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I. Introduction

The struggle between evolutionary theory and creationism provides a staggeringly fertile field for many different lines of scholarship. Scientific, historical, sociological, political, theological, philosophical, legal, and educational studies have all been employed. The long history of the conflict, the strong convictions involved, the intricacies of its subject matters, as well as the far-reaching implications of its outcome continue to attract commentaries from inside and outside of academe, particularly since Charles Darwin published his landmark book *On the Origin of Species* in 1859.¹

It is therefore not surprising that the ideas of one of the most prominent philosophers of science in the 21st century, Thomas S. Kuhn (1922-1996), play a notable role in this struggle. What is rather surprising, however, is which side has laid claim to his support: It was proponents of creationism who prominently dragged Kuhn's thoughts on the nature of science into this controversy on their behalf. Moreover, since its manifestation as a subspecies of creationism in the 1980s, advocates for intelligent design creationism (IDC) frequently call on his famous book *The Structure of Scientific Revolutions*² (henceforth referred to as *Structure*) in their antievolution efforts. They assert that it is a theory in crisis, riddled with unsolved anomalies, ripe for a scientific revolution – and its replacement with a new, triumphant scientific paradigm imminent (i.e. their own intelligent design theory). Furthermore, interpreting Kuhn in a relativist fashion, they blame their paradigm's lack of success on blind commitment of evolutionists to their old-fashioned Darwinian paradigm.

In and of itself, the use of Kuhn's work by creationists is not objectionable. Just because theirs is a theology-based, sociopolitical movement with strong ties to evangelical Christianity, does not mean that they cannot have a genuine insight in their interpretation of the status of evolutionary theory through Kuhnian concepts. This is even more true given Kuhn's own views of the genesis of Darwin's scientific breakthroughs. For example, he talked about how *extrascientific* “nineteenth-century British social thought” influenced the “availability and acceptability” of some of Darwin's ideas.³ He also made several statements which can be interpreted in a way that seems to lend

1 Darwin C.: *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life*, London: John Murray 1859.

2 Kuhn T.S.: *The Structure of Scientific Revolutions*, Chicago: University of Chicago Press 1962, published as Volume 2 (Number 2) of *The International Encyclopedia of Unified Science*.

3 Kuhn T.S.: Objectivity, Value Judgment, and Theory Choice, in Kuhn T.S.: *The Essential Tension. Selected Studies in Scientific Tradition and Change*, Chicago/London: University of Chicago Press 1977, pp. 320-39 (quoted from p. 325).

credence to IDC's position (see Chapters VII. and VIII.). Furthermore, Kuhn himself did refer to Darwin as being "associated with"⁴ a scientific revolution and even called the advent of Darwinism one of the "most extreme and readily recognized" scientific revolutions, indicating that his theoretical framework can be applied to biology.⁵ So even from this angle, it cannot be rejected a priori when modern-day creationists consider their own work as constituting a new biological paradigm in Kuhn's sense.

Apart from creationists and Kuhn himself, other authors have also entered this contested territory. Neal Gillespie, for instance, interpreted Kuhn's paradigms as a "guide" for scientists, maintaining that the creationists' struggle against Darwinian evolution in the later 19th century was just part of a broader epistemic shift that steadily excluded theology from an increasingly positivist practice of science.⁶ Micheal Ruse, in particular, has written extensively on the question whether there exists a Darwinian paradigm or if a Darwinian revolution has occurred, coming to ambivalent conclusions.⁷ Other researchers have also directly referred to Kuhn's ideas in their characterization of more recent developments in biology, some of them even speaking profusely of paradigms and revolutions.⁸ On the other hand, some authors have maintained that Kuhnian categories are not applicable to biology for one reason or another.⁹ Arguably, however, the most important influence of Kuhn on debates in biology came indirectly through the theory of punctuated equilibria, introduced as a corrective for what the paleontologists Niles Eldredge and Stephen Gould saw as hypergradualistic

4 Kuhn T.S.: *The Structure of Scientific Revolutions* (50th Anniversary Edition), Chicago/London: University of Chicago Press 2012, p. 180.

5 Kuhn T.S.: *The Essential Tension: Tradition and Innovation in Scientific Research*, in Kuhn 1977, pp. 225-239 (here on p. 226); see also Kuhn 1977, p. xvii.

6 Gillespie N.: *Charles Darwin and the Problem of Creation*, Chicago: University of Chicago Press 1979 (p. 3).

7 For example, Ruse M.: *The Darwinian Paradigm: Essays on its history, philosophy, and religious implications*, London/New York: Routledge 1989; Ruse M.: The Darwinian Revolution, as seen in 1979 and as seen Twenty-Five Years Later in 2004, *Journal of the History of Biology* (2005) 38:3-17; Ruse M.: The Darwinian revolution: Rethinking its meaning and significance, *PNAS* (2009) 106:10040-7.

8 See, for instance, van den Berghe P.: Human inbreeding avoidance: Culture in nature, *The Behavioral and Brain Sciences* (1983) 6:91-123; Strohman R.: The coming Kuhnian revolution in biology, *Nature Biotechnology* (1997) 15:194-200; O'Malley M. & Boucher Y.: Paradigm change in evolutionary microbiology, *Studies in History and Philosophy of Biological and Biomedical Sciences* (2005) 36:183-208; Pigliucci M.: Do we need an extended evolutionary synthesis? *Evolution* (2007) 61:2743-9; Futuyma D.J.: Evolutionary constraints and ecological consequences, *Evolution* (2010) 64:1865-84; Laubichler M.: Evolutionary Developmental Biology Offers a Significant Challenge to the Neo-Darwinian Paradigm, in Ayala F. & Arp R. (Eds.): *Contemporary Debates in Philosophy of Biology*, Malden/Chichester: Wiley-Blackwell 2010, pp. 199-212; Borofsky R.: *An Anthropology of Anthropology: Is It Time to Shift Paradigms?*, Kailua: Center for a Public Anthropology 2019; Baedke J.: What's Wrong with Evolutionary Causation?, *Acta Biotheoretica* (2020) 69(1):79-89.

9 For instance, Burian R.: Challenges to the Evolutionary Synthesis, *Evolutionary Biology* (1988) 23:247-69; Mayr E.: The Advance of Science and Scientific Revolutions, *Journal of the History of the Behavioral Sciences* (1994) 30:328-34; Wilkins A.: Are there 'Kuhnian' revolutions in biology?, *BioEssays* (1996) 18:695-6.

misconceptions of speciation.¹⁰ Gould later on explicitly acknowledged the importance of the “punctuational theory for the history of ideas” found in *Structure* for the formulation of their widely-debated and influential theory.¹¹ All this suggests that the Kuhnian aspirations of creationists cannot be dismissed offhand but merit continuous scrutiny and genuine examination.

Given the creationists’ track record, it is little surprise that Kuhn himself was not happy about them using his understanding of the nature of science for their own ends, albeit he has made only passing reference to this fact – at least in his printed record.¹² Interestingly, he even declined to partake in one of the many U.S. trials that tried to keep creationism out of public school science curricula, arguing that his view of the nature of science “would do more harm than good” in a court room.¹³ More generally, though, he was equally infuriated with how other colleagues and entire academic fields have interpreted his views, even getting him to throw books and, allegedly, ashtrays across the room in frustration.¹⁴ So Kuhn’s ire alone is not enough to denounce how creationists use his concepts, just like it is not enough to disqualify otherwise serious scholars, who also indulged in more or less wild misappropriations of his writings. Hence, one must look outside of Kuhn’s publications to find a closer analysis of the way creationists employ Kuhnian concepts.

For traditional creationism, several authors have criticized how its proponents mishandled Kuhn’s ideas of paradigms, paradigm change, and scientific revolutions. For example, already in 1980 Robert Price noted how creationists failed to present a coherent alternative to evolutionary theory that could even start to qualify as a rival, new paradigm in Kuhn’s sense.¹⁵ He also stated that creationists mainly focused on fitting empirical results into their pre-conceived, Bible-based framework, which “is the very opposite of what we would expect if the creationist model were the harbinger of a new ‘scientific revolution’.”¹⁶ Philip Kitcher, in his renowned defense of

10 See Eldredge N. & Gould S.J.: Punctuated Equilibria: An Alternative to Phyletic Gradualism, in Schopf T. (Ed.): *Models in Paleobiology*, San Francisco: Freeman, Cooper & Co 1972, pp. 82-115.

11 Gould S.J.: *The Structure of Evolutionary Theory*, Cambridge, MA/London: Belknap Press of Harvard University Press 2002 (quote on p. 981).

12 See Kuhn T.S.: A Discussion with Thomas Kuhn, in Kuhn T.S.: *The Road Since Structure: Philosophical Essays, 1970–1993, with an Autobiographical Interview*, edited by Conant J. & Haugeland J., Chicago/London: University of Chicago Press 2000, pp. 255-323 (here p. 322). (Kuhn’s latest publication list printed in this very same book gives no indication that he has dealt at length with creationist interpretations of his work.)

13 Kuhn *op.cit.*, pp. 322-3.

14 See Kuhn *op.cit.*, p. 315; Morris E.: *The Ashtray (Or the Man Who Denied Reality)*, Chicago/London: University of Chicago Press 2018.

15 Price R.: The Return of the Navel, *RNCSE* (1980) 1:26-33.

16 Price *op.cit.*, p. 32.

evolutionary theory and science against the creationist onslaught, argued that creationists use “a popular caricature” of Kuhn when they portray their rejection by the scientific community as a form of irrational tribalism instead of as the outcome of scientific analysis.¹⁷ Having in mind the widespread support for creationism in the U.S., he further mentioned – though without referring to Kuhn’s own ideas on this point – that not every obscure conjecture has to be taken serious just because it is “popular or backed by influential people,” but that it can be disregarded if it “makes no contribution to our understanding.”¹⁸ Kitcher also maintained that creationism is not aligned with current science and does not offer any answers to open scientific questions.¹⁹ Ruse, later on, in a book discussing the fit of evolutionary theory with the structure of nature in the light of Kuhnian scientific values, also briefly drew attention to the epistemic inferiority of creationism.²⁰

For IDC specifically, Robert Pennock has arguably done the most to point out how its defenders have opportunistically adopted Kuhn’s – supposed – epistemic relativism while, at least unofficially, retaining a strong belief in God’s ultimate Truth as revealed in the Bible. He also worked out the deconstructivist thread in the fabric of IDC. Yet Pennock has not dealt in detail with other characteristics of science that Kuhn discussed, such as the analogies to evolution, and how these might help to more thoroughly assess the ambitions of IDC advocates. What is more, some of his work is already a bit dated and he has focused on only one proponent of IDC (Phillip E. Johnson, one of the founders of the IDC movement, on whom more will be said in Chapters VI. and VII.).²¹ While Pennock’s writings, *Tower of Babel* in particular, provide a good starting point for this thesis, they leave enough room to elaborate on his findings regarding the handling of Kuhn by IDC campaigners. This, in turn, also provides the opportunity to present an update of their more recent incursions into Kuhnian territory.

In an important paper, published in a seminal compendium on IDC edited by Pennock, Matthew Brauer and Daniel Brumbaugh also dismissed the invocation of Kuhn by IDC proponents based on the scientific vacuity of central IDC texts, but did not elaborate further on the connection to Kuhn.²²

17 Kitcher P.: *Abusing Science: The Case against Creationism*, Cambridge/London: MIT Press ²1984 (quote on p. 168).

18 *Ibid.*

19 See Kitcher *op.cit.*, p. 171.

20 Ruse M.: *Mystery of Mysteries: Is Evolution a Social Construction?*, Cambridge: Harvard University Press 1999; see also Ruse M.: Intelligent design theory and its context, *Think* (2005) 4:7-16.

21 See Pennock R.T.: *Tower of Babel. The Evidence against the New Creationism*, Cambridge: MIT Press 1999 (pp. 206-10); *Id.*: The Postmodern Sin of Intelligent Design Creationism, *Science & Education* (2010) 19:757-78.

22 Brauer M. & Brumbaugh D.: Biology Remystified: The Scientific Claims of the New Creationists, in Pennock R.T. (Ed.): *Intelligent Design Creationism and Its Critics: Philosophical, Theological, and Scientific Perspectives*, Cambridge: MIT Press 2001, pp. 289-334.

Other than Pennock's work, the standard critiques of IDC are surprisingly silent on the Kuhn-IDC affair. For instance, neither Eugenie Scott,²³ in what has become a go-to introductory work on the evolution/creation controversy, nor Barbara Forrest and Paul Gross,²⁴ in their authoritative exposition of the close family relations between IDC and standard creationism, brought up the pervasive invocation of Kuhn by IDC advocates.

Dealing with the same issue but going off in almost the opposite direction than the authors mentioned above, Olivier Rieppel provided quite an extensive and highly critical discussion of Kuhn's philosophy of science. He maintained that because Kuhn – together with Paul Feyerabend – reduced science “to one of many social institutions,” (intelligent design) creationists are justified in exploiting his model and in setting themselves up as being on par with established science through social maneuvering.²⁵ Based on this interpretation, Rieppel tackled the problem by attacking both Kuhn's anti-realism and relativism, thereby trying to snap him out of the hands of creationists and deny them entry into the halls of science through extrascientific methods.

Curiously, the paperback literature specializing on Kuhn's philosophy of science has little to say on this issue, confirming the observation by Kelly Smith that “the philosophical community as a whole is strangely silent” on the evolution/creationism controversy.²⁶ Likewise, Massimo Pigliucci and Maarten Boudry, in the introduction to their book on pseudoscience, also lamented that the problem of demarcation is neglected in many quarters of philosophy in the mistaken belief that pseudoscience is only a “harmless pastime indulged in by a relatively small number of people.”²⁷ For example, Paul Hoyningen-Huene, in his book on Kuhn's philosophy of science, did not deal with the creationist assimilation of his protagonist at all.²⁸ Nor did Alexander Bird,²⁹ Robert Richards & Lorraine Daston,³⁰ or Alexander Blum et al.³¹ in their respective volumes on Kuhn.

23 Scott E.C.: *Evolution vs. Creationism: An Introduction*, Berkeley: University of California Press 2009.

24 Forrest B. & Gross P.: *Creationism's Trojan Horse: The Wedge of Intelligent Design*, New York: Oxford University Press 2004.

25 Rieppel O.: *Evolutionary Theory and the Creation Controversy*, Heidelberg/New York: Springer 2011 (quote on p. 156).

26 Smith K.: *Foiling the Black Knight*, *Synthese* (2011) 178:219-35 (quoted from p. 220).

27 Pigliucci M. & Boudry M. (Eds.): *Philosophy of Pseudoscience: Reconsidering the Demarcation Problem*, Chicago/London: University of Chicago Press 2013 (quoted from p. 3).

28 Hoyningen-Huene P.: *Die Wissenschaftsphilosophie Thomas S. Kuhns*, Wiesbaden: Springer 1989.

29 Bird A.: *Thomas Kuhn*, Chesham: Acumen Publishing 2000.

30 Richards R. & Daston L. (Eds.): *Kuhn's Structure of Scientific Revolutions at Fifty: Reflections on a Science Classic*, Chicago/London: University of Chicago Press 2016.

31 Blum A. et al. (Eds.): *Shifting Paradigms. Thomas S. Kuhn and the History of Science*, Berlin: Edition Open Access 2016.

James Marcum, though carrying a small section dedicated to the impact of Kuhn's philosophy of science on religion, did not explore his role in the evolution/creationism struggle.³² Joseph Rouse, at least, did present a small passage that contrasts the creationists' view of science with that of Kuhn and asserted their incompatibility, but other than that confined himself to assert that while the former follows a widespread but mistaken conception of science as "the retrospective justification of belief", the latter stressed "the futural orientation of scientific understanding."³³ More recently, Rouse has briefly returned to this point and, like the authors described earlier, argued that because IDC advocates lack a proper research program, their use of "pseudo-Kuhnian terms of alternative paradigms" must be seen as nothing but "political challenges to scientific understanding."³⁴ In general, the muted reception of the Kuhn/IDC issue is even more odd, given the fact that Kuhn's evolution-inspired twist to his philosophy of science has definitely not gone unnoticed, which shows that researchers *are* thinking about connections between Kuhn and the topic of evolution.³⁵

To recap, the literature sample above suggests that authors tend to focus on two broad points of contention. First, the question of whether creationists are able to provide a rival scientific paradigm. All authors agree that they fail at this crucial point. However, as a second point, given that Kuhn's work contains elements which can be seen as suggestive of epistemic relativism, an 'internalist' assessment of IDC may not be enough to fully examine the creationists' use of Kuhnian concepts. (After all, critics of IDC might just be too indoctrinated by the ruling evolutionary paradigm in order to fairly assess arguments for intelligent design in nature.) Even though this standard line of criticism must be part of any reasonable discussion of the Kuhn/creationist issue, the above authors (except for Rieppel) have maintained that Kuhn did not argue for a relativist image of science. Brushing against these two major issues, a more detailed approach to *Structure* can extract some refinements and provide additional arguments that so far have been underappreciated or unnoticed.

32 Marcum J.: *Thomas Kuhn's Revolution*, London/New York: Continuum 2005 (pp. 153-5).

33 Rouse J.: Kuhn's Philosophy of Science Practice, in Nickles T. (Ed.): *Thomas Kuhn*, Cambridge/New York: Cambridge University Press 2003, pp. 101-121 (quotes from p. 115).

34 Rouse J.: Recovering Thomas Kuhn, *Topoi* (2013) 32:59-64 (quotes on p. 62).

35 For example, Gattei S.: *Thomas Kuhn's "Linguistic Turn" and the Legacy of Logical Empiricism. Incommensurability, Rationality and the Search for Truth*, Aldershot/Burlington: Ashgate 2008, esp. pp. 160-3 & pp. 168-72; Wray K.B.: *Kuhn's Evolutionary Social Epistemology*, Cambridge: Cambridge University Press 2011; Kuukkanen J-M.: Revolution as Evolution: The Concept of Evolution in Kuhn's Philosophy, in Kindi V. & Arabatzis T. (Eds.): *Kuhn's The Structure of Scientific Revolutions Revisited*, New York/London: Routledge 2012, pp. 134-52.

There is enough room for a fresh examination of whether Kuhn's ideas lend plausible or coherent support to the position of creationism.

Besides complementing the existing literature on Kuhn and on the evolution/creation battle, this approach can also help to close argumentative loopholes that creationists try to exploit for their agenda. Bearing in mind the latest political climate in the U.S. of America, the birthplace of the modern creationist movement in the West, closing such loopholes may turn out to become even more urgent in the future. After all, former U.S. president Donald J. Trump (*1946) had the opportunity to give the U.S. Supreme Court (SCOTUS) a 6-to-3 conservative majority by appointing three judges during his administration (2017-2021). In the future, this can lead to worrying developments because the court has played an important role in keeping creationism out of U.S. public school science curricula and helped to contain the political influence of the powerful evangelical lobby behind it.³⁶ Furthermore, creationism has ceased to be an issue peculiar to the United States several decades ago as creationist organizations have been established in numerous European countries.³⁷ As a consequence, in 2007, the Council of Europe even thought it necessary to adopt a resolution warning of "possible ill-effects of the spread of creationist ideas within our education systems."³⁸ Sympathizers of IDC can also be found in Austria, where they sit in top positions of the Roman-Catholic church or the national parliament.³⁹ Even more recently, in mid-2019, the so-called Zentrum für BioKomplexität & NaturTeleologie, located in Lower Austria, had its founding conference attended by speakers associated with the Discovery Institute, the main IDC hub in the United States, and other exponents of IDC.⁴⁰ Also, the recent excision of gender studies

36 In fact, Republican president Richard Nixon (1913-1994) set a remarkable precedent for such a scenario when he appointed four conservative judges to the SCOTUS from 1969 to 1971, which had long-lasting consequences for socioeconomic issues (Cohen A.: *Supreme Inequality: The Supreme Court's Fifty-Year Battle for a More Unjust America*, New York: Penguin Press 2020).

37 See, for instance, Blancke S., Hjermslev H. & Kjaergaard P.: *Creationism in Europe*, Baltimore: Johns Hopkins University Press 2014.

38 Council of Europe Committee on Culture, Science and Education: *Resolution 1580*, adopted by the Parliamentary Assembly on 2007-10-04, retrieved from <https://assembly.coe.int/nw/xml/XRef/Xref-XML2HTML-en.asp?fileid=17592>, on 2020-01-12.

39 See Schönborn C.: Finding Design in Nature, *New York Times* 2005-07-07, Section A, p. 23, retrieved from <http://www.nytimes.com/2005/07/07/opinion/finding-design-in-nature.html>, on 2020-01-12; Franz M.: Darwin und das Design, *Andreas-Unterberger.at* 2014, retrieved from <http://www.andreas-unterberger.at/2014/-10/darwin-und-das-design/>, on 2020-01-12. (Cardinal Schönborn has since then distanced himself from IDC, and Dr. Franz' mandate as member of the parliament has ended in 2017. [For more on the Causa Schönborn see Junker T.: Schöpfung gegen Evolution – und kein Ende? Kardinal Schönborns Intelligent-Design-Kampagne und die Katholische Kirche, in Kutschera U. (Ed.): *Kreationismus in Deutschland*, Münster: Lit Verlag 2007, pp. 71-97.])

40 See Klinghoffer D.: "Teleology in Nature" Gains a Beachhead in Germany [sic!], *Discovery Institute: Evolution News & Science Today* 2019, retrieved from <https://evolutionnews.org/2019/06/intelligent-design-gains-a-beachhead-in-germany/>, on 2019-09-23; the Zentrum's website can be accessed at <https://www.biocomplexity.at>.

from the curricula of Hungarian Universities in Prime Minister Victor Orbán's "21st-century Christian democracy"⁴¹ clearly shows that reactionary attacks on serious scholarship are a real threat.⁴² Moreover, growing Muslim communities in European countries may also increase the potential for an intensifying conflict between (Islamic) creationism and modern evolutionary theory in the years to come.⁴³ Outside of Europe, Brazil has been in the focus of attention from IDC leaders and, in 2017, saw the opening of "an academic center on intelligent design" at Mackenzie Presbyterian University in São Paulo in cooperation with the Discovery Institute.⁴⁴ More recently, the Bolsonaro administration has appointed an outspoken creationist and previous rector of this same university to head the government agency that oversees parts of Brazil's higher education program.⁴⁵ Also, in 2012 creationists in South Korea successfully lobbied textbook publishers to remove at least some evolutionary topics from their publications.⁴⁶

Issues pertaining to the evolution/creation debate are therefore not only of lofty academic interest but can have palpable effects on specific policy issues and the political discourse in general. In this light, every step taken that elucidates and promulgates how (intelligent design) creationists claim Kuhn's eminence for their cause is a worthy endeavor. If there is merit to this, it follows that the ongoing use of Kuhnian concepts in the attack on biological evolution deserves a lot more attention than it is receiving at the moment. The problem, then, is real; ignoring the issue will not make it go away and discounting it as *infra dig* or too banal for scholarly attention will not achieve much either.⁴⁷

41 Cited in Dunai M. & Than K.: EU must give up 'nightmares' of United States of Europe – Hungarian PM, *Reuters* 2018-05-10, retrieved from <https://uk.reuters.com/article/uk-hungary-orban/eu-must-give-up-nightmares-of-united-states-of-europe-hungarian-pm-idUKKBN1IB1VB>, on 2020-01-12.

42 See Kent L. & Tapfumaneyi S.: Hungary's PM bans gender study at colleges saying 'people are born either male or female', *CNN* 2018-10-19, retrieved from <https://edition.cnn.com/2018/10/19/europe/hungary-bans-gender-study-at-colleges-trnd/index.html>, on 2019-01-11.

43 See Hameed S.: Bracing for Islamic Creationism, *Science* (2008) 322:1637-8; Edis T.: Modern Science and Conservative Islam: An Uneasy Relationship, *Science & Education* (2009) 18:885-903.

44 See Anonymous: Brazil's Mackenzie University to Launch New Center on Intelligent Design, Discovery Institute: *Evolution News & Science Today* 2017, retrieved from <https://evolutionnews.org/2017/05/brazils-mackenzie-university-to-launch-new-center-on-intelligent-design/>, on 2021-01-03; the Center's website can be found at <https://www.mackenzie.br/en/discovery-mackenzie/home/>.

45 See Escobar H.: Brazil's pick of a creationist to lead its higher education agency rattles scientists, *Science* 2020-01-26, retrieved from <https://www.sciencemag.org/news/2020/01/brazil-s-pick-creationist-lead-its-higher-education-agency-rattles-scientists>, on 2021-01-15.

46 Park S.B.: South Korea surrenders to creationist demands, *Nature* (2012) 486:14.

47 See Galison P.: Ten Problems in History and Philosophy of Science, *Isis* (2008) 99:111-24; also Pennock R.T.: Can't philosophers tell the difference between science and religion?: Demarcation revisited, *Synthese* (2011) 178:177-206.

Thus, the following thesis has two main goals, both of which aim to complement the literature on the evolution/creation debate and, ultimately, raise awareness of its continued existence. Beforehand, though, it will be helpful to state what is *not* the objective. The goal is neither to provide a comprehensive discussion on Thomas Kuhn's oeuvre and its reception ever since, nor to exhaustively discuss the nature and history of creationism or evolutionary theory and the struggle between them. The thesis is also not to be understood as an all-out endorsement of Kuhn's concepts and ideas. Rather, scope and intent are much more modest. First, the thesis seeks to provide documentation for the ongoing use of Kuhnian language and concepts in IDC publications as a weapon in their attack on evolution and evolutionary theory. This point will consider selected, representative texts both in print and online, spanning the last four decades since the inception of the IDC movement in the 1980s, with special attention being paid to publications linked to the Seattle-based Discovery Institute. Second, the thesis seeks to evaluate whether the use of Kuhn's ideas by proponents of IDC is plausible and coherent. Emerging from this discussion, suggestions will be made as to how Kuhn's views can be used to exclude IDC from science. Overall, points to be considered will include the evolution-inspired elements in Kuhn's image of science; the role of consensus and scientific communities; the merits (or lack thereof) of IDC as a new evolutionary paradigm in light of epistemic values proposed by Kuhn; the question of a scientific crisis in evolutionary theory; and demarcation criteria found in his writings. These aspects will necessarily also include brief excursions on some of the technical points in the field of evolutionary biology put forth by IDC defenders. Here, illustrative examples from the scientific and philosophical literature that critics have published over the last decades on both the modus operandi of IDC and its products will be taken into account.

Because of the truly massive number of books and articles (not to mention differing interpretations) available on both the ideas of Kuhn as well as on the creation/evolution debate, it will be necessary to restrict the breadth of literature under consideration for this thesis. Namely, the focus will be on the intelligent design subspecies of creationism, as promoted in select writings from leading proponents of IDC in the U.S. of America. The primary source from Kuhn will be *Structure*.⁴⁸ Conveniently, IDC publications generally refer only to *Structure* and ignore everything else Kuhn has written as well as all the secondary literature on Kuhn. This helps to prioritize Kuhn's most

48 Kuhn 2012. (The second, revised edition of *The Structure of Scientific Revolutions* was published in 1970 and introduced an important additional chapter with elaborations and clarifications of some of the key issues in the main text, the so-called *Postscript*.)

famous book for the purpose of this thesis. The idea is to use the same source as advocates of IDC to evaluate their output on their own terms, with as little ‘outside interference’ as possible. This is also one reason why there will be quite a few direct citations from Kuhn, in the attempt to show what he really said by staying close to his own words. Such an approach seems even more opportune because of the diverging interpretations of Kuhn’s ideas in the extant literature. If one of them were chosen as the basis for the arguments developed here, it would create yet another lay of interpretation to muddle the message of the original. Thus, going back to the source at least reduces the risk of interpretation bias to one instance (that of the author of this thesis). As for direct quotes from the creationist literature, a generous use of these is licensed by the fact that members of the IDC movement speak untruthfully to hide their religious motifs. Citing verbatim from their own publications forgoes any charges of putting false words in their mouths.⁴⁹ Taking the essays published in *The Essential Tension*⁵⁰ and *The Road since Structure*⁵¹ as a representative sample of the totality of Kuhn’s output (besides *Structure*), some of them will be used to provide additional clarifications and emphases. Finally, only publications in English and, to a minor extent, in German will be discussed.

Before addressing the two core points outlined above, the next chapters will be a short examination of key terms such as ‘evolution’, ‘creationism’, and ‘intelligent design creationism’. This will be followed by an introduction to the genesis of IDC and its main arguments. Such an emphasis on historical developments seems particularly appropriate given Kuhn’s historical approach to the nature of science. And, as will become clear toward the end of this thesis, the genealogical relationship between old-school creationism and IDC is also of importance for argumentative reasons.

49 Cf. Pennock 2010.

50 Kuhn 1977.

51 Kuhn 2000.

II. Biological Evolution: A Definition and Some Clarifications

It is not possible to give satisfactory answers to the questions outlined above without devoting a few words to modern evolutionary theory first. While an in-depth technical and historical understanding must be acquired from textbooks⁵² and the primary literature, this thesis will briefly address some points that are needed to confront various arguments and schemes employed by today's creationists, particularly by IDC exponents.

Defining biological (or organic) evolution can be problematic. Publications for a general audience, including otherwise reputable dictionaries, often retain a teleological character or falsely mingle different aspects of evolution, which may render the definition less than useful for a reasonable discussion. This is especially troublesome since creationists have used inadequate dictionary definitions of science and evolution to confuse lay audiences and nourish support for their agenda. For instance, one well-established dictionary defines biological evolution as “the process by which the physical characteristics of types of creatures change over time, new types of creatures develop, and others disappear.”⁵³ One shortcoming of this definition is that it omits (genetic) heritability. It would count, for example, the secular trends in growth and onset of menarche observed in recent human populations as evolutionary, although they are caused by socio-economic factors without changes to the underlying genetic basis.⁵⁴ Equally troublesome, there is no notion of common ancestry between “types of creatures”, with new ones possibly arising *de novo* from abiotic matter all the time. It is also unclear whether changes in behavioral characteristics (as opposed to physical ones) would qualify as evolution under this definition.

Not entirely blameless, the technical and pop-science literature in evolutionary biology also contains divergent definitions of evolution, adding to the confusion about what it is and what it means.⁵⁵ This divergence can be explained largely by different research traditions and disciplinary practices that focus on distinct facets of organic evolution. Nevertheless, a common definition of

52 A textbook specializing in the topic of evolution is, for instance, Futuyma D.J. & Kirkpatrick M.: *Evolution, Fourth Edition*, Sunderland, MA: Sinauer Associates 2017. The standard works on the history of evolution are Mayr E.: *The Growth of Biological Thought*, Cambridge, MA: Belknap Press of Harvard University Press 1982, and Bowler P.: *Evolution. The History of an Idea* (25th Anniversary Ed.), Berkeley/Los Angeles/London: University of California Press 2009.

53 Cambridge University: Evolution [Def. 2], in *Cambridge Academic Content Dictionary* s.d., retrieved from <https://dictionary.cambridge.org/dictionary/english/evolution>, on 2018-12-31.

54 See Cole T.: Secular trends in growth, *Proceedings of the Nutrition Society* (2000) 59:317-24.

55 See Wilkins J.: Defining Evolution, *RNCSE* (2001) 21:29-37.

biological evolution from a publication commissioned by several U.S. scientific associations on the importance and status of evolutionary biology maintains that “[b]iological evolution consists of change in the hereditary characteristics of groups of organisms over the course of generations.”⁵⁶ Given the core insights of (intra-)group variation and heritability, this means that “from a long-term perspective, evolution is the descent, with modification, of different lineages from common ancestors.”⁵⁷ This definition will be adopted for the remainder of this essay when talking about evolution from the perspective of the scientific community.

Nonetheless, it is unavoidable to belabor a couple of important points because they have played a key role in the creationist assault on evolution. First, it must be noted that evolution as defined above is a fact to which virtually all evolutionary researchers and serious scholarly associations across the globe subscribe.⁵⁸ The evidence in its favor available today is so overwhelming, coming from so many different lines of research in a consilient fashion,⁵⁹ that “it would be perverse to withhold provisional assent.”⁶⁰ This must be kept separate, however, from another aspect where there is less consensus among evolutionary biologists, namely the pattern of evolution. This includes both the evolutionary path that life on earth has taken and the mechanisms responsible for it. The former can only be inferred indirectly from historical evidence (such as fossils) and natural processes operating today; yet the latter can also be examined directly in controlled experiments and field observations. The phenomena revealed by such studies are explained by a bundle of different theories which, taken together, can be labeled as (modern) evolutionary theory. Examples for this kind of sub-theories are the theory of natural selection, the neutral or nearly neutral theories of molecular evolution, the theory of allopatric speciation, etc. Speaking of *the* theory of evolution is therefore somewhat misleading and should be avoided. Evolutionary theory thus understood explains, to the best of the scientific community’s current abilities, the patterns and mechanisms – and thus the fact – of biological evolution. For the evolution/creation dispute it is essential to keep

56 Futuyma D.J. (Ed.): *Evolution, Science, and Society*, Rutgers: Rutgers State University of New Jersey 1999 (p. 3).

57 *Ibid.*

58 See Dobzhansky T.: Nothing in Biology Makes Sense Except in the Light of Evolution, *The American Biology Teacher* (1973) 35:125-129; The InterAcademy Panel (IAP): *Statement on the teaching of evolution*, Trieste: The Global Network of Science Academies 2006, retrieved from <https://www.interacademies.org/statement/iap-statement-teaching-evolution>, on 2020-01-18; for further quotes see Wiles J.: Overwhelming Scientific Confidence in Evolution and its Centrality in Science Education – And the Public Disconnect, *Science Education Review* (2010) 9:18-27.

59 See Coyne J.A.: *Why Evolution is True*, Oxford/New York: Oxford University Press 2009; Dawkins R.: *The Greatest Show on Earth. The Evidence for Evolution*, London: Bantam Press 2009.

60 Gould S.J.: Evolution as Fact and Theory, *Discover* (1981) 2:34-37, reprinted in Gould S.J.: *Hen's Teeth and Horse's Toes*, New York/London: W. W. Norton & Company ²1994, pp. 253-62 (quote on p. 255).

fact, mechanisms, historical patterns, and theories analytically separate because gaps in, or changes to, our understanding of how evolution did (and does) occur do not call into question the basic fact of evolution itself – a standard creationist line of attack.⁶¹

In this context it is also necessary to reiterate that natural selection is neither synonymous with biological evolution nor is it the only (relevant) evolutionary force at work, something that is misunderstood even by many scientists.⁶² This false impression is primarily due to the success of the so-called Modern Synthesis that was created by a cadre of international scientists from the 1920s to the 1950s.⁶³ The result, also dubbed the Synthetic Theory of evolution, fused Darwin's theory of natural selection, i.e. classical Darwinism, with Mendelian genetics and integrated hitherto semi-isolated biological subdisciplines such as botany, zoology, paleontology, and systematics. It ended what some scholars have described as the "eclipse of Darwinism"⁶⁴ that prevailed in the early 20th century, provided mathematical models for experimental evolutionary research, and established the foundational field of population genetics.⁶⁵ Consequently, its proponents conceived biological evolution primarily as gene frequency change within populations, where small mutation events provide a rich resource of genetic variation which is then processed by an omnipresent sorting mechanism (natural selection) to create gradual adaptations.⁶⁶ The followers of the Synthetic Theory then saw macroevolution – major transitions such as the emergence of mammals, but also speciation in general – as the extrapolation of gradual, microevolutionary changes within populations without the involvement of saltational events.⁶⁷ Correctly, mutations in the material basis of evolution (i.e. the genetic code) were found to be random in the sense that their occurrence is independent of organismal needs or any possible fitness effects. Other remnants of teleological

61 See Gould 1994; Gregory T.: Evolution as Fact, Theory, and Path, *Evolution: Education and Outreach* (2008) 1:46-52.

62 See Gould S. & Lewontin R.C.: The spandrels of San Marco and the Panglossian paradigm: a critique of the adaptationist programme, *Proceedings of the Royal Society of London, Series B* (1979) 205:581-98; Lynch M.: *The Origins of Genome Architecture*, Sunderland, MA: Sinauer Associates 2007 (Ch. 13).

63 See Segerstråle U.: Neo-Darwinism, in Pagel M. (Ed.): *Encyclopedia of Evolution*, Vol. 2, Oxford/New York: Oxford University Press 2002, pp. 807-10; for an outline of the influence of positivism, the Vienna Circle and other extrascientific factors on the development of the Modern Synthesis see Smocovitis V.: Unifying Biology: The Evolutionary Synthesis and Evolutionary Biology, *Journal of the History of Biology* (1992) 25:1-65.

64 See Huxley J.: *Evolution: The Modern Synthesis*, London: George Allen & Unwin Ltd. 1942; Bowler P.: *The Eclipse of Darwinism. Anti-Darwinian evolutionary theories in the decades around 1900*, Baltimore: Johns Hopkins University Press 1983.

65 See Hull D.L.: History of evolutionary thought, in Pagel M. (Ed.): *Encyclopedia of Evolution*, Vol. 1, Oxford/New York: Oxford University Press 2002, pp. E7-E22; Smocovitis 1992.

66 Futuyma D.J.: Can Modern Evolutionary Theory Explain Macroeolution?, in Serrelli E. & Gontier N. (Eds.): *Macroeolution. Explanation, Interpretation and Evidence*, Cham/Heidelberg/New York/Dordrecht/London: Springer International Publishing Switzerland 2015, pp. 29-85.

67 *Ibid.*

thought were also rejected as it became increasingly clear that neither genetic mechanisms nor the history of life as revealed in the fossil record showed any signs of directedness or tendencies toward perfection.

Since its inception, the Modern Synthesis has been supplemented several times. Conceptually, at least two extensions have been very important. First, the realization that most of evolutionary change does not consist of adaptations caused by directional natural selection. Instead, at least at the molecular level, biological evolution is mainly the result of the fixation of neutral or nearly neutral (including slightly deleterious) mutations by random genetic drift.⁶⁸ A second major modification came with the appreciation of the importance of so-called constraints that curb the efficacy of adaptive evolution via natural selection. Though not unknown to the authors of the Modern Synthesis, they frequently sidelined such constraining factors in favor of studies on the effects of natural selection on gene pools. The significance of developmental constraints in particular received more and more attention from the late 1970s onwards.⁶⁹ This was part of a broader rapprochement of evolutionary biology and developmental biology, which led to the establishment of a new discipline, evolutionary developmental biology ('evo-devo'). This cross-fertilization bridged an important conceptual gap in the theory of population genetics by providing a mechanistic link between the genetic basis of a trait and its phenotypic manifestation and, ultimately, between the development of individual organisms and macroevolution.⁷⁰ Together with an increased interest in genetic constraints (such as lack of selectable mutations or effects of pleiotropy), developmental insights have also heightened researchers' awareness of the widespread lack of adaptability and of the contingency of evolutionary events.⁷¹ In addition to the modifications outlined above, over the last decades modern evolutionary theory has expanded – though not always smoothly – even more from its (neo-)Darwinian core to incorporate or accommodate non-Darwinian concepts such as endosymbiosis, niche construction, transposable elements, epigenetic inheritance, and the large-scale effects of mass extinctions. In all, these changes in orthodox evolutionary theory have allowed

68 See Kimura M.: Evolutionary Rate at the Molecular Level, *Nature* (1968) 217:624-6; King J.L. & Jukes T.H.: Non-Darwinian Evolution, *Science* (1969) 164:788-98; Ohta T.: Slightly Deleterious Mutant Substitutions in Evolution, *Nature* (1973) 246: 96-8; see also Ohta T. & Gillespie J.: Development of Neutral and Nearly Neutral Theories, *Theoretical Population Biology* (1996) 49:128-42.

69 See, for example, Gould S.J.: *Ontogeny and phylogeny*, Cambridge, MA: Belknap Press of Harvard University Press 1977; Maynard Smith J. et al.: Developmental constraints and evolution, *Quarterly Review of Biology* (1985) 60:265-87.

70 See Gould *op. cit.*; Hall B.: Evolutionary Developmental Biology (Evo-Devo): Past, Present, and Future, *Evolution: Education and Outreach* (2012) 5:184-93; Minelli A.: Grand challenges in evolutionary developmental biology, *Frontiers in Ecology and Evolution* (2015) 2:1-11.

71 See Futuyma 2010.

new vistas to emerge, have shifted attention to neglected aspects of biological evolution, and have contributed to uncover previously unknown phenomena.⁷² They show that theoretical thinking in evolutionary biology is neither slavishly chained to old dogmas nor impervious to new data and reasonable arguments.

For these reasons, it is also ill-advised to equate modern evolutionary theory, let alone the whole field of evolutionary biology, with mere Darwinism (or Neo-Darwinism), as creationist texts regularly do. The term Darwinism is best reserved for Darwin's original notion of nonteleological natural selection as the main force in evolutionary change and, later on, for the Modern Synthesis' focus on this very same mechanism (neo-Darwinism).⁷³ Any publication that appeared during the last 40 years or so that takes issue with a supposed modern-day Darwinism, even those written by mainstream scholars, should be approached with a healthy dose of skepticism. And since creationist attacks on evolution, especially those coming from adherents of IDC, routinely weaponize the term 'Darwinism' to smear its namesake and everything associated with him, some authors have convincingly argued for a complete abandonment of the term outside of its historical context.⁷⁴

72 See Kutschera U. & Niklas K.: The modern theory of biological evolution: an expanded synthesis, *Naturwissenschaften* (2004) 91:255-276; Burian 1988; Futuyma D.J.: Evolutionary biology today and the call for an extended synthesis, *Interface Focus* (2017) 7:20160145.

73 See Gould S.J.: Darwinism and the Expansion of Evolutionary Theory, *Science* (1982) 216:380-7.

74 See Scott E.C. & Branch G.: Don't Call it "Darwinism", *Evolution: Education and Outreach* (2009) 2: 90-4.

III. Of Creationism

Evolutionist teaching is not only harmful sociologically, but it is false scientifically and historically. Man and his world are not products of an evolutionary process but, rather, are special creations of God.

(Henry M. Morris) ⁷⁵

The definition of the term creationism is an integral part of the evolution/creation controversy and is just as hotly contested as the definition of evolution. This chapter will provide some background information on the nature of creationism and its sectarian affiliations. Because the modern-day struggle of creationism versus evolution, and notably IDC, are an almost exclusively U.S. American product, the discussion provided here will focus on the situation and historical developments there. Just like the term evolution, the term creationism can be understood in many ways and take on different meanings in different contexts. In a broad sense, creationism refers to the belief that something supernatural created the universe and life on earth (or at least parts of it).⁷⁶ All believers in the Abrahamic religions, for instance, are creationists in this generic sense. But creationists *sensu lato* are not a monolithic group. In the context of the evolution/creation struggle, using such a broad understanding of creationism is not adequate. For even within a single religion, such as Christianity, there are widely disparate creationist beliefs. Before talking about a narrower meaning of the word creationism, and the ambiguity it still retains, it is both helpful and necessary to go through some demographic statistics and elaborate on some of the main denominations among U.S. Christians. Both historically and in the present, Christianity is by far the most dominant religion in the U.S. In the late 2010s, 71% of the U.S. populace identified as Christian, of which the large majority (48%) were Protestants, whereas only 23% described themselves as Catholic. These numbers have declined notably since the 1980s when IDC appeared on the map (88% net share of Christians; 62% Protestant and 26% Catholic), while the number of religious ‘nones’ has climbed drastically from 7% to 22% during the same time period.⁷⁷

⁷⁵ Morris H.M.: *Scientific Creationism (General Edition)*, Green Forest: Master Books ²1985, p. iii (emphasis in the original).

⁷⁶ See Pennock R.T.: Creationism and Intelligent Design, *Annual Review of Genomics and Human Genetics* (2003) 4:143-63; Scott ²2009; Ruse M.: Creationism, in Zalta E. (Ed.): *The Stanford Encyclopedia of Philosophy*, Winter 2018 Edition, retrieved from <https://plato.stanford.edu/archives/win2018/entries/creationism/>, on 2020-01-20.

⁷⁷ Pew Research Center: *In U.S., Decline of Christianity Continues at Rapid Pace*, Washington, DC: Pew Research Center 2019b.

Opposition to biological evolution comes mainly from evangelical Christians, most of whom are protestants. Taking the statements “Humans have evolved over time” and “Humans have always existed in their present form” as proxies for the evolution/creationism divide, one line of polling in 2014 showed that 62% of U.S. adults agreed with the former, whereas 34% agreed with the latter.⁷⁸ However, of those 62%, only one third agreed that human evolution occurred “due to natural processes” (a proxy for modern evolutionary theory), while a quarter of these respondents opined that human evolution was “guided by a supreme being”.⁷⁹ These numbers stand in stark contrast to those coming from scientific professionals. Acceptance for the statement “Humans and other living things have evolved over time” goes as high as 98% among scientists of the American Association for the Advancement of Science, for example.⁸⁰ The view that God guided (human) evolution corresponds to the idea of theistic evolution, which straddles the border between modern evolutionary theory as understood by scientists on the one hand and creationism on the other hand. Its conflict with evolutionary theory mainly lies in the importance of randomness or contingency in evolution, which theists have to dispute in order to keep teleology in the game. This theological view dominates among mainline protestants and the Catholic Church, even though there is some variation in how much they think divine intervention has actually occurred in (human) evolution.⁸¹ Because theistic evolutionists generally accept things like common ancestry, the evolution of new body plans, the efficacy of natural selection, an old earth etc., creationists (*sensu stricto*) attack their position just as vehemently as they attack modern evolutionary theory.⁸² These conservatives Christians, who are predominantly evangelical protestants, strongly favor the option “Humans have always existed in their present form” (57%), indicating their opposition to central insights of the natural sciences.⁸³ Following David Livingstone and colleagues, who built on earlier work from David Bebbington, evangelicals are characterized by (i) a personal relationship with Jesus Christ through an experience of being ‘born again’; (ii) deference to the word of God, as revealed inerrantly in the Bible; (iii) attachment to the notion of forgiving of sin through Jesus’ suffering on

78 Pew Research Center: *The Evolution of Pew Research Center’s Survey Questions About the Origins and Development*, Washington, DC: Pew Research Center 2019a.

79 *Ibid.*

80 Pew Research Center: *Public and Scientists’ Views on Science and Society*, Washington, DC: Pew Research Center 2015.

81 See Scott 2009.

82 See, for instance, Moreland J.P. et al. (Eds.): *Theistic Evolution: A Scientific, Philosophical, and Theological Critique*, Wheaton: Crossway 2017; Joubert C.: Theistic Evolution: An Incoherent and Inconsistent Worldview?, *Answers Research Journal* (2012) 5:99-114; Rosser A.: Did the Creator use evolution?, *Creation* (1989) 11:38-40.

83 Pew Research Center 2019a.

the cross; (iv) active mission, preaching and outreach.⁸⁴ Their hostility to theistic evolution arises mainly from their biblicism. As revealed in the early chapters of Genesis, casting doubt on the literal Truth is seen as threatening central doctrines of the Christian faith and, in the end, as calling into question the Truthfulness of all biblical texts by turning them into just another ordinary ancient story book. Creationism based on this Bible-abiding worldview is also referred to as biblical or special creationism because its proponents believe humans and other organisms (or kinds of organisms) were specially created through acts of God during special times in the past. In the context of the evolution/creation struggle, arguably this position is most sensibly referred to as creationism or creationist. Yet, making matters more complicated, and as will be sketched out below, a subset of these creationists who believe that the earth is only some 10,000 years old has become associated with the label ‘creationism’ in the U.S. American evolution/creationism debate to such a degree that it is usually them who are referred to as *the* creationists.⁸⁵ But for this thesis, if not stated otherwise, creationism refers to the doctrine of special creation and to its defenders as creationists, irrespective of their stance on our planet’s age.

As special creationism has enough room to accommodate different approaches with important distinctions along a continuum from liberal to conservative, it is necessary to categorize the diverse shapes of special creationism in order to prevent confusion.⁸⁶ Depending on how much input the different groups are willing to tolerate from science (not only from biology but also from astronomy, physics, geology, etc.), they can be distinguished by adding specific modifiers as indicators of their theological position. One major point of contention revolves around the age of the earth. Young-earth creationists postulate that the days of creation mentioned in Genesis were actual, consecutive 24-hour days that happened only a couple of thousands of years ago. Although there are several different young-earth creationist groups, they generally believe in a universal flood (Noah’s Flood) that was responsible for forming most of earth’s geological features. This also includes the fossil record, which supposedly testifies to a single, rapid mass extinction of global proportions. Old-earth creationists, on the other hand, accept evidence from the natural sciences that goes against a crude literal reading of the Bible and allow for an ancient earth, while still holding

84 See Livingstone D.N., Hart D.G. & Noll M.A. (Eds.): *Evangelicals and Science in Historical Perspective*; New York/London: Oxford University Press 1999, p. 6; Bebbington D.W.: *Evangelicalism in Modern Britain: A History from the 1730s to the 1980s*, London: Routledge 1993.

85 This then allows adherents of IDC to claim that they are not the same as *the* creationists, since their intelligent design theory says nothing about the age of the earth.

86 See Scott E.C.: Antievolution and Creationism in the United States, *Annual Review of Anthropology* (1997) 26:263-289.

fast to God's very personal involvement in the acts of creation – particularly the creation of mankind. There are several kinds of mental gymnastics available to harmonize an old earth with Genesis, such as the view that the six days of creation were not literal days but lasted, potentially, billions of years.⁸⁷

Beyond the belief in special creation itself, what unites literalist and progressive creationists is their antagonism to evolutionary theory and, more fundamentally, the rejection of the naturalistic *modus operandi* undergirding modern-day science. By confusing methodological naturalism with ontological naturalism, creationists consider science as it exists today to be a materialistic enterprise that works tirelessly to put biological evolution at the basis of a morally bankrupt society. Of particular concern are public school science curricula, because they are thought of as poisoning children's minds, alienating them from God, and separating their souls from salvation.

Although there have been some remarkable shifts regarding the acceptance of natural selection and speciation over the last decades, creationists reject the idea that natural selection and mutation can cross certain limits. By drawing an idiosyncratic distinction between micro- and macroevolution, creationists can tolerate the idea of evolution of new organismal forms at the level of the species or even the genus, but still maintain that natural processes cannot go beyond the boundaries God established when he created discrete, higher-order kinds of animals and plants and, above and separate from everything else, when he created mankind. Evidence to the contrary, such as transitional fossils and the universal genetic code, are rejected, distorted, or interpreted as reflecting biblical events or the handiwork of a common Creator. Furthermore, the complexity and 'finetuning' found in nature, particularly in animals, are presented as proof of God's supervision.

While the creationist classifications discussed so far are somewhat uncontroversial,⁸⁸ the case of intelligent design is a bit trickier. Its proponents claim that intelligent design theory (also referred to as design theory) has nothing to do with creationism and is just a new scientific theory on biological evolution.⁸⁹ At least in some of their publications they try to avoid references to the Bible and

87 A more detailed discussion of the different flavors of old-earth creationism and the creationist spectrum in general, including outliers such as flat earthers and geocentrists, is provided in Scott 2009.

88 But see Numbers (1999) for a closer discussion on the nebulous nature of the terms 'creationism' and 'creationist' before the interwar period.

89 See Luskin C.: What Is Intelligent Design, Discovery Institute: *intelligentdesign.org* s.d., retrieved from <https://intelligentdesign.org/articles/what-is-intelligent-design/>, on 2021-01-16; Dembski W.A.: *The Design Revolution: Answering the Toughest Questions about Intelligent Design*, Downers Grove: InterVarsity Press 2004; Meyer S.C.: Intelligent design is not creationism, *The Telegraph* 2006-01-28, retrieved from <https://www.telegraph.co.uk/comment/personal-view/3622692/Intelligent-design-is-not-creationism.html>, on 2020-12-10; Menuge A.: Who's Afraid of ID? A Survey of the Intelligent Design Movement, in Dembski W.A. & Ruse M. (Eds.): *Debating Design. From Darwin to DNA*, Cambridge: Cambridge University Press 2004, pp. 32-51; West

downplay any creationist implications of their work. Yet the purpose for this is causally linked to the legal landscape in the U.S., on which the next chapters will provide more information. For now, suffice it to say that intelligent design creationism is purposefully designed to be compatible with almost all the creationist spectrum described above. At its core is the generic notion that some things in the universe (particularly with regards to life on earth) are so complex that they can come about only through the actions of an intelligent designer. Both young-earth and old-earth creationists, even members of the other Abrahamic religions, can potentially agree on such a vague formulation. This way they can provide a united front in their attack on modern evolutionary theory while sweeping theological disputes under the rug (for now). Naturally, this does not automatically imply that all creationists subscribe to intelligent design theory or that they are affiliated with its main institutional hub (Discovery Institute). For example, one major young-earth creationist group sharply criticizes proponents of IDC for being not creationist enough by neglecting God and the Bible in their technical writings.⁹⁰ Regardless, the creationist roots of intelligent design and the argumentative congruence with standard creationism have been established beyond doubt by philosophers, historians, and scientists.⁹¹ Putting the creationist modifier on the intelligent design label is therefore justified, even though it runs counter to the (quasi-official) self-description of IDC adherents.

J.G.: Intelligent Design and Creationism Just Aren't the Same, Discovery Institute: *discovery.org* 2002, retrieved from <https://www.discovery.org/a/1329/NULL>, on 2020-12-10.

90 See Chaffey T. & Lisle J.: *Old-earth Creationism on Trial*, Green Forest: Master Books ²2009.

91 See Pennock 2003, Scott ²2009.

IV. The Deep Roots of the Design Argument

While the IDC movement began to crystallize only some 35 years ago in the U.S. of America, its roots reach much deeper and farther afield than that. Although its adherents have tried to dress up their design argument with concepts from biochemistry, probability calculus and information theory, its basic idea has been around ever since philosophers in ancient Greece and Rome used the argument from design to infer the existence of gods from observations in nature. Platonists and Stoics have used both the complexity found in nature as well as the analogy to the purposiveness of machines designed and built by humans to defend a teleological worldview.⁹² And, most famously, after asserting at the very beginning that God exists, the Bible goes on to teach that evidence for his existence can be found in nature, if one is willing to embrace it.⁹³ Later on, natural theologians have used observations and reason to investigate the characteristics of God and to find signs of his existence based on the arguments from design, cosmology, morality, and beauty. Arguably the most familiar exponent of this theistic tradition is William Paley (1743-1805). He maintained that a watch inevitably leads one to infer the existence of a watchmaker, because he could image no other alternative, except for random chance. Rationally, he rejected the latter in favor of the former explanation, since no sensible person could argue that a highly contrived machine, with parts acting together to achieve a goal, to be formed by chance events alone. He then asserted that the intricate design found in nature just as well leads to the inference of an intelligent creator, again for the lack of a sensible alternative.⁹⁴ This inference to the best explanation was not fatally susceptible to David Hume's (1711-1776) famous critique, because it differs from Hume's conception of the argument from design as an inductive inference based on analogies.⁹⁵ However, Darwin's natural selection did strike a fatal blow to Paley's watchmaker argument because it added a third, viable alternative to the two possible explanations for design suggested by Paley – thus negating his binary approach.⁹⁶

Yet belief in the argument from design endured, broadly speaking, in two forms. First, those who continued to base their worldview on biblicism and who believed in a God who has an intimate

92 See Foster J.B., Clark B. & York R.: *Critique of Intelligent Design. Materialism versus Creationism from Antiquity to the Present*, New York: Monthly Review Press 2008.

93 Genesis 1:1; Romans 1:18-21.

94 See Paley W.: *Natural Theology: or, Evidences of the Existence and Attributes of the Deity*, Philadelphia: John Morgan 1802.

95 For a discussion see Sober E.: *Philosophy of Science*, Boulder/Oxford: Westview ²2000, Chapter 2; as well as Sober E.: The Design Argument, in Dembski W.A. & Ruse M. (Eds.): *Debating Design. From Darwin to DNA*, Cambridge: Cambridge University Press 2004, pp. 98-129.

96 See Gillespie 1979, p. 83; Dawkins R.: *The Blind Watchmaker*, London: Penguin Books ²1991.

relationship with his creation through miraculous interventions along the way. For these antievolutionists, the old arguments from design, cosmology, morality, and beauty still provide direct empirical evidence for God's existence and his benevolence. They attack Darwinism in order to remove it from the equation and rehabilitate the Creator as the only viable explanation for design in nature. Following a different strand within natural theology, exemplified by Richard Owen (1804-1892), the more sophisticated scholars moved away from straightforward empiricism to a more idealistic position. For them, the abstract rational order of creation and the lawlike regularities – which are more distant to human experience – that govern nature's affairs came to be evidence for God.⁹⁷ Yet as scientists started to see referrals to a designer as lacking any empirical content – and thus as being scientifically useless –, both groups became increasingly excluded from science when its practice turned ever more positivistic and naturalistic toward the end of the 19th century.⁹⁸ From within the tradition of the first group just mentioned, with its Paleyesque, utilitarian view of designed adaptations, the intelligent design movement emerged in the 1980s. But it is still helpful to briefly discuss some of the historical contingencies and the immediate creationist ancestors to understand why and when IDC materialized as a coherent force.

97 See Gillespie *op.cit.*, pp. 84; Bowler P.: Darwinism and the Argument from Design: Suggestions for a Reevaluation, *Journal of the History of Biology* (1977) 10:29-43.

98 See Bowler 1977; Gillespie *op.cit.*, pp. 84; De Cruz H. & De Smedt J.: *A Natural History of Natural Theology*, Cambridge/London: MIT Press 2005, pp. 10-11.

V. From *The Fundamentals* to Creation Science

While there was genuine controversy in the scientific community over the merits of Darwinism and, in particular, the concept of natural selection that lasted well into the 20th century,⁹⁹ the ever more naturalistic practice of science led to the extinction of reputable scientists who advocated in favor of creationism. Organic evolution was accepted in one way or another, even among professionals who advocated anti-Darwinist alternatives, such as orthogenesis. In the United States, only evangelical churchmen, mostly protestants, seriously entertained creationist ideas at the beginning of the 20th century. And of those, just a minority were young-earth creationists.¹⁰⁰

Yet at the same time, the U.S. high school system expanded rapidly and exposed more and more children of evangelical parents to some form of evolution through textbooks and teachers who had been trained by evolutionists of one shade or another.¹⁰¹ Then, the horrors of World War I caused some evangelicals to see a direct causal relationship between the believe in the lowly origins of man from “a hairy quadruped, furnished with a tail and pointed ears”¹⁰² and the industrialized aggression of German militarism unleashed on the battlefields in Europe.¹⁰³ The undermining of traditional biblicism among high school children and the perceived moral decay in the world led to the formation of an antievolutionist movement that sought to ban the teaching of evolution as the root of all evil.

These notions were associated with expressions of faith presented in a series of booklets entitled *The Fundamentals*, published from 1910 to 1915. There, authors expressed the fears of conservative protestants over liberal interpretations of the Bible and other supposed ills associated with modernity, such as socialism, atheism, and evolutionism.¹⁰⁴ The essays in these publications that dealt with organic evolution set the groundwork for much of what later creationists would articulate more extensively. One anonymous author, for instance, asserted that at its core the whole issue is dualistic, where one either accepts an inerrant and literalist reading of the Bible (including special creationism) or evolution (i.e. Darwinism) – with logic supposedly preventing any middle

99 See also Chapter II.

100 See Numbers 2006, pp. 24-32.

101 See Numbers *op.cit.*, pp. 51

102 Darwin C.: *The Descent of Man, and Selection in Relation to Sex*, London: John Murray 1871, Volume II, p. 389.

103 See Numbers *op.cit.*, pp. 55.

104 See Lienesch M.: *In the Beginning: Fundamentalism, The Scopes Trial, and the Making of the Antievolution Movement*, Chapel Hill: University of North Carolina Press 2007.

ground.¹⁰⁵ To help his readers with the decision, the author equated evolution with atheism, materialism and moral bankruptcy. He also denounced evolutionary theory as guesswork without supporting evidence and canvassed the scientific literature for any hints of critique. At the same time, he misunderstood or willfully distorted the meaning and significance of scientific debates, such as the rivalry between Darwinists and non-Darwinists, to claim that the idea of evolution was already dead among leading scientists of the day.¹⁰⁶ Even more specifically, another author argued that all experiments have failed to support evolution; that missing links have not been found; that natural selection is false and vacuous; and that teaching Darwinism as settled science to children is intellectually and morally outrageous.¹⁰⁷ Underlying these hostilities to evolution was a view of science strongly influenced by Scottish common sense realism, as espoused by scholars such as Thomas Reid (1710-1796). Scottish presbyterians, emigrating to America, brought with them this approach that channeled a Baconian and Newtonian emphasis on empirical observation in order to discover the basic principles underlying the external world and accompanied by a suspicion against lofty theorizing and metaphysics.¹⁰⁸ By bringing science closer to everyday experiences such as engineering and manufacturing, this hands-on procedure, sat well with citizens of a more democratic nation, who witnessed how a scientific organization of production led to success and prosperity through industrialization and, later on, mechanized mass production.¹⁰⁹ Combined with a literalist reading of the Bible, evangelical protestants maintained that a science such practiced confirmed all the revealed Truth, which is the same for every person in all times and places and accessible through the direct collection of objective facts, with the help of the senses that God had given to man. (After all, Bacon had argued in favor of a “divine marshal” as well, without whom all the “order and beauty” in nature was inconceivable.¹¹⁰) Unsurprisingly, the exclusion of the miraculous from the realm of science was perceived as a major mistake and prejudiced attack on the

105 See Anonymous: Evolutionism in the Pulpit, in *The Fundamentals: A Testimony to the Truth*, Chicago: Testimony Publishing Company 1912, Volume 8, pp. 27-35.

106 *Ibid.*

107 See Beach H.H.: Decadence of Darwinism, in *The Fundamentals: A Testimony to the Truth*, Chicago: Testimony Publishing Company 1912, Volume 8, pp. 36-48.

108 See Kehoe A.B.: The Word of God, in Godfrey L.R. (Ed.): *Scientists Confront Creationism*, New York/London: W.W. Norton & Company 1983, pp. 1-12; Marsden G.M.: *Fundamentalism and American Culture*, New York/London: Oxford University Press 2006, chapters VI and XIII.

109 Two Presbyterian brothers, Lyman and Milton Stewart, who became multimillionaires through their oil business, were essential to the formation and the distribution of millions of copies of *The Fundamentals* (see Marsden *op.cit.*, chapter XIV).

110 Bacon F.: On Atheism, in Bacon F.: *The Essays of Francis Bacon*, edited by Scott M.A., Chicago: Charles Scribner's Sons 1908, pp. 71-5, retrieved from https://en.wikisource.org/wiki/The_Essays_of_Francis_Bacon/XVI_Of_Atheism, on 2021-01-07.

true scientific spirit, which called for the practitioner to start with the collection of fundamental facts provided in the Bible and to follow wherever they may lead.

The strongest support for the antievolutionist movement came from fundamentalist presbyterians and baptists, who were particularly successful in the mostly conservative southern states of the former Confederacy. There, overcoming resistance from scientists as well as liberal Christians, activists and their representatives in the legislatures managed to enforce bans on the teaching of (human) evolution in public secondary schools in Tennessee (1925), Mississippi (1926), and Arkansas (1928) – while other, less strident antievolution bills were enacted or at least proposed in 45 different states.¹¹¹ These bans and other events, such as the so-called Scopes Trial (‘Monkey Trial’) held in Tennessee in 1925, further lead to reduced coverage of evolutionary topics in high-school textbooks all across the U.S.¹¹²

This situation continued until an external shock jump-started the political establishment into action. The offending event was the successful launch of the first satellite (*Sputnik 1*) into space by the USSR in 1957. The perceived gap in technological and scientific advancement between the U.S. and its Soviet nemesis led to a major revision of U.S. science curricula and a profound update of science textbooks for secondary schools. For biology this meant that evolution was reintroduced en masse into U.S. high schools. This, in turn, led to a new spout of resistance from antievolutionists. However, since the 1920s, U.S. society had shifted toward a position far more responsive to the proclamations of scientists, with science having achieved a new level of cultural authority and expansion due to federal funding, especially through the National Science Foundation established in 1950.¹¹³ Meanwhile, excluded from any serious scientific discourse and further marginalized by liberal mainline denominations and the popular media in urban regions, the evangelical fundamentalists set up their own organizations and journals. Furthermore, for a subset of the antievolution movement, the strategy had moved away from a purely antievolutionist stance toward an attempt to develop a rival ‘scientific’ account. The proponents of this approach coopted the creationist label to differentiate themselves from those evangelicals, and Christians in general, with more progressive views on evolution and the age of the earth (i.e. from theistic evolutionists and old-earth creationists).¹¹⁴ In this intrasectarian dispute, the dualistic world view of biblical literalists

111 See Larson E.J.: *Trial and Error: The American Controversy over Creation and Evolution*, Oxford/New York: Oxford University Press ³2003, p. 48.

112 See Grabiner J.V. & Miller P.D.: Effects of the Scopes Trial, *Science* (1974) 185:832-7; Larson *op.cit.*, pp. 84-88.

113 See Larson *op.cit.*, pp. 88-91

114 See Numbers 1999; and above, Chapters III. and IV.

was put to work against both evolutionists as well as moderate and liberal Christians – one was either a believer in God’s creation, as literally revealed in the Bible, or one was against it, be it due to aberrant theology or antireligious hostility.

The main architect of this so-called creation science (also referred to as scientific creationism) was Henry M. Morris (1918-2006), a college-trained engineer, who advocated strict young-earth creationism. In a pathbreaking book, coauthored with fundamentalist theologian John Whitcomb Jr. (1924-2020), he argued that scientific facts and theories confirmed the book of Genesis as literal history, including not only a young earth but also a world-wide flood.¹¹⁵ He founded the Creation Research Society (CRS) in 1963 and, after some internal theological quarrels, the Institute for Creation Research (ICR) in 1972, which continues to publish its own journal called *Acts & Facts*, produces books and videos, organizes conferences and speaking circuits, and does a broad spectrum of public outreach to this day. A similar yet less extensive infrastructure is maintained by the CRS, with its own journal called *CRS Quarterly*. Another fundamentalist organization promoting creation science is the Geoscience Research Institute, established in 1958, which provides resources such as the periodical *Origins*, online videos, and more. In 1994, the second major young-earth creationist organization apart from the ICR was established: Answers in Genesis (AiG). Founded by Ken Ham (*1951), it offers its own broad outreach program, including the periodicals *Answers Magazine* and *Answers Research Journal* as well as a creation theme park in Kentucky that opened in 2016.

Another important manifestation of change in the U.S. American culture was a shift in the interpretation of the U.S. Constitution through the Supreme Court. Parallel to the civil rights movement, which ended law-based discrimination and segregation of African Americans in the 1950s and 1960s, the court issued a string of decisions that pulled the plug on legislative favoritism of certain religious denominations at the state level. Later on, in 1968, the SCOTUS ruled unconstitutional the Arkansas state law banning the teaching of (human) evolution in the first of two landmark cases in the evolution/creationism struggle (*Epperson v. Arkansas*, 393 U.S. 97).¹¹⁶ According to the decision, the law violated the Due Process Clause of the 14th Amendment to the U.S. Constitution and, most importantly, the Establishment Clause of the 1st Amendment. The latter, also referred to as a ‘wall of separation’ between state and church, states that “Congress shall make no law respecting an establishment of religion.” The court held that the Arkansas government, by

115 Whitcomb J.C., Jr. & Morris H.M.: *The Genesis Flood: The biblical record and its scientific implications*, Phillipsburg: Presbyterian and Reformed 1961.

116 The law banning the teaching of evolution in Tennessee was already repealed via legislative action in 1967, while Mississippi’s law was struck down by its Supreme Court in 1970 as a direct result of *Epperson*.

forbidding the teaching of only one account of the origin of humans (i.e. of human evolution), “because it is contrary to the belief of some that the Book of Genesis must be the exclusive source of doctrine as to the origin of man[,]” had violated its obligation for religious neutrality and thus exceeded the state’s right to set public school curricula.¹¹⁷ Yet, showing the possible volatility of SCOTUS decisions depending on who sits on its bench, Justice Hugo Black (1886-1971), who was a member of the Ku Klux Klan in the 1920s before being elected to the U.S. Senate from his native Alabama,¹¹⁸ hinted a way forward for the creationists. While he concurred with the court decision based on the violation of the 14th Amendment, he maintained that if the Darwinian theory is indeed anti-religious, its inclusion in public school curricula might violate the religious neutrality mandated by the Establishment Clause of the 1st Amendment.¹¹⁹ Furthermore, he also suggested that the motive behind the law in question “is simply too difficult to determine,”¹²⁰ implying that if there were non-religious reasons for removing (human) evolution from the curriculum, and provided that the law would be formulated less vaguely so as not to violate the 14th Amendment, a similar law might pass the test of constitutionality. And indeed, both points, the idea of non-religious or non-biblical opposition to evolution and the issue raised regarding religious neutrality, were picked up by advocates of creation science in their new quest for ‘balanced treatment’. A landmark article from a member of the ICR explained that because the exclusive teaching of the theory of evolution is a burden on high-school students’ constitutionally granted free exercise of religion, adding a countervailing viewpoint based on science could balance this deficiency without violating the Establishment Clause.¹²¹ And even if the scientific alternative happens to “harmonize” with a literalist reading of the Bible, this would only help to establish neutrality because evolution also happens to “coincide” with tenets of some religions (such as humanism or atheism).¹²² Because *Epperson v. Arkansas* did not touch on the subject of creation science and its possible inclusion in state-sponsored school curricula, fundamentalist antievolutionists produced their own textbooks. And they introduced legislative language in different states (e.g. Tennessee, Georgia, Florida) either to mandate or at least allow equal time for their ‘scientific’ alternative in order to countenance the

117 Fortas A.: Opinion of the Court, *Epperson v. Arkansas*, 393 U.S. 97 (1968).

118 See Newman R.K.: *Hugo Black: A Biography*, New York: Fordham University Press 1997.

119 See Black H.: Concurring Opinion, *Epperson v. Arkansas*, 393 U.S. 97 (1968).

120 *Ibid.*

121 See Bird W.: Freedom of Religion and Science Instruction in Public Schools, *The Yale Law Journal* (1978) 87(3):515-70

122 *Ibid.*

influence of the “religious philosophy of evolutionary humanism”¹²³ in the class rooms. With this strategy, the nature of science became one of the main battle grounds in the evolution/creation controversy.

One infamous high-school textbook produced to harmonize biblical creationism with science came from the CRS, titled *Biology: A Search for Order in Complexity*. In its revised edition, after setting up their basic approach by declaring that “[t]here are essentially only two philosophic viewpoints of origins among modern biologists – the doctrine of evolution and the doctrine of special creation[.]”¹²⁴ the authors concluded that “[t]he evolution mode contains numerous deficiencies and discrepancies. One may adhere to it as an act of faith, but it is fallacious and misleading to label it ‘science’.”¹²⁵ The creation model, unsurprisingly, was described as being confirmed by numerous observations and as, in fact, being “the most reasonable explanation for the actual facts of biology as they are known scientifically.”¹²⁶ Yet arguably the most famous textbook of this creed, and some sort of type specimen for creation science, came from Morris himself and the ICR. Called *Scientific Creationism* and first published in 1974, the textbook was issued in two different versions – one General Edition and one Public School Edition.¹²⁷ The latter was stripped of all biblical references, purporting to address the creation-evolution question on strictly scientific grounds without recourse to religious doctrines; while the edition for the general public (or, rather, the private Christian schools who are under no constitutional obligation to keep religion out of their curriculum) carried an additional chapter that provided the “proper Biblical and theological context.”¹²⁸ By this Morris meant that “because Biblical revelation is absolutely authoritative [...], the scientific facts, rightly interpreted, will give the same testimony as that of Scripture.”¹²⁹ In order to rectify the “failure of the public schools to maintain academic and philosophic objectivity” and to restore curricular neutrality against the “nontheistic religion of secular evolutionary humanism”, the book claimed to bring irrefutable evidence for the creation model to teachers and students and to show the scientific vacuity of the evolution model.¹³⁰ In fact, Morris claimed that both models, ultimately, had to be

123 Morris H.M.: The Religion of Evolutionary Humanism and the Public Schools, *Acts & Facts* (1977) 6(9), retrieved from <https://www.icr.org/article/religion-evolutionary-humanism-public-schools/>, on 2020-12-18.

124 Moore J.N. & Slusher H.S. (Eds.): *Biology: A Search for Order in Complexity*, Grand Rapids: Zondervan Publishing House 1974, pp. XVIII.

125 Moore & Slusher (Eds.) *op.cit.*, p. XX.

126 Moore & Slusher (Eds.) *op.cit.*, p. XXII.

127 Morris H.M.: *Scientific Creationism (General Edition)* and *(Public School Edition)*, San Diego: Creation-Life Publishers 1974.

128 Morris H.M.: *Scientific Creationism (General Edition)*, Green Forest: Master Books ²1985, p. iv.

129 Morris *op.cit.*, p. 15.

130 Morris *op.cit.*, quotes on p. iii.

accepted on faith because both contained elements that were beyond the purview of science – it just happened to be the case that, unlike the evolution model, the creation model had its basis in “a reasoned faith.”¹³¹ By freely mixing stick-figure versions of Bacon’s and Karl Popper’s views of science,¹³² Morris argued that the scientific method consists essentially of “experimental observation and repeatability,”¹³³ which puts both the supernatural acts of the Creator as well as the unobservable events in a supposed evolutionary past (i.e. macroevolution) beyond the reach of scientific testing and, thus, of falsification. At the same time, microevolution, which can be observed today, is “irrelevant”¹³⁴ since the small scale of variations/mutations remain within the limits of certain types or kinds of organisms. What is more, all other evidence offered in favor of (human) evolution and an old earth, such as the geological record and its fossils, genetics, biochemistry, biophysics, archaeology and linguistics is attacked and discredited by Morris.¹³⁵ Even pedagogically, and here he foreshadowed a central argument put forth by IDC proponents, Morris claimed that the creation model is beneficial because it “is consistent with the innate thoughts and daily experiences of the child and thus is conducive to his mental health”; the school child “knows, as part of his own experience of reality, that a house implies a builder and a watch a watchmaker.”¹³⁶ All this left the evolutionists, among which Morris placed everyone from Buddhists, progressive and liberal Christians, to Marxists and Nazis – with nothing more than blind dogmatic faith as basis for accepting the evolution model. Evolutionists are also unscientific with respect to all the ad hoc modifications they invent to dissolve the numerous “fallacies and contradictions”¹³⁷ in their model. For Morris, it followed naturally that “the answer of the evolutionary establishment to the creationist arguments has not been scientific, but emotional.”¹³⁸

131 Morris *op.cit.*, p. 5.

132 See Hull D.L.: The Use and Abuse of Sir Karl Popper, *Biology and Philosophy* (1999) 14:481-504.

133 Morris *op.cit.*, p. 4.

134 Morris *op.cit.*, p. 7.

135 Responses to these and similar creationist claims can be found, for example, in Godfrey L.R. (Ed.): *Scientists Confront Creationism*, New York/London: W.W. Norton & Company 1983; Kitcher ²1984; Scott E.C. & Cole H.P.: The Elusive Scientific Basis of Creation “Science”, *The Quarterly Review of Biology* (1985) 60(1):21-30; National Academy of Sciences: *Science and Creationism*, Washington, DC: National Academy Press ²1999; Pennock 1999. For a discussion of the pushback from progressive Christians against the fundamentalist attacks see Numbers R.L.: *The Creationists. From Scientific Creationism to Intelligent Design*, Cambridge/London: Harvard University Press ²2006.

136 Morris *op.cit.*, p. 14.

137 Morris *op.cit.*, p. 16.

138 Morris *op.cit.*, pp. xiii.

In spring 1981, in Arkansas, Act 590 was signed into law and mandated balanced treatment for what it labeled evolution-science and creation-science in its public primary and secondary schools.¹³⁹ The statute's purposes included, among other things, "protecting academic freedom," "preventing establishment of Theologically Liberal, Humanist, Nontheist, or Atheist religions," and "assisting students in their search for truth."¹⁴⁰ Based on a model bill provided by members of the ICR, the rationale given in the statute claimed that "[e]volution-science is not an unquestionable fact of science, because evolution cannot be experimentally observed, fully verified, or logically falsified, and because evolution-science is not accepted by some scientists."¹⁴¹¹⁴² According to the Act, evolution-science included the following claims that needed to be balanced out: "(1) Emergence by naturalistic processes of the universe from disordered matter and emergence of life from nonlife; (2) The sufficiency of mutation and natural selection in bringing about development of present living kinds from simple earlier kinds; (3) Emergence by mutation and natural selection of present living kinds from simple earlier kinds; (4) Emergence of man from a common ancestor with apes; (3) Explanation of the earth's geology and the evolutionary sequence by uniformitarianism; and (6) An inception several billion years ago of the earth and somewhat later of life."¹⁴³ The counterweight on the balance would be creation-science, which was characterized in the following way: "(1) Sudden creation of the universe, energy, and life from nothing; (2) The insufficiency of mutation and natural selection in bringing about development of all living kinds from a single organism; (3) Changes only within fixed limits of originally created kinds of plants and animals; (4) Separate ancestry for man and apes; (5) Explanation of the earth's geology by catastrophism, including the occurrence of a worldwide flood; and (6) A relatively recent inception of the earth and living kinds."¹⁴⁴

Despite the lack of direct references to the Bible, the congruence of this legislative language with the sectarian positions of creationists was just too obvious. In 1982, a federal court deemed the statute to be tantamount to establishing a state religion and, thereby, to be unconstitutional.¹⁴⁵

139 See Arkansas Act 590 of 1981 cited in Overton W.R.: Opinion, *McLean v. Arkansas Board of Education*, 529 F. Supp. 1255 (E.D. Ark. 1982), reprinted in Pennock & Ruse (Eds.): *But Is It Science? The Philosophical Question in the Creation/Evolution Controversy – Updated Edition*, Amherst: Prometheus Books 2009, pp. 279-311.

140 *Ibid.*

141 *Ibid.*

142 The supposed scientific dissent came, on the one hand, from those creationists who possessed advanced science and engineering degrees and, on the other hand, from misrepresenting or misunderstanding new ideas in evolutionary biology, particularly the theory of punctuated equilibria proposed by Gould and Eldredge (see Chapter I. and FN 10).

143 Arkansas Act 590 of 1981 cited in Overton *op.cit.*, here pp. 290-1.

144 Overton *op.cit.*, p. 291

145 *McLean v. Arkansas Board of Education*, 529 F. Supp. 1255 (E.D. Ark. 1982).

Leaning heavily on the views of philosopher of science Michael Ruse, the court used a Popperian understanding of the nature of science to show how scientific creationism failed to qualify as such: Science has to be guided by and refer to natural law in its explanations; has to be empirically testable; has to be tentative; and has to be falsifiable. Consequently, the court reasoned, the whole of scientific creationism runs counter to “what scientists think” and “what scientists do.”¹⁴⁶ The federal court ruling in Arkansas was confirmed when the SCOTUS ruled a similar legislation in Louisiana unconstitutional in 1987.¹⁴⁷ But again, a loophole remained. In its opinion, the court stated that

teaching a variety of scientific theories about the origins of humankind to schoolchildren might be validly done with the clear secular intent of enhancing the effectiveness of science instruction.¹⁴⁸

Right away, in a new attempt to evade the wall of separation, creationists could remove any reference to the concepts contained in creation-science and argue that they have gained novel insights from *real* scientific data. Those insights might point to an unnamed designer of some sort. And science education might then be enhanced by exposing students to those insights. Such faint murmuring could still be recognizable to fundamental Christians for what they are, while the judges on the court benches might just not hear them. For another thing, antievolutionists could continue with the strategy to claim that Darwinism fails to pass established demarcation criteria, such as falsification, and should thus also be removed from the curricula. To this end, it could be helpful to find someone with academic standing, untainted by any affiliation to religious activism, who appears to argue that science is not a rational enterprise à la Popper but, all things considered, epistemologically on the same level as creationism.

146 Overton *op.cit.*, p. 295.

147 *Edwards v. Aguillard*, 482 U.S. 578 (1987).

148 Brennan J.: Opinion of the Court, *Edwards v. Aguillard*, 482 U.S. 578 (1987), p. 594.

VI. Now You See Me, Now You Don't: The Wedge of Intelligent Design Creationism

With this said, the groundwork has been laid down for a discussion of IDC and, subsequently, the way its advocates use Kuhn's writings.

The basic argument of intelligent design is that certain things in the universe are too complex to have arisen by purposeless, blind action. Its proponents claim that their approach is scientific because they begin with empirical observations, infer conclusions, and then test them. Their particular claim to fame is that they, unlike run-of-the-mill creationists, apply legitimate concepts from information theory and apply them to novel insights from molecular biology. One major proponent of IDC has offered the following description:

What has emerged is a new program for scientific research known as *intelligent design*. Within biology, intelligent design is a theory of biological origins and development. Its fundamental claim is that intelligent causes are necessary to explain the complex, information-rich structures of biology and that these causes are empirically detectable.¹⁴⁹

As far as evolution and life on earth are concerned, IDC advocates maintain that they can detect intentional design in biological structures by establishing whether they are specific for a certain task and complex, i.e. consisting of different parts that work together to achieve a specific goal. And because we know from experience that machinery and tools made by humans meet both of these criteria, is an inference to the best explanation to conclude that biological structures, such as the bacterial flagellum, also meet both criteria and are therefore also made by an intelligent agent.¹⁵⁰ By doing so, IDC proponents profess to employ standard scientific practice and even claim that other scientific disciplines, such as forensic science and archeology, do utilize this same intelligent design method.¹⁵¹ (If their pronouncements are taken at face value, one is even left with the impression that intelligent design researchers are among the best in the world, getting showered in Nobel Prizes all the time.¹⁵²) Officially, design theorists maintain that they differ from earlier design arguments, such

149 Dembski W.A.: *Intelligent Design: The Bridge Between Science & Theology*, Downers Grove: InterVarsity Press 1999b, p. 106.

150 See Dembski 2004.

151 For instance, Dembski *op.cit.*; Gauger A.: What's the Mechanism of Intelligent Design?, Discovery Institute: *Evolution News & Science Today* 2015, retrieved from https://evolutionnews.org/2015/11/whats_the_mecha/, on 2020-12-12; Luskin C.: A Slightly Technical Introduction to Intelligent Design, Discovery Institute: *discovery.org* 2016, retrieved from <https://www.discovery.org/a/25274/>, on 2020-12-12.

152 Egnor M.: Intelligent Design Wins *Another* Nobel Prize, Discovery Institute: *Evolution News & Science Today* 2018, retrieved from <https://evolutionnews.org/2018/10/intelligent-design-wins-another-nobel-prize/>, on 2021-01-16.

as Paley's, because they do not claim to argue for the existence of God (but only for the existence of an unspecified designer), and also differ from other forms of creationism because they do not refer directly to the Bible or deal with standard creationist points such as the age of the earth.

Today, the central hub for IDC is the Seattle-based think tank Discovery Institute, founded in 1990, specifically its Center for Science and Culture (CSC), established in 1996 as Center for the Renewal of Science and Culture (CRSC). Funded mostly by donations from fundamentalist Christians,¹⁵³ publicly available tax documents show that since the mid-2010s the Discovery Institute has about five million dollars in assets available to finance its activities each year. Besides online resources, such as its main online public-outreach venue *Evolution News & Science Today (ENST)*, the Discovery Institute publishes books and media pieces, offers seminars and scholarships, organizes conferences in the U.S. and internationally, drafts model bills, and lobbies politicians and school board members in support of its anti-evolution agenda. Through grants to the so-called Biologic Institute, the Discovery Institute even funds its own online 'peer-reviewed' journal, called *BIO-Complexity*.¹⁵⁴ Since its start in 2010, the journal has published 38 articles, of which a fourth or so are opinion pieces. Most of the articles were authored by people who are also part of the editorial team (which consists of 32 editors as of January 2021).¹⁵⁵

Several conferences, book publications, and the efforts of key persons were vital to the crystallization of the ID movement in the 1990s. Yet the first inklings appeared in the early 1980s, particularly in the book *The Mysteries of Life's Origin*, which was the first publication that employed the neocreationist stealth tactics and premasticated all the major ingredients for other IDC practitioners. The book argued (*) that certain discontinuities in the universe, especially the origin of life, could not be explained by undirected natural causes but only through intelligence; (*) that the emergence of information in and the complexity of biomolecules, such as DNA, is wholly unexplained; (*) that based on criticism evoked by established scientific methods, current theories are fundamentally deficient; (*) that there is a crisis in chemical and prebiotic evolution research; and (*) that contemporary science is blind on one eye due to an a priori commitment to

153 See Slevin P.: Battle on Teaching Evolution Sharpens, *The Washington Post* 2005-03-14, p. A01, retrieved from <https://www.washingtonpost.com/wp-dyn/articles/A32444-2005Mar13.html>, on 2020-12-10.

154 Available at <https://bio-complexity.org/ojs/index.php/main/index>; see also Richards J.W.: *BIO-Complexity: A New, Peer-Reviewed Science Journal, Open to the ID Debate*, Discovery Institute: *Evolution News & Science Today* 2010, retrieved from https://evolutionnews.org/2010/05/biocomplexity_a_new_peerreview/, on 2021-01-06.

155 See also Branch G.: The Latest "Intelligent Design" Journal, *RNCSE* (2010) 30(6):10-3.

metaphysical naturalism.¹⁵⁶ It is here, connected to the latter point, that the first brief invocation of Kuhn in the context of IDC occurred.¹⁵⁷ The authors refer to the second edition of *Structure* to support their claim that scientists are not objective in their rejection of approaches that may have supernatural implications because they just dislike them. The copyright holder of the book was the nonprofit organization Foundation for Thought and Ethics (FTE), founded in 1980 and folded into the Discovery Institute in 2016, which aimed to “making known the Christian gospel and understanding of the Bible and the light it sheds on the academic and social issues of our day.”¹⁵⁸ The FTE was also involved in another important publication intended as a supplementary high school textbook. First published in 1989, *Of Pandas and People* was the first book to use the phrase intelligent design in a systematic fashion, even though earlier unpublished draft versions had openly referred to a Creator and creationism until the SCOTUS ruled the teaching of creation science in state-funded schools unconstitutional in 1987.¹⁵⁹ After cleansing the Creator from its pages and substituting Him with an unidentified intelligent designer, the book still carried the old dualistic approach common to creation science and reinforced attacks on transitional fossils, macroevolution and common descent, natural selection, and the prebiotic origin of life. Yet still, *Pandas* claimed that intelligent design had nothing to do with creationism but that it was a manifestation of the “controversies within the scientific community itself.”¹⁶⁰ Here Kuhnian language and ideas appeared, although the authors chose not to cite him directly. In particular, neo-Darwinism was described as suffering “paradigm breakdown”¹⁶¹ and intelligent design was presented as a powerful scientific alternative. The expressed goal of the book was to “balance the biology curriculum” with the “scientific rationale” for intelligent design and invited each student to come “to conclusions on [their] own,” with the obvious intent to undermine the evolutionary account presented in the official textbooks.¹⁶² Interestingly, the book also foreshadowed what would in the mid-1990s become a staple for IDC under the catchphrase irreducible complexity, namely the notion that biochemical systems at the sub-cellular level cannot be explained by Darwinian evolution (one example

156 Thaxton C.B., Bradley W.L. & Olsen R.L.: *The Mystery of Life's Origin: Reassessing Current Theories*, Dallas: Lewis and Stanley 1984.

157 See Thaxton, Bradley & Olsen *op.cit.*, p. 207.

158 Quoted in Matzke N.: *But Isn't It Creationism? The Beginnings of "Intelligent Design" in the Midst of the Arkansas and Louisiana Litigation*, in Pennock & Ruse (Eds.) *op.cit.*, pp. 377-413 (quote on p. 391).

159 See *ibid.*; and Forrest B.: My role in *Kitzmiller v Dover*, *RNCSE* (2006) 26(1-2):47-8.

160 Davis P., Kenyon D.H. & Thaxton C.B.: *Of Pandas and People: The Central Question of Biological Origins*, Dallas: Haughton Publishing Company ²1993, quote on p.153.

161 *Ibid.*

162 Davis, Kenyon & Thaxton *op.cit.*, pp. viii-ix.

discussed prominently was the blood-clotting cascade in mammals).¹⁶³ Darwinism itself was defined as “the theory that all living things descended from an original common ancestor through natural selection and random variation, without the aid of intelligence or nonmaterial forces,” thus confusing theory, history, and fact of evolution, and also excluding crucial nonadaptive mechanisms from the equation.¹⁶⁴ In its second edition, among the sources cited in favor of the contention that Darwinism was in critical condition were two other books central to the IDC movement, both of which made extensive use of Kuhnian concepts and phrases (on which the next section will provide more details). Although it did not mention intelligent design per se, *Evolution: A Theory in Crisis* argued basically along the same lines by casting doubt on the fossil record, macroevolution and the generative role of mutations and natural selection. First published in Britain in 1986, the book asserted the existence of fundamental discontinuities in nature that could not be bridged by Darwinian mechanisms and only allowed for microevolutionary changes within immutable typological classes.¹⁶⁵ As suggested in the book’s title, the orthodox Darwinian framework was described as being in a state of crisis, its central concepts being unsupported by empirical evidence, and the whole Darwinian edifice being propped up by nothing more than psychology. The author, Michael Denton (*1943), who holds a PhD in biochemistry from a secular university and has legitimate academic credentials, has since then become a senior fellow at the CSC.

The other publication referenced in *Pandas* came from yet another scholar with serious academic standing. In 1991, Phillip E. Johnson (1940-2019), a law professor at UC Berkeley, created a splash in the creation/evolution controversy by lending his support to the ongoing attacks on evolutionary theory. Johnson became a born-again Christian after a divorce threw him into an early mid-life crisis.¹⁶⁶ He is considered to be the “godfather” of the intelligent design movement.¹⁶⁷ In *Darwin on Trial*, while distancing himself from ordinary creation-science, he maintained that the whole game is rigged in favor of so-called Darwinism, which he defined as “fully naturalistic evolution, involving chance mechanisms guided by natural selection.”¹⁶⁸ The reason being that a metaphysical bias in the scientific establishment arbitrarily excludes – and even suppresses evidence in favor of –

163 See Davis, Kenyon & Thaxton, *op.cit.*, pp.141-6.

164 Davis, Kenyon & Thaxton, *op.cit.*, p. 149.

165 Denton M.: *Evolution: A Theory in Crisis*, Bethesda: Adler & Adler ²1996.

166 Forrest B.: The Wedge at Work: How Intelligent Design Creationism Is Wedging Its Way into the Cultural and Academic Mainstream, in Pennock (Ed.) 2001, pp. 5-53; Pennock 2010.

167 Luskin C.: Why Phillip Johnson Matters: A Biography, Discovery Institute: *Evolution News & Science Today* 2011, retrieved from https://evolutionnews.org/2011/11/the_significance_of_phillip_jo/, on 2021-01-10.

168 Johnson P.E.: *Darwin on Trial*, Washington, DC: Regnery Gateway 1991, p. 4.

intelligent design in nature. Johnson, however, claimed to “examine the scientific evidence on its own terms, being careful to distinguish the evidence itself from any religious or philosophical bias[.]”¹⁶⁹ Thus he asserted that empirical data not only failed to support Darwinism but refuted it – were it not for the frequent ad hoc rationalization orthodox scientists developed in order to keep the reigning paradigm alive. He also put the usual suspects on stage by claiming (*) that, while microevolution did indeed occur, macroevolution is purely speculative; (*) that natural selection cannot bridge certain gaps between kinds of organisms, which, according to Johnson, was also apparent in the pervasive gaps in the fossil record, and is also unable to produce complex biological systems; (*) and that recent insights from molecular biology failed to support the common descent of different species, particularly that of humans and apes. By exposing these weaknesses in Darwinian thinking, *Darwin on Trial* claimed to remove from science “the dead weight of prejudice, and thereby [to free] us to look for the truth”¹⁷⁰ by accepting the uncontroversial evidence for the existence of an intelligent designer and rejecting scientific naturalism with all its atheistic implications.

Another scholar with real academic credentials and a tenured professorship in biochemistry at Lehigh University, a secular university in Pennsylvania, generated even more momentum for the emerging IDC movement. In 1996, Michael Behe (*1952) published a book, ominously titled *Darwin's Black Box*,¹⁷¹ claiming that advances in biochemistry had penetrated to the ultimate explanandum of Darwinian evolution: the complex machinery inside of cells. Following well-treaded paths, Behe continued to equate evolutionary theory with natural selection acting on random mutations and maintained that the underlying gradualism cannot evolve things like the bacterial flagellum or the mammalian blood-clotting cascade. This kind of molecular machinery he described as *irreducibly complex*, because to work properly all its necessary parts had to be in place from the get-go instead of coming together in a stepwise fashion through consecutive rounds of mutation and selection. Thus, the discovery by biochemists of ever-more irreducible complexity inside of cells progressively undermine the status of Darwinism while strengthening the position of intelligent design, or so Behe claimed.

Today, Behe is arguably the most prominent exponent of IDC and senior fellow at the CSC, not least because he is – still – the only proponent of design theory with tenure at a secular university.

169 Johnson *op.cit.*, p. 14.

170 Johnson *op.cit.*, p. 154.

171 Behe M.J.: *Darwin's Black Box. The Biochemical Challenge to Evolution*, New York: Free Press 1996.

He continues to speak prolifically on the alleged weaknesses of Darwinism in books, newspapers, blog posts, and talks. In 2016, the Discovery Institute even produced a documentary about him and *Darwin's Black Box*, humbly titled *Revolutionary*.¹⁷²

In addition to Behe's irreducible complexity, in 1998 a separate but related instrument appeared in the toolbox of IDC advocates, published by the Cambridge University Press no less. William A. Dembski (*1960), who holds a PhD in mathematics and a PhD in philosophy from the University of Illinois at Chicago, as well as an advanced degree in theology from Princeton Theological Seminary, offered the concept of *specified complexity* as a way to detect design in nature through mathematical fiat¹⁷³. By applying a so-called Explanatory Filter, he maintained that two of the three possible explanations that exist for any kind of event – namely law-like regularity and probabilistic chance, which are both undirected natural causes – can be ruled out for certain biological features. Similar to Paley's earlier reasoning, this left only one reasonable explanation standing: design. An intelligent agent of some sort must have intervened to produce the specified events of small probability that characterizes design. At the time, Dembski claimed that this design inference cannot be used to infer anything about the intelligent designer per se. However, in subsequent books on design theory, one of them with the revealing title *Intelligent Design: The Bridge Between Science & Theology*,¹⁷⁴ he was less coy about the nature of the so-called designer and the religious motivations behind the intelligent design movement. In fact, he described intelligent design not only as a scientific research program and intellectual movement but also as “a way to understanding divine action.”¹⁷⁵ The divinity he had in mind was clearly the God of the Bible, who should be praised for “the creation of the world” and “the redemption of the world through Jesus Christ.”¹⁷⁶ Indeed, Dembski said that the design theory “is just the Logos theology of John's Gospel restated in the idiom of information theory.”¹⁷⁷ And overall, according to his own words, “the Christian evangelical world has thus far been the most hospitable place for intelligent design.”¹⁷⁸ Nonetheless, following in the footsteps of earlier IDC publications, Dembski claimed that it was scientific

172 West J.G. (Director): *Revolutionary: Michael Behe and the Mystery of Molecular Machines*, Discovery Institute 2016.

173 See Dembski W.A.: *The Design Inference: Eliminating Chance through Small Probabilities*, New York: Cambridge University Press 1998.

174 Dembski 1999b.

175 Dembski *op.cit.*, p. 13.

176 Dembski *op.cit.*, p. 235.

177 Dembski W.A.: Signs of intelligence: A primer on the discernment of intelligent design, *Touchstone* (1999) 12(4):76-84, quote on p. 84.

178 Dembski W.A.: Intelligent Design Coming Clean, *Access Research Network* 2000, retrieved from http://arn.org/docs/dembski/wd_idcomingclean.htm, on 2020-11-28,.

progress in biochemistry that had led to a comeback of the design argument. To facilitate this comeback, he averred to have discovered a “conservation law governing the origin and flow of information” from which it followed that “information is not reducible to natural causes.”¹⁷⁹ On the other hand, he claimed that Darwinism is without empirical support and kept in place only by the force of naturalistic metaphysics. Citing Kuhn on the necessity for a novel paradigm to be available for a paradigm shift to take place, Dembski argued that the empirical detectability of intelligent causes turned intelligent design into a scientific alternative to naturalistic evolution.¹⁸⁰ For this to come to fruition, however, the restriction of science to the study of “undirected natural processes” (i.e. methodological naturalism) had to be “dumped.”¹⁸¹ Put even more bluntly: “Naturalism is the disease. Intelligent design is the cure.”¹⁸²

Interestingly, Dembski, even though he was one of the highfliers of IDC, “retired” from the movement and cut his “formal associations with the ID community, including [his] Discovery Institute fellowship of 20 years” in 2016.¹⁸³

While the open admission of the sectarian roots of design theory, such as Dembski’s, can be papered over as mere personal opinion, a quasi-official declaration from the Discovery Institute would be much harder to conjure away in a courtroom setting. And indeed, such a document does exist and was leaked to the public in 1999. Drawn up as a fundraising proposal by the CRSC in 1998 and titled ‘The Wedge’, the document contained strategic mid- and long-term plans seeking “the overthrow of materialism and its cultural legacies.”¹⁸⁴ To accomplish this, intelligent design theory was to be established first as an alternative to so-called scientific materialism and, later on, as the “dominant perspective in science.”¹⁸⁵ Among the primary targets to wedge itself into the sciences and the broader culture, the plan explicitly mentions the importance of critiquing “Darwinist theory” and “Darwinian materialism.”¹⁸⁶ The overarching aim was to “replace materialistic explanations with the theistic understanding that nature and human beings are created by God.”¹⁸⁷

¹⁷⁹ Dembski *op.cit.*, p. 18.

¹⁸⁰ See Dembski *op.cit.*, p. 119.

¹⁸¹ *Ibid.*

¹⁸² Dembski *op.cit.*, p. 120.

¹⁸³ Dembski W.A.: Official Retirement from Intelligent Design, *billdembski.com* 2016, retrieved from <https://billdembski.com/personal/official-retirement-from-intelligent-design/>, on 2020-10-15.

¹⁸⁴ Center for the Renewal of Science & Culture: *The Wedge*, s.l. Discovery Institute 1998, retrieved from https://ncse.ngo/files/pub/creationism/The_Wedge_Strategy.pdf, on 2020-11-28.

¹⁸⁵ *Ibid.*

¹⁸⁶ *Ibid.*

¹⁸⁷ *Ibid.*

A couple of years later, in 2005, the Wedge Document played a significant role in another major court case. The so-called Dover Trial unfolded at a federal court in Pennsylvania after a local school board tried for the first time to introduce the teaching of intelligent design into the science curricula of tax-funded schools.¹⁸⁸ To this end, students were to be read a statement in biology classes, which disparaged Darwin's theory as being just a theory, not a fact, and full of gaps. True to the two-world creed of creationists, intelligent design was offered as the alternative theory, and *Pandas* was suggested as a reference book. The Discovery Institute provided assistance and Behe testified as an expert witness in support of the school board's policy. Already in 1999, and directly referring to the dissenting opinion in the *Edwards* ruling mentioned above, proponents of intelligent design had advocated for teachers and school boards to include their theory into science curricula.¹⁸⁹ The Wedge Document, too, included the objective to bring at least 10 states "to rectify ideological imbalance in their science curricula & include design theory."¹⁹⁰

However, the Republican-appointed judge in Pennsylvania delivered a decisive and thorough ruling that shattered the hopes of IDC proponents to bring design theory, at least in its existing form, into public science curricula. The trial expanded on existing evidence showing the historical and ideological continuity from scientific creationism to intelligent design, further stressed the vacuity of its arguments, such as irreducible complexity, and exposed the dishonesty behind the efforts to conceal its religious roots. The two most impressive findings on the continuity from creationism to intelligent design creationism involve the *Pandas* textbook. The first was that in early pre-publication drafts, created before the SCOTUS decision in 1987 (*Edwards v. Aguillard*) ruled the teaching of creationism unconstitutional, the word 'creation' and its cognates were used extensively, but they were systematically replaced in post-*Edwards* editions with '(intelligent) design' and its cognates. The second curious finding was that the definition for creation in these pre-1987 drafts was identical to the definition of intelligent design in later drafts.¹⁹¹ Particularly important as a precedent for any similar endeavors in the future was the court's conclusion that intelligent design did not qualify as science and thus, like old-school creationism, ran afoul of the Establishment Clause of the First Amendment to the U.S. Constitution. To that end, the court established that

188 *Kitzmiller v. Dover Area School District*, 400 F. Supp. 2d 707 (M.D. Pa. 2005).

189 See DeWolf D.K., Meyer S.C. & DeForrest M.E.: *Intelligent Design in Public School Science Curricula: A Legal Guidebook*, Richardson, TX: The Foundation for Thought and Ethics 1999.

190 Center for the Renewal of Science & Culture 1998.

191 Jones J.E.: Memorandum Opinion, *Kitzmiller v. Dover Area School District* (2005), p. 32; see also Scott 2009 (esp. Figure 7.1 on p. 150), and Matzke 2009.

intelligent design is not accepted by the relevant scientific community (including the restriction of science to natural phenomena), did not produce peer reviewed literature that actually applied concepts put forth by Behe or Dembski, and that these concepts have not been subjected to further research, elaboration, and testing by its proponents – indeed, that some propositions made by design theorists are empirically untestable.¹⁹² Interestingly, Steve Fuller (*1959), who also testified as a defense expert on the side of IDC supporters, acknowledged during the trial that the goal of intelligent design is to change the rules of science in order to accommodate their design theory, in obvious contrast to the official assertion that intelligent design is not creationism or religion.¹⁹³ In fact, Behe admitted that under his definition of science, astrology would have to be accepted as scientific.¹⁹⁴

In an effort to mitigate the damage, IDC advocates have smeared the judge with ad hominem attacks and hired a PR company to help them in their attempt to regain an argumentative foothold – even if only in the eyes of their evangelical supporters and financiers.¹⁹⁵

Since the Dover Trial, IDC has lost some of its momentum but it is far from being out of business, even more so in their own self-perception.¹⁹⁶ In fact, the public-outreach machinery of the Discovery Institute continues to make a lot of noise¹⁹⁷ and political lobbying has even lead to some successes in the United States and in other countries (like in Brazil, as pointed out earlier). Already starting in the early 2000s, their tactic has begun to shift away from trying to bring design theory itself into classrooms to ‘teaching the controversy’, to ‘critically analyzing’ evidence for and against evolution, and to informing students of the supposed scientific debate about the ‘strengths and

192 See Jones *op.cit.*, p. 64 and p. 82.

193 Fuller holds a PhD in History and Philosophy of Science and a professorship at the University of Warwick and has no formal ties to the Discovery Institute. He has written very critically – to say the least – about Kuhn (Fuller S.: *Thomas Kuhn: A Philosophical History for Our Times*, Chicago: University of Chicago Press 2000), and continues to offer support for IDC (see, for example, *id.*: *Science v. Religion? Intelligent Design and the Problem of Evolution*, Cambridge: Polity Press 2007; *id.*: *Dissent Over Descent: Intelligent Design's Challenge to Darwinism*, Thriplow, Cambridgeshire: ICON Books 2008; *id.*: *Foreword*, in Moreland et al. (Eds.) 2017, pp. 27-31). For reactions to Fuller’s appearance in Dover see, for instance, Lynch M.: From Ruse to Farce, *Social Studies of Science* (2006) 36(6):819-6, Lambert K.: Fuller’s Folly, Kuhnian Paradigms, and Intelligent Design, *Social Studies of Science* (2006) 36(6):835-42, and Edmond G. & Mercer D.: Anti-social Epistemologies, *Social Studies of Science* (2006) 36(6):843-53.

194 See Jones *op.cit.*, p. 68.

195 See Irons P.: Disaster in Dover: The Trials (and Tribulations) of Intelligent Design, *Montana Law Review* (2007) 68:59-87.

196 See DeWolf D.K., West J.G. & Luskin C.: Intelligent Design Will Survive *Kitzmiller v. Dover*, *Montana Law Review* (2007) 68:7-57.

197 They also sell intelligent design-themed mugs, magnets, and T-shirts in their online store (<https://www.zazzle.com/store/discoveryinstitute>).

weaknesses' of evolution. Ohio and Kansas did in fact include 'critical analysis' of evolution in their science standards (in 2002 and 2005, respectively), even though in both states this language was later eliminated again. In furtherance of these goals, the Discovery Institute also offers blueprints for legislation that would grant pro-design teachers immunity from punishment if they bring up the subject favorably in their public science classes. In several states (Alabama, Louisiana, Mississippi, Tennessee), such 'academic freedom' language has been adopted as statutes or resolutions.¹⁹⁸

As far as arguments are concerned, practitioners of IDC continue to churn out books and articles, mostly targeted at lay audiences, attacking Darwinism.¹⁹⁹ Since Behe's idea of irreducible complexity (and its attempted mathematical formulation by Dembski), which is still being touted as if it was never refuted or received even a single scratch from counterarguments, design theorists have made only one other addition.

In 2016, Douglas Axe, who holds a PhD in molecular biology, argued in favor of a so-called design intuition, a "common human faculty by which we intuit design."²⁰⁰ Just as everyone understands that a breakfast needs a breakfast-maker, everybody can rightfully conclude that species, genes, and enzymes require a maker, too. Because, so goes his argument, the only other mechanism available would be pure chance – and the probability for that to happen is practically zero. And like Paley did, Axe concludes that life and all its intricacies must "come from the mind of God" because "nothing else makes any sense."²⁰¹ This design intuition, according to the Axe, "provides a solid refutation of Darwin's explanation for life"²⁰² and allows everyone – especially ordinary people without scientific know-how – to counter the authoritarian declarations from highbrow, atheism-promoting experts. In fact, Axe praises the "scientific value of public opinion" as the best form of peer review.²⁰³ Citing studies that show children are prone to teleological thinking, he further laments that school science curricula are unnaturally forcing an evolutionary worldview on their minds, oppressing their

198 See Center for Science and Culture: *Discovery Institute's Science Education Policy*, Seattle: Discovery Institute 2017, retrieved from <https://www.discovery.org/a/3164/>, on 2020-11-30.

199 See Behe M.J.: *Darwin Devolves. The New Science About DNA That Challenges Evolution*, New York: HarperOne 2019.

200 Axe D.: *Undeniable—How Biology Confirms Our Intuition That Life Is Designed*, New York: HarperOne 2016 (quote on p. 21).

201 Axe *op.cit.*, p. 185.

202 *Ibid.*

203 Axe *op.cit.* p. 62; similar thoughts are also expressed in Behe M.J.: On Intelligent Design, Do Your Own Homework. Make Up Your Own Mind, Discovery Institute: *Evolution News & Science Today* 2019, retrieved from <https://evolutionnews.org/2019/01/on-intelligent-design-do-your-own-homework-make-up-your-own-mind/>, on 2021-01-15.

insights into nature. Thus, his argument fits neatly into the standard strategy of creationists to target impressionable young minds before they get introduced to the evolutionary worldview in (public) schools and universities.

Other than that, IDC advocates have nothing constructive to offer. They continue to rehash the standard antievolution tropes of gaps in the fossil record, especially the allegedly all-too-sudden emergence of animal body plans during the Cambrian explosion. They say abiogenesis is impossible without conscious guidance. They falsely equate evolution with natural selection acting on chance mutation (Darwinism) and deny these unguided forces creative ability. They reject common descent, at least that of humans with other primates, and they constantly harp on the ‘failure’ of evolutionists to work out every tiny detail of adaptations and evolutionary transitions.²⁰⁴ They then take these antievolutionist claims to be evidence in favor of their design argument. Furthermore, of unchanged importance is the analogy between machines made by humans and biological structures, from which IDC theorists infer that both can only come into existence through an intentional cause. Based on this quasi-Baconian empirical approach, IDC advocates also keep on insisting that their reasoning is indeed scientific and fundamentally different from creationism.²⁰⁵ Despite plenty of evidence to the contrary, such as the quotes from Dembski and Axe, design proponents officially still maintain that their theory is not an argument for the existence of a supernatural entity and is thus also different from Paley’s natural theology.²⁰⁶ They are also unrelenting in blaming the spread of evolution among the public for pervasive moral and intellectual decadence in society, including state welfare and government regulations imposed on the free market.²⁰⁷

204 These attacks on evolution are practically identical to the essentials of creation-science (Chapter V., p. 30). The notable difference is that IDC proponents rarely talk about the age of the earth in their publications.

205 See, for instance, Meyer S.C.: *Signature in the Cell: DNA and the Evidence for Intelligent Design*, New York: HarperOne 2009.

206 See, for example, West J.G.: Attempting to Win the Debate over Intelligent Design through Stereotyping, Discovery Institute: *Evolution News & Science Today* 2013, retrieved from https://evolutionnews.org/2013/10/attempting_to_w/, on 2020-12-10.

207 Examples for this can be found on the blog *Evolution News & Science Today* and the Discovery Institute’s main website on a regular basis.

VII. How Proponents of IDC Use Kuhn

Against this background, it is clear that there is only a very narrow gap through which IDC adherents can possibly try to squeeze Kuhn's words in order to fit them into their view of science. This chapter provides a representative account of when and where Kuhn's ideas pop up in the IDC literature, followed by an attempt to extract a common denominator from the different sources. These contributions vary both in length and sophistication, from off-hand remarks in blog posts to whole book chapters.²⁰⁸ The focus will be on books by three prominent exponents of IDC: Phillip Johnson, Michael Denton, and Jonathan Wells.²⁰⁹

Before that, however, it must at least briefly be noted how earlier creationists also tried to apply Kuhnian ideas to their situation. They claimed that his work has shown the irrational nature of scientists, since they blindly follow the reigning paradigm into which they have been initiated as students and young scientists – regardless of how many explanatory holes it has. By implication, creationists elevated their proposition to the level of a rival paradigm, based on a different indoctrination and (allegedly) supported by new data from paleontology and molecular biology. The fact that the scientific majority did not give them enough credit, and indeed rejected and ridiculed their views, was interpreted to be an effect of herd mentality and the noise of fearful clutching-of-pearls in the face of crisis and looming downfall.²¹⁰

As noted above, the historical setting for the emergence of the intelligent design movement were the early 1980s and the defeat of creation-science in the *McLean* court. The decision followed a rather rigid, Popperian definition of science that was susceptible to severe criticism. IDC proponents are particularly fond of an article from Larry Laudan in which he argued that all demarcation criteria offered thus far have turned out to be unable to get the job done.²¹¹ He also maintained that the ruling in the *McLean* case “rests on a host of misrepresentations of what science is and how it

208 Beyond the publications already mentioned above and the three books described below, Kuhn also appears in other notable IDC publications, for example in: Dembski A.W. (Ed.): *Mere Creation. Science, Faith & Intelligent Design*, Downers Grove: InterVarsity Press 1998; Meyer 2009; Dembski A.W. & Witt J.: *Intelligent Design Uncensored*, Downers Grove: InterVarsity Press 2010.

209 Wells (*1942) has a PhD in molecular biology from UC Berkeley as well as a PhD in religious studies from Yale; he is a Senior Fellow at the Discovery Institute.

210 See, for example, Brand L.R.: A Philosophical Rationale for a Creation-Flood Model, *Origins* (1974) 1(2):73-81; *Id.*: The Paradigm of Naturalism, Compared with a Viable Alternative: A Scientific Philosophy for the Study of Origins, *Origins* (1996) 23(1):6-23; Roth A.A.: The Pervasiveness of the Paradigm, *Origins* (1975) 2(2):55-57.

works.”²¹² For instance, Laudan emphasized that creation-science does make testable empirical claims and therefore actually passes as scientific on the testability and the falsifiability criteria.²¹³ The fact that they have been tested and shown to be false does not preclude these claims from being scientific. By implication, creation-science should pass as constitutional as well, because teaching bad science is constitutionally possible, if the constituency elects to do so. Laudan also pointed out, even referring to Kuhn’s historical studies, that scientists in the past have also been very dogmatic and, thus, would fail the tentativeness criterion used by the *McLean* court.²¹⁴ However, and for whatever reasons, probably because he provided a less comprehensive framework and pertinent catchphrases, Laudan’s importance for the IDC movement was surpassed by that of Kuhn’s work. Also, Laudan’s arguments that the search for demarcation criteria should be abandoned and his claims about the empirical testability of creationist propositions have been shown to be defective.²¹⁵

One of the earliest publications associated with IDC that used Kuhnian concepts to attack evolution and evolutionary theory was Denton’s *Evolution: A Theory In Crisis*. Although the book was not directly arguing for God or an unspecified designer, its antievolutionary position strongly resembled standard creationist assertions and was firmly rooted in a dualistic worldview, where attacks on evolution are automatically considered as support for the other side. Denton, like other IDC proponents, remained vague about what that second option really was.²¹⁶ But because he thought that Darwinian ideas had destroyed “man’s link with God and set him adrift in a cosmos without purpose or end”, it is not hard to see where he came from, even though Denton was clearly not a young-earth creationist.

Claiming that advances in molecular biology fatally undermined evolutionary orthodoxy, by revealing ever-more complexity inside cells, Denton also foreshadowed an argument central to later design theorists’ writings, such as Behe. Furthermore, he was equally fond of the “intuitive feeling” that chance – Denton falsely equated natural selection with a random chance process, and mistook

211 See Laudan L.: The Demise of the Demarcation Problem, in Cohen R.S. & Laudan L. (Eds.): *Physics, Philosophy, and Psychoanalysis*, Dordrecht: Reidel 1983, pp. 111-27, reprinted in Pennock & Ruse (Eds.) 2009, pp. 312-330.

212 Laudan L.: Commentary: Science at the Bar—Causes for Concern, *Science, Technology, & Human Values* (1982) 7(41):16-19, reprinted in Pennock & Ruse (Eds.) 2009, pp. 331-6 (quote on p. 331).

213 See Laudan *op.cit.*, pp. 332-3.

214 See Laudan *op.cit.*, p. 333-4.

215 See Pennock 2011; Pigliucci M.: *The Demarcation Problem. A (Belated) Response to Laudan*, in Pigliucci & Boudry (Eds.) 2013, pp. 9-28.

216 In a follow-up publication, Denton has offered a more concrete proposal for the existence of typological forms in nature, updated and reinforced his antievolutionary thesis (Denton M.: *Evolution: Still a Theory in Crisis*, Seattle: Discovery Institute Press 2016).

natural selection and pure chance (what he dubbed “Darwinism”) as the only evolutionary mechanisms – can never produce all this complex molecular machinery.²¹⁷ Denton was also intimately attached to a Bacon-like view of science, claiming that “science can only deal with repeatable or recurrent events” and that “[a] unique or very improbable event can never be the subject of scientific investigation.”²¹⁸ Approaching the subject matter from this angle, evolutionary history in deep time cannot be investigated through experiment or observation.²¹⁹ In fact, Denton maintained that the antievolutionists have always been the true empiricists, since it is them who use common sense and observations in everyday life to argue against core evolutionary assumptions. While he accepted that microevolution, and even speciation, is a reality, he maintained that it is impossible to generalize these insights to large-scale macroevolutionary events. Denton’s typological view of nature made him see unbridgeable gaps between major groups of organisms and between life and non-life. He argued that there is indeed no empirical evidence to support the evolutionary idea of a continuity of life from a common primordial ancestor to all species, even though researchers have tried to find missing links for over 150 years. This failure, together with the mathematical improbability of random processes to create complex biological adaptations, means that the core ideas of Darwinism have been disproven. Such a lack of explanatory strength and empirical support, said Denton, places the Darwinian theory on par with supernatural claims put forth by creationists. At this point in his argument, Denton introduced his version of Kuhn’s conception of the nature of science to explain why Darwinism cannot be falsified “by any sort of rational or empirical argument.”²²⁰ Referring to Kuhn’s historical examples, he likened the development of evolutionary theory to geocentrism and the phlogiston theory, both of which were sustained by their believers through “mental gymnastics” in order to accommodate contravening evidence.²²¹ In Denton’s view, the reigning paradigm (i.e. Darwinism) is isolated from any hostile evidence, which is either ignored or conjured away through bizarre rationalizations. However, citing Kuhn’s requirement for an alternative paradigm to be available before an old paradigm can be laid to rest, he acknowledged that there is no real alternative available for Darwinist believers at the moment:

217 See Denton ²1996, especially chapter 14 *The Puzzle of Perfection* (quote on p. 327).

218 Denton *op.cit.*, p. 255.

219 See Denton *op.cit.*, p. 55.

220 See Denton *op.cit.*, especially Chapter 15 *The Priority of the Paradigm* (quote on p. 348).

221 Denton *op.cit.*, p. 351.

[G]iven the need for and the priority of paradigms in science, the philosophy of Darwinism will continue to dominate biology [...]; and that until a convincing alternative is developed the many problems and anomalies will remain unexplained and the crisis unresolved.²²²

Further undermining the scientific standing of evolutionary theory, Denton, on the last pages of his book, after lamenting its profound and lasting impact on Western thought, reiterated the mythical status of Darwinism:

Ultimately the Darwinian theory of evolution is no more nor less than the great cosmogenic myth of the twentieth century. Like Genesis based cosmology which it replaced, and like the creation myths of ancient man, it satisfies the same deep psychological need for an all embracing explanation for the origin of the world[.]²²³

While Denton provided some appetizers, the key person to infuse Kuhnian concepts into the veins of IDC was Phillip Johnson. His book *Darwin on Trial* was particularly important for developing a strategy for the newly-consolidating intelligent design movement.²²⁴ Johnson said that the whole evolution/creation controversy was rigged against those who questioned the scientific validity of evolutionary theory and it being taught as a fact in public science classes. While he conceded that proponents of creation-science are young-earth fundamentalists, Johnson maintained that the scientific establishment – and the courts who relied on its expertise – suppressed legitimate dissidence from the prevailing view of evolution. After all, Johnson argued, there are “many dissidents” with scientific training and degrees who “deny that evolution is a fact and who insist that an intelligent Creator caused all living things to come into being.”²²⁵ A big part of the problem, according to Johnson, has to do with definitions and the dominance of science in Western culture, which equates science with truth and religion with myth. He maintained that this (scientific) naturalism is the philosophical lens through which Darwinists construe science. And if only materialistic concepts are considered scientific, it is not even possible for the dissidents to question current evolutionary theory because only fully naturalistic mechanisms are allowed. This way, creationists cannot even get a fair hearing and the wider public has no way to tell whether they are being told the whole story about evolution. Johnson also made an offer to every kind of creationist, even to theistic evolutionists, to rally around a small common denominator, namely “that the world (and especially mankind) was *designed*, and exists for a *purpose*.”²²⁶

222 Denton *op.cit.*, p. 357.

223 Denton *op.cit.*, p. 358.

224 Johnson 1991.

225 Johnson *op.cit.*, p. 3.

226 Johnson *op.cit.*, p. 113 (*italics in the original*).

Johnson was especially concerned with the five characteristics used by the *McLean* court to exclude creation-science from science and approvingly cited the criticism offered by Laudan.²²⁷ He argued that the two characteristics that link science to natural law not only are an unhinged expression of scientific materialism, but that they are in conflict with the other three characteristics that refer to empiricism. Because according to Johnson it is evident that Darwinists have failed to produce empirical evidence in their favor. Like Denton earlier, Johnson said that Darwinism is “hardly more observable than supernatural creation by God,”²²⁸ that evolutionists also “rely upon mystical guiding forces.”²²⁹ Indeed, he contended that “[w]ithout Darwinism, scientific naturalism would have no creation story.”²³⁰ In a chapter titled *Darwinist Religion*, he stated that “Darwinist evolution is an imaginative story about who we are and where we came from, which is to say it is a creation myth.”²³¹ Johnson thought that Darwinian gradualism is unsupported at the macrolevel and “pure philosophy” when it comes to the origin of life.²³² To him, it followed that the scientific elites have to enforce specific characteristics in science to prevent Darwinism from being overthrown and the naturalistic enterprise not getting the rug pulled out from under it. Generously, Johnson did not claim that this strategy is being pursued consciously but because of how indoctrinated scientific materialists have become in their ideology and how strong the emotional appeal of naturalistic assumptions is.

At this point in his argument, Johnson invoked Kuhnian concepts because they provide “an illuminating picture of the methodology of Darwinism.”²³³ Introducing paradigms as “a mist of ideas and assumptions” through which scientists – “like the rest of us” – view the world, set the tone for the rest of Johnson’s approach to Kuhn.²³⁴ Contra the falsifiability criterion used in *McLean*, Johnson called on Kuhn’s work to contend that paradigms cannot be falsified, because scientists can always rationalize anomalies with ad hoc hypotheses. From this, he continued to argue that Darwinists follow this script when they disregard counterevidence offered by their opponents. Somewhat at odds with this line of thought, he also maintained that Darwinism has actually failed on the criterion of falsifiability – i.e. that, according to Popper, it fails to qualify as

227 See above, pp. 43-4.

228 Johnson *op.cit.*, p. 115.

229 Johnson *op.cit.*, p. 44.

230 Johnson *op.cit.*, p. 116.

231 Johnson *op.cit.*, p. 131.

232 *Ibid.*

233 Johnson *op.cit.*, p. 118.

234 *Ibid.*

science. Next, Johnson cited Kuhn on how paradigms can influence the perception of reality in order to argue that Darwinists are blind to empirical observations that run counter to their assumptions. In fact, Johnson thought the parallel between how Kuhn pointed out this kind of blindness in historical examples and how creationists pointed out this kind of blindness among Darwinists was strong enough to maintain that Kuhn was basically a covert creationist.²³⁵

Johnson also briefly referred to Kuhn's inter-paradigmatic incommensurability to suggest that he is part of a competing paradigm because scientific naturalists have failed to comprehend some of the questions he had directed at them in the past. Interestingly, the example he gave was the question whether scientific naturalism is "*true*," suggesting that his paradigm deals with absolute truth instead of truth approximation and truth values.²³⁶²³⁷ A novel paradigm, argued Johnson, "suggests entirely different questions and different factual possibilities,"²³⁸ attempting to normalize *how much* at odds creationist claims are with the current scientific understanding of nature. However, Johnson did acknowledge that Kuhn's model of science calls for the existence of an alternative paradigm before a scientific crisis can be resolved. His alternative paradigm, of course, was special creationism relabeled as intelligent design, with God being replaced by an unnamed designer. (That this novel paradigm he had in mind was not new at all was actually stated quite clearly in the book several times. For instance, Johnson wrote that the motivation for Darwin to develop his theory of evolution was "to establish that purposeless natural processes can substitute for intelligent design,"²³⁹ meaning that Johnson saw the creationism of Darwin's time as equivalent to modern-day intelligent design.)

Nevertheless, the counterevidence and anomalies Johnson had in mind encompassed, yet again, the fossil record and molecular biology. For example, after citing Denton's *Evolution: A Theory in Crisis*, Johnson maintained that bird and bat wings appeared fully formed in the fossil record without gradual intermediaries. Indeed he claimed that paleontologists are so blinded by their paradigm that they only publish supportive studies and disregarded everything that runs counter to evolutionary transformations. Johnson particularly disliked the common ancestry of humans and other apes, contending that it "is the secular equivalent of the story of Adam and Eve."²⁴⁰ He

235 See Johnson *op.cit.*, p. 121.

236 *Ibid.* (italics in the original).

237 In the last paragraph of the book, Johnson explicitly says that science "look[s] for the truth." (Johnson *op.cit.*, p. 154).

238 Johnson *op.cit.*, p. 121.

239 Johnson *op.cit.*, p. 17.

240 Johnson *op.cit.*, p. 83.

generally denied Darwinism any ability to bridge gaps between major groups of organisms and implied that evo-devo, which could explain larger changes in body plans via gradual mutation events and subsequent selection, was just an ad hoc rationalization to accommodate the inadequacy of evolutionary mechanisms. Foreshadowing Behe's irreducible complexity, Johnson also called on new molecular discoveries to argue that cells contained machines that "require the cooperation of numerous complex parts to carry out their function."²⁴¹

With this impression in mind, Johnson criticized that evolution was taught as a fact in public science classes in order to "persuade students to believe in the orthodox theory."²⁴² When educators use the widespread support for evolution and evolutionary theory in the scientific community, Johnson denounces this as a mere "appeal to authority" to hide that Darwinism is nothing more than the result of a philosophical commitment.²⁴³ The whole education in evolution, to him, is a "campaign of indoctrination,"²⁴⁴ which is itself only one of the ways in which Darwinists attempt to "persuade the public to believe that there is no purposeful intelligence that transcends the natural world."²⁴⁵

In the end, and somewhat awkwardly, given what he had written in his book, Johnson lamented that science becomes debased when it is made to serve political or religious needs (he meant the Darwinists, of course). At the same time, he promoted an activist strategy to convince more and more voters to build up pressure on politicians to grant antievolutionists a "fair hearing on the evidence,"²⁴⁶ in the classrooms and elsewhere.

After Behe had proposed the idea of irreducible complexity and Dembski had tried to provide mathematical proof for its existence in the late 1990s, proponents of intelligent design started to advertise these ideas as part of a new paradigm that would replace the old Darwinian incumbent. Because up to that point, with the Bible unavailable for constitutional purposes, all they had were negative arguments against evolution and evolutionary theory. Particularly before the Dover Trial in 2005 steamrolled over them, but in fact ongoing to this day, design theorists heralded the age of a new scientific revolution that would finally replace evolutionary theory with something more

²⁴¹ Johnson *op.cit.*, p. 99.

²⁴² Johnson *op.cit.*, p. 142.

²⁴³ Johnson *op.cit.*, p. 144.

²⁴⁴ *Ibid.*

²⁴⁵ Johnson *op.cit.*, p. 154.

²⁴⁶ Johnson *op.cit.*, p. 144.

intelligently designed. An example of this kind of reasoning can be found in Jonathan Wells' book *The Politically Incorrect Guide to Darwinism and Intelligent Design*.²⁴⁷ While the other two books introduced so far were tailored to a more advanced readership, Wells' main target audience were high school and college students. The fact that he chose to include a whole chapter on Kuhn shows that this strategy is indeed a basic component of IDC.²⁴⁸

Unlike Denton and Johnson, Wells at least acknowledged that there exists a difference between a paradigm in the narrow sense and a paradigm in the broad sense but did not pursue the issue any further. He also criticized Kuhn's incommensurability between competing paradigms as being relativistic. Nevertheless, he quickly proceeded to impose Kuhn's concept of a scientific revolution on the controversy between Darwinism and intelligent design. The former, according to Wells, consists of "unguided processes" that supposedly produced not only all the intricate adaptations in organisms but all major changes in groups of organisms since they diverged from a common ancestor. The latter, on the other hand, is not only different from biblical creationism but "relies on evidence" to infer the existence of an "intelligent cause."²⁴⁹ Wells claimed to have taken four points from Kuhn that describe what is going on during a scientific revolution. First, scientific revolutions are beset by philosophical discussions about the very nature of science. Second, "like a political revolution, a scientific revolution typically divides society 'into competing camps or parties,'" with the old guard using "every means at its disposal," including institutional clout, against the newcomers, where in the end "both parties 'resort to the techniques of mass persuasion.'"²⁵⁰ Third, a scientific revolution calls for a decision to choose which paradigm should shape research in the future, with potential for the future being more important for this decision than the performance in the past (which implies that the new paradigm should have a leg up). And, finally, that young people who are not yet or less "committed" to the old paradigm will be at the vanguard of a scientific revolution. According to Wells, Darwinists are losing the battle because of a lack of evidence and reliance on censoring proponents of design theory as well as stifling debate with "credentialism" and "expertism."²⁵¹ And, Wells continued, they will also fail on this front because "telling people

247 Wells J.: *The Politically Incorrect Guide to Darwinism and Intelligent Design*, Washington, DC: Regnery 2006.

248 See Wells *op.cit.*, Chapter 17 *Scientific Revolutions*, pp. 195-207.

249 Wells *op.cit.*, p. 4.

250 Wells *op.cit.*, p. 197.

251 Wells *op.cit.*, pp. 199-200.

they are not allowed to talk about something” is not going to work “in the land of the free and the home of the brave.”²⁵²

As for the positive research agenda of intelligent design, Wells first claimed that it can be used to test if “certain things are better explained by intelligent design or Darwinian evolution.” However, the two examples he gave, citing Behe²⁵³ and Axe,²⁵⁴ are tests of evolutionary theory instead of a real research agenda of a new paradigm, and the logic is, yet again, the flawed conception of a dualistic worldview, where attacks on one side are seen as supporting the opposing side. Wells also claimed that intelligent design can be used “heuristically to develop new hypotheses.”²⁵⁵ Yet the two examples he provided were authored by an amateur without academic training in science and by himself, and both had no logical connection to potential actions of an intelligent designer.²⁵⁶ Nevertheless, Wells proclaimed that “ID-guided research is progressing rapidly”²⁵⁷ and referred to the popularity of design theory among some students in the U.S. and abroad, as well as press coverage of intelligent design in France, to argue that their new paradigm is vibrant and growing.

To further illustrate how IDC advocates incorporate Kuhn into their work with shorter, pointed statements, a search on the Discovery Institute’s blog *ENST* provides several examples reaching as far back as 2005. For instance, a post commemorating the 50-year-edition of *Structure* offered the following interpretation:

In fact, it didn’t matter to Kuhn how a theory originated; indeed, it didn’t ultimately matter how well it fit the evidence. What mattered was how the theory fared in the subsequent political struggle for survival in the face of existing theories. The one theory Kuhn exempted from his analysis was Darwinian evolution. Indeed, as the description above implies, his analysis was fundamentally Darwinian: random variation sorted by natural selection.²⁵⁸

In 2016, advertising the publication of his book *Evolution: Still a Theory in Crisis*, Denton noted the following:

252 Wells *op.cit.*, p. 199.

253 Behe M.J. & Snoke D.W.: Simulating evolution by gene duplication of protein features that require multiple amino acid residues, *Protein Science* (2004) 13:2651-64; see also below, FN 315.

254 Axe D.: Extreme Functional Sensitivity to Conservative Amino Acid Changes on Enzyme Exteriors, *Journal of Molecular Biology* (2000) 301:585-95; *Id.*: Estimating the Prevalence of Protein Sequences Adopting Functional Enzyme Folds, *Journal of Molecular Biology* (2004) 341:1295-1315.

255 Wells *op.cit.*, p. 204.

256 Wells *op.cit.*, pp. 204-5.

257 Wells *op.cit.*, p. 205.

258 Anonymous: Kuhn’s *The Structure of Scientific Revolutions*, 50 Years Later, Discovery Institute: *Evolution News & Science Today* 2012, retrieved from https://evolutionnews.org/2012/02/kuhns_the_struc/, on 2020-12-27.

Despite its obvious failure, Darwinism has retained its hypnotic hold on the biological mind primarily because cumulative selection has been “the only game in town.” As Thomas Kuhn pointed out, without an alternative framework, scientific communities are forced to regard evidence that to anyone outside the circle of belief may appear to be profoundly hostile as mere anomalies.²⁵⁹

A posting also invoked Kuhn to criticize science education as too dogmatic (i.e. as teaching modern evolutionary theory only), and offered the Discovery Institute’s education policy as remedy:

Yet neo-Darwinism’s defenders hang on because humans have a tendency to reject ideas that challenge preconceived notions. As Thomas Kuhn wrote in *The Structure of Scientific Revolutions*, when faced with an anomaly, a theory’s defenders “will devise numerous articulations and ad hoc modifications of their theory in order to eliminate any apparent conflict.”

The result in the context of origins science is a sort of “fundamentalist” evolutionary thinking that rejects counterevidence and dismisses any suggestion that evolution might have weaknesses. [...]

Nevertheless, in public school science classrooms, evolution is often presented in a one-sided, dogmatic manner. At Discovery Institute, we support education that promotes critical thinking by teaching the evolution controversy.²⁶⁰

In a post that implicitly argued for the miraculous origin of echolocation, potential readers learn that

Thomas Kuhn described normal science as a puzzle-solving project, in which members of the guild don’t question the picture they imagine on the box top (the paradigm). So focused are they on making the pieces fit, they could be failing to appreciate the wonders coming to light in the picture itself. You can see an example of this in two papers about echolocation[.] [...]

The e-word, evolution, saturates this paper. Molecular evolution. Parallel evolution. Neutral evolution. Evolutionary tinkering. Whatever it takes, they are going to keep the Darwin puzzle pieces together, even when homology is not evident in the genes. Withering on the lab counter, meanwhile, is awe for the wonder of echolocation.²⁶¹

Another author chose not to reference Kuhn’s work or even mention his name, despite providing a quite extensive list of other references at the end of the text, but the dependence on Kuhnian concepts is undeniable. After claiming that the fossil record fails to adequately support evolutionary gradualism but shows the sudden emergence of new major body plans, he suggested

259 Denton M.: The Only Game in Town, Discovery Institute: *Evolution News & Science Today* 2016, retrieved from https://evolutionnews.org/2016/03/the_only_game_i/, on 2020-12-27 (internal references omitted).

260 Chaffee S.: Inquiry-Based Science Education — on Everything but Evolution, Discovery Institute: *Evolution News & Science Today* 2016, retrieved from https://evolutionnews.org/2016/01/inquiry-based_s/, on 2020-12-27 (internal hyperlinks omitted).

261 Anonymous: Awe at Echolocation? Nah, Convergence Again, Discovery Institute: *Evolution News & Science Today* 2018, retrieved from <https://evolutionnews.org/2018/10/awe-at-echolocation-nah-convergence-again/>, on 2020-12-27.

the need for a paradigm change in evolutionary biology, as is definitely becoming more and more evident. It is not intelligent design theorists who are the science deniers, but rather all those stubborn Darwinists. The latter still close their eyes to the ever-increasing number of anomalies that their pet theory fails to explain.²⁶²

And, as a final example, a blog post on gold maintains the following (again without mentioning Kuhn directly):

Since ID advocates are better equipped to think outside the box than are the paradigm-locked materialist scientists, they are more free to consider a positive answer — showing once again that intelligent design is not a “science stopper” but a fruitful way to pursue interesting questions.²⁶³

Based on the literature survey above, a summary of how IDC proponents try to accommodate Kuhn’s view on the nature of science might look like this:

The old Darwinian paradigm (what IDC proponents routinely equate with ‘blind’ natural selection acting on random mutations as the only mechanism to account for all diversity and complexity of life on earth) is riddled with problems and in a state of crisis, a time where philosophical discussions about fundamental issues burst into the open. The unsolved puzzles stem from every field of evolution but are particularly numerous in paleontology, molecular biology and in origin-of-life research. A new paradigm, however, has emerged and is ready to challenge the incumbent. The new paradigm is intelligent design: A theory that is based on common scientific procedures, making inferences from empirical observations and testing them, without any recourse to the Bible or other religious doctrines. A growing number of researchers with advanced scientific training have already joined the new paradigm, in addition to a broad base of support from outside the scientific establishment. This situation is constitutive of a Kuhnian scientific revolution. Yet, the scientific community does not acknowledge this because its members are blinded by how the ruling paradigm guides their thinking, both during times of normal science and during this revolutionary time. The old paradigm is, basically, a mixture of philosophical commitment to an atheistic worldview (scientific materialism), psychological preferences, and personal history (including things like indulging cushy tax-funded jobs, angst over losing their professional reputation and admitting intellectual defeat). As such, its pronouncements cannot be falsified due to Darwinists either

262 Bechly G.: Apeman Waves Goodbye to Darwinian Gradualism, Discovery Institute: *Evolution News & Science Today* 2019, retrieved from <https://evolutionnews.org/2019/09/apeman-waves-goodbye-to-darwinian-gradualism/>, on 2020-12-27.

263 Anonymous: Does Gold Have a Purpose? Science Hints at Answers, Discovery Institute: *Evolution News & Science Today* 2020, retrieved from <https://evolutionnews.org/2020/10/does-gold-have-a-purpose-science-hints-at-answers/>, on 2021-01-03.

outright ignoring counterevidence or inventing ad hoc rationalizations and just-so stories. Because they focus their efforts on confirming their preconceived notions through narrow puzzle-solving, Darwinist believers fail to follow the abundant evidence for design in nature. Yet since Kuhn spoke of the incommensurability of competing paradigms, the promising work of design theorists is not only ignored but they are viciously attacked and suppressed by appeals to authority, peer pressure, and censorship (including in scientific journals and academic career options) to preserve the status quo. The public is kept in the dark, and children are indoctrinated to become the next generation of Darwinists through faulty and biased science curricula and textbooks that teach Darwinian evolution as a fact. Change can come – all things considered – not through rational choice but only by way of political struggle that will result in a paradigmatic shift to a different conception of science (and the world).

As for the legal situation, given the five characteristics used in *McLean* to define science as a stand-in for all similar attempts,²⁶⁴ Kuhn's ideas show that the restriction of science to naturalism²⁶⁵ is just a philosophical concoction, meaning that it would only be fair and square to accept the different commitments of the intelligent design paradigm as equally valid – in fact, once the paradigm of intelligent design has been enthroned, its own conception of science will become the new norm.²⁶⁶ And regarding the other three criteria, Kuhn has shown that scientists have never really been tentative in their commitment to the paradigm – intelligent design just has different commitments; that testing is only possible as far as the paradigm allows (which makes it heavily biased as a criterion in the first place) – intelligent design is incommensurable with the Darwinist paradigm and should be tested according to the standards of its own paradigm. This leads to two possible lines of general argument.

(1) The new paradigm is just as scientific as the incumbent paradigm of Darwinism and should be accepted in public-school science curricula on an equal footing.

Or alternatively, if the first tactic fails to gain any ground:

(2) Given the lack of empirical support for the Darwinist mechanism, which makes it equivalent to the Bible-based claims of Christian fundamentalists that also lack empirical evidence for

264 As far as the more recent *Kitzmiller* court ruling is concerned, Kuhn can be misused to attack (some of) its criteria to exclude intelligent design from science in a similar fashion.

265 See criteria one and two, mentioned earlier in Chapter V., p. 31.

266 Of course, IDC advocates will continue to refuse to identify their intelligent designer to try to bypass this whole issue. But by exposing the religious roots of IDC, the *Kitzmiller* trial has set a precedent that will make this tactic hard to execute in future court cases.)

supernatural mechanisms, the philosophical basis of the Darwinian paradigm should likewise be considered religious (and the whole topic should be removed from the classrooms as a violation against the U.S. constitution).

The first option would amount to a return to the era of creation-science, which was struck down in the *McLean* and *Edwards* cases in the 1980s. The obvious result would be a dilution of evolutionary teaching and an all-out political struggle over the content of science curricula in tax-funded schools, where the mobilization capacities of evangelical communities at the local level and the deep pockets of conservative donors might be very advantageous. In this case, today's campaigns to 'teach the controversy', teach the 'strengths and weaknesses' of evolution, 'teach evolution scientifically', or grant 'academic freedom' to anti-evolution teachers are just a foretaste of what such a struggle might look like. The second option, if successful, would be a throwback to the time when evolution (in any of its Darwin-based incarnations) did not exist or was practically absent from public discourse and its teaching restricted to a small section of the U.S. populace. In both cases, the standing of creationism as a viable intellectual enterprise and basis for moral reflections on the human condition would be preserved – and potentially enhanced. This is the ultimate goal of supporters of IDC.

VIII. Kuhn and IDC: Sweeping Away the Dust

It cannot be denied, particularly from the viewpoint of an audience unfamiliar with evolution and history and philosophy of science – i.e. for the general public, at which more or less all work of IDC proponents is directed –, that Kuhn's writings contain language that may appear to support the account given at the end of the previous chapter.

Kuhn did say things that seem to promote epistemological relativism, which in turn can be used to disperse the aura of science's objectivity. Proponents of IDC use this tactic to reduce the strong cultural standing of science, particularly the importance of methodological naturalism (which they always equate with the much stronger, and more doctrinaire, position of philosophical naturalism),²⁶⁷ and uplift creationist doctrines. And has the view of Kuhn as a being relativist not been widespread in mainstream academe,²⁶⁸ and even contributed to the formation of whole fields of inquiry, such as the 'strong programme' in the sociology of scientific knowledge (SSK)? So why should the creationists not be allowed to use Kuhn in a similar fashion?

When Kuhn maintains that

an apparent arbitrary element, compounded of historical and personal accident, is always a formative ingredient of the beliefs espoused by a given scientific community[.]²⁶⁹

he appears to support the claim made by IDC advocates that, in the end, the Darwinist position is irrational. When he writes that normal science is a

devoted attempt to force nature into the conceptual boxes supplied by professional education²⁷⁰ [and] suppresses fundamental novelties because they are necessarily subversive of its basic commitments[.]²⁷¹

Kuhn seems to agree with the contention that Darwinists spend their whole time searching for confirming evidence – instead of testing their propositions against nature – and attacking new ideas, such as intelligent design. In particular, does Kuhn's statement that, once a paradigm is established, problems, including many that had previously been standard, are rejected as metaphysical²⁷²

267 See Forrest B.: Methodological Naturalism and Philosophical Naturalism: Clarifying the Connection, *Philo* (2000) 3(2):7-29; Ruse M.: Methodological Naturalism Under Attack, *South African Journal of Philosophy* (2005) 21(1):44-60.

268 For instance, Shapere D.: The Structure of Scientific Revolutions, *The Philosophical Review* (1964) 73(3):383-94; Lakatos I.: Falsification and the Methodology of Scientific Research Programmes, in Lakatos I. & Musgrave A. (Eds.): *Criticism and the Growth of Knowledge*, Cambridge: Cambridge University Press 1972, pp. 91-196.

269 Kuhn 2012, p. 4.

270 Kuhn *op.cit.*, p. 5.

271 *Ibid.*

272 Kuhn *op.cit.*, p. 37.

not fit the creationist charge that teleological ideas were commonplace before they were disparaged as religious and expelled from science by Darwin and those under the spell of their own paradigm? And does not also Kuhn's claim that scientists

devise numerous articulations and *ad hoc* modifications of their theory in order to eliminate any apparent conflict²⁷³ match with the assertion of IDC proponents, often citing (and either misunderstanding or distorting) the famous Spandrels paper,²⁷⁴ that the Darwinian literature is full of just-so stories? Considering that even some evolutionary biologists claim that "neo-Darwinism has no theory of the generative"²⁷⁵ and the Royal Society of London holds a conference²⁷⁶ discussing "lack of evidence for macroevolution,"²⁷⁷ is the old paradigm not obviously in a state of crisis? And is it not correct to think the Darwinists' failure to appreciate intelligent design is exactly what one would expect during a scientific revolution, for

[e]ach group uses its own paradigm to argue in that paradigm's defense[?]²⁷⁸

Does Kuhn not approve of the fact that intelligent design is fundamentally different from the old paradigm by saying that

when paradigms change, there are usually significant shifts in the criteria determining the legitimacy both of problems and of proposed solutions[?]²⁷⁹

And are design theorists mistaken when they strive for a political shift in order to establish their paradigm, since Kuhn maintains that

[t]he competition between paradigms is not the sort of battle that can be resolved by proofs²⁸⁰ [but] is a conversion experience[?]²⁸¹

273 Kuhn *op.cit.*, p. 78.

274 Gould & Lewontin 1979.

275 Müller G.B. & Newman S.A. (Eds.): *Origination of Organismal Form: Beyond the Gene in Developmental and Evolutionary Biology*, Cambridge/London: MIT Press 2003 (quote on p. 7); see also Meyer S.C.: *Darwin's Doubt: The Explosive Origin of Animal Life and the Case for Intelligent Design*, New York: HarperOne 2013.

276 The Royal Society: *New trends in evolutionary biology: biological, philosophical and social science perspectives*, conference held in London, November 2016, see <https://royalsociety.org/science-events-and-lectures/2016/11/evolutionary-biology/>, last accessed on 2021-01-03.

277 Wells J.: *Zombie Science: Darwin's Theory Feeds on Raw Materialism*, Discovery Institute: *Evolution News & Science Today* 2018, retrieved from <https://evolutionnews.org/2018/05/zombie-science-darwins-theory-feeds-on-raw-materialism/>, on 2020-12-28.

278 Kuhn *op.cit.*, p. 94.

279 Kuhn *op.cit.*, p. 109.

280 Kuhn *op.cit.*, p. 147.

281 Kuhn *op.cit.*, p. 150.

Kuhn himself has of course acknowledged that “there are many ways to read a text,”²⁸² and he admitted that the message he had tried to convey in *Structure* was mired in “plasticity.”²⁸³ But he was equally adamant in explaining that not all interpretations are equally valid, that some may lack “plausibility and coherence.”²⁸⁴ The task of this chapter will be to assess how plausible and coherent the appropriation of Kuhn’s work by IDC proponents is; and to examine IDC in the light of Kuhn’s conception of science.

VIII.a The Misappropriation of Kuhn by Advocates of IDC

If Kuhn had chosen evolutionary biology as a case study, he would have risked being denounced as a creationist. (Phillip E. Johnson)²⁸⁵

My jaw dropped and still sags slightly. (Thomas S. Kuhn)²⁸⁶

Given the evolution/creation controversy as a background, it seems appropriate to start the analysis where Kuhn and biological evolution are in close contact with each other.

Tucked away in the endnotes to *Darwin on Trial*, Johnson acknowledged as “interesting” – without any further deliberation – that Kuhn had used natural selection as an analogy for his own model of science and scientific progress.²⁸⁷²⁸⁸ Indeed, Kuhn saw Darwin’s conception of biological evolution as an open-ended process mirrored in his own view of science, where the development is not toward what we wish to know but only away from what we do know in the present.²⁸⁹ According to Kuhn, science cannot be construed as an enterprise that constantly moves ever closer to a preordained truth enshrined in nature, just like there is no fixed goal in evolution and no perfect adaptation. Yet it is this nonteleological component of evolutionary theory that creationists routinely attack, exactly because it plays such a central role. So, if members of IDC think natural selection is defective, yet Kuhn thought that an unguided mechanism analogous to natural selection characterizes the

282 Kuhn 1977, p. xii.

283 Kuhn T.S.: *Second Thoughts on Paradigms*, in Kuhn 1977, pp. 293-319 (here p. 293).

284 Kuhn 1977, p. xii.

285 Johnson 1991, p. 121 (see above, Chapter VII., p. 48).

286 Kuhn T.S.: *Reflections on my Critics*, in Lakatos & Musgrave (Eds.) ²1972, FN 3 on p. 263

287 Johnson *op.cit.*, p. 184.

288 Kuhn himself complained that nobody took his “Darwinian metaphor” seriously. Although from the context it is obvious that he did not have the creationists in mind, let alone Johnson in particular (Kuhn 2000, p. 307).

289 See Kuhn 2012, p. 170.

progression of science, should creationists not also think of Kuhn's model as defective? If they do think at its core is a fundamental flaw, as they do with natural selection and evolutionary theory, why would they even want to use Kuhn's work for anything other than as a target of criticism? However, if they think such a flaw in Kuhn's ideas does not exist, why do IDC advocates not provide any discussion of this issue, which would have to be quite substantial, given the serious implications of this incongruence?

Connected to this point is yet another fundamentally irreconcilable difference between Kuhn and IDC. When Kuhn declined, as mentioned in Chapter I., to partake in one of the court cases against creationists, he gave two reasons. One was the idea that puzzle-solving constitutes the core element of science (making it somewhat cumbersome to handle as a demarcation criterion, which is a clear disadvantage in a legal setting – but more on demarcation in Chapter VIII.b); and, secondly, he pointed out that he “didn't quite believe in Truth, and getting closer and closer to it[.]”²⁹⁰ Already in *Structure* he had made it clear that he did not think that the development of science brings us ever closer to the truth, neither during normal science nor due to a paradigm shift.²⁹¹ He thought so because there is no “theory-independent way” to make observations and he studied historical episodes to argue that the cyclical rise and fall of paradigms does not show a “coherent direction of ontological development.”²⁹² Of course, such an anti-realist view is truly at odds with the central tenets of IDC, whose advocates start with a belief in the Truth as revealed in the Bible, and then try to use ‘science’ to confirm biblical statements (the most important of which is, of course, that God exists). Against this background, it stands to reason that IDC proponents cannot honestly agree with yet another of Kuhn's conclusions: Like all previous theories about nature have turned out to be false in some respect,²⁹³ design theory – if it really would become a new paradigm – would have to be revolutionized at some point in the future as well. But this would mean that there is something wrong with the Bible or the theological approach taken by practitioners of IDC. It is implausible to expect that such an admission would be forthcoming from Christian fundamentalists.

There is another highly ironic twist to the fact that antievolutionists use Kuhn to attack evolutionary theory and try to coax his model of science to push creationism back into science and science curricula. Quotes provided in Chapter I. already showed that Kuhn considered Darwin's work as a scientific revolution. Combined with the fact that he was a believer in scientific progress – even

290 Kuhn 2000, p. 322.

291 See Kuhn 2012, p. 169.

292 Kuhn *op.cit.*, p. 205.

293 See Kuhn 2000, p. 115.

across revolutionary breaks –, it is safe to conclude that Kuhn regarded Darwinism (in its correct historical sense), and its refinement all the way up to modern evolutionary theory, as superior to the old paradigm that Darwin helped to displace: Namely the teleological approach based on special creationism and natural theology. In fact, Kuhn referred to displaced paradigms as fossils, obviously implying that they are essentially unfit to guide future research.²⁹⁴ The evolutionary paradigm, on the other hand, turned out to be the most promising one and, consequently, experienced more and more elaborations, which in turn led to a proliferation of professional specializations. Such a development is readily observable in the historical course of the biological sciences – particularly in the 20th century. Taking yet more terms from evolutionary biology, Kuhn explained this process as a kind of speciation that leads to a development of disciplines and their specialized journals that looks similar to the branching pattern of an evolutionary tree.²⁹⁵ But to Kuhn, not only paradigms and institutionalized science evolved but also the criteria shared by scientists and used to continually articulate paradigm-suggested propositions and assess rivaling paradigms. These epistemic values are transmitted, like genetic material, through the generations and undergo mutation and recombination along the way, becoming ever-more refined and sophisticated. Kuhn maintained that their intergenerational development, from deep prescientific times up to today, is responsible for the growth of scientific knowledge.²⁹⁶ From this, one can conclude that if the scientific community considers modern evolutionary theory to be firmly established, it is because the theory has experienced prolonged scrutiny with the best-available, most-evolved criteria. With these considerations in mind, what advocates of IDC say about evolutionary theory based on their reading of Kuhn is incommensurable with Kuhn’s actual words.

However, there is an even more fundamental discrepancy between Kuhn and his creationist interpreters. Bringing an old paradigm back to life would constitute a true retrogression, something that Kuhn thought was just not possible in science (nor did he anywhere suggest that such a step would be desirable). Again by analogy to biological evolution, where the idea that the direction of evolution is irreversible was first proposed in 1893 by the Belgian paleontologist Louis Dollo (1857-1931),²⁹⁷ Kuhn thought of the scientific endeavor as something “unidirectional and

294 See Kuhn *op.cit.*, p. 120.

295 See Kuhn *op.cit.*, pp. 116-7; see also Kuhn 2012, p. 204.

296 See Kuhn 2000, p. 118, also Kuhn 2012, pp. 194-5.

297 Gould S.J.: Dollo on Dollo's Law: Irreversibility and the Status of Evolutionary Laws, *Journal of the History of Biology* (1970) 3(2):189-212.

irreversible.”²⁹⁸ Once more the question arises, why IDC advocates would even want to go near such an “evolutionary view of science,”²⁹⁹ let alone use it to attack evolution?

The answer to these questions is that the adoption of Kuhnian concepts and language by IDC proponents is a rhetorical device in furtherance of deeply-held sectarian convictions and yearned-for social change, as revealed in the Wedge Document. If they conflict with their ambitions, members of the IDC movement are quick to disvalue things like internal coherence and intellectual integrity in their work. As the following pages will continue to argue, below a thin veneer of seemingly sophisticated considerations, the exploitation of Kuhn by IDC practitioners is a mess of disinformation as well as selective reading and cherry-picking of isolated ideas and phrases.

In Kuhn’s evolutionary conception of science, consecutive events of competition between paradigms and, so to speak, the survival of the fittest lead to “an increasingly detailed and refined understanding of nature,” i.e. to scientific progress.³⁰⁰ According to Kuhn, this is possible because the selective agent, namely the scientific communities who experience normal science and paradigm shifts, possesses special characteristics. Members of such a community are bound together by shared education and training, by shared literature, by shared research goals, by a shared research practice, and by shared beliefs. These communalities allow for easy communication and nearly complete agreement on questions pertaining to the professional subject of the community.³⁰¹ Kuhn referred to these collective features as a paradigm. At least, this was arguably the most salient meaning of the term in *Structure*.³⁰² It definitely is this understanding of a paradigm that has entered the IDC literature, albeit with an emphasis on the indoctrinational aspects of the shared training and practice as well as the philosophical character of shared beliefs. However, it should not go unnoticed that Kuhn has used the word paradigm in a somewhat equivocal fashion in *Structure*, as critics of his book pointed out, and he himself readily acknowledged later on.³⁰³ As introduced in 1959, the original meaning was much more narrow and closer to the other major way in which he used the word.³⁰⁴ Namely the paradigm as a “concrete puzzle-solution which [...] can replace

298 Kuhn 2012, p. 205, see also p. 105.

299 Kuhn *op.cit.*, p. 172.

300 Kuhn *op.cit.*, p. 169.

301 See Kuhn *op.cit.*, pp. 176-7.

302 Masterman M.: *The Nature of a Paradigm*, in Lakatos & Musgrave (Eds.) ²1972, pp. 59-89 (here p. 71).

303 See for instance Masterman *op.cit.*, and Kuhn’s acknowledgement in the *Postscript* in Kuhn 2012 (p. 174 and p. 181).

304 See Kuhn T.S: *The Essential Tension: Tradition and Innovation in Scientific Research*, in Taylor C.W. (Ed.): *The Third (1959) University of Utah Research Conference on the Identification of Scientific Talent*, Salt Lake City:

explicit rules as a basis for the solution of the remaining puzzles of normal science.”³⁰⁵ Without much success, he tried to rebrand the first, broader meaning as disciplinary matrix, and the narrower meaning as exemplars, which are one of the components of a disciplinary matrix (the others being symbolic generalizations, laws, and values).³⁰⁶ It is telling that defenders of IDC do not take into account these later thoughts of Kuhn, most likely because they contain language less conducive to a relativist interpretation and are, overall, less catchy and thus less useful for their public relations purposes. For this reason, and because they are not essential to the line of argument submitted in this thesis, these later elaborations of Kuhn on matrixes and exemplars will not be pursued in any depth.

Yet, it seems pertinent to the evolution/creation controversy to spend some words on the scope of scientific communities. Kuhn was a bit unclear on exactly where to draw borders between different communities and, consequently, between the different paradigms that are (presumably) unique to them. But he did mention several criteria that can be used to determine membership to a community, such as subject of highest degree, mutual citations in publications, comparable working techniques, participation in conferences and professional societies, as well as informal channels of communication.³⁰⁷ As the largest possible community he identified the entirety of natural scientists (one would assume next to social scientists),³⁰⁸ even though it is debatable, given these criteria, how membership on such a general level can be established in a definite way. At the lower levels he suggested that scientific communities comprise, for instance, physicists and zoologists or, even more zoomed-in, protein chemists and radio astronomers.³⁰⁹ For present purposes, it seems reasonable to accept that researchers in evolutionary biology can also be identified as a scientific community in his sense (although, again, membership cannot be established in a clear-cut manner, and might even have to include philosophers of biology who partake in discussions on evolutionary theory). More fuzziness arises, however, with how advocates of IDC proceed on this issue because they do not reliably identify the community that is supposed to be in crisis and on the verge of a scientific revolution toward their new intelligent design paradigm. Usually they refer to their opponents with terms like Darwinists or evolutionists. But these are not terms in the same category

University of Utah Press 1959, pp. 162-74, reprinted as Kuhn T.S.: *The Essential Tension: Tradition and Innovation in Scientific Research*, in Kuhn 1977, pp. 225-239.

305 Kuhn 2012, p. 174.

306 See Kuhn *op.cit.*, pp. 181-6.

307 See Kuhn *op.cit.*, p. 177.

308 See Kuhn *op.cit.*, p. 176.

309 See Kuhn *op.cit.*, p. 177.

such as physicists, for example. Or else one would have to speak of Einsteinians or relativity-ists as a scientific community as well. What is more, the writings of Johnson and others make it clear that the real target are not only those who deal with Darwinism and evolution in their scientific communities, but all scientists who subscribe to naturalism (in the sense that they exclude the supernatural from their work). A change in *that* group would be a revolution that goes far beyond the entirety of natural scientists (as the largest scientific community identified by Kuhn). It would be a cultural revolution that touches more or less every human activity that explores nature and, consequently, every aspect of society. Something that would go far beyond even the wildest parallels that Kuhn drew from scientific to political revolutions.³¹⁰ Therefore it seems highly implausible, even at this very coarse level of analysis, when promoters of IDC try to use Kuhn for such an undertaking. After all, even the title of the book to which IDC advocates refer almost exclusively when they cite Kuhn, limits its scope to the structure of *scientific* revolutions. Nevertheless, IDC protagonists sometimes also refer to evolutionary biologists in their attacks and the following pages will, for the sake of argument, proceed as if it was that scientific community that is in crisis.³¹¹ But now there is more trouble for members of the IDC movement because they are not part of that group. The criteria mentioned by Kuhn exclude IDC proponents from that community. A stark example for this is the ‘disclaimer’ on the official faculty webpage of the Department of Biological Sciences of Lehigh University, where Behe has a tenured professorship. The last paragraph of the statement reads as follows:

The department faculty, then, are unequivocal in their support of evolutionary theory, which has its roots in the seminal work of Charles Darwin and has been supported by findings accumulated over 140 years. The sole dissenter from this position, Prof. Michael Behe, is a well-known proponent of "intelligent design." While we respect Prof. Behe's right to express his views, they are his alone and are in no way endorsed by the department. It is our collective position that intelligent design has no basis in science, has not been tested experimentally, and should not be regarded as scientific.³¹²

Other IDC notables can be excluded because their subject of highest degree is in law (Johnson), mathematics (Dembski), or philosophy (Meyer). All proponents of IDC can be excluded due to the lack of mutual citations within the relevant technical literature, at least if they publish in the

310 See Kuhn *op.cit.*, pp. 92-4.

311 With a broad understanding of ‘evolutionary biologists’ as those biologists who actively work with concepts from evolutionary theory.

312 Lehigh University: *Department position on evolution and "intelligent design"*, Bethlehem, PA: Lehigh University s.d., retrieved from <https://www.lehigh.edu/~inbios/News/evolution.html>, on 2021-01-11.

capacity of design theorists.³¹³ Members of the IDC movement have indeed published in that literature (as opposed to the articles they place in their own ‘Potemkin village’-like venues, such as *BIO-Complexity*, papers in journals outside of evolutionary biology, as well as articles for a non-professional audience), but without mentioning intelligent design. Some of these articles are supposed to show ‘problems’ with evolutionary theory, but of course only in the light of the false dualistic worldview common to creationists does this count as literature in favor of intelligent design.³¹⁴ And even the supposed problems of Darwinists are often imaginary. One paper from Behe, often cited by IDC proponents as a prime example of their ‘success’ in the peer-reviewed literature, was brought up during the *Kitzmiller* trial in 2005.³¹⁵ There, Behe conceded that

the study which forms the basis for the article did not rule out many known evolutionary mechanisms and that the research actually might support evolutionary pathways if a biologically realistic population size were used.³¹⁶

No technical articles published by the scientific community concerned with evolutionary biology support intelligent design, offer positive arguments in favor of an intelligent designer, or use concepts such as Behe’s irreducible complexity. In fact, Behe has explicitly confirmed that no such papers exist.³¹⁷ Additionally, in their capacity as advocates of design theory, members of IDC are also excluded from technical conferences. For instance, the conference on evolution organized by the London Royal Society in 2016, when first announced, created huge waves of excitement among adherents of IDC,³¹⁸ but they had to admit that the only way for them to participate was to apply for tickets as visitors (those who attended as spectators were then referred to as “our confidential scientists on the scene” and “informants”).³¹⁹ But in reality, members of IDC do not even want to be part of the scientific community as it exists and practices science right now. Because that would

313 Not counting, of course, articles that criticize IDC literature and thus need to cite the sources; see also Pennock 2011.

314 The Discovery Institute even has its own list of publications “supporting intelligent design.” (Discovery Institute: *Bibliographic and annotated list of peer-reviewed publications supporting intelligent design*, Seattle: Discovery Institute 2017, retrieved from <https://www.discovery.org/m/2018/12/ID-Peer-Review-July-2017.pdf>, on 2021-01-11.)

315 Behe & Snoke 2004 (see also above, FN 253).

316 Jones 2005, FN 17 on p. 88 (internal reference omitted).

317 See Jones *op.cit.*, citing from Behe’s cross-examination, on p. 88.

318 See, for instance, Klinghoffer D.: Intelligent Design Aside, from Templeton Foundation to the Royal Society, Darwinism Is Under Siege, Discovery Institute: *Evolution News & Science Today* 2016, retrieved from https://evolutionnews.org/2016/04/intelligent_des_25/, on 2021-01-12.

319 For example, see Klinghoffer D.: Royal Society Meeting Not Provocative Enough for You?, Discovery Institute: *Evolution News & Science Today* 2016, retrieved from https://evolutionnews.org/2016/11/royal_society_m_1/, on 2021-01-12; *Id.*: Pictures from an Exhibition (of Evolution Views), Discovery Institute: *Evolution News & Science Today* 2016, retrieved from https://evolutionnews.org/2016/11/pictures_from_a/, on 2021-01-12; *Id.*: More Reports from Confidential Informants at the Royal Society, Discovery Institute: *Evolution News & Science Today* 2016, retrieved from https://evolutionnews.org/2016/11/more_reports_fr/, on 2021-01-12.

mean they have to accept the rules of and commitments to what they disparage as ‘Darwinism’. Obviously, Darwinism and the supposedly atheistic philosophy of naturalism upholding it, are anathema to Christian fundamentalists. A recent post at the Discovery Institute’s public relations channel is a concise reminder of what is at stake in the evolution/creation controversy, at least according to supporters of IDC. Titled *How to Destroy Love with Darwinism*, the very first line makes the following statement:

When Darwin proposed a new view of biology based on chance, he cheapened everything, including our most precious human values.³²⁰

Returning now to the issue of paradigms, Kuhn argued that they guide their adherents by suggesting concrete research questions and, at the same time, providing ways to solve them as well as an idea of what the answer to these puzzles looks like. This applies to both the narrow and the broad meaning of a paradigm. After such a paradigm has been established, scientific practice becomes a “tradition-bound activity.”³²¹ During these periods of normal science, researchers focus on solving narrow, highly-specific puzzles to further articulate the facts and predictions suggested by the paradigm. Given this full-pension hotel sponsored by the paradigm, there is no need for scientists to step ‘outside’. It is this point on which IDC advocates home in when they denounce evolutionists as being small-minded and oblivious to the world outside of their little box, ignoring not only the ever-growing pile of unsolved puzzles but also all the evidence in favor of intelligently-designed complexity. Based on a closer reading of Kuhn, however, this interpretation is beset by a whole host of severe problems.

For one, supporters of IDC make it sound like the close attention paid to seemingly inconsequential puzzles provided by the evolutionary paradigm is a bad thing, since it makes Darwinists miss the ‘big picture’ and helps them to evade counterinstances. However, Kuhn argued that exactly this concentration on esoteric issues is a prerequisite for scientific progress. Because solely from this practice comes the discovery of anomalies, which might go unnoticed if scientists did not pay so close attention to details. Recognition that paradigmatic predictions have been violated can only come if scientists do not give up too easily on puzzles and on their paradigm. Kuhn also explained that a profound exploration of paradigm-suggested phenomena ensures that when an anomaly

320 Anonymous: How to Destroy Love with Darwinism, Discovery Institute: *Evolution News & Science Today* 2021, retrieved from <https://evolutionnews.org/2021/01/how-to-destroy-love-with-darwinism/>, on 2021-01-12.

321 Kuhn *op.cit.*, p. 6.

finally appears, it will “penetrate existing knowledge to the core.”³²² This helps not only to reveal the weak points of the paradigm which require more attention from the community, but also to formulate a truly novel alternative, should that be necessary.

This leads directly to the question about counterinstances and their position in Kuhn’s image of science. What creationists mean to say is that Darwinists either dishonestly evade falsification by seeking out only those experiments and observations that do not contradict Darwinist dogmas, or explain counterinstances away by inventing silly stories to save their paradigm. Again, a rather apparant discrepancy emerges instantly. IDC proponents acknowledge (either directly or indirectly) that Kuhn rejected the idea of falsification through simple contact between theory and nature. At the same time, they complain that Darwinists behave as they are expected to if their interpretation of Kuhn’s view of science is correct. However, their interpretation is exceedingly implausible and lacking in coherence. Kuhn said, quite clearly, that the violation of paradigmatic expectations is first and foremost seen as a failure not of the paradigm but of the individual researcher.³²³ Only when counterinstances keep on mounting up will members of a scientific group start to question the fundamentals of their paradigm, but will still not discard it yet. According to Kuhn, the presence of another viable alternative is necessary for that step of falsification and abandonment.³²⁴ And at this point several strings come together. Here, only two key elements need to be mentioned briefly. First, that it is the community who decides whether such a state of crisis is present (and IDC adherents are not part of the community – after all, they are not evil Darwinists). Secondly, it is for the relevant community to evaluate a possible alternative; and the scientific community has persistently rejected IDC as a viable candidate. So the Kuhnian version of falsification cannot take place; which means that there is a contradiction between the things Kuhn argued for and what IDC adherents try to do with him. The upshot of Kuhn’s arguments on the role of paradigms can only be that the strong adherence to a paradigm is a good thing in science – which is the exact opposite of what promoters of IDC insinuate. In reality, Kuhn went as far as to suggest that there can be no science without a paradigm to guide researchers. Because without a paradigm, there is no way to tell relevant from irrelevant facts and researchers are drowning in a glut of data and conjectures. In yet another fundamental dissonance with creationists, who champion Bacon’s inductive approach to

322 Kuhn *op.cit.*, p. 65.

323 See Kuhn *op.cit.*, pp. 79-80.

324 See Kuhn *op.cit.*, pp. 78-79.

science and “follow the evidence where it leads,”³²⁵ Kuhn maintained that the paradigm-free fact-gathering of “Baconian natural histories of the seventeenth century [produced] a morass” and that “one somehow hesitates to call the literature that result[ed] scientific.”³²⁶³²⁷

A second, closely related disregard of Kuhn is the accusation that the scientific establishment’s continued resistance vis-à-vis design theory is against the free spirit of science. But on this Kuhn was very clear when he said that even “lifelong resistance [to paradigm change] is not a violation of scientific standards but an index to the nature of scientific research itself.”³²⁸ This is what Kuhn meant when he talked about the resistance from a scientific community to novelty, right up to suppression, even “at considerable cost.”³²⁹ In fact, a small example here can show how unhinged the interpretations of IDC really are and help to highlight further the lack of serious engagement with Kuhn’s writings on their part. Kuhn cited Max Planck’s well-known saying that new scientific theories do not become accepted based on convincing arguments but because proponents of old theories die out eventually.³³⁰ This quote is frequently used in IDC publications right next to Kuhnian ideas (often in a compressed form such as “Science advances one funeral at a time.”).³³¹ In Wells’ *The Politically Incorrect Guide to Darwinism and Intelligent Design*, the quote even takes up a quarter of a page in the chapter on scientific revolutions (right next to the contention that it is “Kuhn’s legacy” that paradigms “compete independently of the evidence from nature” – a topic that will be dealt with in the following paragraphs).³³² Yet not only does Kuhn disagree with Planck’s point immediately after quoting him and calls for a “re-evaluation” of its central message.³³³ Right before that he also quotes Darwin in *On the Origin of Species* as bemoaning that his arguments will fail to convince those “whose minds are stocked with a multitude of facts all viewed, during a long

325 For instance, see Klinghoffer D.: Origins of a Dictum, Discovery Institute: *Evolution News & Science Today* 2019, retrieved from <https://evolutionnews.org/2019/06/origins-of-a-dictum/>, on 2021-01-15.

326 Kuhn *op.cit.*, p. 16.

327 In his *Postscript*, Kuhn softened his view on this point and said that even before a science becomes mature through adoption of a paradigm, the community “shares the sorts of elements” that are constitutive of a paradigm (Kuhn *op.cit.*, p. 178.). But he also maintained that the “nature” of the paradigm changes as a science develops to maturity and allows “normal puzzle-solving research” to start (*Ibid.*).

328 Kuhn *op.cit.*, pp. 150-1.

329 Kuhn *op.cit.*, p. 5.

330 See Kuhn *op.cit.*, p. 150.

331 For instance, Klinghoffer D.: Dartmouth Physicist: When Science Shades Over Into Faith, Discovery Institute: *Evolution News & Science Today* 2014, retrieved from https://evolutionnews.org/2014/11/dartmouth_physi/, on 2021-01-07; Sheldon R.: Rob Sheldon Tries To Help Darwin Follower Get Over ENCODE Findings, *Uncommon Descent* 2015, retrieved from <https://uncommondescent.com/darwinism/rob-sheldon-tries-to-help-darwin-follower-get-over-encode-findings/>, on 2021-01-07.

332 Wells 2006, p. 196.

333 Kuhn *op.cit.*, p. 150.

course of years, from a point of view directly opposite to mine” and that only “young and rising naturalists” will become supportive of his theory.³³⁴ Not only do advocates of IDC ignore Kuhn’s objection, which would directly contradict their spin. They also ignore Darwin’s quote, even though he is much closer to the evolution/creation controversy than Planck, because it would make it all too evident for their audience that, according to their own Kuhn-inspired line of reasoning, antievolutionists were (and potentially are today?) just as bigoted as Darwinists.

Adjacent to these issues is the contention that the hostility toward intelligent design is nothing more than the consequence of blind faith in the Darwinian paradigm instead of a deliberation of evidence. The assertion is connected to the claim that, according to concepts developed by Kuhn, Darwinists cannot engage in a serious scientific competition with intelligent design because the two paradigms are incommensurable. Members of the IDC movement claim that this violation of ‘academic freedom’ is also the reason why their articles do not get published in the peer-reviewed literature of mainstream science. Or, if they somehow manage to wiggle through peer review, why they soon get retracted or marked with an editorial disclaimer at the behest of powerful lobbies, institutions, and publishing houses who toe the ‘party line’.³³⁵ Pennock has referred to these deconstructivist charges of irrationalism in the name of Kuhn and others as the “postmodern sin” of IDC and has identified its two major weaknesses.³³⁶ First off, if creationists wish to retain their belief in an ultimate Truth accessible to humans (which they surely do), it is intellectually incoherent to adopt an approach – such as the ‘strong programme’ or Critical Legal Studies – which aims to show that fixed, universal truth is not attainable. Because, if taken seriously, such an approach would also undermine the truth claims put forth in biblical revelations and fundamentalist traditions.³³⁷ Secondly, in *Tower of Babel*, Pennock has already briefly sketched out that Kuhn did not mean his conception of science to be relativistic or irrational. He pointed out that the conversion experience described by Kuhn when scientists switch to a new paradigm is not equivalent to a religious conversion. Rather, a paradigm

³³⁴ *Ibid.*

³³⁵ For example, Anonymous: Intelligent Design’s Yellow Star: Journal’s Disclaimer Refutes a Common Criticism of ID, Discovery Institute: *Evolution News & Science Today* 2020, retrieved from <https://evolutionnews.org/2020/10/intelligent-designs-yellow-star-journals-disclaimer-refutes-a-common-criticism-of-id/>, on 2021-01-09; Chaffee S.: When It Comes to Origins Science, Is *PNAS* Really “Ready When You Are”?, Discovery Institute: *Evolution News & Science Today* 2019, retrieved from <https://evolutionnews.org/2019/01/when-it-comes-to-origins-science-is-pnas-really-ready-when-you-are/>, on 2021-01-09; Richards J.W.: Heading into Today’s March, Here’s When to Doubt a Scientific “Consensus”, Discovery Institute: *Evolution News & Science Today* 2017, retrieved from <https://evolutionnews.org/2017/04/heading-into-todays-march-heres-when-to-doubt-a-scientific-consensus/>, on 2021-01-09.

³³⁶ See Pennock 2010.

³³⁷ See Pennock *op.cit.*, especially pp. 773-5; also Pennock 1999, pp. 212-3.

shift is a gestalt switch in the wake of an informed judgment made by scientists, which itself comes after assessing competing theories according to a set of epistemic values.³³⁸ Pennock also made it clear that practitioners of IDC do not only want to replace the evolutionary paradigm with their own. Instead they aim at overthrowing methodological naturalism and reintroduce teleological thought into science, thus going way beyond a Kuhnian paradigm shift.³³⁹ The following paragraphs will elaborate on Pennock's observations and reveal in more detail how incoherent and implausible the interpretations by IDC proponents are.

It is well known that, ever after the first publication of *Structure*, Kuhn has resolutely denied that his image of science leads to irrationalism and relativism.³⁴⁰ By and of itself, the fact that advocates of IDC ignore Kuhn's own repudiation fits neatly into the pattern described so far.³⁴¹ Already in 1969 in his *Postscript*, he started to address these allegations head-on: He explicitly classified as "seriously misconstrued"³⁴² the allegations that

the proponents of incommensurable theories cannot communicate with each other at all; as a result, in a debate over theory-choice there can be no recourse to *good* reasons; instead theory must be chosen for reasons that are ultimately personal and subjective[.]³⁴³

Besides several unfortunate choices of words and some too impressionistic phrasings (see the small sample provided in Chapters VII. and VIII.), the misconstrual stems in part from Kuhn's argument that there is no fixed set of methodological rules or algorithms that can be uniformly applied to produce scientific proof, which could then unequivocally favor one proposition over another. Instead, he maintained that, mediated through the paradigm or disciplinary matrix, the scientific *community* possesses certain characteristics which allow for rational judgment, both during normal science and revolutions. For Kuhn, science is a community-based activity. He readily admitted that there are extrascientific influences – including extreme examples such as nationality or professional reputation – which may make an *individual* scientist prefer one theory over its competitor.³⁴⁴ Due to his evolutionary view of scientific development, he even considered this nonuniformity an advantage that can potentially provide helpful variation in the 'gene pool' of the community and

338 See Pennock 1999, p. 208.

339 See Pennock *op.cit.*, p. 277.

340 See, for instance, Kuhn 1972, pp. 231-78 and Kuhn 2000, p. 307.

341 Whether something analogous also applies to the 'strong programme', for instance, is beyond the scope of this thesis. But Kuhn did say that he has found some of the propositions of the 'strong programme' to be "absurd" and "an example of deconstruction gone mad" (Kuhn 2000, p. 110).

342 Kuhn 2012, p. 197.

343 Kuhn *op.cit.*, pp. 197-8 (*italics in the original*).

344 See Kuhn *op.cit.*, p. 152, pp. 184-5, as well as pp. 69-70.

improve its adaptability. In the face of theory-choice, it would be undesirable if all scientists either abandoned the reigning paradigm too readily or collectively ignored a rising competitor.³⁴⁵ Indeed, Kuhn also reasoned that if a scientific group is large and diverse enough, individual variability in theory-choice will follow a normal distribution, where the extremes balance each other out, and the community will converge on a rational consensus around the median. Whereas in a small group, random variation can more easily skew the decision-making process, potentially making progress in science “problematic.”³⁴⁶³⁴⁷ It is evident from the context of these passages that Kuhn did neither argue that scientists historically behaved as if they operated in such small groups (and reached random or irrational conclusions) nor that he recommended they should do so. In any way, for the evolution/creation controversy in particular, the implication of Kuhn’s point is clear. Given the long timespan since Darwin’s revolution, the large ‘population size’ of evolutionary biologists, and their distribution over different social, political, economic, and religious backgrounds, the rejection of creationism is as overwhelming as the confidence in the basic tenets of modern evolutionary theory (see Chapter II.). In fact, the creationist position in biology is not even an extreme outlier anymore: It is literally off the chart.

What is more, nowhere did Kuhn say that logic and empirical data do *not* play a role in science. On the contrary, he was quite clear that researchers cannot just “see anything they please,” that “nature and of logic” are important for scientific choice, and he explicitly rejected the notion that “no arguments are relevant or that scientists cannot be persuaded to change their minds.”³⁴⁸ Kuhn also noted that “observation and experience can and must drastically restrict the range of admissible scientific believe.”³⁴⁹ Furthermore, he affirmed that he did *not* think that “in the sciences might makes right”³⁵⁰, nor that his view of science has replaced “evidence and reason by power and interest.”³⁵¹ But these quotes and others like them cannot be found in the IDC interpretations of Kuhn. Neither is there a discussion of values as guiding scientific choices, most likely because the values that make design theory attractive to its believers are fundamentally different from the values that make evolutionary theory attractive to biologists. As pointed out earlier, Kuhn saw epistemic

345 See Kuhn *op.cit.*, pp. 185-6; see also Kuhn ²1972, p. 241 and p. 262.

346 Kuhn 1977, p. 333.

347 Kuhn did not explicitly mention the concept, but the idea is similar to genetic drift in population genetics, where random sampling in small populations can more readily lead to a change in allele frequencies irrespective of any selective pressure.

348 Kuhn 2012, quotes on p. 149, p. 94, and p. 151, respectively; see also Kuhn ²1972, p. 261.

349 Kuhn 2012, p. 4.

350 Kuhn *op.cit.*, p. 166.

351 Kuhn 2000, p. 116.

values (as opposed to invariant rules) as the basis of rational decision-making, particularly to establish whether a crisis exists and to judge competitors to the current paradigm. Incidentally, this is one of the few things where the interpretation of Kuhn by IDC proponents is accurate: Without a new, alternative paradigm to replace the old one, no scientific revolution can take place.³⁵² Over time, Kuhn provided several values that he considered relevant, such as accuracy (especially for predictions), simplicity, internal and external consistency, plausibility, compatibility with already-established theories, social utility, scope, and fruitfulness.³⁵³ He was unambiguous that the potential fruitfulness for future research (i.e. for successful puzzle-solving) is of tantamount importance to win over members of an old paradigm to a new competitor. This is especially the case for those anomalies that elicited a sense of crisis in the old community.³⁵⁴ Kuhn also explained that there has to be continuity from the old scientific practice to the new one. The new candidate “must promise to preserve a relatively large part of the concrete problem-solving ability that has accrued to science through its predecessors.”³⁵⁵ Yet when applying these values and logical analysis to the positive arguments offered by IDC notables, the relevant scientific community has overwhelmingly found their propositions to have no value at all (see next subsection for a very brief consideration of Behe’s concept of irreducible complexity as the central argument offered by advocates of design theory). In this context it should also be noted that Kuhn explicitly stated that “most proposals for new theories do prove to be wrong.”³⁵⁶ So even from this angle, Kuhn cannot plausibly be used to argue that ‘Darwinists’ simply cannot evaluate design theory because they are trapped inside of their paradigm.

Moreover, by now another very fundamental and irreconcilable mismatch between Kuhn and the travesty set up by IDC believers can be seen with ease. Kuhn defended a form of social epistemology, with a community of professional specialists as *the* relevant agent in scientific matters. *Structure* contains several direct statements to that end:

Recognition of the existence of a uniquely competent professional group and acceptance of its role as the exclusive arbiter of professional achievement has further implications. The group’s members, as individuals and by virtue of their shared training and experience, must be seen as the sole possessors of the rules of the game or of some

352 See Kuhn 2012, pp. 77-9.

353 See Kuhn *op.cit.*, p. 184; Kuhn ²1972, p. 261; Kuhn 1977, pp. 321-2.

354 See Kuhn 2012, p.152-6, and p. 168.

355 Kuhn *op.cit.*, p. 168.

356 Kuhn *op.cit.*, p. 185.

equivalent basis for unequivocal judgments. To doubt that they shared some such basis for evaluations would be to admit the existence of incompatible standards of scientific achievement.³⁵⁷

The very existence of science depends upon vesting the power to choose between paradigms in the members of a special kind of community.³⁵⁸

And:

That commitment [to a shared paradigm] and the apparent consensus it produces are prerequisites for normal science, i.e., for the genesis and continuation of a particular research tradition.³⁵⁹

The contrast to what proponents of IDC have to say about the consensus of the scientific community could not be stronger. Particularly since the *Kitzmiller* ruling in 2005, where the lack of acceptance in the scientific community was part of the judge's reasoning to deny intelligent design scientific status,³⁶⁰ members of the IDC have routinely denounced and vilified the consensus against their theory. They claim that reliance on consensus is unscientific and, if it interacts with broader issues in society, can aid and abet moral decay.³⁶¹³⁶² In light of Kuhn's statements, it is hard to see how one could plausibly try to recruit him and his concepts in support of such a standpoint.

As discussed earlier, Kuhn saw values as subjected to a form of cultural evolution, but also as invariant enough to allow scientific communities to propose and subsequently accept ever-more refined theories, creating scientific progress along the way. Thus, this "relative stability" of criteria for theory-choice makes it possible to rationally bridge the revolutionary gaps between different paradigms.³⁶³ Again, even though he talked of incommensurability, gestalt switches, and living in different worlds, nowhere did Kuhn say that competing theories cannot be evaluated rationally in the light of evolved epistemic praxes. Contrary to his flamboyant prose, he clearly said that

357 Kuhn *op.cit.*, p. 167.

358 Kuhn *op.cit.*, pp. 166-7.

359 Kuhn *op.cit.*, p. 11.

360 See above, Chapter VI.

361 For some recent examples, see Klinghoffer D.: When "Science" Becomes a Cult, Discovery Institute: *Evolution News & Science Today* 2020, retrieved from <https://evolutionnews.org/2020/10/when-science-becomes-a-cult/>, on 2021-01-15; *Id.*: Inside the Evolution Silo – Darwinism as a Cult, Discovery Institute: *Evolution News & Science Today* 2020, retrieved from <https://evolutionnews.org/2020/10/inside-the-evolution-silo-darwinism-as-a-cult/>, on 2021-01-15; Egnor M.: #10 of Our Top Stories of 2019: Jeffrey Epstein and the Silence of the Scientists, Discovery Institute: *Evolution News & Science Today* 2019, retrieved from <https://evolutionnews.org/2019/12/10-of-our-top-stories-of-2018-jeffrey-epstein-and-the-silence-of-the-scientists/>, on 2021-01-15; as well as DeWolf, West & Luskin (2007).

362 As mentioned earlier, the Discovery Institute also advocates free-market policies and opposes government regulations, including environmental protection laws. Therefore its affiliates also attack the scientific consensus on anthropogenic global warming (e.g., Richards J.: *When to Doubt a Scientific 'Consensus'*, American Enterprise Institute 2010, retrieved from <https://www.aei.org/articles/when-to-doubt-a-scientific-consensus/>, on 2021-01-15; see also Richards 2017).

363 See Kuhn *op.cit.*, chapters IX and X; quote from Kuhn 1977, p. 336.

communication across paradigm-borders was partial but not totally lost, allowing for direct comparison and evaluation of competing paradigms.³⁶⁴ In consideration of his evolutionary view, this should come as no surprise,

since new paradigms are born from old ones, they ordinarily incorporate much of the vocabulary and apparatus, both conceptual and manipulative, that the traditional paradigm had previously employed.³⁶⁵

More importantly, members of different paradigms are “still looking at the same world,”³⁶⁶ and they do so with a “neural apparatus” and “neural programming” shared by all humans due to our evolutionary genealogy.³⁶⁷ So there will always be a rudimentary communality available to members of different paradigms to overcome communication breakdown, even if only very hazardously. His analogy from members of different paradigms to members of different language communities is particularly apt at illustrating both the problem at stake and a solution. Even though words have different semantic meanings in different languages and they may be subject to different grammatical rules, that does not mean people become invariably lost in translation.³⁶⁸ At this point, Kuhn could have also taken a more extravagant analogy to biology, where communication is possible even between members of very different taxa, such as dogs and humans, for instance. While the communication between them can only be partial indeed, it is immediately obvious that living in different worlds does not automatically imply no overlap at all. Furthermore, coming back to values as guides for the judgment of competing theories, Kuhn noted that some criteria, such as fruitfulness and accuracy, are relatively easy to apply, even across language barriers. They can provide a first basic understanding that can serve as a springboard for further examination and mutual agreement or disagreement.³⁶⁹ As noted earlier, scientists cannot just see anything they want. The IDC interpretation of Kuhn, claiming that the tenets of design theory cannot be fairly evaluated by members of a different paradigm, can only be made by cherry-picking quotes from Kuhn, removing them from their over-all context, and by actively ignoring other statements that contradict this narrative.

A point that has not been addressed so far is how scientists acquire a paradigm or, asked differently, how they become part of a community of scientific specialists. Kuhn’s answer was rather straightforward. Young scientists become infused with all the elements offered by the reigning

³⁶⁴ See Kuhn 2012, p. 149

³⁶⁵ Kuhn *op.cit.*, p. 148.

³⁶⁶ Kuhn *op.cit.*, p. 129.

³⁶⁷ Kuhn *op.cit.*, p. 200.

³⁶⁸ See Kuhn *op.cit.*, p. 200-1; Kuhn 1977, pp. 338-9; Kuhn ²1972, pp. 266-77.

³⁶⁹ See Kuhn 1977, p. 339.

paradigm (or disciplinary matrix) during their education. What they have learned as students is then reinforced through shared research practice and reading of shared literature. As discussed earlier, for Kuhn the cohesion of a professional community in their paradigm-induced approach to nature is a prerequisite for the existence of the social enterprise called science. The quite literal indoctrination as a kind of initiation ritual for students into a paradigm is an integral part of the whole process. Especially textbooks play an important role in conveying the problems suggested by a paradigm and how to solve them.³⁷⁰ In fact, Kuhn maintained that the special role textbooks play in teaching and upholding their respective paradigms “significantly differentiates its developmental pattern from that of other fields [such as literature or the arts].”³⁷¹ Yet not only due to sociological and epistemological considerations, but also because of pedagogy, Kuhn held that education should be “rigorous and rigid.”³⁷² The following quote encapsulates his ideas:

But science students accept theories on the authority of teacher and text, not because of evidence. What alternatives have they, or what competence? The applications given in texts are not there as evidence but because learning them is part of learning the paradigm at the base of current practice.³⁷³

While Kuhn did not say much about the content of curricula per se, it is obvious from his view of the role of education that the creationists’ attempts to force their ‘theory’ into science classes is a subversive act that undermines the integrity (and success) of science. The same goes for all the campaigns that try to introduce talk of ‘strengths and weaknesses’ of evolutionary theory, of teaching the ‘controversy’ surrounding evolution, of ‘critical thinking’ on evolution, or ‘academic freedom’ to allow fundamentalist Christian teachers to teach creationism in public science classes without any legal repercussions.

After all this, there is even more discrepancy between Kuhn’s ideas and the interpretation of his work offered by IDC proponents. Somewhat overstated – but not by much –, the account given by IDC representatives claims that Darwinism is in a state of crisis; that out of this crisis, bolstered by novel insights from molecular biology, their new paradigm arose; and that now it is without a doubt just a matter of time before a revolution takes place and they win. Right away, however, there is a problem with this story. Kuhn explicitly said that even if a state of crisis exists (more on that below), the outcome is not necessarily a new paradigm followed by a scientific revolution. He

370 See Kuhn 2012, pp. 164-6.

371 See Kuhn *op.cit.*, pp. 136-142, quote on p. 136.

372 Kuhn *op.cit.*, p. 5.

373 Kuhn *op.cit.*, pp. 80-1.

thought that there are, in fact, three different ways for crises to end, and only one of them involves a paradigm shift. Another possibility is that normal science will eventually be able to solve the problems that elicited a crisis. Or scientists may even decide that currently there are no solutions to the recalcitrant puzzles and put them on a shelf for future reconsideration without immediate emergence of a new paradigm.³⁷⁴ So the Kuhnian view of science does neither describe (nor prescribe) a linear development from anomalies to crisis to paradigm-emergence to revolution, contrary to what the creationists insinuate. Indeed, the second possibility – successful persistence of the reigning paradigm – seems to be particularly destructive for the aspirations of the IDC community. It is not a violation of some higher-level ‘law of science’ if Darwinists stick to their paradigm, even if a crisis exists. This is probably why these alternative outcomes are not seriously entertained in the IDC literature, except as being denounced as a bad case of “zombie science.”³⁷⁵ On top of that, nowhere did Kuhn say that even *if* a crisis exists *and* a new paradigm emerges, this particular newcomer is preordained to be victorious. Other, different paradigms might also enter the race at a later time. This point is reinforced by Kuhn’s historical observation of a potential lag between the first inklings of crisis and the emergence of a successful paradigm, thereby opening up a hypothetical wind of opportunity for different candidates to emerge as time passes.³⁷⁶ And Kuhn also talked at length about how scientists decide to leave their old paradigm and join a new one, which automatically entails that they do not have to switch to the next-best alternative by default. Again, this is very inconvenient for the IDC crowd and their simplistic account of Kuhn’s model of science. It is, however, congruent with the Bible-based, dualistic worldview described earlier, where only two opposites exist, and people must choose between Good and Evil.

Immediately, the next question to appear is whether there is a crisis in Darwinism. Several points need to be considered here. First, as outlined in Chapter II., modern evolutionary theory is not identical with what IDC proponents like to call ‘Darwinism’. Several quotes provided in the preceding chapters have shown that creationists fail to understand (or willfully choose to misrepresent) the current status of evolutionary theory. They reduce it to the workings of a ‘mutation-selection mechanism’, incapable of bringing about major transitions (thus unable to substantiate common descent of life on earth) as well as complexity and information-content in biological structures (thus unable to explain the genetic code and molecular ‘machines’, plus

374 See Kuhn *op.cit.*, p. 84.

375 Wells J.: *Zombie Science. More Icons of Evolution*, Seattle: Discovery Institute Press 2017; Wells 2018.

376 See Kuhn *op.cit.*, p. 86.

everything else that looks as if it were designed, such as the human eye or echolocation). Some of the design theorists even claim that natural selection can only break stuff, which leaves the ‘Darwinists’ with nothing but random mutations to explain evolution – exactly the argument offered by Paley and others over 200 years ago. This mismatch between modern evolutionary theory and its creationist caricature produces grotesque outcomes, such as the Discovery Institute’s “Dissent from Darwin” list.³⁷⁷ Several hundred signatories from all academic fields (most of them from engineering, physics, and chemistry, only a minority with connection evolutionary biology) have undersigned the following statement:

We are skeptical of claims for the ability of random mutation and natural selection to account for the complexity of life. Careful examination of the evidence for Darwinian theory should be encouraged.³⁷⁸

The intention is to try to conjure up an illusion of widespread crisis by getting as many people as possible with *any* academic credentials whatsoever to sign the list. However, the statement is a farce; even Darwin himself could have subscribed to it, without ever calling his theory into question, let alone its modern descendant. The line of argument also shows yet again the fallacious dualistic mindset, where attacks on evolution are automatically seen as a defense of special creation. Besides, the list has existed now for over a decade. Getting only a couple of hundred signatories is a weak showing, given the ambitious goal of its publisher. And, as argued earlier, proponents of the IDC are not even a part of the relevant scientific community (and the same goes for people working in completely different areas or with academic degrees far removed from evolutionary biology). In the Kuhnian view of science, it is not for unqualified outsiders to decree a scientific crisis into existence. The idea that it can be done by signing an online petition sponsored by a Christian fundamentalist, free-market-propagating organization, that also sells themed mugs and refrigerator magnets in its online store, causes a truly incommensurable tension with Kuhn’s ideas. Of course, and the conference hosted by the Royal Society in 2016 is a testimony to that fact, there are lively – and indeed far-reaching – discussions among professionals about concepts in evolutionary theory and how to improve or extend them. They include not only technical debates among biologists but also broader considerations from philosophers of biology.³⁷⁹ (Conferences and publication of positions critical of evolutionary theory in mainstream journals also expose the vacuity in the

377 Discovery Institute: *Scientific Dissent from Darwinism*, Seattle: Discovery Institute 2020 (time of last update), retrieved from <https://dissentfromdarwin.org/>, on 2021-01-15; see also, for example, Anonymous: Skepticism About Darwinian Evolution Grows as 1,000+ Scientists Share Their Doubts, Discovery Institute: *Evolution News & Science Today* 2019, retrieved from <https://evolutionnews.org/2019/02/skepticism-about-darwinian-evolution-grows-as-1000-scientists-share-their-doubts/>, on 2021-01-15.

378 Discovery Institute 2020.

allegations made by IDC proponents that scientists are blindly protecting Darwin and that every criticism gets punished and suppressed by the community.) Although some of the rhetoric involved in these debates can potentially be interpreted as manifestations of an underlying crisis, most contributors argue that those who call for major reforms in evolutionary theory base their assumptions on an outdated view of its current status (as neo-Darwinism or Modern Synthesis) and thus falsely exaggerate their own case.³⁸⁰ Be that as it may, all participants have made it clear that their proposals have nothing to do with intelligent design or any other form of creationism, let alone with the real bone of contention for creationists, namely methodological naturalism.³⁸¹ Even if some of the criteria proposed by Kuhn as indicators of a state of crisis seem to be present, such as “the expression of explicit discontent, the recourse to philosophy and [the] debate over fundamentals,”³⁸² other characteristics of crisis are clearly absent, such as “the proliferation of competing articulations [or] the willingness to try anything.”³⁸³ The over-all picture does not give any support to the claim by IDC advocates that modern evolutionary theory is rotten to the core, riddled with anomalies, and lumbering on like a zombie because scientists are blindly prioritizing their atheistic paradigm over inductive reasoning from empirical facts. For example, devastating reviews of Denton’s *Evolution: A Theory in Crisis* and Johnson’s *Darwin on Trial* have shown that both failed to engage correctly with evolutionary theory – up to the point of distorting its tenets, providing over-all faulty logic, use of quote mining, and other such things – and, consequently, were in no position to speak of any kind of crisis.³⁸⁴ Surprisingly, the review with the harshest rhetoric was published in *Nature*, one of the most prestigious journals in the sciences, and its pertinence for the present thesis justifies some

379 See, for instance, Kutschera & Niklas 2004; Pigliucci M. & Müller G.B.: *Evolution. The Extended Synthesis*, Cambridge/London: MIT Press 2010; Laland K.N. et al.: Does evolutionary theory need a rethink? Yes, urgently, *Nature* (2014) 514:161-4; Wray G.A. et al.: Does evolutionary theory need a rethink? No, all is well, *Nature* (2014) 514:161-4; Pievani T.: How to Rethink Evolutionary Theory: A Plurality of Evolutionary Patterns, *Evolutionary Biology* (2016) 43:446-55; Futuyma 2017; Baedke J.: Does the extended evolutionary synthesis entail extended explanatory power?, *Biology & Philosophy* (2020) 35, 20.

380 See, for instance, Wray *op.cit.* and Futuyma *op.cit.*

381 Laland K.N.: Schism and Synthesis at the Royal Society, *Trends in Ecology & Evolution* 32(5):316-7; see also the disclaimer on the website of a group of researchers who take a more radical stance and advocate for a ‘third way’, beyond what they call neo-Darwinism and creationism, including Austrian biologist Gerd B. Müller, who was quoted earlier with an inciting statement on the incompleteness of Neo-Darwinism (Shapiro J., Pookottil R. & Noble D.: *The Third Way* s.d., retrieved from <https://www.thethirdwayofevolution.com>, on 2021-01-15).

382 Kuhn 2012, p. 91.

383 *Ibid.*

384 On Denton’s book see, for instance, Eldredge N.: Review of *Evolution: A Theory in Crisis*, *The Quarterly Review of Biology* (1986) 61(4):541-2; Spieth P.T.: Review of *Evolution: A Theory in Crisis*, *Zygon* (1987) 22(2):252-7; Brauer & Brumbaugh 2001. On Johnson see, e.g., Gould S.J.: Impeaching a Self-Appointed Judge, *Scientific American* (1992) 267(1):118-21; Kitcher P.: *Born-Again Creationism*, in Pennock (Ed.) 2001, pp. 257-87 (here esp. pp. 268-81).

quotes. As far as the line of argument goes, the reviewer called Denton's book "sad stuff" written "for uninformed readers." He maintained that Denton's *modus operandi*

is to sift through the writings of Darwin, and such popular secondary and tertiary sources as Stephen Gould's essays [...]. From this material, [he] seize[s] upon the bits that look like difficulties for Darwinism, and ignore[s] everything else. Then, after surrounding the difficulties with schoolroom rhetoric, *sub-Kuhnian psychobabble* and suitably simplified Victorian history, [he] send[s] the whole to press.³⁸⁵

Conclusions such as these are a frequent occurrence in reviews of creationist tractates. Based on such assessments from members of the community professionally involved with evolutionary theory, it is clear that advocates of IDC would not be able to correctly locate a crisis in evolutionary biology even if it poked them in their eyes.

The next section will look, in a necessarily cursory manner, at why, even *if* there was such a crisis in Kuhn's sense, the work of IDC proponents does not qualify as the promised savior in the eyes of the relevant community. Worded differently, now that it has been established in this section that the interpretation of Kuhn offered by members of the IDC movement is neither plausible nor coherent (especially concerning option (2) stated at the end of Chapter VII.), which elements of Kuhn's ideas can be used to clip the wings of IDC's scientific aspirations (option (1))?

VIII.b Kuhn Strikes Back

Chapters III. to VI. have been one long argument to show the continuity from run-of-the-mill creationism to its modern-day offspring, intelligent design creationism. By itself alone, if Kuhn's conception of science as discussed in the previous subsection is taken seriously, establishing that design theory is a relic of *tempi passati* is already enough to disqualify it from being a 'new' paradigm-candidate in science. For Kuhn maintained that a new paradigm has to be "sufficiently unprecedented to attract an enduring group of adherents away from competing modes of scientific activity."³⁸⁶ But intelligent design has also failed to gain acceptance in the relevant community of evolutionary professionals, based on the epistemological wiggle room Kuhn offered for the rational evaluation of new theories: logic, observations, values. Taken together, these tools can show that IDC is bad science, its core argument the exact opposite of an inference to the best explanation.

385 Ridley M.: More Darwinian detractors, *Nature* (1985) 318(6042):124-5, quote on p. 124 (emphasis added).

386 Kuhn *op.cit.*, p. 10.

The trouble for design theory already starts with its basic idea. To recap, a description of this idea looks like this:

Intelligent design is a scientific theory which states that some aspects of nature are best explained by an intelligent cause rather than an undirected cause such as natural selection. Design theorists argue that we can find biological structures with the same informational properties we commonly find in objects we know were designed.³⁸⁷

Hidden behind it are two premises that are necessary for the argument to work. First, the belief that human-crafted artifacts are similar enough to natural structures. Second, that the human designers are similar enough to the (unknown) intelligent designer. Without these, the inference from ‘We can easily tell which things in the human sphere are intentionally designed.’ to ‘We can just as well detect which things in nature are intentionally designed.’ is totally empty. But both premises are faulty. The former one because artefacts created by humans have a ‘life history’ and characteristics completely at odds with those of biological organisms.³⁸⁸ The latter one because we know nothing about the intelligent designer. That is because IDC proponents do not even try to specify who that designer might be (for the legal reasons outlined earlier), so ‘officially’ no information on the designer has been disclosed; or because they believe the designer is the Christian God – of whom nothing is known either, except for what Scripture and theological traditions allegedly know. And this line of reasoning only works if one believes in the Bible and God in the first place. Which, as a matter of fact, was admitted by Behe during the hearings of the *Kitzmiller* trial, where he is on the record with the admission that “the *plausibility of the argument for ID depends upon the extent to which one believes in the existence of God.*”³⁸⁹³⁹⁰

Likewise, all the talk about information and information theory, particularly as proposed by Dembski’s ‘complex specified information’, has been rejected by scientific professionals as fundamentally flawed and incapable of detecting anything, let alone the fingerprints of the Designer.³⁹¹ The same fate has struck the brightest star of the IDC movement: Behe and his notion

387 Luskin s.d.

388 Pigliucci M. & Boudry M.: Why Machine-Information Metaphors are Bad for Science and Science Education, *Science & Education* (2011) 20:453-71; Nicholson D.J.: Organisms ≠ Machines, *Studies in History and Philosophy of Biological and Biomedical Sciences* (2013) 44:669-78.

389 Jones 2005, p. 28 (italics in the original).

390 See also Axe 2016, p. 185.

391 Godfrey-Smith P.: *Information and the Argument from Design*, in Pennock (Ed.) 2001, pp. 576-86; Fitelson B., Stephens C. & Sober E.: *How Not to Detect Design – Critical Notice: William A. Dembski*, The Design Inference, in Pennock (Ed.) 2001, pp. 597-615; Elsberry W. & Shallit J.: Information theory, evolutionary computation, and Dembski’s “complex specified information”, *Synthese* (2011) 178:237-70. For a broader discussion of the kind of information present in biological systems see Dawkins R.: *The “Information Challenge”*, in Pennock *op.cit.*, pp. 618-31.

of ‘irreducible complexity’. Already one of the earliest reviews of his book *Darwin’s Black Box* showed (*) Behe’s claim that irreducibly complex systems (according to the definition used by him) cannot evolve naturally to be defective and that in first half of the 20th century, Nobel Prize winner Hermann Joseph Muller had already pointed out how such systems can develop; (*) that Behe disingenuously downplayed the well-established concept of gene duplication because it would render his whole idea pointless; (*) and that the entire book is a “bizarre string of confusions and contradictions.”³⁹² Other replies highlighted yet more fatal errors.³⁹³ This stands in stark contrast to Behe’s claims that his insight is “so unambiguous and so significant that it must be ranked as one of the greatest achievements in the history of science,” rivaling “Newton and Einstein, Lavoisier and Schrödinger, Pasteur, and Darwin.”³⁹⁴ This mismatch is a perfect illustration of how out of step IDC notables are with scientific professionals.³⁹⁵ Behe’s other contributions in the name of design theory offer no positive case to establish a novel paradigm but consist solely of attacks on evolution; it can therefore be ignored for the present purposes.³⁹⁶ Which leaves only a – quite literal – childish ‘design intuition’ as basis for a potential intelligent design research program, for instance as espoused by Axe (see Chapter VI.). As such, it barely merits any attention. It should just be pointed out that the probability calculations offered by Axe, Dembski, and Behe, to support the intuition that biological structures and organisms are designed, have all fallen short in the eyes of the relevant scientific community.³⁹⁷ In fact, even Johnson has admitted that there exists no positive case for intelligent design:

392 Orr H.A.: Darwin v. Intelligent Design (Again), *Boston Review* (1996/1997) Dec/Jan:28-31.

393 The fact that a tenured scientist from a secular university came forward with a seemingly sophisticated, ‘scientific’ case in favor of an intelligent designer raised a lot of eyebrows in the scientific community, which can be readily seen from the quantity of book reviews. For a sample see Coyne J.A.: God in the details, *Nature* (1996) 383:227-8; Miller K.R.: A review of Darwin’s Black Box, *Creation/Evolution* (1996) 16:36-40; Blackstone N.W.: Argumentum ad Ignorantiam, *The Quarterly Review of Biology* (1997) 72(4):445-7; Weber B.H.: Irreducible Complexity and The Problem of Biochemical Emergence, *Biology & Philosophy* (1999) 14:593-605. For more discussions see, for instance, Pennock 1999, 2001, 2003, and Jones 2005, pp. 71-83.

394 Behe M.J.: *Darwin’s Black Box. The Biochemical Challenge to Evolution* (10th Anniversary Edition), New York/London/Toronto/Sydney: Free Press 2006, quote on pp. 232-3.

395 Even though Behe admitted in 2001 that irreducible complexity failed to take into account how evolution actually works, today he is still touting it as a successful challenge to evolutionary theory (Behe M.J.: Reply to My Critics: A Response to Reviews of *Darwin’s Black Box: The Biochemical Challenge to Evolution*, *Biology and Philosophy* (2001) 16:683–707; *Id.*: *A Mousetrap for Darwin. Michael J. Behe Answers His Critics*, Seattle: Discovery Institute Press 2020.

396 For example, Behe 2019.

397 See, for instance, Rosenhouse J.: On Mathematical Anti-Evolutionism, *Science & Education* (2016) 25:95-114; Forrest & Gross 2004.

I also don't think that there is really a theory of intelligent design at the present time to propose as a comparable alternative to the Darwinian theory, which is, whatever errors it might contain, a fully worked out scheme. There is no intelligent design theory that's comparable.³⁹⁸

Based on these criticisms, it is no surprise that evolutionists are forcefully rejecting the high-flying aspirations of IDC adherents. Kuhn's criteria, such as fruitfulness of potential future research, only compound the problem. The intellectual sterility of the Discovery Institute's 'peer-reviewed' journal, *BIO-Complexity*, has already been mentioned. Likewise, a cursory glance at the 'Best of' stories published at the end of each year on the Discovery Institute's main public-outreach venue, *ENST*, clearly shows that their focus is on attacking 'Darwinism', complaining about being censored, lamenting the bad influence 'materialism' has on society, and advertising their books and conferences. Based on what they have offered so far, it is impossible to see how intelligent design could provide puzzles (and solutions) for scientific exploration. Other criteria, such as plausibility and compatibility with other scientific theories, provide an equally dire outlook. Advocates of IDC have clearly failed to follow Kuhn's suggestion on how to establish itself as a vital alternative to the reigning paradigm. In fact, the development of intelligent design since its consolidation as a coherent movement in the early 1990s is the exact opposite of what Kuhn suggested a successful paradigm should look like:

At the start a new candidate for paradigm may have few supporters, and on occasions the supporters' motives may be suspect. Nevertheless, if they are competent, they will improve it, explore its possibilities, and show what it would be like to belong to the community guided by it. And as that goes on, if the paradigm is one destined to win its fight, the number and strength of the persuasive arguments in its favor will increase. More scientists will then be converted, and the exploration of the new paradigm will go on.³⁹⁹

Yet, as discussed earlier, establishing that IDC is bad science alone would not be enough to prevent exponents of the ID movement from pushing their 'theory' into the science curricula of U.S. public schools, since there is no constitutional wall to hold off bad science, if the electorate casts its vote accordingly. The question arises now if there is something spicier that can be harvested from Kuhn's work. The claim, offered by some authors, that Kuhn provided, at most, a "single criterion approach" to demarcation⁴⁰⁰ is based on Kuhn saying that puzzle-solving is the closest thing to a

398 Phillip E. Johnson as quoted in Miller K.R.: *Deconstructing Design: A Strategy for Defending Science*, *Cold Spring Harbor Symposia on Quantitative Biology* (2009) 74:463-68 (here on p. 464).

399 Kuhn 2012, pp. 157-8.

400 Mahner M.: *Science and Pseudoscience. How to Demarcate after the (Alleged) Demise of the Demarcation Problem*, in Pigliucci & Boudry (Eds.) 2013, pp. 29-43 (quote on p. 32); the same is claimed in Hansson S.O.:

definite demarcation criterion he has.⁴⁰¹ However, that is not the whole story, for he did offer several other essential characteristics of science, some of which have already been brought up in the previous subsection. Together, these can be used to set science apart from other social activities, such as the arts, literature, and pseudo- or nonscience.⁴⁰² Although Kuhn himself believed no clear-cut, unequivocal way to demarcate science from pseudoscience (or nonscience) can be found or should even be sought after.⁴⁰³ His anti-realist stance, his nonteleological view of evolving communities and epistemic values, his appreciation of individual variability in value-application, and the rejection of fixed rules for theory-choice all suggest that his view of science simply does not license a demarcation criterion, or a group of criteria, that can be applied uniformly in all cases. It follows that different theories under examination require potentially different criteria or a different emphasis put on each criterion. For example, creationists make extensive use of political pressure, legal bills and resolutions, as well as obfuscation, to hide their religious motives. They vilify scientists, and – like a Melanesian cargo cult – they set up mock journals and ‘laboratories’ imitating mainstream science practice. Nothing similar can be found among astrologers or believers in dowsing, for instance. Accordingly, the composition and weighting of criteria have to be responsive to the characteristics of the candidate. Based on the three-pronged categorization proposed by Mitchell G. Ash, demarcation criteria can be classified regarding the historical development of a candidate, its propositions and how they are supposed to be inserted into science, and moral considerations.⁴⁰⁴ Kuhn’s ideas offer something for each of these categories.

The historical post hoc argument against creationism has already been discussed above. Its theology-based paradigm has been pushed out of biology through Darwin’s theory of transmutation and his heirs. This is also why the elaborations on the genealogical continuity of intelligent design with that paradigm are so important – and devastating for the scientific pretensions of design theorists. Indeed, Kuhn said that “the man who continues to resist after his whole profession has been converted has *ipso facto* ceased to be a scientist.”⁴⁰⁵ Since Kuhn’s view of science clearly excludes the resurrection of fossilized paradigms, what the men of IDC are proposing has ceased to

Defining Pseudoscience and Science, Pigliucci & Boudry *op.cit.*, pp. 61-77 (p. 72) and Bird A.: Kuhn, Naturalism, and the Social Study of Science, in Kindi V. & Arabatzis T. (Eds.): *Kuhn’s The Structure of Scientific Revolutions Revisited*, New York/London: Routledge 2012, pp. 205-30 (p. 219).

401 Kuhn T.S.: *Logic of Discovery or Psychology of Research*, in Kuhn 1977, pp. 266-92 (p. 272).

402 See Kuhn 2012, p. 206.

403 See Kuhn 1977, p. 272.

404 See Ash M.G.: Pseudowissenschaft als historische Größe. Ein Abschlusskommentar, in Rupnow D. et al. (Eds.): *Pseudowissenschaft*, Frankfurt am Main: Suhrkamp 2008, pp. 451-60.

405 Kuhn 2012, p. 158 (his italics).

be scientific at least some 150 years ago.⁴⁰⁶ Turning to Ash's second category, Kuhn proposed several interconnected criteria for a synchronic evaluation of would-be scientific theories. As mentioned, the ability to provide puzzles and puzzle-solutions was of central importance to Kuhn and his conception of science. For instance, he excluded astrology from science because its paradigmatic assumptions were so broad that no puzzles nor potential solutions could be logically derived from them.⁴⁰⁷⁴⁰⁸ In that regard, intelligent design clearly fails. It is a sterile enterprise with no positive research agenda to generate puzzles and solutions. Of course, they can formulate questions, such as Does gold have a purpose? or Was the bacterial flagellum designed?, but they have no way to get an answer, and even if they did, nothing more could be done to further articulate the theory: How were bacterial flagella designed? When? And why? What for? No suggestions for answers have been forthcoming. Nor will they, because the 'designer' they have in mind is a supernatural entity. As such, it is in principle not open to test and experiment, which is why it is at odds with the methodological naturalism at the heart of contemporary science.⁴⁰⁹ On this point, Kuhn offers no relief to creationists. He specifically said that "scientists are concerned with the study of *natural* phenomena"⁴¹⁰ and that "no theory that was not *in principle* testable could function [...] when applied to scientific puzzle solving."⁴¹¹ Although it is not entirely certain if Kuhn held these methodological limitations of science to natural causes and effects to be valid a priori, in the light of his evolutionary view of the nature of science, it is only plausible that he considered methodological naturalism to have 'evolved' as well. And that it is now a prerequisite for conducting science because it has survived a selection process spanning many generations of scientific communities. Kuhn put even more emphasis on his argument that the community of professional scientists is the "exclusive arbiter"⁴¹² for evaluating (new) theories. In the context of creationism, him stressing that "if nonprofessional authority were the arbiter of paradigm debates,

406 99% of its public figures are men.

407 Kuhn 1977, pp. 274-7. Relevant to the first category of demarcation criteria, Kuhn also stated that astrology was once part of astronomy, i.e. of science as practiced then, but stopped being so because astrologers failed to partake in paradigm shifts through which astronomy progressed (Kuhn 2012, FN 11 on p. 19). The parallel to creationism is striking.

408 Contrast this with Behe's admission that under his idea of the nature of science, astrology would have to be included as scientific even today (see above, p. 40).

409 See Pennock 2011 and 1999. Also, on how Behe uses a supernatural loophole in his argument of irreducible complexity, see for example Coyne 1996.

410 Kuhn 2000, p. 118 (emphasis added).

411 Kuhn 1972, p. 248 (italics in the original).

412 Kuhn 2012, p. 167.

the outcome of those debates might still be revolution, but it would not be *scientific* revolution” is particularly helpful.⁴¹³ And last but not least:

One of the strongest, if still unwritten, rules of scientific life is the prohibition of appeals to heads of state or to the populace at large in matters scientific.⁴¹⁴

These criteria provide another basis for the exclusion of intelligent design from science, considering the unrelenting attacks on the epistemic standing of scientific communities and the accusations of moral depravity emanating from Darwin(ism),⁴¹⁵ the unhinged attempts to wedge design theory into public science classes through legal fiat and political lobbying, as well as the constant pandering to the general public, through conferences, movies, selling of refrigerator magnets, contracting of PR companies, and so on.

As for Ash’s third category, Kuhn even offers a moral criterion for demarcation. Even though it is not unique to scientific discourse, if used together with other criteria, it can play quite a powerful role to exclude certain activities from science. For present purposes, it may be called honesty or integrity, since Kuhn did not attach a specific label to it:

But scientists may always be asked to explain their choices, to exhibit the bases for their judgments. Such judgments are eminently discussable, and the man who refuses to discuss his own cannot expect to be taken seriously.⁴¹⁶

Something along these lines is at the basis of the well-established practice to revoke academic titles that have been acquired through plagiarizing or straight-up falsification of data. It is being used to retract publications from the body of scientific literature (thus also rejecting its theoretical and empirical propositions) and remove individuals from scientific institutions and academic positions. Though not unequivocal in its application, and probably even resented by some, it is a powerful ideal held up by the scientific community as a whole: No one who admitted upfront to be a deceiving, cunning stealer of ideas and fabricator of data would be accepted into a scientific community (nor any community, hopefully); they would most likely fail in their early days in university. Such a criterion is very pertinent to the case of IDC. Not only do advocates of design theory refuse to identify the designer (at least ‘officially’). They actively try to hide their ultimate sectarian motivations, for example, by advancing so-called ‘academic freedom’ bills to weaken the teaching of evolution in U.S. public science classes. These motivations, as pointed out in the early

413 Kuhn *op.cit.*, p. 166 (italics in the original); see also Kuhn 1977, p. 290.

414 Kuhn 2012, p. 167; also Kuhn ²1972, p. 263.

415 These accusations are sometimes couched in more academic prose, e.g. Weikart R.: *From Darwin to Hitler. Evolutionary Ethics, Eugenics, and Racism in Germany*, New York/Houndmills, Basingstoke, Hampshire: Palgrave Macmillan 2004.

416 Kuhn 1977, p. 337.

chapters of this thesis, are not only religious in a general sense – such as those who propose that God created *via* natural laws and (evolutionary) mechanisms –, but a highly specific sectarian conviction that calls for a close relationship with the Creator, not only with each individual but also with the world, i.e. special creationism. But the lack of integrity on the side of IDC adherents does not end there. They also subvert the peer-review process by channeling their work through editors of third-rate journals, who are sympathetic to their anti-evolution crusade, and then wave the articles around as proof of design theory being scientific.⁴¹⁷ Or by submitting book manuscripts to the engineering division (as opposed to the life sciences division) of reputable science publishers in order to trick the peer-reviewers and editors, who may not be cognizant of the creationist newspeak about information and complexity or of deceptively-labeled ‘institutes’ with all their PhD-touting ‘Research Fellows’.⁴¹⁸ Members of the Discovery Institute also do not shy away from spreading falsehoods in the academic literature. It was pointed out earlier that champions of IDC actively sought to introduce intelligent design into the science curricula of public schools in the U.S.⁴¹⁹ Yet, after the *Kitzmiller* decision had ruled intelligent design to be a religious concept and thus unfit for these curricula, affiliates of the Discovery Institute started to claim that they had “consistently *opposed* policies that would mandate the teaching of the theory of ID in public schools.”⁴²⁰ More stories like these exist, but the necessary point here has been made.

Taking all these criteria into consideration, a solid case can be made by using Kuhn’s view of the nature of science to designate the entire IDC paradigm as nonscience or pseudoscience. Their whole operation runs afoul of several characteristics of science, and maybe with the exception of the criterion from morality, they are all decisive. As a matter of fact, observing creationist behavior and tactics, the reading of Kuhn suggested here even sanctions active resistance against their movement, as they try to undermine the very basics that Kuhn held essential for the scientific enterprise (e.g. the peculiar nature of student education or the epistemic supremacy of professional communities in matters scientific).

Writing these conclusions down in an academic treatise is one thing, but would demarcation à la Kuhn also work in a practical setting? Yes, most likely. The criteria to exclude intelligent design

417 Brayton E.: The Richard Sternberg Affair. Intelligent Design at the Smithsonian Institution, *Skeptic* (2008) 14(2), retrieved from <https://www.skeptic.com/eskeptic/08-04-17/#part2>, on 2021-01-20.

418 O’Hare B.: Science book delayed when someone notices it’s written by creationists, *The Guardian* 2012-03-07, retrieved from <https://www.theguardian.com/science/grrlscientist/2012/mar/07/2>, on 2021-01-20.

419 See above, FN 189 & 190.

420 DeWolf, West & Luskin 2007, p. 10 (*italics in the original*).

from science used in the *Kitzmiller* trial, for example, were also not perfectly unequivocal (except maybe for the appeal to the supernatural), yet they definitely had an impact. Following Pennock's assessment that identifying the violation of methodological naturalism by itself would have been enough to label intelligent design as religious in the legal setting of the Dover Trial, the plaintiffs could have just as much relied on Kuhn to make the same point.⁴²¹ In fact, the other attributes used by the judge in Dover resemble Kuhn's criteria.⁴²² With the integrity criterion, Kuhn could have even provided one more leg to stand on in the court room battle against IDC. While Kuhn's reservations about his potential lack of success in a trial against creationists may or may not have been justified in the 1980s, some 20 years later, he could have entered the fray without holding back.

421 Pennock 2011, p. 190. (Pennock served as an expert witness for the side of the plaintiffs and was a major force behind the philosophical arguments that convinced the judge to rule intelligent design religious.)

422 See above, Chapter VI., pp. 39-40

IX. Conclusion

There is no excuse for the crude parodies of Kuhn's position that are still in circulation. Collectively if we wanted to understand him we could. All too often it seems that we do not want to.

(David Bloor)⁴²³

In light of what he saw – and quite correctly so – as nonsensical interpretations of his ideas, Kuhn postulated the existence of an alter ego, Kuhn₂, whose ideas are almost diametrically opposed to his own, but whose writings nevertheless seem to have been the basis for the allegations made by some critics against himself (Kuhn₁).⁴²⁴ It is not clear if Kuhn was ever aware of the extent to which creationists have used his work in their crusade against evolution and the standing of science in society. It does not seem like he was, or else he would have needed to postulate the existence of yet another incarnation of himself, Kuhn₃, whose writings are not just at odds with Kuhn₁ but are a grotesque distortion of him. Even the most generous and permissive hermeneutist imaginable would find it hard to believe that Kuhn₁ is the basis for the interpretation of *Structure* advanced by proponents of IDC, such as Johnson or Wells. On top of that, what they try to make out of Kuhn's work is also incoherent in itself *and* with the broader goals and tenets of their movement. If one seriously considers Kuhn's own criteria of logic and rational argument based on values such as accuracy, external and internal consistency, and plausibility, the IDC interpretation amounts to a willful distortion to fit him into their narrative, by hook or by crook. Already the simple realization that Christian fundamentalists try to use Kuhn's evolutionary view of science to attack evolution and evolutionary theory is exceedingly ironic. The irony turns into absurdity when they argue that because Kuhn said scientific theory-choice is subjective and irrational (he didn't), they are correct to insist that scientists discriminate against design theory because of a precommitment to the "nontheistic religion of secular evolutionary humanism."⁴²⁵ If taken in earnest, their own relativistic interpretation would also undermine scientific creationism and intelligent design. And in the end, it would deconstruct biblical authority, thus forcing the faithful to concede that they have reduced the lofty notions of a benevolent and omniscient God, whose existence can be confirmed through observation and reason, to the same level as belief in Russell's teapot. But coherence is not the

423 Bloor D.: Obituary Thomas S. Kuhn (18 July 1922 – 17 June 1996), *Social Studies of Science* (1997) 27:498-502 (quote on pp. 501-2).

424 Kuhn ²1972, p. 231.

425 Morris ²1998, p. iii.

foremost concern for creationists in their attack on evolution. They do not want to deconstruct everything, only ‘Darwinism’ and the naturalistic practice of science.⁴²⁶ Meanwhile, Kuhn argued that science is a unique social enterprise, whose professional *communities* are the only ones who can speak authoritatively on scientific matters, even though individual members can be influenced by extrascientific preconceptions. Both research practice and epistemic values for theory-choice have evolved over centuries, allowing science to produce progress unattainable in other areas of human activity, such as the arts or theology. Kuhn’s work does not license the claim that there are different, equally valid kinds of scientific rationality – there is only one kind; what changes is the number and composition of criteria operational in communities during rational discourse. The paradigm (or disciplinary matrix) dictates which values are permissible, determines puzzles worthy of research and suggests limits to their solutions. A Kuhnian paradigm is not a grab-bag full of random philosophical or ideological ideas. It cannot be, for it has emerged from an earlier paradigm that successfully guided previous generations of communities, which itself was born out of the paradigm before that. And so on, back to prescientific times, where, ultimately, those groups survived and reproduced (both biologically and culturally) whose acumen allowed them to solve the puzzles put forth by nature, while those who could not tell apart a stick from a snake perished. Probably because he took it for granted, Kuhn only made passing reference to methodological naturalism as one of these values that characterize science today. He made it very clear, however, that appeals to politicians or the general public to settle scientific disputes would destroy the basis of science. Yet all these ideas are anathema to creationists. Especially their vilification of ‘Darwinists’ as morally and intellectually bankrupt Hitler-enablers, trapped inside their antireligious paradigm, borders on obsession. Creationists *do* appeal to the supernatural, politicians and the wider public in order to suppress the teaching of evolutionary theory in public school science classes and/or to wedge their own ‘theory’ into science courses. The topic even reached the pinnacle of U.S. politics when then-president George W. Bush (*1946) said that “both sides ought to be properly taught.”⁴²⁷ Kuhn also stressed that science, like biological evolution, is unidirectional; there is no retrogression to already-discarded paradigms or theories. In this vein, intelligent design’s core assumptions have been revealed as nothing but dressed-up natural theology à la William Paley. It

426 For more on the deconstructivist approach taken by Johnson and colleagues and its internal incoherence see Pennock 2010.

427 See Bumiller E.: Bush Remarks Roil Debate Over Teaching of Evolution, *New York Times* 2005-08-03, Section A p. 14, retrieved from <https://www.nytimes.com/2005/08/03/politics/bush-remarks-roil-debateon-teaching-of-evolution.html>, on 2021-01-23.

has been rejected by the relevant scientific communities as flawed and unable to provide puzzles and solutions necessary for normal science. If one takes Kuhn's view of science seriously, design theory – hailed by its proponents as a new scientific rival paradigm to 'Darwinism' – is neither new nor scientific. With the contention that honesty and integrity are also an essential component of science, Kuhn even provides a way to include the creationists' constant spreading of falsehoods, their obfuscations and stealth tactics, when discussing to which side of the wall of demarcation their theories belong.

If the reading of Kuhn presented in these pages has merit, he could play a much more proactive role in the evolution/creation controversy, instead of just being abused by creationists. Even Pennock, whose writings on the IDC-Kuhn affair have been foundational to this thesis, may not have given enough credit to Kuhn's view of science and how it can be deployed against the creationist attacks on evolution and science. For instance, Kuhn's subtle references to methodological naturalism remain unmentioned in Pennock's discussions on Kuhn. In addition, Pennock did not consider Kuhn's point on honesty and integrity, thus missing a potentially interesting auxiliary tool to demarcate creationism from science. Equally unfortunate is that Pennock wrote a lot about how scientists have to be open about their research and their line of reasoning, as well as how appeals to authority are not acceptable in science, but failed to mention that Kuhn has said the exact same things. Also, while Pennock acknowledged (some of) Kuhn's proposed epistemic values, he falsely claimed that Kuhn said these values were "invariant between paradigms,"⁴²⁸ thereby overlooking the evolutionary component of Kuhn's view of science. A curious omission, because Pennock explicitly referred to Kitcher's "evolutionary epistemology" and how he was influenced by Kuhn's critique of logical positivism.⁴²⁹ The omission is even more tragic in light of the reading of Kuhn presented in this thesis, where the evolutionary component plays a central role. It seems Kuhn's complaint that no one took his evolutionary perspective seriously is also accurate for some of the major players who defend evolution against the creationist assault.

All in all, the relationship between Kuhn and creationists is analogous to parasitism in ecology: An antagonistic interaction, wherein the parasite lives off the host and potentially inflicts harm to him. While creationists cherry-pick pieces from Kuhn's body of work (from *Structure*, to be precise) and twist them out of shape in order to feed them into their narrative, Kuhn gains nothing in return. On the contrary, his reputation is tarnished by association and he is reduced to the role of a passive

428 Pennock 1999, p. 208.

429 Pennock *op.cit.*, p. 354.

victim. While scholars such as Pennock, Rouse, or Kitcher have exposed the major flaws and some of the distortions inflicted upon Kuhn by the creationists, this thesis has provided more details to help remove these disfigurements from Kuhn's legacy. The fact that the creationist plague so heavily afflicted Kuhn is particularly tragic, because unlike other philosophers who have also been abused by antievolutionists,⁴³⁰ Kuhn never said unfortunate things about the scientific status of evolutionary theory and natural selection.⁴³¹ Here, modesty and the conviction that it is the *scientific* community – not philosophers of science – who is the sole arbiter on issues in evolutionary biology clearly helped him to avoid embarrassment. Unfortunately, his position on scientific communities makes him, even if only implicitly, also a target of the vitriolic accusations hurled around by creationists: When they denigrate scientists because they 'unfairly' reject faith-based 'theories', by extension they also denigrate Kuhn, since he maintained that communities of scientists are the only authority in scientific questions. But in addition to some thorough cleansing, Chapter VIII.b provides an exposition of demarcation criteria offered by Kuhn, allowing him to take an active part in the evolution/creation struggle. Here, his utility is not limited to a singular criterion, as suggested by Hansson or Bird, for example, but includes other decisive standards as well that are particularly effective against creationist tactics.

But the struggle against creationism not only concerns scientific, historical, and philosophical matters, since the attack on evolution marches in lockstep with a broader cultural movement. The values cherished by fundamentalist and conservative Christians, the main supporters of creationism, are not only at odds with contemporary science but also with modern views on the equality of women, abortion rights, LGBT issues, and freedom of and from religion.⁴³² In the case of the Discovery Institute, as mentioned in the Wedge Document and elsewhere, advocacy for small government and free-market policies also comes into play.⁴³³ Given the devastating effects for the entire biosphere on earth, not to mention the social and moral destitution and the political dysfunctions, any pushback against an economic system based on unhinged profit orientation and

430 See Hull 1999.

431 Then there is also the category of philosophers who say provocative things about evolutionary theory, fully aware of the implications for the evolution/creation controversy – in their case, they are used but not abused by creationists (Nagel T.: Public Education and Intelligent Design, *Philosophy & Public Affairs* (2008) 36(2): 187-205; *Id.*: *Mind and Cosmos. Why the Materialist Neo-Darwinian Conception of Nature Is Almost Certainly False*, Oxford/New York: Oxford University Press 2012).

432 See Pennock 2010; Pennock 1999, chapter 8; Schäfer A.R.: *Countercultural Conservatives: American Evangelicalism from the Postwar Revival to the New Christian Right*, Madison: University of Wisconsin Press 2011.

433 See also Hackworth J.: Religious Neoliberalism, in Cahill D., Cooper M., Konings M. & Primrose D. (Eds.): *The SAGE Handbook of Neoliberalism*, London/Thousand Oakes, CA/New Delhi/Singapore: SAGE 2018, pp. 323-34.

growth seems more than worthwhile.⁴³⁴ On top of that, the neoliberal transformation of society has greatly accelerated the commodification of higher education over the last several decades, transforming one half of its participants into mere Humankapital and the other half into consumers of streamlined curricula adjusted to employability and market conformity. The intrinsic values of scientific communities and their work are increasingly subjected to the overarching dictates of competitiveness and efficiency, manifesting themselves in the shape of performance audits, benchmarking, quality assurance measures, impact factor fetishism, and so forth, all planned and implemented by a cadre of politicians, managers, and other extrascientific technocrats.⁴³⁵ Such a development arguably undermines the social nature of science, as envisioned by Kuhn. If he can help to demarcate science from religious fundamentalism, as this thesis maintains, Kuhn may also be able to supply arguments to help preserve the autonomy of science vis-à-vis the forces of market fundamentalists. Accordingly, using Kuhnian concepts to closer investigate the incursion of the neoliberal Denkstil into science could potentially be as rewarding as the analysis of creationist strategies in their attack on evolutionary theory.⁴³⁶

The question of demarcation also has another economic dimension, because if not clearly excluded from science, proponents of intelligent design are, in principle, eligible for money from (state-owned) funding organizations. At least in their early days, before being widely exposed and rejected by scientists, IDC notables professed a strong interest in accessing grants from the U.S. National Science Foundation.⁴³⁷ So even in these roundabout ways, it seems like Kuhn is as relevant as ever.

434 For example, Cooper V. & Whyte D. (Eds.): *The Violence of Austerity*, London: Pluto Press 2017; Brown W.: *In the Ruins of Neoliberalism. The Rise of Antidemocratic Politics in the West*, New York: Columbia University Press 2019; Wiedmann T., Lenzen M., Keyßer L.T. & Steinberger J.K.: Scientists' warning on affluence, *Nature Communications* (2020) 11, 3107.

435 Cf. Münch R.: *Akademischer Kapitalismus. Zur Politischen Ökonomie der Hochschulreform*, Berlin: Suhrkamp 2011.

436 See Nordmann J.: *Der lange Marsch zum Neoliberalismus. Vom Roten Wien zum freien Markt – Popper und Hayek im Diskurs*, Hamburg: VSA Verlag 2005.

437 For instance, Dembski W.A.: *Introduction: Mere Creation*, in Dembski (Ed.) 1998, pp. 13-30.

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List of abbreviations

AiG.....Answers in Genesis

CRS.....Creation Research Society

CRSC.....Center for the Renewal of Science and Culture

CSC.....Center for Science and Culture (formerly CRSC)

ENST.....Evolution News & Science Today

FTE.....The Foundation for Thought and Ethics

ICR.....Institute for Creation Research

IDC.....Intelligent Design Creationism

SCOTUS.....Supreme Court of the United States of America

Abstract

Intelligent design is the latest incarnation of biblical creationism. It emerged in the 1980s in the U.S. of America and consolidated into a coherent movement in the early 1990s. Since then it has become an international phenomenon by spreading to South America, Europe, and elsewhere. In their attack on evolutionary theory, proponents of intelligent design creationism (IDC) deploy terminology and concepts taken from Thomas S. Kuhn's (1922-1996) philosophy of science. They claim that 'Darwinism' is a theory in crisis, full of unsolved puzzles and anomalies, and ripe to be replaced by their own design theory in a new scientific revolution. Referring to Kuhn's idea of incommensurability and his (supposed) epistemic relativism, they also maintain that 'Darwinists' refuse to accept this situation due to their philosophical preconceptions and psychological biases. After a short excursion into modern evolutionary theory and a brief history of creationist thought, this thesis provides a detailed reappraisal of a representative sample of Kuhn's work and a survey of key IDC texts. A thorough comparison demonstrates that the interpretation of Kuhn espoused by IDC advocates amounts to a misappropriation of his legacy. Their Kuhnian aspirations are neither plausible nor coherent. On the contrary, it will be argued that Kuhn provides convincing demarcation criteria to exclude IDC from science.

Zusammenfassung

Intelligent Design ist die neueste Manifestation von biblischem Kreationismus. Entstanden in den 1980er-Jahren in den Vereinigten Staaten von Amerika, hat es sich ab den frühen 1990ern zu einer geschlossenen Bewegung konsolidiert. Mittlerweile ist es zu einem internationalen Phänomen angewachsen und auch in Südamerika, Europa, und anderen Regionen präsent. In ihrem Angriff auf evolutionsbiologische Theorien setzen VertreterInnen des Intelligent Design Kreationismus (IDK) auch auf wissenschaftsphilosophische Terminologie und Konzepte von Thomas S. Kuhn (1922-1996). Sie behaupten hierbei, dass sich die Theorie des ‚Darwinismus‘ in einer Krise befindet, voll mit ungelösten Rätseln und Anomalien, und dafür reif ist, um von ihrer eigenen Design-Theorie in einer wissenschaftlichen Revolution abgelöst zu werden. Mit Berufung auf Kuhns Ideen zur Inkommensurabilität und seinem (angeblichen) epistemischen Relativismus, erklären sie außerdem, dass sich die ‚Darwinisten‘ aufgrund philosophischer Befangenheiten und psychologischer Gründe gegen diese Entwicklung wehren. Nach einem Exkurs zum aktuellen Stand der Evolutionstheorien und einer kurzen geschichtlichen Abhandlung des Kreationismus, umfasst die vorliegende Masterarbeit eine detaillierte Darstellung einer repräsentativen Auswahl aus Kuhns Werken und gibt einen Überblick relevanter Texte des IDK. In einer genauen Gegenüberstellung zeigt sich, dass die von IDK-VertreterInnen aufgestellte Interpretation von Kuhn einer Zweckentfremdung seiner Aussagen gleichkommt. Ihre Kuhn’schen Bestrebungen sind weder plausibel, noch kohärent. Ganz im Gegenteil, die Arbeit argumentiert sogar dafür, dass Kuhn überzeugende Kriterien liefert, um IDK aus der Wissenschaft auszuschließen.