

Pursuing the Source of Information in the Cell

An Empirically-Driven Rebuttal of Naturalism's Critique of *Signature in the Cell*

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November 28, 2016, revised February 18, 2017

Stephen C. Meyer. *Signature in the Cell: DNA and the Evidence for Intelligent Design* (SC). (Harper One, 2009), 508 pages plus endnotes, bibliography, and index. Textual references are cited in parentheses.

I was surprised at my reaction when I first read Charles Darwin's seminal work, *On the Origin of Species* (OS).¹ Since I had enrolled in Biola University's *Science and Religion* Masters' Degree program precisely for the purpose of equipping myself to become a valiant Christian apologist, I anticipated that I would read that course assignment in a psychological attack-mode that was marked by a hyper-hostile analytical posture. Yet I was immediately attracted to OS with an almost child-like spirit of gaiety. It is not that I *fully* laid aside my spirit of discernment or that I was converted to his central argument. The latter outcome is simply not going to happen. Yet I now consider that, had I allowed my reservations to cloud my experience of reading OS, I believe I would have been thereby intellectually deprived. The aspects of Darwin's work which positively captivated me were two-fold, both of which are pertinent to the significance of Stephen Meyer's work, *Signature in the Cell* (SC). Firstly, my pleasure in reading OS was kindled by my first-hand discovery of Darwin's obvious broad and insatiable curiosity about the zoological facts of life. He was clearly driven by a desire to discover and document as many facts from the natural order as he possibly could. Secondly, short of remotely conceding defeat, Darwin identified without hesitation the very empirical criteria by which his own theory could potentially be falsified.²

In a manner that is consistent with both Darwin's focus and his attention to detail, Meyer in chapter 15 of SC specifies both the nature of his own thesis and the process by which he intends to advance it by stating, "*before historical scientists can evaluate competing explanations of an effect, event, or body of evidence, they usually **need to define precisely what it is that needs to be explained***" (326 — boldface mine). Earlier in his work (ch. 5) Meyer had noted that in light of the "*discovery of life's information processing systems...scientists investigating the origin of life **must now explain at least three key features of life:***" 1) "*the origin of the system for storing and encoding digital information,*" 2) "*the large amount of specified or functionally specified information in DNA,*" and 3) "*the integrated complexity...of the cell's information processing system*" (134, 5 – boldface mine).

It is precisely on this point that science journalist Chris Mooney committed two errors in his critique of Meyer's work by stating, "*Alas, it is pretty hard to directly refute someone [Meyer] who looks at the currently unsolved question of the origins of life, throws up his hands and says, it's [sic] so improbable, God must have done it. That's just not in the scientific spirit.*"³ I reply that it is one thing for Mooney to reject Meyer's world-view (the former identifies "the scientific spirit" with materialism), but an altogether different matter for Mooney to so glaringly misrepresent Meyer's position. Since Meyer expressly distances himself from *god-of-the-gaps* argumentation by stating that he instead arrives at his position by means of *inference to the best explanation* (ch. 15), then it is apparent that Mooney either didn't actually read the book, or that he failed to grasp one of Meyer's most fundamental points.

¹ Charles Darwin. *On the Origin of Species: A Facsimile of the First [1859] Edition*. (Harvard, 1964).

² *Ibid*, pp. 189, 207, 308, 463f (Cambrian Explosion), etc.

³ Chris Mooney. "Time to Refute Steven Meyer?" Nov. 17, 2009. http://blogs.discovermagazine.com/intersection/2009/11/17/time-to-refute-stephen-meyer/#.WC_YOfkrLIW.

Since Mooney's hostile review of SC is apparently premised on the implicit strictures that attend a "naturalistic" view of how science is to be defined, then I will take this opportunity to challenge his assertion that ID is "*not in the scientific spirit.*" Meyer thoroughly substantiates his own position that the traditional demarcation between *scientific* and *non-scientific* inquiry is, according to the broad⁴ consensus of philosophers of science, becoming less fixed (chapters 18 and 19). For example, he states the increasingly obvious: "*This diversity of methods [employed by practitioners across the range of scientific disciplines] has doomed attempts to find a single definition (or set of criteria) that accurately characterizes all types of science ... Thus philosophers of science now talk openly about the 'demise' of attempts to demarcate or define science by reference to a single set of methods*" (401—boldface mine).

It now seems fitting to highlight an additional indication that it is naturalism (of any stripe)⁵, and not ID, which confounds the true "*scientific spirit.*" As abhorrent as the following notion may appear to either of the following parties (though for different reasons), I stand firm in my proposition that, with respect to the matter of commitment to the arbitrating authority of empirical evidence, philosophical naturalism (PN) imposes an intellectual error which is epistemologically equivalent to the strictures that are harmfully imposed by a central dogmatic tenet of young-earth creationism (YEC). In both cases, that error entails embracing an *a priori* non-scientific criterion which functions to advance the desired agenda of the adherent (either PN or YEC) by dismissing or ignoring whatever empirical evidence stands in the way of their respective agendas.⁶ Each party, in its peculiar way, effectively elevates its overriding metaphysical commitment above the authority of empirical facts, in the otherwise valid pursuit of scientific truth.⁷ With respect to the thesis of *Signature in the Cell* in particular, naturalists of every stripe will, as they indeed philosophically **must**, dismiss out-of-hand any evidence which gives indication of a personal Intelligent Designer, either in terms of the direct evidence, or on account of ramifications which logically follow from a given ID-leaning scientific conclusion.⁸

Meyer states on p. 404 that his employment of *inference to the best explanation* from out of a pool of *multiple competing hypotheses* is the same methodological research strategy that Darwin employed in his investigations leading to the writing of his OS. While I would not understate the weight of the role of Darwin's commitment to denying teleology as an explanatory factor to account for the development of life, he nevertheless stands utterly apart from the spirit of contemporary Darwinism by reason of both his granting the priority of empirical data over protecting his premise at all costs, and by his retaining a place for the challenge posed by potential counter-evidence.⁹

My chief objection, for example, to the fury behind *Creationism's Trojan Horse's* objection to ID¹⁰ is that its co-authors and their enthusiastic followers are so ideologically inclined that they appear to be driven less by a pursuit of truth wherever it happens to lead in the realm of the natural sciences,

⁴ Darwinist Michael Ruse has repudiated (in 1993) his prior employment of the demarcation problem as a ploy for delegitimizing ID argumentation (p. 433).

⁵ Either philosophical or methodological.

⁶ Materialist Richard Lewontin stated, "*We are forced by our a priori adherence to material causes to create an apparatus of investigation and a set of concepts that produce material explanations.*" Cited from John A. Bloom. The Natural Sciences: (Crossway, 2015), p.56. ** On the other hand, YECs rejects legitimate scientific evidence indicating creation is older than 6,000 years on the basis of a faulty biblical interpretation. See my essay, "The Biblical Demand to Take Another Look," p. 14, at my website, <http://www.christianityontheoffense.com>.

⁷ Romans 1:18-20 disapproves of the principle which drives these respective parties by its insistence, to the contrary, that the witness of nature is a truthful and trustworthy standard that people are forbidden to suppress.

⁸ Op.cit. (6). ** See also my paper, "Scientism is Not Science," which is available at my website (Op.cit. (6)).

⁹ Op.cit. (2).

¹⁰ Barbara Forrest and Paul Gross. Creationism's Trojan Horse. (Oxford, 2004).

than they are by seeking to frustrate ID researchers in the latter's goal to *best* give a plausible account for the exceedingly high level of life's complexity identified by Meyer on p. 1 of this review.¹¹ Darwin, who argued that, given enough time, un-guided processes could ultimately produce life as we now know it, **understood but a tiny fraction** of what scientists understand about biology today. For this reason it is entirely sensible that the question of the legitimacy of teleology be reopened today. Barbara Forrest asserted in a recent lecture, "*The motivation behind all ['creationist' arguments in general] has always been religion. In no case has the teaching of creationism been motivated by scientific advancement or anything like that.*"¹² That statement is demonstrably false (in spite of my conviction that she sincerely believes it to be true). That she (and Eugenie Scott, both)¹³ could have spoken so inaccurately on this matter illustrates a fundamental error of neglect in the process of scientific investigation, namely that before taking any other step one must gather the actual relevant data and analyze the degree of its legitimacy.¹⁴ As I will endeavor to demonstrate in this paper, Meyer's text represents the very best of scientific investigation in that he begins it with neither theology nor ideology, but in line with Darwin's investigational methods (page 1), by taking stock of the entire range of the data of nature under consideration. That enterprise entails the following two aspects: 1) identifying firstly the features of the natural phenomenon being investigated and which consequently calls for an explanation (p. 1, above), and 2) identifying the *peripheral* empirical data and laws of nature which are relevant to the task of discriminating (by means of the process of elimination) between competing hypotheses in order to determine which one best accounts for the phenomenon.¹⁵ So let's now plough through each of them:

1. The phenomenon of a "system for storing and encoding digital information."

At the time of the first publication of Darwin's OS only a little over a century and a half ago, life in its most primary form (the cell) was deemed to be so simple that it hardly called for an explanation. In OS Darwin never addressed, and apparently wasn't troubled by, the question of the origin of first life for the reason that the cell was at that time viewed as "*homogenous and structure-less globules of protoplasm*" (44) that was composed of so few chemicals, it seemed plausible to them that "*the right*

¹¹ In an interview between Eugenie Scott and Stephen Meyer, Scott sought to denigrate the legitimacy of ID as science by asserting (absurdly) that "*ID descended with little modification from creation science*" (<https://www.youtube.com/watch?v=FFhMxAsMDvk> – 7:15). ** See my paper, "Thirteen Prominent Categorical Objections to Intelligent Design Answered," at my website: <http://www.christianityontheoffense.com>

On the other hand, on another occasion Scott simply equivocated on the question of what constitutes a *scientific* explanation. In an interview which again included both Scott and Meyer, John Gibson of Fox News asked Scott, "*Are scientists able to explain the origin of life in scientific terms?*" She replied, "*No, but that's not what evolution is all about. Evolution is the inference that living things had common ancestors,*" to which Meyer rejoined, "*There is [indeed] an evolutionary theory about the origin of the first life...called chemical evolutionary theory.*" (www.discovery.org/a/2561/). In other words, when Gibson queried Scott as to how science can, **on its own terms**, explain the origin of life, she evaded that decisive question by retreating to the *red herring* fallacy of both distinguishing and separating evolutionary *development* from evolutionary *beginnings*.

¹² Barbara Forrest, William Jeynes, and Steve Harvey. "Religious Liberty and Public Education." 10-14-2013. [youtube.com/watch?v=_Yci6Vs-KYo](https://www.youtube.com/watch?v=_Yci6Vs-KYo) (17:00).

¹³ Op.cit. (11).

¹⁴ Since they seek to undermine Meyer's work, then their relevant data pertains to framing his position correctly.

¹⁵ Although Meyer is a professing Christian, with respect to the facts of nature biblical texts are not used as a net through which to catch data according to its favorability to his theory. Instead, his faith in the rationality of the Maker of heaven and earth inspires him (as in a trajectory) to investigate nature in order to discern whether indications of teleology can be perceived in the realm of specifically biology (143). Indeed, he agrees with former atheist Antony Flew who, as Meyer states, "*Insists correctly that we must 'follow the evidence wherever it leads,' regardless of its implications*" (445).

chemicals in the right environment might combine to make the simple protoplasmic substance” (45). Two of Darwin’s contemporaries, T.H. Huxley and Ernst Haeckel, having rejected vitalism, and at the same time embraced materialism, described the cell as “scarcely indistinguishable from inorganic crystals” (46-47). Yet with the discovery of enzymes and other proteins toward the last decade of the 19th century, it became clear to scientists that life wasn’t simple at all (47). The other side of the story, however, is that Friedrich Wohler’s discovery that the physical composition of living organisms was in fact identical to that of inanimate matter, restored the prominent materialistic belief that physical causes alone could account for the complexity of life after all (49-50).

On the other hand, although vitalism thereby came to be decisively discredited, an entirely new factor came to be introduced into biological thinking. Meyer notes that “the **information revolution** in biology officially began in 1953” when James Watson and Francis Crick announced they had determined the structure of the DNA molecule (58 – boldface mine). I judge Meyer’s narration in ch. 3 of the investigation leading to their discovery to be delightful reading. There he recounts the train of events, even as he also highlights the investigational strategy (abduction), that they employed which led these two relatively under-qualified and little-known scientists, working *outside* of their fields of expertise, to receive the spoils of discovering the double-helix DNA molecule ahead of their “competition.”

If readers seek to *visualize* the inner workings of the cell, including DNA, Michael Denton describes the current level of scientific knowledge of the cell as follows: “*To grasp the reality of life as it has been revealed by molecular biology, we must magnify a cell a thousand million times until it is twenty kilometers across [(think “Independence Day” – the movie)]... On the surface of the cell we would see millions of openings, like the port holes of a vast ship, opening and closing to allow a continual stream of materials to flow in and out. If we were to enter one of these openings we would...see endless highly organized corridors and conduits branching in every direction away from the perimeter of the cell, some leading to the central memory bank in the nucleus and others to assembly and processing units...We would see, all neatly stacked together in ordered arrays, the miles of coiled chains of the DNA molecules. A huge range of products and raw materials would shuttle along all the manifold conduits in a highly ordered fashion in and from all the various assembly plants in the outer regions of the cell...*”¹⁶

He continues, “*We would [further] see that nearly every feature of our own advanced machines had its analogue in the cell: artificial languages and their decoding systems, memory banks for information storage and retrieval, elegant control systems regulating the automated assembly of parts and components, error fail-safe and proof-reading devices utilized for quality control, assembly processes involving the principle of prefabrication and modular construction.*”¹⁷

At the same time, in contrast to Denton’s portrayal in phenomenological language, Meyer employs analytical terminology by framing his own argumentation on the basis of *abstract* and mathematical reasoning. He approaches his conclusion of ch. 3 (“The Double Helix”) stating, “*The Watson-Crick model made it clear that DNA had an impressive chemical and structural complexity. It was a very long molecule composed on the outside of a **regular** arrangement of sugar and phosphate molecules. But on the inside it **could contain many potentially different arrangements** of the four bases. Thus it had an impressive potential for variability and complexity of sequence required by any potential carrier of heredity information. As [the two] later explained, ‘The phosphate-sugar backbone of our model is completely regular, but any sequence of the pairs of bases can fit into the structure. It follows that in a*

¹⁶ Michael Denton. Evolution: a Theory in Crisis. (Adler and Adler, 1985), p. 328.

¹⁷ Ibid, p. 329.

long molecule **many different permutations are possible, and it therefore seems likely that the precise sequence of the bases is the code which carries the genetic information**" (83-84 – boldface mine).

Nevertheless, as impressive as DNA is, it is but one example among numerous other highly complex 3-dimensionally-shaped proteins, all of which are formed by the very manufacturing units which DNA must first specify. This amounts to one of the most profound "*chicken or the egg—which comes first?*" conundrums of all times. Granting with Charles Lyell that the present biological reality that the building blocks of life (proteins) are known to be assembled according to specifications prescribed by the configuration of the nucleotide base-pairs within the DNA strand, then it stands to reason that neither the proteins, nor the DNA specifications, could have preceded the other! Meyer examines the array of attempts to resolve this riddle apart from the existence on an intelligent designer. Although the prior (hence primary) existence of either DNA, or RNA, or Proteins have been postulated by differing schools of thought, he concludes that such "*attempts to simulate how purely undirected processes might have produced information **only pushed the information problem back to a decidedly directing entity—the human mind...Thus, in an oddly unexpected way, evolutionary algorithms and the conservation principle derived in part from analyzing them, pointed to an external source of specified information [i.e. a mind]***" (294—boldface mine). Stated succinctly, attempts to resolve this challenge in any conceivable naturalistic way, end in failure of a kind likened to moving the deck chairs around on a sinking ship.

As Meyer concludes ch. 3, "*At the close of the nineteenth century, most biologists thought life consisted solely of matter and energy. But after Watson and Crick [a half a century later], biologists came to recognize the importance of a third fundamental entity in living things: information*" (84). This conclusion, drawn as it was by two committed materialistic scientists, as opposed to ID proponents, leads us to consider a second feature of life which Meyer insists likewise calls for an explanation.

2. The phenomenon of large amounts of specified or *functionally* specified information in the DNA.

DNA contains *functionally* specified information. By the adjective "functionally,"¹⁸ is meant information which specifies the process within the ribosome as to how a chain of 3-dimensional amino acids will fold into building blocks (proteins) that will be useful in building new body parts and/or replacing decaying ones. Meyer states, "*Indeed, since the confirmation of the sequence hypothesis in the early 1960s, biologists have known that the ability of the cell to build functional proteins depends upon the precise sequential arrangement of the bases in DNA.*" He further writes, "*DNA also contains information in the sense of Webster's second definition: it contains 'alternative sequences or arrangements of something that produces a special effect'*" (109). Meyer additionally states, "*The design patterns exemplified in the cell's information-processing system also exhibits specifications [because] we recognize [that they] match ones we know...from our own information technology*" (368).

3. The phenomenon of *integrated* complexity in the cell's information processing system.

In ch. 5, "The Molecular Labyrinth," Meyer states, "*As scientists began to discover more about how the cell uses information in DNA to build proteins, they realized that DNA is only a part of a complex system for expressing and processing information...**without this whole system, DNA by itself could do nothing***" (109). As he approaches his conclusion of chapter 3 he states, "*Although DNA does not convey information [in a manner] that is received, understood, or used by a conscious [human] mind, it does have information [of another kind] that is received and used by the cell's machinery to build structures*

¹⁸ As opposed to the mere capacity (in the Shannon sense) to carry and convey non-meaningful information.

critical to the maintenance of life" (113). Meyer describes this phenomenon as "profoundly mysterious" in part for the reason that these structures which exhibit "*specified complexity are **completely unknown apart from DNA, RNA, and proteins***" (110—boldface mine). Although the following is not directly connected to the central thesis of CS, with respect to the construction of the entirety of body plans, another relevant element of mystery is addressed in his Epilogue under the theme of "morphogenesis." While the properties of *individual* proteins are determined by the information specified in DNA, higher level structures, the skeleton, organs, muscles, and their interrelationships, are not. Cell division is directed by other information that is yet to be located. Meyer states that "*the properties of individual proteins (or indeed, the lower-level parts in the hierarchy generally) do not fully determine the organization of higher level structures. Nor does the genetic information that codes for proteins determine these higher level structures...Indeed, higher-level structural information appears to play a critical role in the development of organisms*" (474-475). Michael Denton similarly concludes, "As things stand today, there is no universally-agreed upon route to the first replicating system."¹⁹

In other words, even if the neo-Darwinian claim were true that beneficial genetic mutations occur in numbers they determine to be sufficient to advance macroevolution, genetic studies indicate that "*DNA does not wholly determine the morphological form in organisms*" (474). Consequently, there are no grounds in any case for expecting to discover a *naturalistic* pathway "from amoeba to man."

In 2004 former atheist Antony Flew shook the intellectual world by announcing his acceptance of the existence of God, in part because he became convinced that the evidence for ID was legitimate and compelling, particularly with respect to the challenge of life first beginning from inanimate material. He recalls that following his conversion to deism, scientists lined up urging him to read their latest list of the scientific works purporting to show how life arose from non-life by naturalistic means. Flew replied that that very question was a **philosophical** as opposed to scientific **matter**. He refused to relent for the reason that, as he states, "*The origin of life cannot be explained if you start with matter alone.*"²⁰

Accounting for the Phenomena

Although my employment of Flew's preceding statement might appear to prematurely lay bare my conclusion, my purpose in noting his "conversion" account was to highlight that for him the task of accounting for physical features that are habitually ascribed to an intelligent agent is a philosophical, as opposed to a scientific, undertaking. Indeed, in spite of David Hume's notorious conclusion to his *Enquiry Concerning Human Understanding*, it is impossible for scientists to undergo their investigations apart from philosophical reflection that is guided by the very rational methodologies which Hume denigrates.²¹ The question is, will such reflection be undertaken with the philosophical care that it demands? Denton has noted that "*Between a living cell and the most highly ordered non-biological system, such as a crystal or a snow-flake, there is **a chasm as vast and absolute** as it is possible to conceive*" (boldface mine).²² As the determination by a forensic scientist whether or not a dead body

¹⁹ Michael Denton. *Evolution: Still a Theory in Crisis*. (Discover Institute, 2016), p. 123 (boldface mine).

²⁰ Antony Flew: with Roy Abraham Varghese. *There is a God*. (Harper One, 2007), p. 89f.

²¹ "It seems to me that the only objects of abstract science or of demonstration is quantity and number, and that all attempts to extend this more perfect species of knowledge beyond these bounds are mere sophistry and illusion." David Hume. *Enquiry Concerning Human Understanding*. World Public Library and Project Gutenberg Consortia Center. <https://ebooks.adelaide.edu.au/h/hume/david/h92e>. ** Karl Popper has noted, "Thus Hume...condemned his own *Enquiry* on its last page." (*Logic of Scientific Discovery*. (Routledge, 2002), p. 12).

²² Op.cit. (16), pp. 249-50.

discovered at the end of a dark alley is the result of an intelligent (though despicable!) agent, two investigational principles are absolutely paramount: 1) enter the arena with an unprejudiced mind, and 2) withhold judgment until all of the facts are gathered and considered. It is simply absurd to suggest that the investigator must resist suspecting criminal activity until he is able to positively identify the perpetrator right at the very beginning.²³ It bears repeating that unlike either Darwinists or YECs, it is ID proponents who commit to following the empirical facts of science irrespective of where they lead.²⁴

It also bears repeating that Meyer's leading investigational method entails inference to the best explanation (abduction) among a pool of competing hypotheses. Although inductive, deductive, and analogical reasoning all play roles in such research, abduction alone avoids "god-of-the-gap" pitfalls of a kind that either argue from ignorance or impose a burden of proof solely onto the opposing contender (376-8). It further considers the evidential case for every potential hypothesis in order to determine which of them most successfully accounts for the key features of life identified on p. 1 that Meyer correctly insists, calls for a causal explanation. Consequentially, abduction obligates even Darwinists to substantiate the superiority of their claim on the basis of empirical facts.²⁵ In light of this reality, I now highlight two severely delimiting factors which render naturalistic hypotheses to be **virtually impossible**.

1. A finite cosmos as measured by its duration, its material resources, and its dimensions.

In 1992 a team of astrophysicists reported discoveries from the Cosmic Background Explorer satellite which decisively discredited the "steady-state" (SS) theory for its inability to account for the evidence of cosmic background radiation. The Big Bang (BB) alone remained for its ability to account for the **entirety** of the evidence of physics and astronomy.²⁶ Meyer summarizes as false the SS position that "*the universe has been expanding eternally [as] new matter is continually created*" (165). In stark contrast, astrophysicist Hugh Ross notes of the *vindicated* BB model, that "*the hot big bang model says the entire physical universe—all the matter and energy, and even the four dimensions of space and time—burst forth from a state of infinite, or near infinite, density, temperature, and pressure*" (boldface mine).²⁷ Notice the ramifications of this phenomenon. Prior to the discovery of the BB, the scientific community had assumed that the universe is eternal. Now it is acknowledged that the observable scientific facts point to its absolute beginning.²⁸ With respect then to accounting naturalistically for the existence of information in DNA, the discovery of the BB has three ramifications. By its implying the necessity of a transcendent cause of the universe,²⁹ it firstly removes certitude on the part of materialists that physical matter is the entirety of reality. Secondly it removes the notion of an infinity of time out of which evolution is supposed to have managed to play itself out.³⁰ And thirdly, the very

²³ Eugenie Scott and Stephen Meyer interview with Dan Abrams as host. Both Scott and Abrams prejudicially insisted the cause of the natural world must be naturalistic (<https://www.youtube.com/watch?v=FFhMxAsMDvk>).

²⁴ Op.cit. (15).

²⁵ Rather than merely assuring that Darwinian claims will ultimately somehow be vindicated. (Dembski and Ruse, eds. *Debating Design*. Wm. Dembski. "Logical Underpinnings of Intelligent Design." (Cambridge, 2004), pp. 325-7).

²⁶ *Theoretical* physicists seek to blunt the empirical evidence which undergirds the BB by instead appealing to abstract mathematical models which speculate on possible conditions "prior" to it, notions about which scientists have no scientific access (Op.cit. (25). John Polkinghorne. "The Inbuilt Possibility of Creation." p. 252).

²⁷ Hugh Ross. *The Creator and the Cosmos*. (NavPress, 2001), pp. 31-2.

²⁸ William Lane Craig. *Reasonable Faith*, 3rd ed. (Crossway, 2008), p. 130.

²⁹ Prior to the "zero-volume singularity" (Ibid, p. 127), there was neither matter, energy, space, nor time, out of which scientific events could conceivably issue into existence a physical universe.

³⁰ Sir Arthur Eddington stated both, "*Philosophically, the notion of a beginning of the present order of nature is repugnant,*" and, "*We [must] allow evolution an infinite time to get started.*" Quoted in Ross. Op.cit. (26), p. 77.

body of data that is attained by observations across the history of the development of the universe, including the origin of vital elements in the periodic table that are required for life (especially Carbon), further delimit the possible time frame out of which life in the universe could first develop.³¹

Although Meyer affirms the standard age of the universe as around 14 billion years, in ch. 15 (“Beyond the Reach of Chance”) he focusses on the question of “*amino acids or nucleotide bases, phosphates, and sugars knocking into each other in an ocean-sized soup until the correct arrangements of these building blocks arose by chance somewhere*” (215). Wm. Dembski, he notes, has calculated the maximum possible number of events occurring across the known universe over its entire history to be 10^{139} (216).³² Considering that the probability of the above entity resulting by unguided processes to be 1 in 10^{164} , the total possible number of events in cosmic history is “*more than a trillion trillion trillion times*” smaller than the number of combinations required to produce that outcome by chance (217-19).

2. The electro-chemical properties of the DNA Helix.

The concept of “self-organization” asserts that the configuration of the amino acids forming the nucleotide bases are determined by the laws of physics in that the chemical properties of both the DNA spines and between the individual amino acids determine their individual placement within their codon. Yet in reality, Meyer **highlights** Crick’s staggering realization that “*there was [and is] nothing about either the chemical properties or shapes of the bases to ensure that one and only one amino acid would fit into, or attach to, the cavities created by a group of bases*” (115 – boldface mine). For this reason, the convictions of both Lawrence Krauss³³ and Richard Dawkins³⁴ that the laws of physics will ultimately produce complex life entirely apart from specified information, is utterly undermined.

Conclusion

Were it the case that genetic sequences are the result of chemical bonding, then the possibility of *code* which specifies *non-pattern* information of a kind required to produce living organisms would in principle be utterly nil. Yet as things actually stand, the presence of functional specified information that is essential to accomplish necessary tasks, must logically be the work of a mind. This conclusion is not reached out of ignorance, but instead as the rational conclusion to a two-fold reality: 1) the only source for information that is known from the entirety of human experience is an intelligence, and 2) the incapacity of material entities, for *categorical* reasons, to either create functional *code* or channel its *instructions* into the multi-faceted production of useful material configurations. So then, by every measure, materialistic theories fall utterly short, both in accounting for phenomena observed both within the nucleus of the cell, and across the entire bodily structure of living organisms, small and large. Such creatures *exhibit* features that not only *appear* to be designed, but also *bear* within their DNA the information that directs the assembly of the building blocks necessary for their viable existence within the natural arena. Such wonders can only be the work of a providential intelligent artisan designer.

³¹ Hugh Ross. Why the Universe is the Way it Is. (Reasons to Believe, 2008), pp. 44-45.

³² His calculations are based on “Planck time,” the reality of which Meyer defines as follows; “*a physical transition from one state to another cannot take place faster than light can traverse the smallest physically significant unit of distance (an indivisible ‘quantum of space’).*”

³³ In Ray Comfort’s interview with Lawrence Krauss, the latter sought to employ the actuality of crystalline structures as an explanation for the formation of life as well, stating that “*the laws of physics, chemistry, and ultimately biology will in principle explain how DNA first arose.*” The Atheist Delusion DVD. (Living Waters, 2016), 15:06f.

³⁴ Richard Dawkins. The Greatest Show on Earth. (Free Press, 2009), ch. 8.