrom, *Governing the Commons*, Cambridge, Cambridge Univ. Press, 1990.



definitions we'll need as we go forward. Strong supervenience<sup>99</sup> is a necessary determination-relation between sets of properties or states of different ontological 'levels', a relation that is weaker than strict property/state-identity, and is usually taken to be asymmetric, although two-way or bilateral supervenience is also possible. But assuming for the purposes of simpler exposition that strong supervenience is asymmetric, then *B*-properties/states (= the higher level properties/states) strongly supervene on *A*-properties/states (= the lower-level properties/states) if and only if (i) for any property/state *F* among the *A*-properties/states had by something *X*, *F* necessitates *X*'s also having property/state *G* among the *B*-properties/states (upwards necessitation), and (ii) there cannot be a change in any of *X*'s *B*-properties/states without a corresponding change in *X*'s *A*-properties/states (necessary co-variation). It follows from strong supervenience that any two things *X* and *Y* share all their *A*-properties/states in common only if they share all their *B*-properties/states in common (indiscriminability). In turn, *logical* supervenience is a super-strong version of strong supervenience which says that the necessitation relations between the *B*-properties/states and the *A*-properties/states are *logical* and *a priori*. Or more simply put: The *B*-properties/states are 'nothing more than' and 'nothing over and above' the *A*-properties/states. If logical supervenience holds, then if there were such a being as an omnipotent and omniscient creator-God, and if They were to create and/or know all the *A*-properties/states, then They would have nothing more to do in order to create and/or know all the *B*-properties/states. By contrast to logical supervenience, *natural or nomological* strong supervenience is a modally weaker notion which says that the necessitation relations between the *B*-properties/states and the *A*-properties/states are determined by laws of nature, and hold in all and only the worlds in which those natural laws obtain. It's crucial to recognize that no matter what its level of modal strength, strong supervenience specifies at best a set of *extrinsic modal properties and relations* (namely, upwards necessitation, necessary co-variation, and indiscriminability) between a thing's *A*-properties/states and its *B*-

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<sup>99</sup> See, e.g., J. Kim, *Supervenience and Mind*, Cambridge MA: Cambridge Univ. Press, 1993, esp. part 1; T. Horgan, 'From Supervenience to Superdupervenience: Meeting the Demands of a Material World', *Mind*, 102, 1993, pp. 555-586; and D. Chalmers, *The Conscious Mind: In Search of a Fundamental Theory*, New York, Oxford Univ. Press, 1996, chs. 1-3.

properties/states, or between any two things' *A*-properties/states and *B*-properties/states. If relations of strong supervenience hold for a thing or things, as such, then there's no further implication that these are relations of *constitution*, *essence*, or *efficacious causal power*, such that a thing's or things' immanent structural characteristics—and in particular, if the thing or things are natural or physical, their efficacious causal powers—depend on these relations. Conversely, if relations of constitution, essence, or causal efficacy do indeed hold for a thing or things, then there is no further implication that strong supervenience holds for them. In short, the metaphysics of strong supervenience is modally *shallow*, not modally *deep*, unlike the *real* metaphysics of manifestly real constitution, essence, or causality.<sup>100</sup>

Against that theoretical backdrop, another way of saying that all formal and natural mechanisms are (either logically or naturally/nomologically) strongly supervenient on the fundamentally processual, purposive, and self-organizing (i.e., organic) nature of the manifestly real, all-inclusive natural or physical world—the cosmos—is to say that all formal and natural mechanisms are *systematic abstractions* from the fundamentally organic nature of the cosmos. For example, in mathematical logic, as Gödel, Alfred Tarski, Alonzo Church, Thoralf Skolem, and Turing collectively demonstrated, all computable, decidable, and complete systems of logic are all either truth-functional or primitive-recursive-arithmetic,<sup>101</sup> and therefore (in effect, logically strongly supervenient) *fragments*, of systems at least as rich as *Principia Mathematica*-style systems, containing the Peano axioms for arithmetic, which are themselves inherently *undecidable* and *incomplete*, and cannot prove their own consistency or contain their own truth-definitions.<sup>102</sup> And in mathematics, as Cantor demonstrated, the natural, whole, and rational number systems are all discontinuous, denumerably infinite, share the same cardinality, and therefore are (in effect, logically strongly supervenient) *fragments*, of the system of real numbers.<sup>103</sup> Similarly, as Ilya Prigogine demonstrated,

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<sup>100</sup> See R. Hanna, 'Kant, the Copernican Devolution, and Real Metaphysics', in M. Altman (ed.), *Kant Handbook*, London, Palgrave Macmillan, 2017, pp. 761-789.

<sup>101</sup> See T. Skolem, 'The Foundations of Elementary Arithmetic Established by Means of the Recursive Mode of Thought, Without the Use of Apparent Variables Ranging Over Infinite Domains', in Van Heijenoort (ed.), *From Frege to Gödel*, pp. 302-333.

<sup>102</sup> See, e.g., Boolos and Jeffrey, *Computability and Logic*, ch. 15.

<sup>103</sup> See, e.g., M. Hallett, *Cantorian Set Theory and Limitation of Size*, Oxford, Oxford Univ. Press, 1984.

thermodynamic systems that obey The 1<sup>st</sup> and 2<sup>nd</sup> Laws of Thermodynamics are all closed, non-complex, entropy-enslaved, time-reversible when entropy is maximal at the equilibrium state of the system, and therefore are (in effect, naturally/nomologically strongly supervenient) *fragments*, of open, complex, non-equilibrium, negentropic, time-irreversible, self-organizing thermodynamic systems.<sup>104</sup> From the anti-mechanistic/ organicist, Prigogine-style point of view, the wrongheaded common claim made by contemporary physicists who are committed to (i) the Standard Models of cosmology and particle physics, and (ii) the thesis that increase in entropy ‘explains’ the asymmetry/ unidirectionality of time, aka time’s arrow, is precisely analogous to the wrongheaded *formalist* claim that decidable or Turing-computable algorithms ‘explain’ logical or mathematical truth. Doubly on the contrary, the asymmetric/unidirectional character of time is an *essential feature* of open, complex, non-equilibrium, negentropic, time-irreversible, self-organizing thermodynamic systems, just as undecidability and incompleteness, including a logical system’s inability either to prove its own consistency or to contain its own truth-definition, are *essential features* of all systems of mathematical logic at least as rich as *Principia Mathematica*-style systems.

**Second**, it’s precisely the fact that all mechanical systems logically or naturally/nomologically strongly supervene on the fundamentally organic nature of the cosmos, and are systematic abstractions from it, which explains why it is that when mechanical thought-shapers are correctly applied to inherently mechanical domains of content, then they’re lower-bound, limiting cases of organic, generative thought-shapers. Such mechanical thought-shapers are cognitive-semantic *fragments* of essentially richer organic, generative thought-shapers, just as inherently mechanical domains of content are formal or cosmological *fragments* of essentially richer organic systems.

**Third**, if we start out with systematically abstracted or strongly supervenient fragments of formal or cosmological systems, and then *mistakenly take them to be concrete and fundamental*, then we’ve blindly ignored their origins and presuppositions, and flagrantly committed the explanatory fallacy that A.N.

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<sup>104</sup> See, e.g., I. Prigogine, *The End of Certainty: Time, Chaos, and the New Laws of Nature*, New York, Free Press, 1997.

Whitehead aptly calls ‘the fallacy of misplaced concreteness’.<sup>105</sup> But although all formal or natural mechanical systems and all mechanical thought-shapers have this feature of hiding their own origins and presuppositions, due to systematic abstraction or strong supervenience, *only* mechanical, *constrictive* thought-shapers *systematically undermine* our ability to recognize their systematically abstractive or strongly supervenient origins and presuppositions, by locking us into cognitive (whether theoretical, emotional, or practical) routines that are essentially *driven* by the fallacy of misplaced concreteness. The essentially mechanical, constrictive character of such thought-shapers stems from the fact that they deviously appear as the logically sound upshot of reasoning, while in reality, they appear plausible in this way *only if* the bogus reasoning that’s supposed to justify them is tacitly and uncritically assumed. All the rational justificatory work has yet to be done, and therefore mechanistic, constrictive thinking is *not*—as Richard Dawkins notoriously said about neo-Darwinism —‘the only game in town’.<sup>106</sup>

A prime example of this adverse cognitive effect, taken from mathematical logic, is systems that are inherently self-contradictory or paradoxical, like the contradictory system described in Gottlob Frege’s *Basic Laws of Arithmetic*, which is subject to Russell’s Paradox (set-theoretic paradox), or *Principia Mathematica*-style systems *without* Gödel’s incompleteness theorems and/or *without* Alfred Tarski’s metalinguistic semantic definition of truth,<sup>107</sup> both of which are subject to versions of the Liar Paradox (truth-theoretic paradox). A second prime example of this adverse cognitive effect, now taken from contemporary physics, are the paradoxes of relativity and quantum mechanics that depend on the stipulative assumptions (i) that causally efficacious atomic and sub-atomic facts must be composed *either* of waves *or* of particles, but *not* both, and (ii) that the speed of light is an absolute causal limit in the cosmos, and, as a consequence of that, necessarily, all causation is ‘local’ (i.e., within the light-cone). But what if the complementarity of waves and particles, and also so-called ‘non-locality’ effects,

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<sup>105</sup> A.N. Whitehead, *Science and the Modern World*, New York, The Free Press, 1967, p. 51.

<sup>106</sup> R. Dawkins, *The Greatest Show on Earth: The Evidence for Evolution*, London, Transworld, 2010.

<sup>107</sup> See, e.g., A. Tarski, ‘The Semantic Conception of Truth and the Foundations of Semantics’, *Philosophy and Phenomenological Research*, 4, 1943, pp. 342–360; and A. Tarski, ‘The Concept of Truth in Formalized Languages’, in A. Tarski, *Logic, Semantics, and Metamathematics*, Oxford, Oxford University Press, 1956, pp. 152–278.

are simply *inherent* and *pervasive* features of a fundamentally organic cosmos whose causal powers are *not* absolutely limited by the speed of light?<sup>108</sup> And a third prime example of this adverse cognitive effect, this time taken from sociopolitics, is advanced capitalism, together with what we call *scientistic Statism*, both of which are inherently controlled and driven by what we call *the military-industrial-university-digital complex*, aka *the Hyper-State*.<sup>109</sup>

**Fourth**, here's one final point about the adverse cognitive effects of mechanical, constrictive thought-shapers. In order to make this point, let's distinguish between two different kinds of beliefs: (i) *adventitious beliefs*, bound up with relatively trivial, temporary, or everyday states of affairs and purposes—say, beliefs about various things I have on my 'to-do' list for today, and (ii) *fundamental beliefs*, bound up with worldviews, group identity, and/or personal identity—say, beliefs about morality, society, politics, or metaphysics. Now, it's easy enough to change one's mind about adventitious beliefs. For example, I might believe by looking at the weather app on my smart phone that it's going to snow this afternoon, so I decide that I won't go for a walk then; yet when I look outside at that time, it's sunny and clear, so I change my mind about my earlier belief, and decide to go for a walk then after all. Nevertheless, it's very and even exceptionally *cognitively difficult* to change one's mind about fundamental beliefs, especially those that are bound up with mechanical, constrictive thought-shapers, since they're inherently inflexible and recursive, and therefore 'install' and 'groove' human thinking inflexibly, recursively, and intransigently in the corresponding shaped thoughts, in the form of fundamental beliefs. Moreover—and here's the crucial point—if one *were* to change one's mind about fundamental beliefs, it would essentially consist in *substituting one thought-shaper for another thought-shaper*, whether it be (i) substituting a mechanical, constrictive thought-shaper for another

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<sup>108</sup> See, e.g., R. Hanna, *FROM COSMOLOGY TO DIGNITY: A Theory of Life, the Universe, and Everything*, Unpublished MS, 2021, esp. chs. 1-3, available online at URL = [https://www.academia.edu/45217233/FROM\\_COSMOLOGY\\_TO\\_DIGNITY\\_A\\_Theory\\_of\\_Life\\_the\\_Universe\\_and\\_Everything\\_Final\\_draft\\_version\\_March\\_2021](https://www.academia.edu/45217233/FROM_COSMOLOGY_TO_DIGNITY_A_Theory_of_Life_the_Universe_and_Everything_Final_draft_version_March_2021) >.

<sup>109</sup> See, e.g., R. Hanna, 'The New Conflict of the Faculties: Kant, Radical Enlightenment, The Hyper-State, and How to Philosophize During a Pandemic', *Con-Textos Kantianos*, 11, 2021, forthcoming, also available online in preview at URL =

[https://www.academia.edu/42632182/The\\_New\\_Conflict\\_of\\_the\\_Faculties\\_Kant\\_Radical\\_Enlightenment\\_The\\_Hyper\\_State\\_and\\_How\\_to\\_Philosophize\\_During\\_a\\_Pandemic\\_Forthcoming\\_in\\_Con\\_Textos\\_Kantianos\\_13\\_June\\_2021](https://www.academia.edu/42632182/The_New_Conflict_of_the_Faculties_Kant_Radical_Enlightenment_The_Hyper_State_and_How_to_Philosophize_During_a_Pandemic_Forthcoming_in_Con_Textos_Kantianos_13_June_2021) >.

mechanical, constrictive thought-shaper, (ii) substituting an organic, generative thought-shaper for another organic, generative thought-shaper, (iii) substituting a mechanical, constrictive thought-shaper for an organic, generative thought-shaper, or (iv) substituting an organic, generative thought-shaper for a mechanical, constrictive thought-shaper.

Changing one's fundamental beliefs according to option (iii), although it would be *cognitively pathological*—for example, such cognitive substitutions are a characteristic feature of 'mind-control' or 'thought-control' techniques<sup>110</sup> all-too-effectively used by gaslighters, coercive interrogators, and other Big Brothers in the real-world versions of the fictional traditions of George Orwell's 1949 novel *1984* and John Frankenheimer's 1962 movie, *The Manchurian Candidate*—wouldn't normally be *very* cognitively difficult or effortful (even if often highly unpleasant) from the human cognitive subject's first-person point of view. According to empirical studies and fictional accounts alike, such cognitive substitutions, from the human cognitive subject's first-person point of view, feel like they're abjectly surrendering their existing organic, generative cognitive repertoire to the gaslighter/coercive interrogator/Big Brother and passively 'letting go'. But by a diametric oppositional contrast to this, what would be *most* cognitively difficult and effortful of all from the cognitive subject's first-person point of view, is changing one's fundamental beliefs according to option (iv). For this kind of cognitive substitution would involve not only a high degree of self-conscious critical awareness, but also a resolute readiness to transform one's existing worldview, group identity, and/or personal identity radically. Still, as cognitively difficult and effortful as it would be, changing one's fundamental beliefs according to option (iv) would amount to *genuine progress in human thinking*.

## 7. HOW CAN WE ACKNOWLEDGE ORGANIC SYSTEMS AND ORGANIC, GENERATIVE THOUGHT-SHAPERS?

If it's indeed the case, as we've argued in section 6, that all mechanical systems and mechanical thought-shapers inherently hide their origins and

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<sup>110</sup> See, e.g., Wikipedia, 'Mind Control', 2021, available online at URL= [https://en.wikipedia.org/wiki/Mind\\_control](https://en.wikipedia.org/wiki/Mind_control); and also J.A.M. Meerloo, *Mental Seduction and Menticide: The Psychology of Thought Control and Brainwashing*, London, Jonathan Cape, 1957.

presuppositions, but *only* mechanical, constrictive thought-shapers systematically undermine our ability to recognize these origins and presuppositions, and yield corresponding shaped thoughts, in the form of persistent and backfire-effect-producing bad, false, or wrong beliefs, then since organic systems and organic, generative thought-shapers are categorically different from and inherently contrary to mechanical systems and mechanical, constrictive thought-shapers, it follows that organic systems and organic, generative thought-shapers must *display their origins and presuppositions openly* and, as it were, ‘wear them on their sleeves’. And that in turn makes *prima facie* good sense: everything that’s inherently organic *naturally bears, displays, and purposively utilizes its own evolutionary past*—for example, evolutionary phylogenetic facts about species, and also ontogenetic organismic facts about individuals, especially including aging and human episodic memory or skill memory; and it’s also plausibly arguable that for everything that’s inherently organic, its presuppositions are *weakly transcendently ideal*, and therefore self-consciously available via transcendental arguments, as a priori conditions of the real possibility of the manifestly real world.<sup>111</sup>

But here’s a *prima facie* problem to go along with what makes *prima facie* good sense. If what we’ve been saying about organic systems and organic, generative thought-shapers is true, and especially if organic systems and organic, generative thought-shapers naturally bear and display their origins and their presuppositions openly and ‘wear them on their sleeves’, then why isn’t everyone *already* a metaphysical/ontological organicist and a creative, open-minded thinker via organic, generative thought-shapers and their corresponding shaped thoughts, in the form of good, true, and right beliefs? Otherwise put, how did the hegemony of the mechanistic worldview and the endemic cognitive tyranny of the ‘mind-forg’d manacles’ of mechanical, constrictive thought-shapers, and their corresponding shaped thoughts, in the form of bad, false, and wrong beliefs, since the early 20<sup>th</sup> century, come to be?

It seems to us that the deep diagnosis of this historical, cultural, moral or sociopolitical, and more generally cognitive fact about bad, false, and wrong thinking, and intellectual vice more generally,<sup>112</sup> must include an appeal to the

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<sup>111</sup> See, e.g., Hanna, *Cognition, Content, and the A Priori: A Study in the Philosophy of Mind and Knowledge*, THE RATIONAL HUMAN CONDITION, Vol. 5, chs. 6-8.

<sup>112</sup> See, e.g., Q. Cassam, ‘Bad Thinkers’, *Aeon*, 13 March 2015, available online at URL =

natural tendency of human reason to pursue and valorize dialetheic *noumenal explanations*, and correspondingly to ignore and theoretically undermine the *authentic* or *veridical* appearances (*Erscheinungen*), by wrongheadedly turning them into *mere* or false appearance (*Schein*).<sup>113</sup> Kant's philosophical method of the *critique of pure reason* and his *empirical realism* in the first *Critique* make that very point; and very similar points are made by the later Wittgenstein—everything we need for the purposes of clear and distinct, true, sound, and creative thinking *already lies fully open to our view*:

Philosophy simply puts everything before us, and neither explains nor deduces anything. —Since everything already lies open to view there is nothing to explain. For what is hidden, for example, is of no interest to us.... One might also give the name “philosophy” to what is possible before all new discoveries and inventions.<sup>114</sup>

But if we simply *cannot* acknowledge ‘what already lies open to view’, then that’s because we’ve been historically, culturally, morally, and/or sociopolitically cognitively blinded, imprisoned, and ultimately self-stultified, by our obsession with the noumenal, which, since the early 20<sup>th</sup> century, has been dominantly and pervasively identified *with the mechanistic worldview*.

Although this insight has always formed an undercurrent in Western philosophy since the pre-Socrates, Socrates, and Plato, and finally became fully explicit in Kant's *Critique of Pure Reason* and the post-Critical Kant's *Critique of the Power of Judgment*, and in the works of German absolute idealists, the Romantics, and existentialist philosophers, especially including Kierkegaard, Schopenhauer, and Nietzsche, we can also find a long tradition in Japanese thought that emphasizes a ‘qualified form of seeing’. For example, it's salient in Nishi Amane's

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<<https://aeon.co/essays/the-intellectual-character-of-conspiracy-theorists>>; and more generally, Q. Cassam, *Vices of the Mind: From the Intellectual to the Political*, Oxford, Oxford Univ. Press, 2019. Cassam correctly identifies, describes, and catalogues core habits of bad, false, and wrong thinking; but he provides no deeper explanation of them. The theory of inherently mechanical, constrictive (as diametrically opposed to inherently organic, generative) thought-shapers provides this deeper explanation.

<sup>113</sup> See, e.g., R. Hanna, ‘Kant, Radical Agnosticism, and Methodological Eliminativism about Things-in-Themselves’, *Contemporary Studies in Kantian Philosophy*, 2, 2017, available online at URL = <<https://www.cckp.space/single-post/2017/05/10/Kant-Radical-Agnosticism-and-Methodological-Eliminativism-about-Things-in-Themselves>>.

<sup>114</sup> Wittgenstein, *Philosophical Investigations*, §126, p. 50<sup>c</sup>; see also §92, p. 43<sup>c</sup>.



philosophical aesthetics, in Ōnishi Yoshinori's account of the notion of *aware*,<sup>115</sup> and also later on in the work of Kitarō Nishida. Notably, Nishida based an important tenet of his philosophy of the notion of 'pure experience'<sup>116</sup> and later on, developed it into the notion of 'object logic'.<sup>117</sup> Concisely put, according to Nishida we erroneously revert to an 'object logic' or fragmented world-picture once we suppress or deform our innate abilities for real seeing. Thinking about discrete, manipulable objects leads, according to Nishida, to a distorted world hypothesis—or distorted root-metaphor—about how the world actually functions. This distortion stems from the fact that we've turned our back on our abilities to comprehend the world as a unity. In a vivid illustration of the approach of much Japanese philosophy, James Heisig gives an excellent description of a truly organic, generative thought-shaping moment:

The tree outside my window is connected to the soil, to the birds that are perching on it, to the insects crawling around in its leaves, to the neighbouring tree whose branches it touches, and even to me who happens to be looking at it. I was struck by this late one afternoon as the sun was setting and I saw my own faint image in the window pane superimposed on the scene. For a fleeting moment, it seemed as if I were suspended in the middle of the tree. There in front of my eyes was the fiction of the phantom spectator, the self that imagines itself to be looking at things objectively, when in fact it is no more than a pale haze overlaying and obscuring the real connections I have with the tree.<sup>118</sup>

'The fiction of the phantom spectator' is perhaps the most persistent and ubiquitous thought-shaper of all, and it gives rise to the atomistic, mechanistic thought that the objectively real, noumenal world is ultimately made up of discrete objects that one can analyze, dissect, and lawfully combine according to

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<sup>115</sup> 'Aware' is the Japanese word for a special kind of aesthetic perception. Although it's a homonym of the English term 'aware', and even overlaps in meaning with the English word slightly, it expresses an importantly different concept.

<sup>116</sup> Nishida borrowed and adapted the notion of 'pure experience' from William James, and it forms the backbone of much of his early thinking, although he also refined and reworked it over the years. See, e.g., K. Nishida, *An Inquiry Into the Good*, trans. C. Ives and A. Masao, New Haven, CT, Yale Univ. Press, 1990, pp. 3–10. See also W. James, 'A World of Pure Experience', *Journal of Philosophy, Psychology and Scientific Methods*, 1, 1904, pp. 533–543.

<sup>117</sup> Nishida's views on 'object logic' are presented in K. Nishida, *Last Writings: Nothingness and the Religious Worldview*, Honolulu, HI, Univ. of Hawaii Press, 1993.

<sup>118</sup> J. W. Heisig, *Much Ado About Nothingness: Essays on Nishida and Tanabe*, Nayoga, Chisokudō Publications, 2016, p. 17. For the reception of Western models of aesthetics and aesthetic perception in Japan, see, e.g., M. Marre, *Modern Japanese Aesthetics: A Reader*, Honolulu, HI, Univ. of Hawaii Press, 2002.

Turing-computable functions, the Conservation Laws, and The 2<sup>nd</sup> Law of Thermodynamics. Moreover, it's precisely the mechanistic worldview that has desensitized us and prevented us from looking at the world in a fully entangled, organic manner. No wonder, then, that the faint mirror image strikes Heisig so vividly: self-consciously and affectively to realize one's detachment from the world crucially undermines the hegemony of mechanical, constrictive thought-shapers and alerts us to our inherently organic embeddedness in the world. Once the detached, fictional, and mechanistic 'phantom spectator' has been recognized to be nothing but a 'pale haze' that obscures the real connections we have with the fundamentally organic world, then the mechanistic, atomistic world-picture to which the fiction of the phantom spectator give rises cannot fail to appear as deeply contrived and unsound.

In a closely related way, in the late 18<sup>th</sup> and 19<sup>th</sup> century, Goethe (especially in *The Metamorphosis of Plants*), the British Romantic poets, Henry David Thoreau, and the Impressionists all made the excellent point that being truly able to see what already lies right before one's eyes in the fundamentally organic cosmos requires a special kind of cognitive humility, cognitive openness, and cognitive self-discipline: for example, resolving to live self-reliantly and simply, in the woods beside Walden Pond. Wordsworth, Shelley, and the early 20<sup>th</sup> century British philosopher Samuel Alexander aptly call that special cognitive attitude or standpoint *natural piety*:

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.<sup>119</sup>

Earth, ocean, air, belov'd brotherhood!  
 If our great Mother has imbued my soul

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<sup>119</sup> W. Wordsworth, 'My Heart Leaps Up', 1807, available online at URL = <http://www.poets.org/poetsorg/poem/my-heart-leaps>.

With aught of natural piety to feel  
Your love, and recompense the boon with mine.<sup>120</sup>

I do not mean by natural piety exactly what Wordsworth meant by it—the reverent joy in nature, by which he wished that his days might be bound to each other—though there is enough connection with his interpretation to justify me in using his phrase. The natural piety I am going to speak of is that of the scientific investigator, by which he accepts with loyalty the mysteries which he cannot explain in nature and has no right to try to explain. I may describe it as the habit of knowing when to stop in asking questions of nature.

[T]hat organization which is alive is not merely physico-chemical, though completely resolvable into such terms, but has the new quality of life. No appeal is needed, so far as I can see, to a vital force or even an *élan vital*. It is enough to note the emergence of the quality, and try to describe what is involved in its conditions.... The living body is also physical and chemical. It surrenders no claim to be considered a part of the physical world. But the new quality of life is neither chemical nor mechanical, but something new.

We may and must observe with care our of what previous conditions these new creations arise. We cannot tell why they should assume these qualities. We can but accept them as we find them, and this acceptance is natural piety.<sup>121</sup>

Moreover, there's an analogous, parallel phenomenon in the formal sciences—exemplified, for example, by Cantor's mathematics of transfinite or 'transcendental' numbers, which bears witness to higher-dimensional infinities, by Gödel's incompleteness theorems, which bear witness to the inherently non-logical character of mathematical truth, and by Tarski's semantic conception of truth, which bears witness to Gödel-incompleteness and the Liar Paradox alike<sup>122</sup>—that we'll call *formal piety*. Again, there's another analogous, parallel phenomenon in the social sciences and political anthropology—exemplified, for

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<sup>120</sup> See P.B. Shelley, *Alastor*, 1816, available online at URL = <[http://www.online-literature.com/shelley\\_percy/2778/](http://www.online-literature.com/shelley_percy/2778/)>.

<sup>121</sup> S. Alexander, 'Natural Piety', in S. Alexander, *Philosophical and Literary Pieces*, London, Macmillan, 1939, pp. 299-315, at pp. 299, 310-311, and 306.

<sup>122</sup> See, e.g., Tarski, 'The Semantic Conception of Truth and the Foundations of Semantics'; and Tarski, 'The Concept of Truth in Formalized Languages'.

example, by Wilhelm Dilthey's notion of *Verstehen*,<sup>123</sup> by what Wittgenstein calls 'agreement (*Übereinstimmung*) ... in form of life (*Lebensform*)',<sup>124</sup> and by what James C. Scott calls *metis*<sup>125</sup>—that we'll call *social piety*. Similarly, there's another analogous, parallel phenomenon in moral theory and ethics—exemplified by Kant's notion of respect for human dignity—that we'll call *moral piety*.<sup>126</sup> And finally, the correlate of all these in organicist metaphysics is what we'll call *metaphysical piety*.

For convenience, and to distinguish all these modes of piety sharply from *religious piety*—which (to mix metaphors) is a horse of a different color and a different kettle of fish—we'll group them under the general term *creative piety*. Creative piety is *bearing witness* to the essentially rich structures of organic formal systems, organic cosmological systems, organic social systems, organic moral and ethical systems, and organic metaphysical systems.

An essential feature of creative piety, in every one of its modes, is that it inherently involves taking a critical, reflective standpoint on some or another determinate domain of content, a standpoint that's at once (i) *higher-dimensional*—for example, generating a 'transcendental' third-dimensional point-of-view out of an array or spreadsheet of that content that's otherwise merely 'flat' or two-dimensional, (ii) *synoptic* with respect to the entire determinate domain of content—for example, seeing a landscape as a dynamic three-dimensional contour map from the vantage point of an airplane flying over it, and also (iii) fully critical cognizant of the inherent *boundaries* or *limits* of that determinate domain of content—for example, its Gödel-incompleteness or Tarski-irreflexivity with respect to logico-mathematical truth, truth-definitions, or alethic self-

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<sup>123</sup> See, e.g., R. Makkreel, 'Wilhelm Dilthey', in E.N. Zalta (ed.), *The Stanford Encyclopedia of Philosophy*, Spring 2021 Edition, available online at URL = <<https://plato.stanford.edu/archives/spr2021/entries/dilthey/>>, esp. section 2.3, at sub-URL = <<https://plato.stanford.edu/entries/dilthey/#N19oHistUndeHerm>>.

<sup>124</sup> Wittgenstein, *Philosophical Investigations*, §241, p. 88<sup>c</sup>.

<sup>125</sup> J.C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed*, New Haven, CT, Yale Univ. Press, 1998, pp. 309-341. 'Metis' is Homer's term in the *Odyssey* and the *Iliad*, used to describe Odysseus's capacity for essentially non-conceptual and non-discursive social and political insight.

<sup>126</sup> See, e.g., R. Hanna, 'Sensibility First: How to Interpret Kant's Theoretical and Practical Philosophy', *Estudos Kantianos*, 2021, forthcoming, section IV, available online in preview at URL = <[https://www.academia.edu/40549538/Sensibility\\_First\\_How\\_to\\_Interpret\\_Kants\\_Theoretical\\_and\\_Practical\\_Philosophy\\_Forthcoming\\_in\\_Estudios\\_Kantianos\\_q\\_2021](https://www.academia.edu/40549538/Sensibility_First_How_to_Interpret_Kants_Theoretical_and_Practical_Philosophy_Forthcoming_in_Estudios_Kantianos_q_2021)>.

reference; or more humbly, as per the mental representation of Foster Wallace's famous allegory or parable, the older fish's critical reflective recognition of the transparent liquid environment ('Morning, boys. How's the water?') in which the mind-manacled younger fish uncritically and unreflectively live, move, and have their being ('What the hell is water?'). Just to give this standpoint a handy label, let's call it *organic meta-cognition*. An important emergent feature of organic meta-cognition is that even though, as per element (iii), it always involves a critical recognition of the inherent boundaries or limits of some determinate domain of content, nevertheless, in view of elements (i) and (ii), it *also* yields a new kind of creatively *unbounded* or *unlimited* cognition of that bounded or limited determinate domain, that Wittgenstein in the *Tractatus*, under the rubric of 'the mystical'—which we'll interpret as a synonym of 'creative piety'—calls 'the intuition of the world sub specie aeterni':

6.45 The intuition (*Anschauung*) of the world sub specie aeterni is its intuition as a limited (*begrenztes*) whole.

The feeling (*Gefühl*) of the world as a limited whole is the mystical (*das mystische*).<sup>127</sup>

For these reasons, organic meta-cognition via creative piety should be sharply distinguished from the merely Turing-computable, recursive, rote generation of higher-order levels of content from lower-order levels of content, that we'll call *mechanical meta-cognition*—for example, Russell's theory of types, specifically designed to solve his set theoretic Paradox, but which in fact permits the construction of a precise analogue of the original version of the Paradox in terms of Russellian propositions;<sup>128</sup> and post-modernist chatter about meta-this and meta-that.

All in all, therefore, achieving the special organic meta-cognitive attitude or standpoint of creative piety is a *cognitive revolution*. So in this way, for genuine progress in human thinking to occur, in any domain—formal-scientific or natural-scientific, applied-artistic or fine-artistic, philosophical, moral, or sociopolitical—we must emancipate ourselves from the mechanistic worldview

<sup>127</sup> Wittgenstein, *Tractatus Logico-Philosophicus*, p. 187.

<sup>128</sup> See, e.g., B. Russell, 'Mathematical Logic as Based on the Theory of Types', in B. Russell, *Logic and Knowledge*, New York, G.P. Putnam's Sons, 1971, pp. 59-102; and M. Potter, *Reason's Nearest Kin: Philosophies of Arithmetic from Kant to Carnap*, Oxford, Clarendon/Oxford Univ. Press, 2000, ch. 5, esp. section 5.5.

and the mind-forg'd manacles of mechanical, constrictive thought-shapers and their corresponding shaped thoughts in the form of bad, false, and wrong beliefs, and thereby achieve one or another of the modes of organic meta-cognition, by acknowledging organic systems and organic, generative thought-shapers and their corresponding shaped thoughts in the form of good, true, and right beliefs, according to all or any of the modes of creative piety.

## CONCLUSION

In the 19<sup>th</sup> century, Flaubert wrote brilliantly and scathingly about *sentimental education*, faintly and ironically echoing Kant's concept of a moral catechism. But what *we* all need to do here and now, during the long roll-out and even longer fall-out of the 2020-2021 COVID-19 pandemic, is to replace the inherently destructive and deforming current global system of *mechanical, constrictive thought-drills*, by designing and dynamically implementing a new and inherently constructive and enabling global system of *organic, generative thought-skills*. Such a new thought-system, communicated, disseminated, and inculcated by a correspondingly new global system of social institutions, would essentially consist in effectively priming, evoking, and sustaining the special organic meta-cognitive attitude or standpoint of creative piety described in section 7, in order not only to *acknowledge*, but also to *enact*, organic systems and organic, generative thought-shapers, and their corresponding shaped thoughts in the form of good, true, and right beliefs. Or to borrow Voltaire's classical organic, generative thought-shaper and its corresponding shaped thought, the last sentence of *Candide*, and to repurpose it for the 2020-2021 COVID-19 pandemic, and beyond: *Il faut cultiver notre jardin mondial*—we must cultivate our global garden.

Ironically, and even tragically, there's a popular 20<sup>th</sup> and 21<sup>st</sup> century neo-Hobbesian misinterpretation of '*Il faut cultiver notre jardin*', which says: *always stay focused on your own self-interest, i.e., always keep your eye on the main chance*. But in fact, fully in accordance with Voltaire's radically enlightened, and realistically optimist, dignitarian humanism, and fully rejecting Leibniz's *faux*-enlightened, scandalously unrealistically optimist, rationalistic theism, Voltaire was actually saying: *in a world filled with natural and moral evil, without an omnipotent, omniscient, and omnibenevolent God to do anything, much less everything, for us, it's all up to humanity to*

*cultivate/nurture everyone and everything, for ourselves.*<sup>129</sup> Updating that proto-existentialist Voltairean imperative to the third decade of the 21<sup>st</sup> century, we strongly believe that in a world dominated and pervaded by the mechanistic worldview and mechanical, constrictive thinking, *it's all up to humanity to engage consistently, resolutely, and wholeheartedly in organic, generative thinking, for ourselves, by globally acknowledging and enacting organic systems and organic, generative thought-shapers and their corresponding shaped thoughts in the form of good, true, and right beliefs, whether in the formal sciences, natural sciences, applied arts, fine arts, philosophy, morality, or sociopolitics. For otherwise, if we fail to do this, then not only metaphorically but also quite literally, it's The End of the World.*<sup>130, 131</sup>

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<sup>129</sup> See Hanna, 'The New Conflict of the Faculties: Kant, Radical Enlightenment, The Hyper-State, and How to Philosophize During a Pandemic', esp. sections VI and VII; and R. Hanna, 'On Rutger Bregman's *Humankind*: Optimism For Realists, Or, Neither Hobbes Nor Rousseau', Unpublished MS, 2020, available online at URL = <[https://www.academia.edu/43631182/On\\_Rutger\\_Bregmans\\_Humankind\\_Minor\\_revisions\\_22\\_September\\_2020](https://www.academia.edu/43631182/On_Rutger_Bregmans_Humankind_Minor_revisions_22_September_2020)>.

<sup>130</sup> R. Hanna and O. Paans, 'This is the Way the World Ends: A Philosophy of Civilization Since 1900, and A Philosophy of the Future', *Cosmos & History*, 16, 2, 2020, pp. 1-53, available online at URL = <<http://cosmosandhistory.org/index.php/journal/article/viewFile/3865/1510>>, and also available online in preview at URL = <[https://www.academia.edu/42823697/This\\_is\\_the\\_Way\\_the\\_World\\_Ends\\_A\\_Philosophy\\_of\\_Civilization\\_Since\\_1900\\_and\\_A\\_Philosophy\\_of\\_the\\_Future\\_Co\\_authored\\_with\\_Otto\\_Paans\\_Published\\_version\\_in\\_Cosmos\\_and\\_History\\_16\\_2\\_2020\\_1\\_53](https://www.academia.edu/42823697/This_is_the_Way_the_World_Ends_A_Philosophy_of_Civilization_Since_1900_and_A_Philosophy_of_the_Future_Co_authored_with_Otto_Paans_Published_version_in_Cosmos_and_History_16_2_2020_1_53)>.

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