EPISTEMIC FRAMEWORKS AND THEIR IMPLICATIONS FOR UNDERSTANDING THE RATIONALITY OF SCIENCE

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ABSTRACT: This paper discusses the role epistemic frameworks play in science. First, the text explains what epistemic frameworks are and indicates that they are based on small sets of methodological decisions. Second, the paper shows that the different metaphysics underlying the various epistemic frameworks leads to diametrically opposed worldviews. Third, the paper investigates epistemic frameworks from the perspective of their incommensurability. In light of the discussed analysis, epistemic frameworks express the greatest possible difference in scientific views. The essay concludes that the approach presented here moves the discussion of the rationality of science from the traditional level − promoted by various schools of philosophy of science via analyses of rather extensive sets of methodological rules to the (meta)level of the two, or at most three, most basic methodological decisions.

KEYWORDS: Epistemic frameworks; Naturalism; Anti-naturalism; Incommensurability; *Weltanschauungen*; Rationality of science; Presuppositionalism

1. PRELIMINARY REMARKS

One of the worst things a philosopher of science can do is to instruct scientists on how they should practice their discipline, e.g., by suggesting to them which of the rival approaches is accurate. A philosopher should remain silent in these matters. He can, however, pick out the philosophical assumptions that appear in these approaches and indicate the implications of adopting them. This is one of the aims of this paper. Another aim is to propose a view of a certain aspect of the

problem of the rationality of science in a more general perspective than has been done so far.

The problem of the rationality of science is one of the most important issues in the philosophy of science. The former has many strands which an extensive body of literature deals with.[1] However, it is not the task of this article to give an account of what the problem of the rationality of science consists in. The article has a more modest task of indicating how the idea of epistemic frameworks (EFs) affects the understanding of an aspect of the rationality of science.

Epistemic frameworks (EFs), as will be explained in more detail in the next section, are small, two- or three-element sets of the most general, historically changeable assumptions. These assumptions determine *sine qua non* conditions of scientific practice. In contrast, in the course of the discussion of methodological decisions (rules) that has been going on since the turn of the 20th century, much more extensive sets of such rules have been considered from various perspectives.

There is no doubt that science has been cognitively successful, and that it has been the source of many practical benefits.[2] These facts are the main source of the belief that there is a characteristic rationality of conduct in science.[3] This rationality manifests itself in beliefs according to which: there are science-specific reasons for accepting, rejecting or modifying theories; the whole range of methodological decisions other than those mentioned above, which scientists usually make, are also made in a science-specific way.[4]

The proponents of such an approach to the problem of scientific rationality intended only to describe it accurately if they accepted the descriptive character of methodology (e.g. Henri Poincaré),[5] or to constitute it if they regarded

[1] See e.g., Paul Thagard, 'Rationality and Science', in: Alfred R. Mele, Piers Rawling (eds.), *The Oxford Handbook of Rationality*, Oxford University Press, Oxford, New York 2004, pp. 363-379; Monika Walczak, *Racjonalność nauki. Problemy, koncepcje argumenty*, Towarzystwo Naukowe Katolickiego Uniwersytetu Lubelskiego, Lublin 2006.

[2] Even "the worst enemy of science", Paul K. Feyerabend, did not claim that this was not the case. See e.g., Paul K. Feyerabend, *Killing Time*, University of Chicago Press, Chicago and London 1995, pp. 91, 151; Paul K. Feyerabend, *Science in a Free Society*, Verso, London 1983, p. 101.

[3] See e.g., Henri Poincaré, *Science and Method*, Thomas Nelson and Sons, London, Edinburgh, Dublin and New York 1914, pp. 22-23, 59-60, 275.

[4] See e.g., Karl R. Popper, *The Logic of Scientific Discovery*, Routledge Classics, London and New York 2002, p. 4.

[5] See Henri Poincaré, *Science and Hypothesis*, The Walter Scott Publishing Co, New York 1905, p. xxvii.

methodology as a normative discipline (e.g. Karl R. Popper).[6] However, two thick cracks have appeared on such an approach.[7]

The first serious and at the same time widely perceived crack[8] on this approach was Thomas S. Kuhn's view that periods of rational development of science are interspersed with "irrational" ones. The vast majority of the history of science consists of periods of normal science, i.e., practised on the basis of a specific paradigm (disciplinary matrix) which sets the specific standards of scientific rationality. In contrast, periods of scientific revolutions, during which this methodological superstructure is exchanged, are relatively rare and short phases in the development of science. These periods − characterized by a tendency to replace the existing criteria of rationality − are not, according to Kuhn, reconstructible on the basis of the previously accepted accounts of the problem of scientific rationality. For this reason, writing about interparadigmatic incommensurability, Kuhn argued against the belief that there are supra-historical criteria for evaluating theories and methodological rules. In his view, with the victorious scientific revolution, not only the theoretical beliefs but also the entire methodological superstructure changes.

The second significant crack on this view was Paul K. Feyerabend's epistemological anarchism. He challenged the Kuhnian "punctuated equilibrium" thesis[9] by questioning the relevance of the division between the rational (scientific) and the irrational (non-scientific). He maintained that the elementary assumption of all the previous methodologies, including even the limited Kuhnian account, of the existence of a characteristic rationality of research procedure in science should be rejected. According to Feyerabend, every rule of doing science described or discovered by methodologists has been

[6] See Popper, The Logic of Scientific Discovery…, p. 29.

[7] See e.g., Stefan Amsterdamski, *Między historią a metodą*, Państwowy Instytut Wydawniczy, Warszawa 1983, pp. 11-12.

[8] Before that, of course, there was Ludwik Fleck's conception of the thought collective (Denkkollektiv) expressed in Entstehung und Entwicklung einer wissenschaftlichen Tatsache. Einführung in die Lehre vom Denkstil und Denkkollektiv (Benno-Schwabe et Co. Verlag, Basel 1935).

[9] Kuhn's approach is sometimes called "punctuated equilibrium". See Peter Godfrey-Smith, *Theory and Reality. An Introduction to the Philosophy of Science*, University of Chicago Press, Chicago and London 2003, p. 100.

broken and replaced by another counter-rule.[10] Therefore, such tactics of breaking valid methodological rules should not be reserved, as in Kuhn's view, only for the revolutionary periods, but should be applied simultaneously (revolution in permanence) in revolutionary and normal periods (proliferation and tenacity in Feyerabend's terminology).

Another common feature of all the approaches mentioned here, which is important in the perspective of the issue at hand, is that each of them focused on extensive sets of rules for doing science.[11] For example, Feyerabend, when he considered himself a critical rationalist, defended around ten supra-historical rules for the effective practice of science. Later, already as an anarchist, he also argued against about ten, clearly articulated, supra-historical rules. And Imre Lakatos discussed a number of decisions made within the varieties of falsificationism he distinguished at length.[12]

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[10] See e.g., Krzysztof J. Kilian, 'What is Epistemological Anarchism?', *Filozoficzne Aspekty Genezy* 2023, Vol. 20, No. 2, pp. 207-225 [203-233], https://tiny.pl/9bbtw8qm (accessed Oct. 10, 2024).

[11] In Kuhn's case, the issue is somewhat more complicated, as on the one hand he acknowledged that "[m]en whose research is based on shared paradigms are committed to the same rules and standards for scientific practice" (Thomas S. Kuhn, *The Structure of Scientific Revolutions*, The University of Chicago Press, Chicago 1970, p. 11, see also e.g., p. 38). However, within earlier accounts of the problem of making of methodological decision (e.g. by Popper or Lakatos), the reconstruction of such decision-making was reduced to the explicit formulation of rules guiding scientists in their work. According to Kuhn, the decisions made by scientists depend not on clearly articulated rules (see Kuhn, *The Structure*…, pp. 47-48) but on the values they adopt (see Kuhn, *The Structure*…, p. 164), that allow them to tacitly accept certain rules (see Kuhn, *The Structure*…, p. 44, fn. 1). And "[n]ormal science is a highly determined activity, but it need not be entirely determined by rules. […] Rules, I suggest, derive from paradigms […]" (Kuhn, *The Structure*…, p. 42).

Moreover, Kuhn also used the term "rule" in a different, broader sense than, for example, aforementioned philosophers. The former spoke of the "rules of the [scientific] game", using the term to denote four main categories: (a) "explicit statements of scientific law and about scientific concepts and theories"; (b) "a multitude of commitments to preferred types of instrumentation and to the ways in which accepted instruments may legitimately be employed" (Kuhn, *The Structure*…, p. 40); (c) "quasi-metaphysical commitments" (Kuhn, *The Structure*…, p. 41); (d) "a set of commitments without which no man is a scientist" (Kuhn, *The Structure*…, p. 42), i.e. various cognitive values (e.g. injunctions to know the world precisely, to order it strictly, to inquire in detail into various aspects of nature). And in "Postrscript-1969" (see Kuhn, *The Structure*…, pp. 181-190), he spoke of disciplinary matrixes, which also has four elements: symbolic generalisations, beliefs in particular models, scientific values and exemplars. Incidentally, in the unpublished 1960 version of *The Structure*… there is a chapter entitled "Normal Science as Rule-Determined", which in the published 1962 version was replaced by a chapter entitled "The Priority of Paradigms".

[12] After 1975 (*Against Method* – the book), only commentaries appeared on the controversies thus outlined (methodology is normative - methodology is descriptive; there are supra-historical rules for doing science -

The idea of epistemic frameworks presented here shows that the dispute over the rationality of science takes place at a much more fundamental level than suggested by all previous accounts of the problem of scientific rationality. It shows that, by means of two or three conditions, one tentatively decides[13] what is science and what is not; and, consequently, what is rational and what is not.

This paper addresses issues concerning the contemporary understanding of scientificality.[14] The conflict between different EFs: naturalistic, artificialistic and supernaturalistic is at the core of the dispute between "the standard evolutionary model",[15] i.e. gradualist evolutionism, and the theory of intelligent design and scientific creationism.[16] It is a conflict between radically different conceptions of

there are no such rules), which, although interesting from the perspective of philosophical reflection on science, did not bring anything radically new and are therefore not considered in this article.

[13] One speaks of provisional decisions here because EFs only set necessary conditions for doing science, without setting sufficient conditions. And, as such, contemporary EF-s do not set a criterion of demarcation (see Piotr Bylica, Krzysztof J. Kilian, Dariusz Sagan, 'Wstęp', in Piotr Bylica, Krzysztof J. Kilian, Robert Piotrowski, Dariusz Sagan (red.), *Filozofia — nauka — religia. Księga jubileuszowa dedykowana Profesorowi Kazimierzowi Jodkowskiemu z okazji 40-lecia pracy naukowej*, Oficyna Wydawnicza Uniwersytetu Zielonogórskiego, Zielona Góra 2015, p 18 [11-33]; Dariusz Sagan, 'Kazimierz Jodkowski o teorii inteligentnego projektu', in Bylica, Kilian, Piotrowski i Sagan (red.), *Filozofia — nauka — religia*…, p. 217 [213-227].

[14] The earlier understanding of scientificality is not directly related to the problem addressed in this article, and so it will not be discussed here. I have discussed it elsewhere. See Krzysztof J. Kilian, 'Epistemiczne układy odniesienia – nowe spojrzenie na racjonalność naukową', *Sofia. Pismo Filozofów Krajów Słowiańskich* 2018, Vol. 18, pp. 45-54 [37-58], https://tiny.pl/tl4mn (accessed Oct. 10, 2024).

[15] See Thomas Nagel, 'Public Education and Intelligent Design', *Philosophy & Public Affairs* 2008, Vol. 36, No. 2, p. 192 [187-205].

[16] The belief that life, man and the universe are the result of special creative acts, and this fact can be justified in a manner characteristic of the *natural sciences* makes it possible to distinguish scientific creationism from biblical creationism. According to the latter, the universe, life and man are the result of special creative acts, while this fact can be justified in a manner characteristic of *Biblical studies*. See Kazimierz Jodkowski, 'Klasyfikacja stanowisk kreacjonistycznych', *Filozoficzne Aspekty Genezy* 2005/2006, Vol. 2/3, pp. 262-263 [241-269], https://tiny.pl/yx_47xxt (accessed Oct. 10, 2024); Kazimierz Jodkowski, 'Demistyfikacja sporu kreacjonizm-ewolucjonizm', *Przegląd Filozoficzny – Nowa Seria* 1999, R. 8, Nr 3 (31), p. 80 [77-94], https://tiny.pl/03qvpcpw (accessed Oct. 10, 2024). An example of such a scientific explanation can be found in the research of the creationist, geophysicist, and expert in designing computer models of geophysical convection John R. Baumgardner (from Los Alamos National Laboratory). He has claimed that geological plates covering the earth may once have moved thousands of times faster than they do today. If that was the case, then major geological changes could have occurred over a relatively small period of time, which would justify some of the young-earth creationist views. See, e.g., John R. Baumgardner, 'Catastrophic Plate Tectonics: The Physics Behind the Genesis Flood', *The Proceedings of the*

doing science. The result of this conflict is mutual accusations of unscientificality. This conflict has two main sources. One such source is the worldview and ideological components present in the EFs; and the other one is the incommensurability of theories based on different EFs.

This paper, excluding the present introduction, consists of three sections and a summary.

Section 2 explains what EFs are. Small sets of metaphysical theses, called "hard cores", characterized in this section, which determine the most general ontological perspective of doing science are also an essential component of EFs.

Section 3 will show that the different metaphysics underlying the various EFs leads to diametrically opposed worldviews. It will also demonstrate that each side of the argument maintains that its adversaries propose a view whose credibility is undermined by the fact that it is ideological and worldview-based.

Section 4 analyses EFs from the perspective of their incommensurability. In light of the earlier analysis, EFs express the greatest possible difference in scientific views. This difference is analysed here on four levels of the occurrence of incommensurability relationships, that is, the levels of variability: methodological, observational, linguistic, and ontological. The difficulties that arise as a result of the incommensurability relationships, and, above all, the difficulties of translating one incommensurable theory into another, make communication between the advocates of alternative views difficult.

2. WHAT EPISTEMIC FRAMEWORKS ARE

In order to clarify what EFs are, it is necessary to address the very important, long recognized, and universal problem of the relationship between the content of scientific claims and "non-scientific" beliefs.[17] This problem, called the "thesis

International Conference on Creationism 2003, Vol. 5, pp. 113-126, https://tiny.pl/wwdl8 (accessed Oct. 10, 2024).

[17] Even though this issue has been known about for a long time ("Natural scientists believe that they free themselves from philosophy by ignoring it or abusing it. They cannot, however, make any headway without thought […]. Hence, they are no less in bondage to philosophy […]"; Frederick Engels, *Dialectics of Nature*, transl. and ed. by Clemens Dutt, International Publishers, New York 1940, pp. 183-184, https://tiny.pl/wwdk3 [accessed Oct. 10, 2024]), it is still quite common for researchers to direct their attention away from it. "Despite the tight historical links between science and philosophy, present-day scientists often perceive philosophy as completely different from, and even antagonistic to, science." Lucie

of the irreducible presence of philosophy in science",[18] is combined with the thesis of presuppositionalism. According to the latter, science cannot exist without philosophical presuppositions. The latter claim has three components.[19]

Of these, the most important from the perspective of the considerations being pursued here is the first. According to this, before anyone begins to practise science, they must *a priori* accept a number of elementary assumptions. These assumptions, instilled in a trainee during their scientific education, tell us what practising science is all about.

According to the second component, within any given science there is the possibility of revising its basic assumptions. This thesis has gone unchallenged since the times of Charles Sanders Peirce. According to the third component, there are indelible, but changeable, metaphysical components of scientific theories within scientific activity. These components can be changed quite freely. However, they cannot be completely eliminated.

Despite the fact that there are still voices today saying that science should be free from all worldview influences,[20] the belief that there exists science that is free from such influences is wrong. The fact that even before research begins, decisions are made about what will be studied and how, has been repeatedly emphasized. In turn, such decisions, as has also been repeatedly pointed out, do not depend solely on facts and logic.[21] They are shaped by different traditions of practising science, which exert a powerful influence on scientists' biases and

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Laplane, Paolo Mantovani, Ralph Adolphs, Hasok Chang, Alberto Mantovani, Margaret McFall-Ngai, Carlo Rovelli, Elliott Sober and Thomas Pradeu, 'Why Science Needs Philosophy', *PNAS* March 5, 2019, Vol. 11, No. 10, p. 3948 [3948-3952], https://tiny.pl/wwd2t (accessed Oct. 10, 2024).

[18] See Krzysztof J. Kilian, 'Geneza idei epistemicznych układów odniesienia i ich odmiany', *Filozoficzne Aspekty Genezy* 2017, Vol. 14, pp. 137-190, https://tiny.pl/wwd2w (accessed Oct. 10, 2024).

[19] See Kazimierz Jodkowski, 'Racjonalność Kopernika i Darwina. Polemika z drem Eugeniuszem Moczydłowskim', *Na Początku…* 2003, No. 11-12A (174-175), p. 435 [433-448], https://tiny.pl/kr7h307z (accessed Oct. 10, 2024); Kazimierz Jodkowski, 'Nienaukowy fundament nauki', in Zbigniew Pietrzak (ed.), *Granice nauki*, *Lectiones & Acroases Philosophicae* 2013, Vol. VI, No. 1, p. 105 [59-108], https://tiny.pl/n-36qskz (accessed Oct. 10, 2024); Kazimierz Jodkowski, 'Metafizyczne opowieści nauki jako fundament pluralizmu naukowego', in Johnson Phillip E., *Wielka metafizyczna opowieść nauki (z posłowiem Kazimierza Jodkowskiego)*, *Archiwum Na Początku*..., Vol. 13, Polskie Towarzystwo Kreacjonistyczne, Warsaw 2003, pp. 80-81 [74-85].

[20] See, e.g., Keith B. Miller, 'Countering Public Misconceptions about the Nature of Evolutionary Science', *Georgia Journal of Science* 2005, Vol. 63, No. 3, p. 178 [175-189], https://tiny.pl/tqw12 (accessed Oct. 10, 2024).

[21] See, e.g., Paul K. Feyerabend, 'Problems of Empiricism', in Robert G. Colodny (ed.), *Beyond the Edge of Certainty. Essays in Contemporary Science and Philosophy*, Prentice-Hall, Englewood Cliffs, New Jersey 1965, p. 227 [145-260]; Kuhn, *The Structure of Scientific Revolutions*…, p. 4.

beliefs. Motives of a metaphysical, religious and even aesthetic and volitional nature also play an important role, allowing the scientist to persist with his or her chosen path of research.[22]

Moreover, the thesis of the complete theorization of observations (according to which observations are not merely theory-laden but fully theoretical, so that observation statements have no "observational core")[23] is, in principle, still accepted today.[24] Thus, if there are no bare or brute facts, and all facts are always interpreted in some theoretical framework, then, *mutatis mutandis*, there is no "bare or brute science" either, the latter always being practised in some pre-accepted context.

Such contexts have been called "epistemic frameworks",[25] where this term denotes "a set of the most general assumptions about how science can and cannot be done".[26] They express the greatest possible difference in scientific views.[27] In

[22] See, e.g., Paul K. Feyerabend, 'Explanation, Reduction and Empiricism', in Herbert Feigl, Grover Maxwell (eds.), *Scientific Explanation, Space and Time*, *Minnesota Studies in the Philosophy of Science*, Vol. III, University of Minnesota Press, Minneapolis, 1962, pp. 48-49 [28-97].

[23] "[O]bservations (observation terms) are not merely theory-laden (the position of Hanson, Hesse and others) but fully theoretical (observation statements have no «observational core»)." Paul K. Feyerabend, 'Introduction to the Volumes 1 and 2', in Paul K. Feyerabend, *Philosophical Papers. Vol. 1. Realism, Rationalism & Scientific Method*, Cambridge University Press, Cambridge – New York – Port Chester – Melbourne – Sydney 1981 p. x [ix-xiv].

[24] See e.g., Jodkowski, 'Nienaukowy fundament nauki…, pp. 89-90; Gonzalo Munévar, *A Theory of Wonder: Evolution, Brain and the Radical Nature of Science*, Vernon Press, Wilmington, Malaga 2021, pp. xxi-xxii; John Grimes, 'On the Failure to Detect Changes in Scenes Across Saccades', in Kathleen Akins (ed.), *Perception*, *Vancouver Studies in Cognitive Science*, Vol. 5, Oxford University Press, New York, Oxford 1996, p. 108 [89-110]; Ralph Baergen, 'The Influence of Cognition Upon Perception: The Empirical Story', *Australasian Journal of Philosophy* 1993, Vol. 71, No. 1, pp. 21-22 [13-23]; Jitendranath Mohanty, 'Intentionality, Meaning, and Open-Endedness of Interpretation', in Michael Krausz (ed.), *Is There a Single Right Interpretation?*, The Pennsylvania State University Press, University Park, PA 2002, p. 73 [63-75]; Tim Lewens, 'Realism and the Strong Program', *British Journal for the Philosophy of Science* 2005, Vol. 56, p. 573 [559-577].

[25] The term "epistemic framework", and the core ideas pertaining to this, were presented by Kazimierz Jodkowski in 2004 (see Kazimierz Jodkowski, 'Epistemiczne układy odniesienia i «warunek Jodkowskiego»', in Anna Latawiec and Grzegorz Bugajak (eds.), *Filozoficzne i naukowo-przyrodnicze elementy obrazu świata 7*, Wydawnictwo Uniwersytetu Kardynała Stefana Wyszyńskiego, Warsaw 2008, p. 115 [108-123]. See also Krzysztof J. Kilian, *Współczesne epistemiczne układy odniesienia w nauce*, *Biblioteka Filozoficznych Aspektów Genezy*, Vol. 9, Oficyna Wydawnicza Uniwersytetu Zielonogórskiego, Zielona Góra 2021.

[26] See Jodkowski, 'Nienaukowy fundament…', p. 96.

[27] See Kazimierz Jodkowski, 'Kreacjoniści przed sądem. Aspekty filozoficzne «małpich procesów»', in Jakub Michalczenia, Jadwiga Mizińska, Katarzyna Ossowska (eds.), *Poszukiwania filozoficzne. Tom I: Nauka, Prawda. Panu Profesorowi Józefowi Dębowskiemu w darze*, Instytut Filozofii Uniwersytetu Warmińsko-Mazurskiego w

other words, EFs are small, two- or three-element sets of the most general, historically variable assumptions, adopted on the basis of decisions made by scientists, and which determine the necessary conditions for doing science.

It is worth mentioning at this point that the very idea of EFs is already widely-acknowledged. For example, a necessary condition for the naturalistic practice of science is the presence of

> a basic epistemological and metaphysical framework, which either excludes the existence of God or, at best, places him entirely outside the boundaries of the natural universe.[28]

The assumptions (methodological decisions) on which EFs are based cannot be scientifically justified without falling into a vicious circle,[29] as all research that counts as scientific already presumes them.[30] They tell us what, according to a given group of scientists, is forbidden in the practice of science, and what not, indicating how science can and cannot be done. They thus determine the range

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Olsztynie, Olsztyn 2014, p. 177 [175-198]; Krzysztof J. Kilian, 'Czym są epistemiczne układy odniesienia?', *Filozoficzne Aspekty Genezy* 2017, Vol. 14, pp. 192-213 [191-235], https://tiny.pl/g86dn (accessed Oct. 10, 2024).

[28] Nagel, 'Public Education and Intelligent Design…', p. 205. See also e.g. Jonathan Bartlett, 'Philosophical Shortcomings of Methodological Naturalism and the Path Forward', in Jonathan Bartlett and Eric Holloway (eds.), *Naturalism and Its Alternatives in Scientific Methodologies: Proceedings of the 2016 Conference on Alternatives to Methodological Naturalism*, Blyth Institute Press, Broken Arrow, Oklahoma 2017, pp. 32-33 [13-37], https://tiny.pl/tr32k (accessed Oct. 10, 2024); Eric Holloway, 'Problems With Non-Naturalistic Theories of Science', in Bartlett and Holloway (eds.), *Naturalism and Its Alternatives*…, p. 163 [163-176]; Stephen C. Meyer, 'Scientific Tenets of Faith', *Journal of the American Scientific Affiliation* 1986, Vol. 38, No. 1, pp. 41-42 [40-42], https://tiny.pl/wwfqv (accessed Oct. 10, 2024); J.P. Moreland, *Scientism and Secularism: Learning to Respond to a Dangerous Ideology*, Crossway, Wheaton Ill. 2018, p. 32; Andrzej Zybertowicz et al., *Samobójstwo Oświecenia?*, Wydawnictwo Kasper, Krakow 2015, p. 21.

[29] It has been noted that justifications of EFs can be attempted at a meta-scientific level. If, among alternative scientific hypotheses, one is chosen that proposes the best explanation of the phenomena in a given field, then, following the same principle, among alternative EFs, one should be chosen that guides research work in the field better than others. Here is one example of such an attempt: "Naturalism was a major premise of Darwin's thinking and the success of his theory gave strong sanction to the validity of naturalism, showing that the supernatural account of the world's seeming design was a superfluity" (David R. Oldroyd, *Darwinian Impacts: An Introduction to the Darwinian Revolution*, Humanities Press, Atlantic Highlands, New Jersey 1980, p. 254). However, the acceptance of this meta-scientific justification depends on the rejection of the incommensurability thesis and Kuhn's loss thesis. And, therefore, such an attempt at justification has significant limitations. I will return to these issues in section 4.

[30] See Jodkowski, 'Epistemiczne układy odniesienia…', p. 115. See also Robert A. Larmer, 'Is Methodological Naturalism Question-Begging?', *Philosophia Christi* 2003, Vol. 5, No. 1, pp. 117-118, 130 [113-130], https://tiny.pl/g2sgc (accessed Oct. 10, 2024). Larmer has formulated his argument only for methodological naturalism.

of acceptable solutions of problems. They also indirectly inform scientists about what exists, and in so doing determine, in addition, the most general metaphysical perspective involved in the practice of science.[31] The latter two questions call for a broader commentary, stating what specific assumptions are being discussed in this regard, and indicating what kind of metaphysical theses these assumptions are based on.

The only EF that is widely known and well described in modern philosophy of science is methodological naturalism. This consists of three decisions, all of which stem from Charles Darwin. The first prescribes that we accept only naturalistic explanations for facts, processes and phenomena.[32] This decision was supplemented by Darwin with two others, with the aim of excluding anti-naturalistic explanations: these are the prohibitions on accepting explanations that invoke supernatural[33] and final causes, respectively.[34] In short, methodological naturalism[35] is a prescription to the effect that scientific inquiry be confined to the natural world, and thus that only naturalistic explanations for facts and processes be accepted, along with a simultaneous prohibition on

[31] See Kazimierz Jodkowski, 'Dlaczego kreacjonizm jest pseudonauką?', in Józef Zon (ed.), *Pogranicza nauki. Protonauka — paranauka — pseudonauka*, Wydawnictwo KUL, Lublin 2009, p. 322 [317-323]. See also Ernan McMullin, 'Varieties of Methodological Naturalism', in Bruce L. Gordon and William A. Dembski (eds.), *The Nature of Nature: Examining the Role of Naturalism in Science*, ISI Books, Wilmington, Delaware 2011, p. 82 [82-92].

[32] See Charles Darwin, *The Origin of Species*, P. Collier & Son, New York 1909, p. 400, https://tiny.pl/wwfg9 (accessed Oct. 10, 2024).

[33] In its original form, methodological naturalism involved a set of three decisions: the first required that scientific research be limited to the natural world, the second that only naturalistic explanations for facts and processes be accepted, and the third that no explanations invoking supernatural causes be admitted. See Darwin, *The Origin*…., p. 400.

[34] Darwin's later statement clearly suggests a prohibition on allowing teleological explanations: "There seems to be no more design in the variability of organic beings, and in the action of natural selection, than in the course which the wind blows." Charles Darwin, *Autobiography of Charles Darwin with Two Appendices by His Son Francis Darwin*, Rupa & Co., New Delhi 2003, p. 136, https://tiny.pl/wwfgl (accessed Oct. 10, 2024). See also Grzegorz Malec, 'Teologiczne dylematy Karola Darwina', *Roczniki Filozoficzne* 2012, Vol. 60, No 1, pp. 69-70 [67-85], http://tiny.pl/g4751 (accessed Oct. 10, 2024).

[35] It is generally claimed that the term "methodological naturalism" was first used by the American philosopher Paul de Vries in 1983 (see Paul De Vries, 'Naturalism in the Natural Sciences: A Christian Perspective', *Christian Scholar's Review*, Summer 1986, Vol. 15, No. 4, pp. 388-396). However, it was used earlier by another American philosopher and Christian theologian in the Methodist tradition, Edgar Sheffield Brightman, in his paper 'An Empirical Approach to God' (*The Philosophical Review* 1937, Vol. 44, No. 2, pp. 157-158 [147-169], https://tiny.pl/wwfgs [accessed Oct. 10, 2024]).

accepting explanations invoking anything other than natural causes. Thus, the latter prohibition applies to two different types of explanations: on the one hand, those invoking supernatural causes (anti-naturalism$_1$), and on the other, those invoking intelligent causes (anti-naturalism$_2$),[36] for not every intelligent cause is a supernatural cause.[37] The fact that these are sometimes equated[38] does not mean that they are the same. *De facto*, therefore, we are dealing here with two varieties of this naturalism, and two variants of the naturalistic EF. The first is anti-supernaturalistic naturalism, while the second is anti-artificialistic naturalism.[39] The former prohibits invoking supernatural causes, while the latter prohibits appealing to artificial (intelligent) causes.

In practice, however, these two prohibitions are generally brought to bear simultaneously. For example:

> It was Darwin's greatest accomplishment to show that the directive organization of living beings can be explained as the result of a natural process, natural selection, without any need to resort to a Creator or other external agent.[40]

Even so, the widespread acceptance of such a broad criterion, which has laid stress on extending the requirements of methodological naturalism to include a stipulation prohibiting the admission of artificialist explanations, has led to

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[36] Cf. on this issue the remarks of Kazimierz Jodkowski, 'Antynaturalizm teorii inteligentnego projektu', *Roczniki Filozoficzne* 2006, Vol. 54, No. 2, pp. 68-73 [63-76], https://tiny.pl/tdzjz (accessed Oct. 10, 2024).

[37] See Ratzsch's comments on finite design and supernatural design (Del Ratzsch, *Nature, Design and Science. The Status of Design in Natural Science*, State University of New York Press, Albany 2001, pp. 17-40). See also Leon Brunschvicg, *L'Expérience Humaine Et La Causalité Physique*, Felix Alcan, Paris 1922, pp. 155-159, https://tiny.pl/wwftj (accessed Oct. 10, 2024).

[38] See, e.g., Phillip Kitcher, 'Born-again Creationism', in Robert T. Pennock (ed.), *Intelligent Design Creationism and Its Critics: Philosophical, Theological, and Scientific Perspectives*, MIT Press, Cambridge, MA 2001, pp. 257-288; Barbara Carroll Forrest, 'Inside Creationism's Trojan Horse: A Closer Look at Intelligent Design', *Georgia Journal of Science* 2005, Vol. 63, No. 3, pp. 153-166; Julian Chela-Flores and Joseph Seckbach, 'Divine Action and Evolution by Natural Selection. A Possible and Necessary Dialogue', in Joseph Seckbach, Richard Gordon (eds.), *Divine Action and Natural Selection. Science, Faith and Evolution*, World Scientific, New Jersey, London, Singapore, Beijing, Shanghai, Hong Kong, Tai Pei, Chennai, 2009, pp. 1035-1048.

[39] The term "artificialism" was introduced into the study of EFs by Kazimierz Jodkowski. It expresses the conviction that neither the origin of life itself, nor the subsequent evolution of its various forms, can be explained by means of impersonal and unintelligent causes (see Jodkowski, 'Antynaturalizm teorii…', p. 73; Kilian, 'Geneza idei epistemicznych…', p. 139). However, it was first used by Brunschvicg in a more general sense, denoting the belief that all things result from a transcendent act of creation (see Brunschvicg, *L'Expérience Humaine*…, pp. 155, 159.

[40] Francisco J. Ayala, 'Darwin's Revolution', in John H. Campbell and J.W. Schoff (eds.), *Creative Evolution!?*, Jones and Bartlett, New York 1994, p. 5 [1-18].

serious theoretical problems, in that a set of restrictions has been proposed that are incompatible with what is standardly done in science. These lead to disciplines whose scientific character is not in question being considered unscientific. There are fields (such as archaeology) that allow for artificial explanations (in that archaeologists repeatedly conclude that the objects they discover are the creations of intelligent beings), yet no one denies their claim to scientificality.[41]

Returning to our main problem, it should be said that methodological naturalism, as a set of three methodological decisions, is grounded in a particular metaphysics.[42] These stipulative commitments derive their *raisons d'être* from metaphysical theses, called "hard-cores", such as delimit the scope of what exists in very general terms.[43] The hard core of anti-supernaturalism can be presented in the form of the following thesis: either God does not exist, or, if he does exist, he does not act in nature in a direct way.[44] Meanwhile, the hard core of anti-artificialist naturalism states that the course of events in the universe is not influenced by any intelligent factor.[45]

A counterproposal to anti-supernaturalist naturalism will be furnished by the supernaturalist EF associated with the supernaturalist interventionism of creationism. According to this approach, supernatural explanations − the intervention of a supernatural being, i.e. God − should be allowed to figure in

[41] In the case of archaeology, it is tacitly assumed that every artefact studied by archaeologists is a man-made product.

[42] See Krzysztof J. Kilian, 'Arguments For Methodological Naturalism and Their Roots in a Particular Metaphysics', *Cosmos and History: The Journal of Natural and Social Philosophy* 2023, Vol. 19, No 1, pp, 113-157, https://tiny.pl/c32z4 (accessed Oct. 10, 2024); Krzysztof J. Kilian, 'Arguments Against Methodological Naturalism and Their Roots in Metaphysics', *Cosmos and History: The Journal of Natural and Social Philosophy* 2024, Vol. 20, No. 1, pp. 268-313, https://tiny.pl/bb6cnnmg (accessed Oct. 10, 2024).

[43] See Kazimierz Jodkowski, 'Darwinowska teoria ewolucji jako teoria filozoficzna', in: Stefan Konstańczak, Tomasz Turowski (eds.), *Filozofia jako mądrość bycia*, Oficyna Wydawnicza Uniwersytetu Zielonogórskiego, Zielona Góra 2009, p. 19 [17-23], https://tiny.pl/w6q1hgdt (accessed Oct. 10, 2024). Such a basing of methodological decisions on metaphysical assumptions is not only a characteristic of EFs: "The standards we use and the rules we recommend make sense only in a world that has a certain structure. They become inapplicable, or start running idle in a domain that does not exhibit this structure" (Paul K. Feyerabend, *Against Method. Third Edition*, Verso, London 1993, p. 233).

[44] Cf., on this issue, the remarks of Jodkowski ('Darwinowska teoria ewolucji…', p. 19) and Nagel, 'Public Education…', p. 205.

[45] See Charles Thaxton, 'A New Design Argument', *Discovery.org* September 1, 1994, https://tiny.pl/wwf9d (accessed Oct. 10, 2024).

the explanation of natural phenomena, in addition to natural causes: "explanations in terms of the direct and immediate activity of a divine agent may constitute a proper part of natural science".[46]

Incidentally, it is worth mentioning at this point that neither within supernaturalism, nor within artificialism (which we shall characterize in due course), is it assumed that *explanations* that pretend to be scientific can refer to deities or non-human intelligences deliberately intervening in the natural world. In other words, within these approaches, it is not claimed that *the premises* in scientific explanations are claims that appeal to deities or non-human intelligences.[47]

The hard core of the supernaturalist EF can be expressed like this: God exists and acts in nature in a direct way, while life is the unique work of the creation period. Creation took place by virtue of unique processes that no longer occur nowadays.[48]

Meanwhile, the counterproposal to anti-artificialistic naturalism will be the artificialistic EF associated with the theory of intelligent design (ID). The latter can be presented as a prescription to allow artificial, intelligent causes in scientific research alongside natural causes:

> the central claim [of artificialism] is that only intelligent causes can adequately explain the complex, information-rich structures of biology and that these causes are empirically detectable.[49]

The hard core of artificialism can be formulated thus: in addition to chance and necessity, intelligent causes also operate in nature in a direct way.[50]

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[46] Robert C. O'Connor, 'Science on Trial: Exploring the Rationality of Methodological Naturalism', *Perspectives on Science and Christian Faith* 1997, Vol. 49, No. 1, p. 15 [15-31], https://tiny.pl/wwf95 (accessed Oct. 10, 2024).

[47] See e.g., Ronald H. Pine, 'But Some of Them Are Scientists, Aren't They?', *Creation/Evolution Journal* 1984, Vol. 4, No. 4, p. 10 [6-18], https://tiny.pl/j_thbm4f (accessed Oct. 10, 2024); Stephen C. Meyer, *Signature in the Cell: DNA and the Evidence for Intelligent Design*, Harper One, New York 2009, p. 171.

[48] See Henry M. Morris, *Scientific Creationism*, Creation-Life Publishers, San Diego 1974, p. 46.

[49] William A. Dembski, 'Intelligent Design: A Brief Introduction', *4Truth.NetScience* February 5, 2008, https://tiny.pl/tmkvf (accessed Oct. 10, 2024).

[50] It can be said that the causes can be either divine or created by intelligent agents, e.g. humans, aliens, angels. ID separates the question of design recognition from the question of the identity of the designer. While agreeing with the first statement, it should be noted, however, that Behe and Dembski, for example, subscribe to what is written in the second statement, while Ratzsch disagrees. Cf. Ratzsch, *Nature, Design and*

The EFs presented so far can be arranged in the following pairs:
anti-supernaturalist naturalism − supernaturalism;
anti-artificialist naturalism − artificialism.

However, there is another EF, which is a variant of naturalism – namely, naturalistic theism – which targets both supernaturalism and artificialism.

Naturalistic theism, as a worldview, is supposed to be oriented towards defending Christian civilization against attempts to turn the latter into something post-Christian. The aforementioned naturalistic and anti-naturalistic EFs are intended to form the most general cognitive framework for the pursuit of science. Naturalistic theism, meanwhile, also seeks to create such a framework, and at the same time gives rise to another, *sui generis* worldview framework for scientific practice. Of course, at the heart of the previously discussed EFs there are also to be found certain worldviews that give meaning to some human actions while denying it to others.[51] However, such theism is primarily stated as a worldview:

> By naturalistic theism I mean a comprehensive theistic worldview that takes the existence and non-coercive action of God to be essential to the nature of Nature. This worldview sees supernatural (coercive) divine intervention as something that is precluded by the very natures of God, the World, and the God/World relationship […].[52]

Naturalistic theism is such an EF, it being primarily intended to obviate "the crisis of faith among educated people, especially scientists, which is the result of the incompatibility of the traditional theistic and contemporary scientific description of the world",[53] and to restore this faith to scientists. This crisis is alleviated by an important and religiously significant *change in the content of faith*: God does not act in nature in a special, empirically recognizable way. (God, as

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Science..., pp. 41-60, sections 4 and 5 entitled "Identifying Supernatural Design: Primary Marks"; "Identifying Supernatural Design: Secondary Marks".

[51] See Krzysztof J. Kilian, 'Światopoglądowy i ideologiczny wymiar epistemicznych układów odniesienia a teistyczno-naturalistyczny epistemiczny układ odniesienia', *Filozoficzne Aspekty Genezy* 2018, Vol. 15, pp. 142-194 [139-222], https://tiny.pl/w4chg (accessed Oct. 10, 2024).

[52] Howard J. Van Till, 'Cosmic Evolution, Naturalism, and Divine Creativity, or Who Owns the Robust Formational Economy Principle?', in Gordon and Dembski (eds.), *The Nature of Nature*…, p. 540 [535-546].

[53] Piotr Bylica, 'Główne założenia i problemy teizmu naturalistycznego w sprawie relacji sfery nadprzyrodzonej i świata przyrodniczego', in Wiesław Dyk (ed.), *Sozologia systemowa. Vol. IV. Biosfera. Człowiek i jego środowisko w aspekcie przyrodniczym, filozoficznym i teologicznym*, Wydawnictwo Naukowe Uniwersytetu Szczecińskiego, Szczecin 2012, p. 88 [55-95], https://tiny.pl/k_g9ky1x (accessed Oct. 10, 2024).

thus conceived by such naturalistic theists themselves, is referred to as "the God of a believing scientist".)[54] In turn, the effect of this change is to reconcile the worldview of the contemporary natural sciences with Christian theism.

Naturalistic theists also believe that "the evolutionary vision of nature expresses the Christian doctrine of creation and the immanence of God much better than pre-Darwinian biology did".[55] The latter suggested that God created a ready-made world, while Darwinian biology is supposed to lead to the belief that God created a world that is self-creating. According to this belief, evolution not only does not stand in opposition to creation, but together with it provides a synthetic picture of the world.[56]

The EF of naturalistic theism is the injunction to accept only naturalistic explanations for natural phenomena, accompanied by prohibitions against appealing to supernaturalistic and artificialistic explanations ("creation, a creator, an intelligent designer are simply outside the confines of scientific investigation").[57] Moreover, the hard core of this EF can be formulated in terms of the idea that God exists and is immanently present in the laws of nature, while not acting in nature in an empirically detectable way. Thus:

> God does not act on the world by some extraordinary interventions, but always through the natural course of the world. His action is not revealed in the natural course of the world not because His action is not there, but because the entire natural course of the world is His action.[58]

The hard cores of naturalistic and anti-naturalistic EFs indicate how these EFs differ on the metaphysical level. This leads directly to the thesis that they also differ on that of worldviews.

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[54] See George V. Coyne SJ, 'Evolution and Intelligent Design. Who Needs God?', in Seckbach, Gordon (eds.), *Divine Action and Natural Selection*…, p. 24 [9-26].

[55] Józef Życiński, Bóg i ewolucja. Podstawowe pytania ewolucjonizmu chrześcijańskiego, Prace Wydziału Filozoficznego, Vol. 89, Towarzystwo Naukowe KUL, Lublin 2002, p. 24.

[56] See Michael [Michał] Heller, *The New Physics and a New Theology*, transl. by G.V. Coyne, S.J.S. Giovannini, T.M. Sierotowicz, Vatican Observatory Publications, Vatican 1996, p. 44.

[57] Coyne SJ, 'Evolution and Intelligent…', p. 18. See also, e.g., Van Till, 'Cosmic Evolution…' p. 539; Francisco J. Ayala, 'Darwin's Greatest Discovery: Design without Designer', in John C. Avise and Francisco J. Ayala (eds.), *In the Light of Evolution. Volume I: Adaptation and Complex Design*, The National Academies Press, Washington DC 2007, p. 20 [3-21], https://tiny.pl/tx8s2 (accessed Oct. 10, 2024).

[58] Michał Heller, 'Chrześcijański naturalizm', *Roczniki Filozoficzne* 2003, Vol. 51, No 3, p. 47 [41-58], https://tiny.pl/tq2q2 (accessed Oct. 10, 2024).

3. THE WORLDVIEW DIMENSION OF EPISTEMIC FRAMEWORKS

In the classic Diltheyan understanding of the term, *Weltanschauungen* were supposed to solve the two riddles: one of life, and the other one of the world. The EFs presented here not only provide answers to these, but also these are ones that lie at the heart of their functioning.

The worldview component of the EF of supernaturalist interventionism is clearly visible in the widespread references within this interventionism to the Holy Scriptures (or other holy books, such as the Quran or the Upanishads). Indeed, a feature of creationism, highlighting this component, is that the results of scientific research are continuously reconciled with the relevant parts of the holy books. Here is one of many examples:

> The data of geology, in our view, should be interpreted in light of the Scripture, rather than distorting Scripture to accommodate current geological philosophy.[59]

This supernaturalism also leads to the conception of man as an entity who is at the centre of the divine plan of creation: "In my Father's house are many mansions" [John 14:2].

The model example of a scientific theory based on the naturalistic EF is gradualist evolutionism. The latter also seeks to resolve the riddles mentioned above. In so doing, it does not appeal to supernatural forces, and is considered a worldview alternative to Christianity:

> Evolution is promoted by its practitioners as more than mere science. Evolution is promulgated as an ideology, a secular religion − a full-fledged alternative to Christianity, with meaning and morality. […] Evolution is a religion. This was true of evolution in the beginning, and it is true of evolution still today.[60]

This gradualism also has its "holy book", the content of which is widely accepted. This "book" is methodological naturalism. The "book" itself is only visible when the actions of scientists are juxtaposed with what creationists aim to accomplish when they seek to accommodate scientific data within their holy books.[61] And man, from the point of view of atheistic evolutionism, is merely "a

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[59] Henry M. Morris, John D. Morris, *Science, Scripture, and the Young Earth*, Master Books, El Cajon, CA 1989, p. 36.

[60] Michael Ruse, 'Saving Darwinism from the Darwinians', *National Post*, Saturday 13th May, 2000, p. B3 [B1, B3, B7].

[61] See Kazimierz Jodkowski, 'Uczony w ciemnym budynku. Na marginesie metafory Elżbiety Kałuszyńskiej', in Józef Dębowski and Ewa Starzyńska-Kościuszko (eds.), *Nauka. Racjonalność . Realizm. Między filozofią*

kind of cosmic accident, just one bauble on the Christmas tree of evolution".[62]

The hallmark of the naturalistic-theistic worldview is revealed in the "skillful reading"[63] of the books of Scripture and nature, which is all about the thought that "our understanding of the Bible [...] has to be updated".[64] The EF of naturalistic theism has, *de facto*, two "holy books": one "more sacred" or "more basic" than the other. It is the book of nature that provides the reference point for a skilful reading of the other, the Scriptures.[65] The Bible, on this approach, has been reduced to a set of ethical postulates, speaking only about moral values and the meaning of life.[66]

The EF of artificialism, together with its hard core, furnishes a highly capacious account, as it can be reconciled with both naturalism and anti-naturalism. Therefore, this EF has been referred to as the "neutral option".[67] Within the framework of artificialism, it is argued that the known empirical evidence from biology and cosmology points to traces of the actions of an

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przyrody a filozofią nauki i socjologią wiedzy, Instytut Filozofii Uniwersytetu Warmińsko-Mazurskiego w Olsztynie, Olsztyn 2013, p. 59 [55-67].

[62] Stephen Jay Gould, *Wonderful Life: The Burgess Shale and the Nature of History*, W.W. Norton & Company, New York–London 1990, p. 44.

[63] Wojciech Kotowicz, 'Józefa Życińskiego meta-przedmiotowe ujęcie relacji między nauką a religią', *Roczniki Filozoficzne* 2012, Vol. 60, No. 4, p. 254 [249-260], https://tiny.pl/tqfh3 (accessed Oct. 10, 2024).

[64] Mark Allfree, Matthew Davies, *The Deception of Theistic Evolution*, Bible Study Publications, Mansfield UK 2017, p. 10.

[65] Incidentally, this approach is based on an archaic vision of science as an infallible *episteme* – and, therefore, the content of Scripture is adapted to it: "When conflict arises between a literal reading of some Bible text and a truth about the nature of things which has been demonstrated by reliable argument, the Christian must strive to reinterpret the biblical text in a metaphorical way" (Ernan McMullin, 'Introduction: Evolution versus Creation', in Ernan McMullin (ed.), *Evolution versus Creation*, University of Notre Dame Press, Notre Dame 1985, p. 11 [1-58]). With this statement, McMullin was referring to the 21st chapter of Book I of St. Augustine's treatise *De Genesi ad Litteram. Libri Duodecim.*

[66] It is worth mentioning here that this moral dimension of the Bible, promoted by "enlightened religion" (see Jerry A. Coyne, *Why Evolution is True*, Oxford University Press, Oxford and New York 2009, p. 11), has already lost its uniqueness in the eyes of some naturalists: "If religion, including the dogmatic secular ideologies, can be systematically analyzed and explained as a product of the brain's evolution, its power as an external source of morality will be gone forever […]" (Edward O. Wilson, *On Human Nature*, Harvard University Press, Cambridge Mass., London 1978, p. 201). Also: "[M]y Darwinian metaethics says that substantive morality is a kind of illusion, put in place by our genes, in order to make us good social cooperators" (Michael Ruse, 'Evolution and Ethics', in Gordon and Dembski (eds.), *The Nature of Nature*…, p. 858 [855-864]).

[67] See Andrzej Wiśniewski, 'Dlaczego należy czytać Jodkowskiego?', in: Bylica, Kilian, Piotrowski and Sagan (eds.), *Filozofia — nauka — religia*…, p. 40 [37-41].

intelligent being. This evidence does not make it possible to determine the identity of the latter, as the facts that are supposed to testify in favour of the project do not give us any clues as to this.[68] It is also not difficult to see that amongst the proponents of intelligent design theory are both believers and non-believers.

The spectrum of worldviews presented above provides a good understanding of how the EFs presented here differ. These differences can also be seen through the prism of another problem: the incommensurability of scientific theories.

4. EPISTEMIC FRAMEWORKS AND THE PROBLEM OF INTERTHEORETICAL INCOMMENSURABILITY

Proponents of the incommensurability thesis depart from the traditional view that newly formulated theories must be compatible with their predecessors, as those theories dealt in part with the same range of phenomena. They also claim that in the history of science it is possible to observe breaks of continuity in the development of science.[69] The new theories perceive the world differently from their rivals: they are incompatible on the linguistic level, there being no language such that both could be fully formulated in it, and which could be used for a step-by-step comparison of their claims, and they admit different standards of scientificality and postulate radically different ontologies.[70]

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[68] See, e.g., David K. DeWolf, Stephen C. Meyer, Mark Edward DeForrest, 'Teaching the Origins Controversy: Science, or Religion, or Speech?', *Utah Law Review* 2000, Vol. 39, p. 93 [39-110], https://tiny.pl/tgqg4 (accessed Oct. 10, 2024).

[69] See, e.g., Paul K. Feyerabend, '«Science». The Myth and Its Role in Society', *Inquiry. An Interdisciplinary Journal of Philosophy* 1975, Vol. 18, No. 2, pp. 169-170 [167-181]; Kuhn, *The Structure*…, pp. 1-2. See also e.g., Joseph Agassi, 'Continuity and Discontinuity in the History of Science', *Journal of the History of Ideas* 1973, Vol. 34, No. 4, pp. 609-626.

[70] The fullest articulation of the incommensurability thesis can be found in the writings of Thomas S. Kuhn and Paul K. Feyerabend. However, they did not use the term "incommensurability" perspicuously, leading to a number of misinterpretations of the thesis. The word itself has no sharply defined meaning in the philosophy of science, either. That issue lies far beyond the scope of this paper. For present purposes, I will make use of just one approach, which deals with the problem of the vagueness of this concept in such a way that it distinguishes five levels of incommensurability where scientific theories are concerned: quantitative variability of empirical consequences (this level will not be discussed here, since it applies only to those areas of science in which precisely quantified research results play an important role), observational variability, linguistic variability, methodological variability (variability with respect to scientific problems and evaluation criteria), and ontological variability (see Kazimierz Jodkowski, *Teza o niewspółmierności w ujęciu Thomasa S. Kuhna i Paula K. Feyerabenda*, *Realizm. Racjonalność . Relatywizm*, Vol. 1, Wydawnictwo UMCS, Lublin 1984,

What is being said here, then, is that certain successive theories are *incommensurable in some sense, and in some ways incomparable*. This does not mean that in no way can they be studied or compared.[71]

Naturalistic and anti-naturalistic theories amount to incommensurable views.[72] This fact leads to a different understanding of the nature of science in each case. It makes it difficult, but not impossible, for proponents of differing views to communicate, as at least some participants in this debate are aware.[73] For example:

> we [anti-naturalists] have to understand how secularists – in this context, that means those who subscribe to scientific naturalism – think, and what particular words mean in their system of thinking.[74]

Despite the fact that the relationship of incommensurability is most often said to obtain between scientific theories, not all such theories can be incommensurable. Indeed, this possibility holds only for realistically interpreted

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https://tiny.pl/tlk98 [accessed Oct. 10, 2024]). In one of Feyerabend's texts one can find clues that allow for just such an interpretation of the thesis of incommensurability (see Paul. K. Feyerabend, 'Changing Patterns of Reconstruction', *British Journal for the Philosophy of Science* 1977, Vol. 28, No. 4, pp. 363-365 [351-369]). See also: Krzysztof J. Kilian, 'Epistemiczne układy odniesienia a problem interteoretycznej niewspółmierności—część 1', *Filozoficzne Aspekty Genezy* 2017, Vol. 14, pp. 237-280, https://tiny.pl/wwf48 (accessed Oct. 10, 2024); Krzysztof J. Kilian, 'Epistemiczne układy odniesienia a problem interteoretycznej niewspółmierności—część 2', *Filozoficzne Aspekty Genezy* 2017, Vol. 14, pp. 281-325; https://tiny.pl/wwf46 (accessed Oct. 10, 2024).

[71] See, e.g., Thomas S. Kuhn, 'The Road since Structure', *PSA: Proceedings of the Biennial Meeting of the Philosophy of Science Association* 1990, Vol. 2, p. 5 [3-13]; Thomas S. Kuhn, 'Theory Change as Structure Change: Comments on the Sneed Formalism', in Thomas S. Kuhn, *The Road since Structure*, The University of Chicago Press, Chicago and London 2000, p. 189 [176-195]; Paul K. Feyerabend, 'More Clothes from the Emperor's Bargain Basement: A Review of Laudan's Progress and its Problems', in Paul K. Feyerabend, *Philosophical Papers. Vol. 2. Problems of Empiricism*, Cambridge University Press, Cambridge–New York–Port–Chester–Melbourne–Sydney 1981, p. 238 [231- 246]; Paul K. Feyerabend, 'Third Dialogue', in: Paul K. Feyerabend, *Three Dialogues on Knowledge*, Basil Blackwell Ltd., Oxford UK & Cambridge USA 1991, p. 154 [125-160].

[72] See James T. Robinson, 'Incommensurability of Evolution and Special Creation', *The American Biology Teacher* 1971, Vol. 33, No. 9, pp. 535-538 and p. 545; Kazimierz Jodkowski, *Metodologiczne aspekty kontrowersji ewolucjonizm-kreacjonizm*, *Realizm. Racjonalność . Relatywizm*, Vol. 35, Wydawnictwo Uniwersytetu Marii Curie Skłodowskiej, Lublin 1998, pp. 204-318.

[73] See, e.g., Theodore Arabatzis, 'Can a Historian of Science Be a Scientific Realist?', *Philosophy of Science* 2001, Vol. 68, No. 3, Supplement, pp. S536-S538 [S531-S541].

[74] Phillip E. Johnson, 'Shouting «Heresy» in the Temple of Darwin', *Christianity Today* 1994, October 24, Vol. 38, No. 12, p. 26 [22-26], https://tiny.pl/tnnxyjc9 (accessed Oct. 10, 2024).

universal ones.[75]

Universal theories can be characterized in three ways. First, they are top-level theories: that is, theories that are not elements of other theories. The objects they speak of are neither defined independently from these theories, nor are we independently convinced of the existence of these objects.[76] Second, they are theories that apply, at least in some respect or other, to everything that exists.[77] They must provide the researcher with an adequate system of concepts for describing and explaining features of the world. They must also be sufficient to completely replace the previously accepted language and ontology. Third, they are theories that are distinguishable from (directly testable) empirical generalizations. Universal theories are themselves tested by deriving empirical generalizations from them and from certain boundary conditions.[78] It is not difficult to see that the theories on which the EFs discussed here are based, are, at least in the first two senses, universal theories.

On *the ontological level*, the incommensurability thesis states that when moving from one theory to another, fundamental beliefs about the structure of the world and the structure of each object are changed. Thus, it is claimed that "[i]n a sense [...] the proponents of competing paradigms practice their trades in different worlds",[79] and that "the possibility of choosing a methodology on the basis of

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[75] Feyerabend expresses his view thus: "I never said […] that any two rival theories are incommensurable. What I did say was that certain rival theories, so-called «universal» theories, or «non-instantial» theories, if interpreted in a certain [realistic] way, could not be compared easily. More specifically, I never assumed [unlike Kuhn] that Ptolemy and Copernicus are incommensurable. They are not" (Paul K. Feyerabend, *Against Method. Outline of an Anarchistic Theory of Knowledge*, New Left Books, London 1975, p. 114).
Examples of incommensurable approaches include the following transitions: from fixed species doctrines to evolutionary biology; from Aristotelian to Lockean colour theory; from Aristotelian mechanics to impetus theory; from impetus theory to Newtonian mechanics; from Newtonian mechanics to special and general relativity; from phlogiston to the caloric and kinetic theory of heat; from geometrical optics to wave optics.

[76] See Paul K. Feyerabend, 'Physics and Ontology', in Paul K. Feyerabend, *Philosophical Papers. Vol. 4. Physics and Philosophy*, Stefano Gattei and Joseph Agassi (eds.), Cambridge University Press, New York 2016, pp. 20-22 [9-24].

[77] See Feyerabend's statement in Herbert Feigl, Paul K. Feyerabend, Norwood R. Hanson, Carl G. Hempel, Mary Hesse, Grover Maxwell and William Rozeboom, 'Discussion at the Conference on Correspondence Rules', in Michael Radner and Stephen Winokur (eds.), *Analyses of Theories and Methods of Physics and Psychology*, *Minnesota Studies in the Philosophy of Science* 1970, Vol. 4, p. 246 [220-259].

[78] See Feyerabend, 'Explanation, Reduction…', p. 28, n. 1; Kazimierz Jodkowski, 'Filozofia nauki Paula K. Feyerabenda. Stadium umiarkowane', *Studia Filozoficzne* 1979, Nr 11, pp. 63-64 [59-75].

[79] Kuhn, *The Structure*…, p. 150. See also Feyerabend, 'Problems of Empiricism…', p. 170.

cosmological considerations shows that there can be different types of science".[80] So, before we start looking for causes of the phenomena in the world around us, we must first decide where we will look for these causes. For example:

> my practice as a scientist is Atheistic. That is to say, when I set up an experiment, I assume that no god, angel, or devil is going to interfere with its course; and this assumption has been justified by such success as I have achieved in my professional career. I should therefore be intellectually dishonest if I were not also Atheistic in theory, at least to the extent of disbelieving in supernatural interference in the affairs of the world.[81]

The preconceived structure of the world, and not a different one, therefore forces scientists to adapt certain standards of investigation to it. Here is an example of another perspective:

> we Christians must think about the matter at hand from a Christian perspective; we need Theistic Science.[82]

Such practising of science "in different worlds" is what we encounter, for example, in a statement such as the following, which clearly sets up an "either-or" perspective:

> if you are an orthodox Christian with a high view of the authority of the Bible, you cannot believe in evolution in any form at all. […] If you believe in God, you can't believe in evolution. If you believe in evolution, you can't believe in God.[83]

Beliefs about the structure of the world impose a certain way of interpreting evidence. This is eloquently demonstrated, for example, by such statements explaining the interspecies similarities of organisms differently:

> Why should a rat run, a bat fly, a porpoise swim, and I type this essay with structures built of the same bones unless we all inherited them from a common ancestor? An engineer, starting from scratch, could design better limbs in each

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[80] Paul K. Feyerabend, 'The Methodology of Scientific Research Programmes', in Feyerabend, *Philosophical Papers. Vol. 2*…, p. 212, n. 18 [202-230].

[81] John B.S. Haldane, *Facts and Faith*, Watts & Co., London 1936, p. vi, https://tiny.pl/wwfk7 (accessed Oct. 10, 2024).

[82] Alvin Plantinga, 'When Faith and Reason Clash: Evolution and the Bible', *Christian Scholar's Review* 1991, Vol. 21, No. 1, p. 30 [8-33], https://tiny.pl/gzlnq (accessed Oct. 10, 2024).

[83] Tim Keller, 'Creation, Evolution, and Christian Laypeople', *BioLogos* February 23rd, 2012, p. 1 [1-14], https://tiny.pl/wwfkj (accessed Oct. 10, 2024). See also, e.g., Richard Dawkins, *The Selfish Gene*, Oxford University Press, Oxford 1976, p. 1.

> case.[84]
>
> [A] supernatural being who created the cosmos could presumably build intended patterns and structures into the primordial, ultimate, initial conditions of the cosmos, or into the very laws and constants of the cosmos.[85]

Creationists and naturalistic theists also interpret evidence differently. According to the former

> [n]either the Bible, nor its consistent enemies allow "theistic evolution".[86]
>
> The reinterpretation of geologic data according to flood geology would include a re-evaluation of all dating methods, including especially a critical review of radiometric dating methods.[87]

The latter, on the other hand, claim that creationists

> have developed their own little "folk conception" of science, one that is totally subservient to their preconceived fundamentalist theology. […] However, the folk conception of "true" science developed by "scientific" creationists has about as much resemblance to legitimate science as does astrology to astronomy or witchcraft to medicine.[88]

It is also not difficult to see that although creationists and naturalistic theists speak of the God of the Bible, it is neither the same God (a God intervening in the natural order and a God not intervening in such an order) nor the same world (a two-sphere reality – natural and supernatural, the latter interacting in a special way with the former; there is no natural and supernatural realm in the world, so the latter does not intentionally interact with the natural world in any way).

Here is another example. If the existence of baramins[89] is assumed, then all

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[84] Stephen Jay Gould, 'Evolution as Fact and Theory', in Stephen Jay Gould, *Hen's Teeth and Horse's Toes*, W.W. Norton & Company, New York, London 1983, p. 258 [253-262].
[85] Ratzsch, Nature, Design and Science…, p. 27.
[86] CSSHS Editorial Staff, 'Lesson 1. Creation, the Foundation of the Biblical World View', in CSSHS Editorial Staff, *A Creation Course – In 13 Lessons*, *Creation Social Science and Humanities Society. Quarterly Journal* 1990, Vol. 12, No. 1, p. 2 [2-7], https://tiny.pl/th318 (accessed Oct. 10, 2024).
[87] Duane Gish, *Evolution: The Challenge of the Fossil Record*, Creation-Life Publishers, El Cajon 1985, p. 51.
[88] Leon H. Albert, '«Scientific» Creationism as a Pseudoscience', *Creation Evolution Journal* 1986, Vol. 6, No. 2, p. 30 [25-34], https://tiny.pl/2gqt_dxd (accessed Oct. 10, 2024).
[89] The term was introduced by Frank Lewis Marsh (1899-1992), a biologist and Seventh-day Adventist, in his book *Fundamental Biology* (Lincoln, NE 1941). The term derives from "the two Hebrew words *bara* («created») and *min* («kind»)" (Frank Lewis Marsh, 'Fundamental Biology', in Ronald N. Numbers (ed.), *Creationism in Twentieth-Century America. A Ten Volume Anthology of Documents, 1903-1961, Vol. 8. The Early Writings of Harold W. Clark, and Frank Lewis Marsh*, Garland Publishing Inc., New York & London 1995, p. 502 [395-

hypothetical family trees showing continuous lines going back from modern organisms to their fossil ancestors must be abandoned, since the inconsistencies between these trees will be a consequence of the fact that the basic phyla of living organisms arose through separate creative acts.[90] Moreover, for proponents of the occurrence of macro-evolution, any theory that does not take into account a holistic view of descent from a common ancestor will lead to an arbitrary interpretation of the tree of life, conflict with empirical evidence, and involve a logically inconsistent theory of origins.[91] The belief in the existence of baramins also leads creationists to the thesis that at least some taxonomic units are objective in nature.[92] By contrast, evolutionists maintain that "any attempt to group all living things, past and present, into sharply defined groups, between which no intermediates exist, is foredoomed to failure".[93]

On *the methodological level* (i.e. that which deals with the variability of scientific problems and criteria of evaluation), the incommensurability thesis states that when moving from one theory to another (or from one paradigm to another, or from one scientific research program to another), standards of scientificality and criteria for evaluating research results are radically altered. This is recognized by both sides of the conflict. We see naturalists acknowledging it:

> A real debate [between proponents and opponents of gradualist evolutionism] is thus impossible for a simple reason: there is no agreement on what mutually acceptable framework it should be held within.[94]

530]). Marsh did not give the term "baramin" a clear meaning, and this caused a wave of criticism from evolutionists. The case was described by Todd Charles Wood, Kurt P. Wise, Roger Sanders and N. Doran, 'A Refined Baramin Concept', *Occasional Papers of the Baraminology Study Group* 2003, No. 3, pp. 1-12 [1-14], https://tiny.pl/wwd4s (accessed Oct. 10, 2024).

[90] See e.g., Nancy Pearcey, 'Evolution After Darwin – What's Left?', *Bible–Science Newsletter* August 1985, Vol. 23, No. 8, pp. 7-10; Dean H. Kenyon, 'The Creationist View of Biologic Origin', *Nexa Journal* Spring 1984, pp. 28-35.

[91] See Gert Korthof, 'Common Descent: It's All or Nothing', in Matt Young and Taner Edis (eds.), *Why Intelligent Design Fails: A Scientific Critique of the New Creationism*, Rutgers University Press, New Brunswick 2006, pp. 32-47; Gert Korthof, "Who Created the First Tree of Life? Comparing Trees of Hitchcock, Darwin and Haeckel", *Towards the Third Evolutionary Synthesis* 12th February 2017, https://tiny.pl/tm1m7 (accessed Oct. 10, 2024).

[92] See, e.g., Henry M. Morris, *The Biblical Basis for Modern Science*, Baker Books, Grand Rapids, MI 1984, p. 372.

[93] John Maynard Smith, *The Theory of Evolution*, Cambridge University Press, Cambridge UK 2000, p. 217.

[94] Jerzy Kowalski-Glikman, 'Bezradność postępowego inteligenta', *Świat Nauki* 2008, No 2 (198), p. 85 [84-85].

But we also witness anti-naturalists doing so:

> A message, however eloquent it may sound to us [anti-naturalists], is a mere noisy gong or clanging cymbal to those who have a different frame of reference.[95]

It has already been mentioned that the assumptions on which EFs are based are no more than methodological decisions of a certain kind, stipulating how science should or should not be practised. Even so, as was already noted, there is of course no absolute prescription to the effect that we must make these and not other decisions: researchers working within different EFs will make their own choices, such that they are willing to allow certain kinds of causes and not others when seeking to explain phenomena. These are not arbitrary. They are justified by means of various arguments.[96] However, at the heart of such choices is a belief, arrived at by a particular community of researchers, in the validity of conducting research in a certain way.[97] Let us quote the following as an example:

> [S]cientific method is based upon an assumed orderliness of the universe open to rational investigation, and this orderliness can be assumed only due to creation by the God of the Bible.[98]

Proponents of different theoretical approaches, at least in part, may also be interested in other problems and evaluate their solutions differently. For example, evolutionists and creationists assign different roles to natural selection. The former see it as the driving force behind all evolutionary processes, while the latter consider it a far less important factor. According to ID, the search for naturalistic explanations for the emergence of irreducibly complex systems is

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[95] Johnson, 'Shouting «Heresy» …', p. 26.

[96] See, e.g., Arminius Mignea, 'Methodological Naturalism and Its Creation Story', in Bartlett and Holloway (eds.), *Naturalism and Its...*, p. 130 [129-162]; Martin J.S. Rudwick, 'Charles Lyell Speaks in the Lecture Theatre', *The British Journal for the History of Science* 1976, Vol. 9, No. 2, *Lyell Centenary Issue: Papers Delivered at the Charles Lyell Centenary Symposium*, London 1975, p. 150 [147-155]; John F.W. Herschel, *Preliminary Discourse on the Study of Natural Philosophy*, Longman, Brown, Green & Longmans, London 1851, p. 144, https://tiny.pl/tr3vw (accessed Oct. 10, 2024); Ernst Mayr, *What Evolution Is*, Phoenix, London 2002, p. 10; Brightman, 'An Empirical Approach…', p. 157; David W. Snoke, "Defining Undesign in a Designed Universe", *Perspectives on Science and Christian Faith*, December 2008, Vol. 60, No. 4, p. 230 [225-232], https://tiny.pl/wwf8q (accessed Oct. 10, 2024).

[97] See, e.g., Kuhn, *The Structure*…, pp. 176-177.

[98] CSSHS Editorial Staff, 'Lesson 7. Man's Creativity: Science', in: CSSHS Editorial Staff, *A Creation Course*…, p. 36 [33-38], https://tiny.pl/th34w (accessed Oct. 10, 2024).

pointless, since these systems did not arise that way.

With the transition from one incommensurable theory to another it is not just that the set of problems considered scientific changes, with some of them being dismissed as pseudo-problems, but also that their importance changes, with some now considered secondary and others still that were initially regarded as marginal becoming essential. For example, for proponents of ID, the proposal to reintroduce intelligent causes into scientific explanations is a radical departure from conventional science, and intelligent design must be considered at least a possible scientific explanation for the origin of biological information.[99] Furthermore, for naturalist critics of this view, the artificialist belief – according to which certain features of the living world indicate that they are the result of the interference of an intelligent designer as they could not have arisen naturally – is a pseudo-issue because, by allowing anti-naturalistic explanations, it leads to the sanctioning of ignorance.[100] The variability as regards acceptable explanations, problems, and standards of evaluation restricts us when it comes to choosing between competing theories. Criteria for estimating which theory solves more problems, or solves them more accurately, which is more effectively confirmed, etc., do not apply in this case. For example, for creationists consistency with the Bible is a key value, whilst for naturalists it has no value at all. Conversely, the lack of reference to supernatural causes, a fundamental advantage of the naturalistic system as viewed by naturalists, is a disadvantage in the eyes of creationists.[101] The creationist belief in the objective existence of taxonomic units leads to attempts to empirically determine the ranges of such units.[102] For theistic and atheistic evolutionists, such efforts lead nowhere, since such units are determined conventionally.

The *level of observational variability* engenders different ways of seeing the world. According to this idea (i.e. that of observational variability), proponents of different, incommensurable theories will view the world differently. "What were ducks in the scientist's world before the revolution are rabbits afterwards".[103]

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[99] See, e.g., Stephen C. Meyer, *Signature in the Cell*…, p. 171.
[100] See, e.g., Douglas J. Futuyma, 'Miracles and Molecules', *Boston Review*, February/March 1997, pp. 29-30.
[101] See, e.g., Morris, *Scientific Creationism*…, p. 46-47.
[102] See, e.g., Marsh, 'Fundamental Biology…', p. 505.
[103] Kuhn, *The Structure*…, p. 111.

However, if all empirical evidence is theorized, then there is no way to verify this evidence independently of theory. The implications of this state of affairs are recognized by some participants in the controversy we are discussing:

> Both schools of thought [naturalists and anti-naturalists] have had a tendency to rely on the same class of evidence […].[104]

> Observational data and logic alone do not force one to accept either of the two positions.[105]

Others, on the other hand, do not seem to recognize this:

> What the Cambrian explosion unambiguously tells us is nothing other than a miracle of creation taking place 530 million years ago, as one did when the Earth was first created.[106]

Still others, meanwhile, are well aware that it is the theory that explains the observations, not the other way around:

> We proposed the theory of punctuated equilibrium largely to provide a different explanation for pervasive trends in the fossil record.[107]

Thus, there is no way to organize facts and explain phenomena free from any theoretical perspective. This is especially true for attempts to compare incommensurable theories. Accepting the thesis of incommensurability leads to the belief that the continuity of the development of science is radically broken. Then the problem of criteria for choosing between incommensurable theories arises. Traditional cumulative approaches, rejecting the incommensurability thesis and accepting the stability thesis,[108] referred to the idea of a crucial experiment.

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[104] Kirk Fitzhugh, 'Evidence for Evolution Versus Evidence for Intelligent Design: Parallel Confusions', *BMC Evolutionary Biology* 2010, Vol. 37, p. 68 [68-92].

[105] Lee M. Spetner, 'The Evolution Controversy and Randomness', in Seckbach, Gordon (eds.), *Divine Action and Natural Selection*…, p. 815 [815-830].

[106] Harun Yahya, 'Did Life on Earth Begin Suddenly and in Complex Forms?', in Seckbach, Gordon (eds.), *Divine Action and Natural Selection*…, p. 309 [299-319]. See also, e.g., Evan Shute, *Flaws in the Theory of Evolution*, Tameside Press, London 1961, p. 5.

[107] Gould, 'Evolution as Fact and Theory…', p. 260.

[108] The expression "stability thesis" was introduced by Feyerabend to denote the position claiming that the meanings of observational statements do not change when theories change and that the theoretical neutrality of observational language makes it possible to evaluate competing theories. See, e.g., Paul K. Feyerabend, 'An Attempt at a Realistic Interpretation of Experience', in Feyerabend, *Philosophical Papers. Vol. 1*…, p. 31 [17-36].

According to the approach in which competing universal theories are incommensurable, things get incredibly complicated. There has been a fruitless search for ways to compare these theories that would allow for non-arbitrary choices between them.[109] However, this does not mean that the scientist is helpless in the face of incommensurable theories – "some kind of comparison is always possible":[110]

> It is much more interesting and instructive to examine what kinds of things can be said and what kinds of things cannot be said […] if the comparison has to take place within a certain specified and historically well-entrenched framework.[111]

Such comparisons are possible, but it is always the assumed EF that will be the basis for making choices between alternative approaches. However, this does not lead to the idea of full observational plasticity, according to which our theoretical acknowledgement of facts will be identical to their being in agreement with our theory. The facts registered by a theory may be inconsistent with the latter,[112] since, as was noted, a theory's predictions depend on both its meaning postulates and its initial conditions, while the meaning of the theory's original terms depends only on the postulates. Thus, it is possible to undermine a theory by means of an experiment that is completely interpreted in its terms.[113]

However, this possibility does not prove that inference to the best explanation plays an essential role in evaluating competing hypotheses. For we are speaking here of competing *incommensurable* hypotheses, not of hypotheses between which

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[109] The most famous attempts to compare incommensurable theories were presented by Feyerabend (see Feyerabend, "Problems of Empiricism…", pp. 214-217; Paul K. Feyerabend, 'Reply to Criticism. Comments on Smart, Sellars and Putnam', in Feyerabend, *Philosophical Papers. Vol. 1*…, pp. 115-117 [104-131]). Incidentally, Feyerabend's realization of the problems facing attempts to make an objective choice between incommensurable theories became, for him, one of the main reasons to abandon attempts to build a constructive methodology and turn instead to anarchist positions.

[110] Feyerabend, Against Method. Outline…, p. 232.

[111] Feyerabend, *Against Method. Outline*…, pp. 232-233.

[112] Michael Devitt ('Against Incommensurability', *Australasian Journal of Philosophy* 1979, Vol. 57, No. 1, pp. 29-50) noted that the semantic variant of the incommensurability thesis ("the meaning of an observational statement is determined by the theory from which it is derived", p. 32) is not always distinguished from the epistemic variant ("one's judgement about the truth value of an observation statement is partly dependent on one's belief in various theories which may turn out to be wrong", p. 32). See also Feyerabend, 'Explanation, Reduction…', p. 30.

[113] See Paul K. Feyerabend, 'Consolations for the Specialist', in: Feyerabend, *Philosophical Papers. Vol. 2*…, p. 158 [131-167].

there is no incommensurability relationship. Accepting the incommensurability thesis does not allow for the same solving of the problem "why P *rather than* Q?",[114] in relation to incommensurable theories and in relation to theories for which there is no incommensurability relationship. In the case of the latter, the aforementioned inference can be invoked to decide which (P or Q) alternative hypothesis solves the problem in question better, since both hypotheses agree on what methods to use, what the world is like, what the various terms scholars use mean and how observational results should be interpreted. In contrast, in the case of incommensurable hypotheses, there is no such agreement. There is therefore nothing to refer to. This can be illustrated by a very simple example. ID proponents claim that ID provides a number of better answers than gradualist evolutionism to questions like "why P *rather than* Q?".[115] Unfortunately, it does not, because the most elementary assumption that the best explanation is to appeal to design is rejected by naturalists, no matter what ID proponents write in the apodosis of a sentence of e.g. the form: "the best explanation is to appeal to design because a, b, c, ..., n", i.e. no matter what evidence the ID proponents invoke and no matter how weak the counter-evidence of evolutionists is when juxtaposed with the evidence presented by ID proponents, because for naturalists, an appeal to design is a pseudo-explanation. Naturalistic methodology does not allow for such explanations.[116]

On *the linguistic level*, the incommensurability thesis boils down to the claim that when moving from one universal theory to another, certain terms change their meaning. In turn, this effectively makes it difficult to achieve accurate translations of the claims of alternative theories. Such theories do not use terms with a common meaning, because the terms of each theory owe their meaning to the fundamental principles of the theory from which they derive.[117]

An example of such meaning-change is furnished by the way in which

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[114] See e.g., Peter Lipton, 'Inference to the Best Explanation', in W.H. Newton-Smith, *A Companion to the Philosophy of Science*, Blackwell Publishers, Malden MA, Oxford UK 2000, p. 188 [184-193]. Italics in original.
[115] See e.g. Stephen C. Meyer, 'No New Genetic Information Needed?' in David Klinghoffer (ed.), *Debating Darwin's Doubt. A Scientific Controversy That Can No Longer Be Denied*, Discovery Institute Press, Seattle 2015, p. 133 [133-141]).
[116] See e.g., Casey Luskin, 'Mistaking Intelligent Design for a God-of-the-Gaps Argument', in Klinghoffer (ed.), *Debating Darwin's Doubt…*, p.303 [295-304].
[117] See Feyerabend, 'Problems of Empiricism…', p. 227, n. 19.

evolutionists and creationists understand the concept of natural selection.[118] For the former, natural selection is the driving force of evolution, the causal agent of macroevolution – the formation of new species. For the latter, on the other hand, it is considered only a conserving factor, keeping the species healthy and strong by removing weak and deformed individuals. Another example of meaning-change concerns how the concept of evolution is construed. When evolutionists use the term, they mostly have in mind the special and general theories of evolution. The former corresponds to microevolution, the latter to macroevolution. Creationists not only postulate a clear separation of microevolution and macroevolution[119] – they also maintain that the concept of microevolution should be abandoned (replacing it with the term "adaptation" or "fittingness"). The effect of this procedure will be to get rid of the belief, false in their view, according to which microevolution leads to macroevolution.[120]

Moreover, it happens not only that sentences constructed with the help of a new conceptual system negate claims about the obtaining of states of affairs created with the help of an older one, but also that, in the sentences of the new system, we are unable even to formulate statements expressing such states of affairs, because proponents of alternative approaches "use concepts that cannot be brought into the usual logical relations of inclusion, exclusion, overlap".[121] The creationist taxonomic unit baramin is a model example of this, since it has no clear equivalent among evolutionist units.

The last example of a linguistic shift to be mentioned here is the widespread treatment among both evolutionary biologists and ID proponents of living organisms or their parts as biochemical machines. At first glance, both sides of

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[118] See, e.g., Edward T. Oakes, 'The Enigma of Final Causality. Biological Causality in Aristotle and Neo-Darwinism', in Seckbach, Gordon (eds.), *Divine Action and Natural Selection*…, pp. 35-36 [31-44].
Of course, there are evolutionists who challenge the thesis that natural selection is the driving force of evolution, just as there are evolutionists who substitute gradualism with punctuated equilibrium (see e.g., James A. Shapiro, *Evolution. A View from the 21st Century. Fortified. Why Evolution Works as Well as It Does*, Cognition Press, Chicago 2022, pp. xvi, 209, 427). However, none of them allow for explanations other than naturalistic ones. This shows that the impact of evidence on theory abandonment is less than is generally supposed.
[119] See, e.g., Bert Thompson, *Creation Compromises*, Apologetics Press Inc., Montgomery AL 2000, pp. 37-38, https://tiny.pl/wwf6n (accessed Oct. 10, 2024).
[120] See Pearcey, 'Evolution After Darwin…', p. 9.
[121] Feyerabend, 'Changing Patterns…', p. 363.

the dispute seem to be talking about the same thing.[122]

Here, for instance, we see naturalists addressing the following question:

> Why do we call the large protein assemblies that underlie cell function protein machines? Precisely because, like the machines invented by humans to deal efficiently with the macroscopic world, these protein assemblies contain highly coordinated moving parts.[123]

Artificialists, on the other hand, maintain that

> life is a molecular phenomenon: All organisms are made of molecules that act as the nuts and bolts, gears and pulleys of biological systems. […] It was once expected that the basis of life would be exceedingly simple. That expectation has been smashed. Vision, motion, and other biological functions have proven to be no less sophisticated than television cameras and automobiles. […] The cumulative results show with piercing clarity that life is based on machines — machines made of molecules![124]

ID proponents use such terms literally, unlike evolutionary biologists, for whom such terms have only a figurative meaning. This is because a literal understanding of such terms leads to the belief that living organisms were designed. Thus, it turns out that for the latter this is a mere *façon de parler*, intended to provide them with certain heuristically valuable metaphors without which science could not progress.[125]

As a consequence of the differences of view outlined above, accusations are levelled in both directions – of being unscientific,[126] or of disregarding the content of the Bible,[127] or of failing to understand that the Bible is not a textbook for teaching the natural sciences.[128] It has long been noted that at crucial moments

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[122] See Erkki Vesa Rope Kojonen, *Intelligent Design: A Theological and Philosophical Analysis*, University of Helsinki Press, Helsinki 2014, pp. 162-163, https://tiny.pl/tmc7b (accessed Oct. 10, 2024).

[123] Bruce Alberts, 'The Cell as a Collection Overview of Protein Machines: Preparing the Next Generation of Molecular Biologists', *Cell* 1998, Vol. 92, p. 291 [291-295], https://tiny.pl/wwf68 (accessed Oct. 10, 2024).

[124] Michael J. Behe, *Darwin's Black Box: The Biochemical Challenge to Evolution*, Free Press, New York, London, Toronto, Sydney 2006, p. X and p. 4.

[125] See Michael Ruse, *Darwin and Design: Does Evolution Have a Purpose?*, Harvard University Press, Cambridge MA, London 2003, pp. 284-285.

[126] See, e.g., Michael S. Luciano, 'Why Intelligent Design Doesn't Cut It: A Primer', *Talk Reason* June 30, 2009, https://tiny.pl/tt7fv (accessed Oct. 10, 2024); Coyne, *Why Evolution is True*…, p. 148.

[127] See e.g., CSSHS Editorial Staff, 'Lesson 1…', p. 2.

[128] See, e.g., John H. Walton, *The Lost World of Genesis One: Ancient Cosmology and the Origins Debate*, InterVarsity Press, Downers Grove Ill. 2009, p. 19; Peter M. J. Hess, 'How Do I Read the Bible? Let Me Count the Ways', *National Center for Science Education* January 22nd, 2016, https://tiny.pl/k-gdhgn8 (accessed Oct. 10, 2024).

in the development of science, disputes between researchers have come to resemble propagandizing rather than honest substantive discussions, with the matter in question very often settled by a straightforward appeal to the authority of one or other of the parties.[129]

As we can see below, naturalists use strongly worded language:

> Scientifically Creationism is worthless, philosophically it is confused, and theologically it is blinkered beyond repair.[130]

> So what that we have the right views on everything, if there is a significant group of people who simply won't listen to our views?[131]

Meanwhile, creationists also do not mince their words:

> The notion that the diversity of life arose through random mutation and natural selection is neither an empirical fact nor a scientific theory, but rather a groundless conjecture based on weak, inferential methods of backward extrapolation through eons of unobserved time over unknown conditions and having known and uncontrollable systematic errors. […] [A]ccepting Darwinian evolution requires a leap of faith that may be more radical and less substantiated than to believe that God created the world in six days and on the seventh day He rested.[132]

Neither, for that matter, do artificialists:

> [F]aith in naturalism is no more "scientific" (i.e. empirically based) than any other kind of faith.[133]

In order to summarize our reflections on these dissimilarities with respect to EF, two points are worth emphasizing: acceptance of a particular theoretical approach renders alternative approaches meaningless, and the authority of a commonly accepted EF can be invoked, as well, to neutralize any difficulty facing a theory that accepts that particular EF.[134] This thesis leaves no room for even

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[129] See, e.g., Thomas S. Kuhn, 'Reflections on My Critics', in: Kuhn, *The Road since Structure*…, pp. 123-175.
[130] Michael Ruse, 'Creationism', in Edward N. Zalta and Uri Nodelman (eds.), *The Stanford Encyclopedia of Philosophy*, https://tiny.pl/tgr44 (accessed Oct. 10, 2024). See also, e.g., Adam Łomnicki, 'Czy darwinowska teoria ewolucji jest dogmatem współczesnej biologii, czy zmową elit?', *Wszechświat* 2014, Vol. 115, Nos. 1-3, p. 60 [56-60], http://tiny.pl/gkb4q (accessed Oct. 10, 2024).
[131] Kowalski-Glikman, 'Bezradność postępowego…', p. 85.
[132] Arnie Gotfryd, 'Evolution: Myths and Facts', in: Seckbach, Gordon (eds.), *Divine Action and Natural Selection*…, p. 1030 [1023-1031].
[133] Phillip E. Johnson, 'Evolution as Dogma: The Establishment of Naturalism', *First Things* October 1990, https://tiny.pl/thtmq (accessed Oct. 10, 2024).
[134] See Kazimierz Jodkowski, 'Eskapizm teologii i filozofii katolickiej w sprawie «nauka a religia»', *Na Początku*… 2005, Nos. 7-8 (196-197), pp. 273-274 [261-284], https://tiny.pl/xgdgh3yt (accessed Oct. 10, 2024).

token concessions – something that is evidenced not only by the history of the dispute between naturalism and anti-naturalism itself. For example, in *The Republic*, Plato sought to neutralize in this kind of way the results achieved by "craftsmen-astronomers":[135]

> our approach to astronomy will be like our approach to geometry. It will be based on problems. If we want to take part in true astronomy, and make the naturally rational part of the soul useful instead of useless, we shall forget about the heavenly bodies. That's a much, much larger task […] compared with the way astronomy is done at the moment.[136]

5. CONCLUDING REMARKS

Philosophers of science long ago relinquished the belief that a theory's incompatibility with facts is enough to reject it. Subsequently, an approach emerged according to which the process of rejection is more complicated, with the correct account of the theory-experiment relationship being held to be of a tripartite kind: namely, *theory – alternative theory – empirical testing*. At the same time, investigation of EFs has since led to the belief that the relationship between theory and experience may be more complicated than established solutions to the problem suggest. The same investigations have shown that in at least some cases, when dealing with incommensurable approaches, the correct account of the theory-experience relationship is actually a four-part one: *theory – alternative theory – accepted EF – empirical test*.[137] Even if the facts speak against a theory, and there is another alternative theory compatible with them, this is not enough to eliminate the former in cases where it is compatible with the commonly accepted mode of explanation in science (EF), but its rival is not.

The exchange of one EF for another is inextricably linked to the rejection of one hard core and its replacement by another. Expressed differently, without exchanging one metaphysics for another, no change will take place in the most elementary methodological decisions on which EFs are based. This confirms the thesis of the irreducible presence of philosophy in science.

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[135] See Larry Laudan, 'The Demise of the Demarcation Problem', in Robert S. Cohen and Larry Laudan (eds.), *Physics, Philosophy and Psychoanalysis*, D. Reidel Publishing Company, Dordrecht 1983, p. 113 [111-127].
[136] Plato, *The Republic*, transl. by Tom Griffith, Cambridge University Press, Cambridge UK 2018, 530 C.
[137] See Kazimierz Jodkowski, 'Filozofia przyrody a nauki przyrodnicze', *Colloquia Communia* 2007, Nos. 1-2 (82-83), pp. 21-22 [15-22], https://tiny.pl/tlkgz (accessed Oct. 10, 2024).

The approach outlined here aptly describes the basic mechanisms for declaring views and theories scientific or non-scientific, since the failure to meet these, set by EFs, strong *sine qua non* conditions was, and still is, sufficient to recognise a theoretical proposal as non-scientific. This approach also shows that the belief that there are monotheoretical and monomethodological periods that dominate in the history of science is untenable.

The disagreements between the different EFs outlined in the previous sections also clearly suggest the co-occurrence of revolutionary and normal periods in the history of science. It should also be noted that, on the one hand, Kuhn was right, because it is always the case that one point of view becomes the dominant approach and suppresses alternative approaches. On the other hand, however, Feyerabend was right, because the constant challenging of the prevailing EF is a common practice in science.[138]

Adopting the approach discussed here also allows for a clear distinction between modern science and contemporary science. The latter begins to operate with Darwin's introduction of the postulate of methodological naturalism.

The approach presented here moves the discussion of the rationality of science from the traditional level – promoted by various schools of philosophy of science via analyses of rather extensive sets of methodological rules to the (meta)level of the two, or at most three, most basic methodological decisions. These latter decisions determine the sets of acceptable scientific explanations. Acceptance of these decisions opens the door to disputes as articulated by traditional philosophies of science. Were it not for the fact that the label "simplicism" is mainly associated with the conventionalism of Poincaré and Duhem, it would be ideal for the approach presented here.

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[138] It was not only Feyerabend who thought so, cf. e.g., Karl R. Popper, 'Normal Science and its Dangers', in: Imre Lakatos and Alan Musgrave (eds.), *Criticism and The Growth of Knowledge*, *Proceedings of the International Colloquium in the Philosophy of Science, London, 1965*, Vol. 4, Cambridge University Press, Cambridge 1970, p. 52 [51-59]; Stefan Amsterdamski, *Między doświadczeniem a metafizyką*, Książka i Wiedza, Warszawa 1973, pp. 171-172; Hasok Chang, *Is Water H_2O? Evidence, Realism and Pluralism*, Springer, Cambridge 2012, p. 224; Michał Jakub Wagner, 'The Liminal Nature of the »Eclipse of Darwinism« as a Critical Phase in the History of Evolutionary Biology', *Filozoficzne Aspekty Genezy* 2022, Vol. 19, Nr 2, p. 159 [141-162], https://tiny.pl/wzrn7 (accessed Oct. 10, 2024).

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