An Improbable God Between Simplicity and Complexity: Thinking about Dawkins's Challenge

Philippe Gagnon

ABSTRACT: Richard Dawkins has popularized an argument that he thinks sound for showing that there is almost certainly no God. It rests on the assumptions (1) that complex and statistically improbable things are more difficult to explain than those that are not and (2) that an explanatory mechanism must show how this complexity can be built up from simpler means. But what justifies claims about the designer's own complexity? One comes to a different understanding of order and of simplicity when one considers the psychological counterpart of information. In assessing his treatment of biological organisms as either self-programmed machines or algorithms, I show how self-generated organized complexity does not fit well with our knowledge of abduction and of information theory as applied to genetics. I also review some philosophical proposals for explaining how the complexity of the world could be externally controlled if one wanted to uphold a traditional understanding of divine simplicity.

THERE WAS A TIME WHEN the various sectors of scientific inquiry were thought to be capable of being ordered by philosophy, understood as the most elevated of the disciplines and the locus of wisdom. From this perspective assertions about the existence of God were not thought to clash with scientific explanations. If diverse provinces of inquiry met at all, they would do so only at the highest of the meta-viewpoints.[1]

The cover of the Norton 1987 edition of Richard Dawkins's *The Blind Watchmaker* shows the earth opening up to contain intricate mechanisms resembling a watch. Together, the title and the artwork suggest that there is no need to posit a designer for the inventions observable in the biological world. Relying on tools borrowed from confirmation theory, some philosophers of religion such as Richard Swinburne have sought to evaluate the extent to which God, as an agent analogous to us on some level, is needed to provide a justification for a world like ours and the operation of its laws. Others, however, find this too anthropocentric.

Although Dawkins has come to seem an enemy of Christians by the way in which he presents them as delusional, sometimes one's worst enemies are one's closest friends in sharing much common ground. Upon careful analysis, it appears that there are many shared assumptions between the promoters of the intelligent

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[1]See J. Navarro, "Religious Truth and Scientific Relativism" in *How Do We Know? Understanding in Science and Theology: Biennial Yearbook of the European Society for the Study of Science and Theology 2009–2010*, ed. D. Evers, A. Jackelén, and T. Smaedes (Tübingen, Germany: Forum Scientiarum, 2010), pp. 169–78.

design theory and the "new atheists." Dawkins's oft-repeated affirmation that, had God made this universe, it would have been something qualitatively different than what it is, has had the beneficial effect of forcing Christian philosophers to consider the empirical component of their faith and its truth-claims. Dawkins's claims have prodded philosophically minded believers to examine their own argumentation.[2] Meanwhile, instead of recognizing any limits to their scientific theorizing, the new atheists quietly reassure us that, even when we are facing obviously mind-designed technologies, it all has come about through unguided random encounters and that "the universe bootstraps itself."[3]

My intention here is to consider the challenge to believers that Dawkins has posed in claiming to be able to give a simpler explanation than theism can offer for statistically improbable complexly organized realities that bear an apparent mark of design. Those realities, he claims, are a consequence of natural selection sifting variations. Any talk of a designer, such as we find in our experiences of assembling or building things, would be an anthropomorphic imposition on scientific objectivity and would, epistemologically speaking, smuggle fraudulently the complexity into that very designer.

I first try to make sense of such claims by considering information theory and its use of concepts of statistics, probability, complexity and the like, for Dawkins tends to use these operationally-defined notions in an idiosyncratic way. Surprisingly, this fact has not often been pointed out. Second, after admitting that Dawkins has helped us to better grasp what we mean by holding that the divine reality is capable of acting in the world, I ask about what happens with orders of structural stability and levels of description. Although it will not be possible here to review the entire doctrine of divine simplicity, we will look at some of the possible ways in which the complexity of the world and that intrinsic to the divine comes to bear on the problem. In considering this difficulty we will appreciate how little we understand about the mental unification of a great many parts held together in a pattern.[4]

I. INFORMATIONAL UNDERSTANDING AND THE IMPROBABILITY ARGUMENT

I.1. Dawkins's Concern With the Improbability of the Designer

In *The Blind Watchmaker* Dawkins first offered the claim that contemporary science has put in place every needed element to support the view that the probability that there is a God is vanishingly small and that, consequently, any talk of a designer being responsible for improbable complexity would in reality leave it unexplained. Any explanation of the complexity found in our universe that attributes its inception

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[2]For a short introductory summary of his "challenge," see "The Emptiness of Theology," *Free Inquiry* 18 (1998): 18–19.

[3]Richard Dawkins, *The God Delusion* (Boston MA: Houghton Mifflin, 2006). See p. 155 for the explicit use of the "crane" metaphor. See also D. Dennett, *Darwin's Dangerous Idea* (New York NY: Simon & Schuster, 1995), p. 185.

[4]Concomitant with expansion and revision, see A. Aliseda, *Abductive Reasoning: Logical Investigations into Discovery and Explanation* (Dordrecht, Holland: Springer, 2006), p. 184.

to a designer is marred by unacceptable infinite regress, since the designer would have to be himself more improbable than what he is called on to justify.[5] Now, this way of putting the matter shifts the meaning of scientific terms from their typical use in the *natural* sciences to the positing of open-ended, context-free, and unrestricted claims for conclusions obtained within those natural sciences. We know, however, that those conclusions have pre-required the bracketing and non-consideration of all the possible connections that an object of investigation could have, in contexts other than the biological or empirically-determined ones. It is a feature of scientism that it claims for science all-encompassing authority, but surely it is evident that no one claiming to study everything about anything would be legitimately considered a "scientist."[6]

Nothing in his later book *The God Delusion* appreciably modifies the argumentation offered earlier for the view that "there is almost certainly no God." The challenge is set forth in the "Boeing 747 gambit." There Dawkins claims that one can discover the fatal defect of a design explanation that invokes anything other than natural principles. It goes like this: the proponent of the need for an intelligent designer urges us to consider a hurricane blowing in a junkyard; it is impossible to imagine that from all the dismantled components that make up a Boeing 747 the mere event of their agitation at random and by mindless and impersonal forces could have produced the fully-formed airplane. Dawkins claims that this scenario has little to do with what happens in the biological world and that only "somebody who doesn't understand the first thing about natural selection"[7] could make such an argument. Dawkins reasons about it in the following steps:

(1) Something is statistically improbable.

(2) We are asked about the source of the constraints imposed on it to assemble it into a final shape.

(3) Biological improbability could only have come about in its *generation* by chance, and in its *conservation* by natural selection.

(4) So, we must conclude that all accounts of the origin of biological functionality that claim that something was designed in light of its complexity generate a new problem instead of an explanation.

The argument can be stated thus:

(1) Something is statistically improbable.

[5]*The Blind Watchmaker* (New York NY: Norton, 1987), pp. 316–17; *The God Delusion*, pp. 113–14; see also a clear and shorter statement in Dawkins's preface to N. Shanks, *God, the Devil, and Darwin* (Oxford UK: Oxford Univ. Press, 2004), pp. vii–x.

[6]G. Ganssle puts it well when he notes that traditional discussion on these matters never assumed that everything needed an explanation, which would even include God. Rather, arguments for God's existence qualified what needed an explanation, as they spoke of contingent things requiring an explanation outside themselves. G. Ganssle, "Dawkins's Best Argument: The Case against God in *The God Delusion*," *Philosophia Christi* 10 (2008): 42. See also G. Dawes, *Theism and Explanation* (London UK: Routledge, 2009), pp. 16 and 58.

[7]*The God Delusion*, p. 113.

(2) Statistically improbable things will come about in unguided encounters pro-
vided there is a sifting and a retention mechanism.

(3) Design does not sort or sift anything; it possesses the pattern already.

(4) So, design cannot qualify as an explanation of statistically improbable things.

This argument is supposed to yield the conclusion that the result of design is not
to be considered improbable *when looked at from any angle* where it makes sense
to invoke design. To examine this claim is thus the main concern of this paper.
We, however, must ask how the picture is modified when, for argument's sake, we
stop outlawing design and ask what would happen to Dawkins's inferences about
improbability in such a context.

First, we should notice the shift from *anything* being statistically improbable to
biological improbability. I will come back to this later. Scientists have observed that
the reasons why the adaptations by which an organism might bring about what is
to its own advantage occur, are not traceable to any mechanism known to us. What
is problematic is not that molecular structures are subjected to such things as heat,
noise, cosmic rays, or crossing over and thus vary all the time, but explaining what it
is in the first place that comes to be made subject to the process of natural selection.

What is the problem with design? Dawkins holds that it is *essentially* unaccept-
able since it takes us along the path of infinite regress.[8] He objects to the fact that
design does not have the character of slow and gradual improvement and finds
fault in what he calls the "jackpot or nothing" assumption of its defenders. In
his view, they refuse to recognize that if one cannot climb Mount Improbable by
jumping right to the top, one can always ascend the other slope gradually. Dawkins
would grant, for instance, that opening-up a well-conceived combination lock
would require a tremendously improbable chance event. But if the lock were giv-
ing off hints that one is getting close, "the burglar would hone in on the jackpot in
no time."[9]

We intend to ask here whether that suggestion makes sense in the context of infor-
mation theory applied to biology. For, contrary to the claim by Dawkins, information
theory used as an instrument in the analysis of biological codes holds that efficient
communication *is a matter of all or nothing*, just as the simple algorithm that is
represented by a phone number is knocked out and made non-operational by the
omission of even a single digit. In the same way, for example, all we need for the
occurrence of sickle-cell anemia is the substitution, in the formation of hemoglobin,
of an adenine molecule to a thymine in the sixth codon. One way out would be to
invent error-correcting codes and make efficient use of redundancy, a question to
which we devote a section below. This consideration highlights another problem: it
is all well and good to say that, if a lock would tell us "you're burning" as opposed
to "you're not even close," the discovery of the combination could be accelerated.
But how would we know *just what it is* that we are supposed to be getting close

[8]Ibid., p. 141.
[9]Ibid., p. 122.

to, given that Dawkins spends many pages, in a more recent defense of evolution, arguing that species in reality do not exist?[10]

Following on a denial of typological Platonism reminiscent of Ernst Mayr, Dawkins argues that since adaptations obey the "crane" logic (as opposed to the "sky hooks" logic, to use Dennett's terminology), they are as perfect as they can be, given the environment that conditioned them. Wherever we find them, they are equivalent to being dealt a perfect hand in games of chance.[11] Yet, they are said to be the result of a gradualist crane. Dawkins thus claims that an *honest* quest for truth will not only accept a crane model of development for the bringing about of any state of affair witnessed in the natural world but, furthermore, that it will also grant that the decisive process does not have to be natural selection. A still undiscovered principle would be acceptable, so long as the argument does not beg the question by having recourse to a designer.

Dawkins writes that "[c]omplex, statistically improbable things are by their nature more difficult to explain than simple, statistically probable things."[12] He also implies that information is equivalent to complexity.[13] One of our tasks, in the light of previous remarks, will be to ask whether it is justified to say that *necessarily* all reference to a "designer" must only consider it as a material and energetic system. Dawkins, as can be appreciated by his discussion in a chapter of *A Devil's Chaplain* (considered below), knows that information is neither, i.e., that it is not matter nor energy.

Let us consider this claim about information amounting to *mere* complexity using an example. What would be entailed by making each possible result of a jumble as probable as any other, and adding the further requirement of "pre-specification" in the case of "complicated things"? Say we were to take the organized body of a metazoan of large dimensions and decide to plot it along some axis to determine its degree of complexity. In the case of a higher mammal, for instance, we find that the number of similar units (in the human body there are about 250 types of cells) would have to be subtracted from the determination of the amount of information in the end.[14] If we follow the definition of an organized system as used in algorithmic information theory, we would find that a high degree of organization needs a long algorithm for its description, and in turn this means that it must have a high entropy. If we look at it differently, though, by activating transcription from just one cell, one could in principle describe the whole multicellular organism: is it not odd that this gets equated with high entropy, which means used up energy in a state of maximum disorder?[15] This capacity represents an efficient use of redundancy since,

[10]*The Greatest Show on Earth: The Evidence for Evolution* (New York NY: Free Press, 2009), esp. pp. 21–42.

[11]*The God Delusion*, p. 155.

[12]Dawkins, "Lions 10, Christians Nil," *The New Humanist* 107 (1992): 3.

[13]"The Information Challenge" in *A Devil's Chaplain* (New York NY: Mariner, 2004), p. 102; on this see R. M. Hazen et al., "Functional Information and the Emergence of Biocomplexity," *Proceedings of the National Academy of Sciences* 104 (2007): 8574–81.

[14]"The Information Challenge," p. 100.

[15]See A. Elitzur, "The Origin of Life," a review of H. Yockey's *Information Theory and Molecular Biology* in *Contemporary Physics* 35 (1993): 276.

as von Neumann understood, one way to prevent the degradation of a message is to have extra copies of it made. In this case we see reduplication not only in the multiply-realized set of instructions but also in the way in which the coding system for amino acids has made it less likely that copying mistakes have any detrimental effects. The effects of "over-coding" or mismatch between 64 messages coming from codons, capable of coding 64 amino acids, joined to the presence of only 20 amino acids, means (among other things) that the substitution of one nucleotide to another (say ATC instead of ATT) might not have appreciable consequences. In this case, as DNA codons they would both code for isoleucine. What we find is an *intermediary* disposition between the copying of the same cell and the fifty trillion cells of the human body being all different and thus equivalent to the maximally greater degree of complexity. So, were one to look at information theory for hints about a designer or its absence from the consideration of specified complexity, one would have to keep in mind that any appeal to pattern, if we are considering a periodical or quasi-periodical one (in other words if there is appreciable redundancy) could very well indicate that we have encountered the results of cosmic periodicity. The other possibility, that of maximal originality, is what *could* give us some hint of an intelligent action. But this creativity (if we want, we could call it the signature of a framing consciousness) could still not be counted an *ultimate proof* since it would correspond to an absolute absence of order *physically speaking*, that is, in terms of complexions. One could *interpret* it as a sign of an intelligence acting through "surprise events," or one could claim that any intelligent-looking contrivance is the result of uninformed, unguided spontaneous creation of complexity that mimics intelligent activity, but out of mere projection of a pattern on our part. In their 1986 debate, the first option was that of A. E. Wilder-Smith, and the second that of J. Maynard-Smith.[16]

There is need to question the assertion that designers must be as improbable as their creations. Imagine that we enter a room in havoc: this state of things cannot be judged probable nor improbable until we learn whether or not everyone in that neighborhood has tidy interiors, and whether this household also fits this description. Only then do we know whether this is improbable. Why would anyone say that the designer needs to be as complex as the result of his exertions? One possible explanation, if other pieces of evidence were in harmony with it, is that burglars had come into this room. A statement about *them* has nothing to do with the situation that we are considering other than affirming that they perpetrated it. It is not *they* that are messy, but the *room*. Two different things are present here. There is the probability of a state of affair conditional on another statement, with a first variable that refers to the attributed statement, and a second variable in reference to which the statement is made, called the reference class. If we extend the class of attribution, the X in P($X \mid Y$), at first intended to only include the judgment on a state of affair as more or less complex—by which one would mean likely to have

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[16]See J. Durant, "A Critical Historical Perspective on the Argument about Evolution and Creation" in *An Evolving Dialogue: Theological and Scientific Perspectives on Evolution*, ed. James B. Miller (London UK: T & T Clark, 2001), p. 263.

taken place without anyone designing it—by adding the question of the designer's own complexity, we are not simply having to decide between (LC standing for low complexity and HC for high complexity) LC-LC, LC-HC, HC-LC, or HC-HC, as logic would have it. Probability of evidence can be conditional upon a hypothesis, but we cannot *transfer* the situation within the reference class, the Y in $P(X \mid Y)$, to a supposedly complex perpetrator without making highly problematic additional assumptions. That statement is required to be fixed for our evaluation to be carried. We are making it a question that is empirical, not available solely from logical considerations. In probability theory, the introduction of a conjunct, or supplementary premiss, does not preserve probabilistic values for what we already know, but might just as much subvert the relationship between this state of affair or contrivance and the determination of its probability using the requirement of maximal specification.

The meaning of probability evaluations, when used to shed light by analogy on biological examples, is therefore to clarify how empirically-discovered states of affairs come to be. Say we consider a single protein and find that it lines up hundreds of amino-acids, with themselves dozens of atoms ordered in a certain way, which came from being matched to a transfer RNA strand in the ribosomes. We need a lot of *Shannon information* to account for this situation. This is not just random, it is highly ordered. The same goes for a message that is highly technical written on paper, a very stylized poem, or a chain of amino acids. They are all improbable, and we do not just expect them to pop-up in nature. What is improbable and can be read off the arrangement of organized complexity contains *more* information.

A question is raised by Dawkins's surmising in that realm, when he assumes that only the methods of the empirical sciences can lead to true knowledge. The question is this: can a message be considered *in itself*, apart from the question of how the body, or the brain, of a purported messenger came to be, and what is its own complexity signature? How can one say that the message considered in this way is improbable? As just said, if we are considering the description of a protein molecule, it is improbable that this message be generated by random search. However, if there is a mind that escapes this description, i.e., if the dualistic aspect in our phenomenological experience is true (without going here into a longer assessment of dualism in the philosophy of mind[17]), then this message can very well be *highly probable*. Indeed, if we consider a well-established law of nature, its probability will be in the area of 1.0 and it will have a fantastically short description considering its effects.[18]

Dawkins tells us that the universe is complex and improbable, and he adds that the Darwinian explanation introduces simplicity all the way to the bottom. Science would offer an explanation of how the difficult, assimilated to the complex, arose

[17]But see H. Robinson, "Dualism" in *The Blackwell Guide to the Philosophy of Mind*, ed. S. Stich and T. Warfield (Malden MA: Blackwell, 2002), esp. pp. 89–90.

[18]In D. Dennett and A. Plantinga, *Science and Religion: Are they Compatible?* (New York NY: Oxford Univ. Press, 2011), p. 14, Alvin Plantinga makes a similar point about a planet that we already know to contain intelligent beings, and for whose description no Ockhamistic cost would be involved in saying that the artefacts found to be present on it are explainable by intelligent agency. They are not explained in a simpler way by treating them as though naturalistic unguided causes brought them about. By claiming this, naturalism would be begging the question.

out of the simple. Judging by that standard, he considers the "God hypothesis" to be useless since it postulates what we are trying to explain.[19] One must be careful in specifying the language one is using. In the terminology of algorithmic information theory, "simple" means "ordered." This has only one possible physical and information-theoretic meaning: it means the opposite of complex.

Can the Darwinian process be called simple? It states that if one gives oneself a system of replicators and occasional variations, some variants will remain in existence because they cope better with changes in a slowly modified environment, but it does not specify which ones. Such a process is inherently statistical; it does not make it to the individual level where there is no need for statistics. Dawkins has *defined* the mutation-selection tandem as simple in an *aesthetic* way. It is not simple epistemologically since the signature of this process in organisms is DNA coding that seems to be generated by a random walk, with nothing of the simplicity of a program that has its algorithm neatly and clearly specified. The purportedly "simple" process refers to the action of all the laws of nature operating together. Unless one were to bring all lawful action to one universal equation, this cannot be said to be simple.

The evolutionist physician Randolph Nesse has argued in several recent publications that the organism should *not*, from a biological viewpoint, be compared to a machine. A machine has a blueprint, but from an evolutionary perspective the phenotype has none. It is the result of the action of genes that interact with environments to maximize reproductive success.[20] When evolutionists consider the machine/codescript and nature analogy, the intended meaning is that natural selection is the "writer" of the program. This process would be the one incorporating new information in the genome, something that cannot be done by reverse transcription via the changes that have happened in the phenotype. Such a process is deemed equivalent to typing mistakes that hit within a certain range of functionality. To convince us of this, the same evolutionist writers appeal to the analogy of a program and speak of algorithms that have been generated by sheer random search. There is not, however, any other understanding of a program than a tidy set of instructions.[21]

Famous scientists such as Francis Crick have considered that, in light of the unlikely character of the origins of life scenarios, life was probably seeded on earth from outer space. When Dawkins speaks about this "exospermia" hypothesis, he tells us that this, if true, would push back the design problem. This should be an occasion

[19]"Lions 10, Christians Nil," p. 3.

[20]See "Evolution: A Basic Science for Medicine" in *Pragmatic Evolution: Applications of Evolutionary Theory*, ed. A. Poiani (Cambridge UK: Cambridge Univ. Press, 2012), p. 112.

[21]J. Lennox has written about a law of conservation of information such that an entity that is self-informing all the way down is impossible, in much the same way that perpetual motion is impossible. See his *God's Undertaker: Has Science Buried God?* (Oxford UK: Lion Hudson, 2009), pp. 158–59. The same idea can be found in B.-O. Küppers, "Information and Communication in Living Matter" in *Information and the Nature of Reality*, ed. P. Davies and N. H. Gregersen (Cambridge UK: Cambridge Univ. Press, 2010), p. 181. The "law of diminishing information" has been established on a rigorous axiomatic and information-theoretic basis by J. Kåhre in *The Mathematical Theory of Information* (Dordrecht, Holland: Kluwer Academic, 2002), in particular chap. 2, pp. 35–38.

to recognize that *every* scientific theory does just that.[22] Science explains by cramming the later (effect) into the former (cause), making everything that comes after depend on a particular organization of the initial conditions, along with a law-like inference pattern. We might have to restrict this last statement if we encountered a generation of non-trivial novelty. If one wants to use information theory as a theory of explanation, and do it consistently, one would have to grant that, to the extent that causation becomes a copying process, information theory and its probabilistic basis is silent about copying *errors* that could be steps in the generation of a novel design.[23] It is simply not prepared to deal with things such as origins, existence, or being. Here Dawkins is alternating between two levels of discourse.

The argument that Intelligent Design (which it is not my business here to defend) is "lazy science" could just as easily be turned on its head.[24] A science that uses randomness to explain features of things, really uses laws to do it (this is admitted by Dawkins himself who often repeated that the Darwinian process is not a chance one). If laws of nature ultimately accomplish the job, then complexity and improbability should be *reduced*, as laws make things *more* probable, not *less*. To stop looking for the laws and to call on chance, some would say, is an act of intellectual laziness.

I.2. Whence This Ideal of Simplicity?

If we wage our bet on science and its restrained endorsement of conclusions reflecting experience, and if we think along the lines of a "rationalism to come,"[25] we could say that any *understood* explanation is simple. Indeed, it is simpler than it was when partly scattered data presented themselves at first to the mind, without unification. Structures, as we experience them, have a material organization that will probably forever resist our probing to an ultimate level of reduction, but abductive inferences collect a great complexity in what is often times partaking in a marvelous simplicity.[26] Simplicity in this sense can grow. There can be degrees of it. Once something is comprehended clearly, it is also comprehended with simplicity since the mind has found a scheme to fit it in.

The following question can be asked: can logically impossible worlds be said to exist in certain conditions? This has kept many medieval thinkers busy, and the forthcoming response is always in the negative. Perhaps things can be made clearer if we so reformulate the question: (1) are there worlds where the laws of logic would cease functioning? and (2) are there worlds where impossible things can happen?

These two questions are in reality quite different. To the first, it would be difficult to see how we could answer in the affirmative since we would have to formulate our reasoning in the logic of our understanding, or modified versions of it. We would still need for those to accomplish what is required of a logically sound reasoning:

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[22]As D. Berlinski correctly pointed out in *The Devil's Delusion* (New York NY: Basic Books, 2009), p. 143.

[23]See J. Collier, "Causation is the Transfer of Information" in *Causation and Laws of Nature*, ed. H. Sankey (Dordrecht, Holland: Kluwer, 1999) pp. 230–31.

[24]See preface to Shanks, *God, the Devil, and Darwin*, p. ix.

[25]See B. Saint-Sernin, *Le rationalisme qui vient* (Paris, France: Gallimard, 2007).

[26]This point is made against Dawkins in J. Polkinghorne and N. Beale, *Questions of Truth* (Louisville KY: Westminster John Knox, 2009), pp. 112–16.

preserve any truth in statements if truth there is, or at least integrate it in a step-process in the case of non-monotonous logics.

To the second question, we could answer that this is less paradoxical than it may seem at first sight. To the extent that we would accept, for argument's sake, to turn the cause-effect relationship into logical entailment, as Hume and Spinoza did, as well as Leibniz but in a different way (the cause implies the effect in the sense of the French "*envelopper*"), we would have to conclude that any true discovery in science realizes the condition of an effect without a cause. It makes us see in a new light not previously seen by others. To the extent that it relies on a new qualitative outlook, or a new "form," it introduces a unifying perspective which itself requires to be unified *in re*, in the behavior of the object grasped as satisfying this functional relationship. When we do this, we hark back to the cause but in proceeding first *from its absence* or its initial ignorance. As such, it has the nature of an abduction. Raymond Ruyer has suggested that one should see situations like these as the re-establishing of an information.[27]

In this sense, knowing and explaining are functions of informing. In their quality of being an ordering, they can be grasped in their significance only if one contrasts them to what Csikszentmyhalyi has suggested calling "psychic entropy."[28] If order is disorder vanquished, nobody will possess a definition of "orderly" that is context-free or in a vacuum, not any more than one will possess a definition of *true in general*. We only know of true in a language. Ultimate simplicity is that which one *sees* to be such. It is not transmissible, but rather is something qualitative. It can only be apprehended in mereology, and it will be simple for some because it is unified, perfectly proportioned, yet it might not be simple as such, the predicate "beautiful" having something complex about it. The desire to find a perfectly objective standard of simplicity is misguided. It cannot be had. Just as physics needed "ideal gases" and probability theory an "ideal dice," we need what Bar-Hillel called (and Jan Kåhre developed further) an "ideal receiver." Dawkins is guilty of inconsistency in both using a standard that in the end is aesthetic (the process would be an explanation only if simple) and denying it at the same time, in not affirming that minds exist (which leads to the problem of the designer's own complexity alongside an understanding of physical complexity).

I.3. Biological Organisms as 'Nothing But'

Reacting to an oft-reprinted paper of Thomas Nagel, Dawkins gave us in *The Blind Watchmaker* his version of what it is like to be a bat. First, he collapses the problem of *qualia*, that of perceiving a world of sounds and colors irrepresentable with mere numbers and measurements, into that of wavelengths hitting receptors. He makes the point that obviously bats do not bother as such with delays of echoes in the perception of any flying prey. He goes on to hypothesize that they echolocate just as we see and makes the correct observation that we transform incident wavelength differences and encode them as colors. This is done, Dawkins tells us, by the *com-*

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[27]See his "Le problème de l'information et la cybernétique," *Journal de psychologie* 45 (1952): 385–418.
[28]See *Flow: The Psychology of Optimal Experience* (New York NY: HarperCollins, 1990), pp. 36–39.

puter in the brain (it is noticeable that he does not bother to use scare quotes). Let us keep in mind what we just observed about blueprints, programs, and machines in their *direct* applicability to the natural world. For Dawkins, everything is relative to this internal "computer" model. Its usability will be determined not so much by incoming information, but according to the use for internal representation.

The point is that bats can do with sound something similar to what we do with light. For him, evolution would have made bats "see" in an adapted way, different from ours but just as efficient *ceteris paribus*. At first, scientists were skeptical of this radar model applied to the bat, Dawkins tells us, because it took our most advanced technology to invent radar detection and "we find it hard to imagine a little animal doing it in its head."[29]

Seeing is as difficult, involving as many impulse differentiations, but we take it for granted and rather get upset with an evolutionarily "designed" means of detection that we do not possess. Dawkins adds that bats in a conference of their own could be as upset as scientists have been at the mere suggestion that small creatures might use something like radar detection, when they in turn would be told that human beings do very well with the bouncing off of waves hitting objects and use these cues along with a sophisticated system of detection involving cells such as the retinal ones wired to the brain. The conclusion will be of particular interest: "The bat should be thought of as analogous to the police radar trapping *instrument*, not to the *person* who designed that instrument."[30] Again, recall what we said about machines, and whether organisms should be so characterized. Essential to Dawkins's point is that "living machines" mislead us into thinking that a conscious and purposeful designer is always needed, while in fact the designer could just as well be unconscious natural selection.

The presentation rests on some misunderstood power to adapt to frequency shifts or photon scattering, such as bats have done along with the human eye. It is added that what bats do is not any more marvelous than it would be for them turned mathematicians and considering us, the common feature being that we have adapted to something that we do not understand nor can we represent. In this context, the worst metaphor on which to build one's book would be technological inventions in no need of technological inventors. The analogy with computers, including talk of ROM and RAM,[31] is highly misleading since, as computer scientist Gelernter made plain, one can delete a software from its implementation material, whereas it is not possible to erase integrated experiences that have a mind-imprinted component.[32] Dawkins tells us that embryology and the specification of the phenotype are not only epigenetic but recipe-like, which he deems equivalent to a computer program.[33] The reason why a program does not allow reversibility (in other words, why from

[29]*The Blind Watchmaker*, p. 35.

[30]Ibid., p. 36 (my emphasis).

[31]Ibid., pp. 116–17.

[32]David Gelernter, *The Muse in the Machine: Computerizing the Poetry of Human Thought* (New York NY: Free Press, 1994), pp. 123–24.

[33]*A Devil's Chaplain*, p. 89; see also *The Extended Phenotype* (Oxford UK: Oxford Univ. Press, 1992), p. 175.

a cake as resulting from a recipe one cannot get back to a blueprint whereas from a house one could), which Dawkins seems to make the principal criterion, is that not everything is in the program.

As Robert Berwick observed in his critical notice on *Climbing Mount Improbable*, a computer program needs a computer to run it, while a genome, unlike such a program, does *not* contain all the information about sequence and timing.[34] This does not entail that a program has the nature of a recipe, defined in the sense first outlined. A program shares in that quality of integrating information that is in space-time rather than in any chemical code-script. When this program is that coding for the proteins of a living organism, epigenetic signaling and encounters of unpredictable environmental factors come into play. But that is only in the case of nature, since much information is not encoded in DNA.[35]

In humanly conceived programs, however, this is not the case. The computer program *is* a sort of blueprint, more precisely a blueprint that executes itself and, as such, it does not integrate incremental "advantages" unless one adds them up from outside. What is more, in so doing one will run against an upper bound since piecemeal modifications will have at some point to be abandoned in favor of grander scale ones. The invocation of the computer program might extend the "metaphor of our age," but it is still only a metaphor.

One does not find anything in physical chemistry that would have the nature of a message, an algorithm, or control reactions. If genetic processes were operating from what is dictated by chemical reactions alone, laws of thermodynamics and mass action would control the positioning of amino acids in the protein sequences. As anyone knows who has observed osmosis in cell membranes, this would be done according to concentration. An heredity mechanism of this type could not be neguentropic and would revert to the defects in the theory of heredity that Darwin could not explain away when Fleeming Jenkin voiced his series of objections.

One is here reminded of the irreversible mixture accomplished in processes submitted to thermodynamic equalization, say a drop of ink in water, to which one certainly could not give back its original configuration. Mendelian genetics, with particulate inheritance, does not mix futures states as genes never really mingle, but through recombination they shuffle and code or do not code phenotypically for physiologic-structural traits while they can still then be passed on. Reviewing an argument of Gould and Cannon, Dawkins concedes that particulate inheritance would be erroneous if used to account for *all* factors in the phenotype. This argument states that bodies are not a collection of parts and that selection can only act at a level different from that of genes.[36] He insists that this does not work against a vision of embryology where mixing up *does* take place, as genes *do* mix when it comes to developing the phenotype.

Dawkins says his computer analogy is not metaphorical, but real, and he adds that it is not circular. If this is so, and if our brains unconsciously solve complex

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[34]Robert Berwick, "A Feeling for the Organism," *Boston Review* 21 no. 6 (Dec.–Jan. 1996).

[35]See L. Boi, "Topological Knots Models in Physics and Biology" in *Geometries of Nature, Living Systems and Human Cognition*, ed. L. Boi (Singapore: World Scientific, 2005), pp. 259–60.

[36]See *The Extended Phenotype*, pp. 116–17.

equations,[37] justifying Rod Swenson's criticism of this being a neo-pythagoreanism alien to Darwin,[38] we can indeed capture Dawkins oscillating between two explanatory regimes. On the one hand, there is the material irritability and the tradition of vitalism, positing something non-mechanical in nature that he thinks he can ridicule when dismissing "protoplasm" (despite the fact that he borrows from it), and, on the other hand, the Pythagorean-Leibnizian tradition of a universe that progresses according to unforeseen calculations. What Dawkins does is to take advantage of the first, while claiming that the misunderstood intelligent strategies of life can all be discarded in the name of an illusion of design since it is all in the end random pieces of code from a self-generating program, thus using the terminology of the second, in no need to contain that vitalistic component.

Let us be reminded that his popularity came from his selfish gene theory. If one were to review all its implications, one would find that intentionality and a sort of obscure will is attributed to what are supposed to be mindless molecules. If one were to look for simplicity as a criterion, it would be much simpler and *empirically equivalently justified* to say that we, conscious agents, use genes to pass on a summary of the instructions to build a body, as was argued by systems biologist Dennis Noble.[39]

Dawkins considers that the argument could be reversed and that bats might wonder how modest humans could perform such sophisticated calculations as the ones that allow us to perceive unhampered numerous shapes in the flow of incoming photons. In fact, there is an unanticipated connection to be established between Dawkins's reversal of outlook between bats and us, and the fact that we can do planning and control action in the midst of universal non-predictability as we now know as a result of thirty years of study of deterministic chaos and its non-integrable solutions to differential equations.

The aeronautics engineer Pierre Perrier observed that the anthropic principle, tautological if stated under its "strong" guise, when coupled with the *absence* of finalistic development laws in a strong sense establishes that we *can* make small changes with large consequences and participate in the invention of this universe in which we live.[40] The question here is going to be: let us assume for argument's sake that we are at the same place as bats. Could not the argument be inverted? Short of saying that they have engineered in *our* sense, what is the meaning of the statement that makes them a self-assembling police radar? We understand in *general terms* how our camera-eye works, but that does not enable us to adjust our counting capacities to the speed at which photons come our way, nor our discrimination capacities to their formidable number. That bats do not understand us, or that we do not understand them, in no way points toward self-assembling technologies if we are to use technology in the *human* sense.

[37]*The Blind Watchmaker*, p. 98.

[38]See Rod Swenson, "Evolutionary Theory Developing: The Problem(s) with *Darwin's Dangerous Idea*," *Ecological Psychology* 9 (1997): 65.

[39]See Dennis Noble, *The Music of Life* (Oxford UK: Oxford Univ. Press: 2008), pp. 10–15.

[40]See P. Perrier, *Science des cœurs et de la nature* (Méolans-Revel, France: DésIris, 1998), pp. 66–68.

I.4. More On the Use of Information Theory

In *The Blind Watchmaker* and in a chapter of *A Devil's Chaplain*, Dawkins attempts to illustrate the possibility of overcoming the improbability argument. He seems to get leverage for his position merely from its being paradoxical and counter-intuitive.[41] In *The God Delusion*, this involves denying the need to call on to a more improbable state of affair as an analogy to what unguided evolution accomplishes, and it becomes the "Boeing 747 gambit." In a review of *The Blind Watchmaker*, Maynard-Smith noted that Dawkins explains his thesis by drawing on analogies from engineering and information theory. He added that the *principal* thing that happened between us and Darwin is our understanding of information.[42]

Nowhere does Dawkins's account of information theory mention that initially, information was to be defined according to how much it *breaks* a code. If a sender had no other choice than to emit the sequences of an alphabet successively and in order, there would be no probability to communicate a message, there being no degrees of freedom. Thus, a quantity of information would be *uniquely understandable* in terms of its degree of disorder, the amplitude with which it breaks the sequence of the code. This would agree with the "consciousness as epiphenomenon" thesis and would leave for information only a realm of pre-existing forms.[43] Information theory has not and could not develop in this way. The early developers of the theory recognized that we are in the situation where we *decipher* nature, not in the demiurgic one where we would have to upset all regularities to instill a message. This virtual and elusive amount of what is in reality patterned dichotomic choices will therefore only be useful if it helps us solve the question that bears on the quantity of information a message contains, one that *ex hypothesi* reaches its recipient. In this sense, it cannot be said to be equivalent to Boltzmann's entropy since it is internalized in a consciousness.[44] Wicken and Yockey (one could also mention Perutz and Pauling) have argued that Shannon's information does not apply to physical entropy

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[41]Thus writes S. Barr: "Paley finds a 'watch' and asks how such a thing could have come to be there by chance. Dawkins finds an immense automated factory that blindly constructs watches and feels that he has completely answered Paley's point. But that is absurd." *Modern Physics and Ancient Faith* (Notre Dame IN: Univ. of Notre Dame Press, 2006), p. 111. In *The Science and Religion Debate: Why Does it Continue?* ed. H. W. Attridge (New Haven CT: Yale Univ. Press, 2009), p. 109, A. Plantinga questions whether "it is not impossible that *p*, therefore *p*" can be an acceptable epistemological basis to give *p* a high prior probability.

[42]John Maynard-Smith, "Evolution For Those Who Have Ears," *New Scientist* 112 (1986): 61.

[43]See O. Costa de Beauregard, "Towards a Cosmology" in *Science and Synthesis* (*UNESCO International Colloquium*), trans. B. Crook (Berlin, Germany: Springer, 1971), pp. 113–14. On the question of the presence of forms in the natural order, very few explanations are offered. Some declare them non-existing and call onto a ban on the use of those "program" metaphors. In *Ni Dieu ni gène* (Paris, France: Seuil, 2003), J.-J. Kupiec and P. Sonigo claim that this was Darwin's original insight. For others, what is more important than the code or what is scripted in the genes is the set of epigenetic instructions along with the instructions from other cells to delay programmed cell death, also referred to as "apostosis"; see R. Lockshin and Z. Zakeri, "Programmed Cell Death and Apoptosis: Origins of the Theory," *Nature Reviews: Molecular Cell Biology* 2 (2001): 545–50.

[44]As M. Artigas observed, a language needs to be understood by someone. See his *The Mind of the Universe* (West Conshohocken PA: Templeton Press, 2000), pp. 142–44.

since entropy is a continuous magnitude that cannot be negative.[45] However, when Dawkins gives us an example, he speaks about the presence or absence of rain in the Sahara, something that manifestly does not have any connection with Shannon's theory. This is an expectation that involves prior knowledge and beliefs, for it relates to the meaning of words, not to the probability of their independent morphemes being selected. As such, it makes an additional assumption that was deliberately disregarded by Shannon, McMillan and others.[46]

When information is considered from the semantic standpoint, the fundamental units are statements, not letters or words. The probabilities involved make reference to the uncertainty of events in relation to evidence. A statement will have semantic information through identifying the class of all propositions that are implied by it. For Bar-Hillel, this takes place with the assumption of an *ideal receiver*. In his work with Carnap, he proposed that tautologies contain the least amount of that sort of information, but logically false sentences can be the hiding place of undetermined amounts of information.[47]

Shannon's model requires us to imagine a well-defined question Q with a set of possible answers. If one assigns $P = 1$ to one of the answers, consequently $P = 0$ will be the value of the others, and the entropy H will be 0. If all answers are equiprobable, H is at a maximum (if one has to assign equal probabilities, one's information must be next to nothing). This is using knowledge K to define entropy H, but one could use H to define K, since any K that maximizes $H(Q \mid K)$ is maximum ignorance about Q. What a Shannon message produces is a situation K', and this in turn entails a *new* assignment of probabilities, with a revised value for H; the information I ends up being the difference between those uncertainties, or $I = H(Q \mid K) - H(Q \mid K')$. Information thus understood means a change in the observer's knowledge (from the knowledge situation K to K').

Therefore, a theory will have information content in proportion as it excludes more. If we follow what is presented to us as an argument relying on a better understanding of the information concept, the most improbable (self-assembling Boeings from junk heaps and the like) would have to be considered the most likely. This is odd, and seems to go against the likelihood principle, which says that the

[45]See J. Wicken, *Evolution, Thermodynamics, and Information: Extending the Darwinian Program* (Oxford UK: Oxford Univ. Press, 1987), pp. 19–21; H. Yockey, *Information Theory and Molecular Biology* (Cambridge UK: Cambridge Univ. Press, 1992), p. 313.

[46]"The Information Challenge," p. 93. Dawkins classifies under "redundancy" what the receiver would already know, thus confusing and conflating a semantic question with the information that the message would objectively contain, whether or not we meet this criterion. If one brings in possessed knowledge, one has brought the analysis into the realm of the semantic counterpart to information. Consider the following passage by E. T. Jaynes: "Bar-Hillel described his encounter with John von Neumann and his shock at what von Neumann tried to tell him. He could not believe his ears because it seemed to him that von Neumann was saying that entropy is not a real physical property of anything, but only a measure of human information. Of course, that is exactly what von Neumann was trying to tell him." "Notes on Present Status and Future Prospects" in *Maximum Entropy and Bayesian Methods*, ed. W. T. Grandy and L. H. Schick (Dordrecht, Holland: Kluwer, 1991), p. 4.

[47]See S. D'Alfonso, "On Quantifying Semantic Information," *Information* 2 (2011): 65–66.

better confirmed h_1 must be preferred to the less confirmed h_2.[48] It is useless to pit, as we constantly do, an inductive Carnap-inspired logic against a Popper-inspired content-rich vision of theories that nothing at all would have enabled us to read off of nature. If one analyzes the "missing link" in this situation, one will see that abductive inference, the discovery moment left out of epistemology by *both* Popper and the neopositivists, can be studied and found to be (*pace* Hintikka who suggested to look at it as equivalent to a "blind guess")[49] something that has the same value as the likelihood principle, in other words $P(e \mid h)$ where e is the evidence and h the hypothesis. As Fetzer suggested, the question is not to elevate an inference to the degree seen to obtain through past observation of some conjunction, it is rather to *find* that degree or value.[50] Inverse probability does not involve guessing. Should a counterfactual situation obtain (say gremlins are in the attic), we can state what would follow without having to guess. If they were in the attic, a noise just heard would be expected to follow. If this does not make the gremlin hypothesis probable, it enables one to assess what is likely *given* this hypothesis.

The connection to our problem has not often been drawn. Be it bats or human beings, information might not just mean the degree of interconnectedness of parts assumed to have been, in their given material organization, obtained by the equivalent of dice tossing. This particular information is an imaginary grid with logarithmic transformation, and it ignores meaning as we noted against Dawkins's own account in reference to the Sahara example. There might very well be mind-dependent information, a psychological *corollary* of what happens as we look at binary specifications, which would correspond to the ability of an internal representation to try, and this is the crucial point, mentally discard hypotheses that are unlikely. Since the discussions by Donald Campbell and others on evolutionary epistemology, we have taken for granted that organisms are some sort of hypotheses themselves, somatically. As somatic hypotheses, they are considered to succeed or die, while *we* would have the possibility of trying in the realm of imagination and virtuality, with an ability to retain or discard without dying. But that might be exaggerated since no provision is made for the immense inertial force that will resist even false ideas being discarded.

I.5. The Significance of Complexity

In "The Information Challenge," Dawkins tells us that the abundance of unused DNA, which he deems to be "junk," is a "simpler" explanation in the hypothesis of the selfish gene.[51] When dealing with seemingly meaningless instructions, one has

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[48]See E. Sober, "Explanation and Causation," *British Journal for the Philosophy of Science* 38 (1987): 244–46.

[49]Jaako Hintikka, "What is Abduction? The Fundamental Problem of Contemporary Epistemology," *Transactions of the Charles S. Peirce Society* 34 (1998): 517.

[50]J. H. Fetzer, "What is Abduction?: An Assessment of Jaakko Hintikka's Conception" in *Quantifiers, Questions, and Quantum Physics: Essays on the Philosophy of Jaako Hintikka*, ed. D. Kolak and J. Symons (Dordrecht, Holland: Springer, 2004), p. 150.

[51]*A Devil's Chaplain*, p. 99; see *The Selfish Gene*, new ed. (Oxford UK: Oxford Univ. Press, 2006), p. 45: "The true 'purpose' of DNA is to survive, no more and no less. The simplest way to explain the surplus DNA is to suppose that it is a parasite, or at best a harmless but useless passenger."

to remember that a pattern can be hidden in the midst of apparent jumble and that it will always be possible to proceed from its initial non-recognition to the deciphering of some hidden message. It is impossible to go the other way and hold that definite instructions with clearly mapped out operations are *in fine* random. The reason why this is a much riskier statement would lead us into considerations of evolutionary epistemology about the generation and uses of heuristics.[52]

Gérard Battail, a retired telecommunications engineer, has noted in his meritorious pioneering work that our physiologic-structural system collapses due to copying errors after it has endured for some decades and that those errors come from a jamming of our program by noise when it, e.g., inhibits part of what a cell could code for from its nucleic acid instructions. For Battail, the nucleic instructions are isolated, "nested," and thus really protected by walls, and this is hypothetically what in evolution has allowed them to be sheltered from noise. This does not obtain when cells copy themselves and create large physiological organs since selection is exerted on the phenotype and will not prevent the turning down of those clusters.

The starting point for Battail's reflection has been Dawkins's replicator model, along with an article by Franc and Gouyon, who were themselves reacting to remarks made by physician and mathematician Schützenberger.[53] The survival of those replicators requires that replication be as faithful as possible. Copying errors do play a role at the level of the phenotype, allowing for mutation and change through heredity. But the forces that bring us down after seven decades on average cannot be seriously operating in an identical fashion on the nucleic storehouse of instructions. The reason for this, according to Battail, has to do with the existence of error-correcting codes. The closest the replicator will be to the center, the more it will be protected from errors, shielded from things such as thermal noise, radio-activity, cosmic rays, etc.

To have error-correcting codes, one must have redundancy. With replication tending to infinity, over millions of years, error will happen with certainty. A theorem says that for a message of k symbols, an error-free communication is possible if and only if k/n is less than the channel's capacity, k being the message's length in symbols, and n the code-word with $n > k$. This in turn depends on the rate of error of the channel. If p is the channel's error rate, and n is sufficiently large, the number of errors will approach the average pn. Battail adds that if a minimum distance d exists between the words of the code, an error-free communication can be had if and only if $pn > d/2$.

Furthermore, if such a code is in operation, one would expect to find lots of redundancy. The introns are a natural candidate to act as such a storehouse. If one

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[52]See my "A Look at the Inference Engine Underlying 'Evolutionary Epistemology' Accounts of the Production of Heuristics" in *Is Religion Natural? Biennial Yearbook of the European Society for the Study of Science and Theology 2011–2012*, ed. Dirk Evers, Michael Fuller, Antje Jackelén, and Taede A. Smedes (Halle-Wittenberg, Germany: Martin-Luther-Universität, 2012), pp. 161–82.

[53]See his "Does Information Theory explain Biological Evolution?" in *Europhysics Letters* 40 (1997): 343–48, whose text we follow closely. Initially, Battail tried to meet the challenge expounded in A. Franc and P.-H. Gouyon, "Information et complexité: questions sans réponses," *La Recherche* 296 (1997): 106–09. They were reacting to M. P. Schützenberger, "Les failles du darwinisme," *La Recherche* 283 (1996): 87–90.

measures this redundancy by k/n, the probability of error is smaller if n becomes larger. In other words, the longer the genome, the safer it gets. In species such as ours with an extremely long genome, we would thus expect reliable replication.

A further consequence of Battail's model, laid out in great detail in a scientific monograph that followed a series of groundbreaking articles,[54] is to support a saltationist vision of evolution.[55] Let us draw a consequence of such a model: the basis of molecular and cellular cooperation, sometimes denied in the literature when everything is attributed to molecular Darwinism, would be relative to the satisfaction of a perfectly abstract mathematical property, expressed as a relation between information and redundancy.

Let us ask here: how can one have information defined as complexity and assume as an unstated premiss that what ought to be used is simplicity? Dawkins says that the statistical improbability argument leads to a conclusion opposed to that of the creationists.[56] He claims that this argument *belongs to evolutionists* because *only* natural selection can generate improbable complexity out of simplicity. This begs the question until a demonstration has been provided that a statistically improbable concatenation came from simplicity.[57] Michel Serres noted how complex means "a great number of objects and a great number of figures." Not so long ago, when epistemologists used this vocable, such as Bachelard in *The New Scientific Spirit* (1934), they meant to refer through it to what science had not yet solved. The new sciences, Serres observes, being non-linear and non-deterministic, show us that a

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[54]Gérard Battail, *An Outline of Informational Genetics* (San Rafael: Morgan & Claypool, 2008).

[55]On a different note, P. Perrier has argued that in the theory of control algorithms, there is no mathematical representation of the reaching of a goal without activators and captors, which amounts to controlled saltationism, representing thresholds of species' formation. See his detailed discussion in "Que nous apprend l'analyse mathématique de la micro et de la macro évolution?" in *L'Evoluzione: Crocevia di Scienza, Filosofia e Teologia*, ed. R. Pascual (Rome, Italy: Edizioni Studium, 2005), pp. 149–97. It is interesting to see how Battail can look at the only ways a code can carry information and protect it from destructuring forces, at the most elementary level, and then to contrast it to Perrier who looks at the macro-level and distills his long experience of optimal control algorithms. The convergence is striking.

[56]Preface to Shanks, *God, the Devil, and Darwin*, pp. vii–viii; *The God Delusion*, p. 113.

[57]After noting that the greater the contribution of an algorithm, the less compelling is the vision of an inferential staircase, D. Berlinski is right to point out that you either have fundamental physical laws, that are left incomplete short of a yet-unachieved complicated use of models capable of showing how they can bring about remote effects, or with the setting in place of laws, chance, and simulation through numerical analysis and algorithms, you end up with laws that are no longer simple. See *The Advent of the Algorithm* (New York NY: Harcourt, 2000), pp. 324–25. See also a clear statement of the same idea in S. Barr, *Modern Physics and Ancient Faith*, pp. 106–07. In his review of *The God Delusion* ("Dawkins needs to show some doubt," *The Guardian*, 28 September 2006), S. Unwin gives the clearest and shortest account of the epistemological flaw in Dawkins's position: when Dawkins talks about his personal assessment and that of Unwin as irrelevant to the question at hand (see *The God Delusion*, p. 135), he is diverting from the main problem, which is: what caused one to not have to update one's assessment of a probability for God? In other words, and more technically put, if the "god hypothesis" is to be made empirical in a way that has any meaning, one cannot turn around and write that nothing whatsoever could confirm it. All that Dawkins's viewpoint could be said to do is to say that God ought to have a low prior probability, but to deny that hypothesis the capacity to acquire a high updated, or posterior probability, is simply unsound. See D. H. Glass, "Darwin, Design, and Dawkins' Dilemma," *Sophia* 51 (2012): 33. E. T. Jaynes argues that a judgment of degree of belief cannot be $-\infty$, since this signals that one would never change one's mind, and thus dogmatism; see *Probability Theory: The Logic of Science* (Cambridge UK: Cambridge Univ. Press, 2010), chap. 5, pp. 119–48.

phenomenon could have been different, that its result is contingent, which therefore enables us to think of *singularity*. We went from a repetitive vision of the world where we saw schemes, to singling out *this* phenomenon, e.g., the liver of Martha at forty, instead of drawings of livers in general.[58]

Complexity leads to incalculable and intractable problems, it means plurality in quantity and variation. The goal of a mature science is to approach the *singularity* of the phenomenon. The earth's volume, density, etc., would have been treated fifty years ago as one of many, with the moon and other planets; now we can see through chaos theory that the earth is a determined singularity that has little to do with the moon or Venus. The "complex" side of things is dominated, while previously things were complex and rejected for this reason. What complex should mean is an invitation to break something down.

II. REMARKS ON GOD'S ACTION IN THE UNIVERSE

I mentioned in the beginning the use of confirmation theory by Swinburne in an attempt to justify attributing to God the responsibility for the way the world is. This British philosopher of religion and former colleague of Dawkins at Oxford University is, to Dawkins, the best example of the inanities that will be proffered by theologians, or theologically-minded philosophers, when they step in the realm of scientists' "turf" (to use with a twist one of Dawkins's titles). His position will become, in Dawkins's hands, that of a divinity tweaking simultaneously an unimaginably high number of knobs, since Swinburne made God responsible for upholding the laws of the universe in existence. To use a shorthand figure and drive his objection home, Dawkins speaks of God putting his finger on every single atom.[59]

In fact, what Swinburne said is that it is a simpler hypothesis for all atoms to behave coherently, obeying the same laws and being scientifically undistinguishable, than it would be for each of them to have a behavior of their own. Rather than reconstructing the meaning of God's sustaining activity relative to the laws of nature in Swinburne's written work, let us take what seems to be Dawkins's bottom point: this universe would not be the way it is if a God designed it. As already seen, it would be "something qualitatively different." The reason for this is that the sheer complexity we witness is not better accounted for, or reduced, by invoking a God. This presupposes a number of things, among them that, in our inability to compare this world to others, we are prone to take for designed that which is not. It also presupposes that natural selection creates simplicity underlying that complexity (the term "simplexity" is now being introduced into the literature[60]) where theism does not. This, in turn, presupposes that it is the right move to explain away the "minding" activity of persons by mindless particles or simpler states of affair.

[58]M. Serres, "Des sciences qui nous rapprochent de la singularité" in *La complexité. Vertiges et promesses*, ed. R. Benkirane (Paris, France: Le Pommier, 2002), p. 388.

[59]*The God Delusion*, p. 177.

[60]See A. Berthoz, *Simplexity: Simplifying Principles for a Complex World*, trans. G. Weiss (New Haven CT: Yale Univ. Press, 2012); J. Kluger, *Simplexity: Why Simple Things Become Complex, and How Complex Things Can Be Made Simple* (New York NY: Hyperion, 2009).

Let us look at some consequences drawn by credible philosophers facing similar questions. Indeed, if God is to be defined as simple, and if a world were to be made by him and conserve some resemblance to its maker, should not the expected outcome be a world beautifully simple?

It is a fact that with Hume, and already with Spinoza, there was a reversal of the viewpoint on the question when some thinkers asked themselves: if, on the one hand, God is to sustain in being an immense number of parts and their relations, with things built up complexly, and, on the other hand, if God is said to be simple, how could we make God responsible for sustaining them? Those creatures, or material systems, are not simple.

Would that, however, make it possible to bring about the sort of aim that God has in mind if he wants to create a being that is not only caused, but called in return to accept God's intentions as good ones and enter in relationship with him, by first experiencing relationality with fellow creatures? That is the sort of question that Dawkins brushes aside, and Swinburne has taken more seriously.

Even a philosopher such as Malebranche, fond of thinking about a God always operating according to the wisest of ways, through the simplest laws of nature, relaxed that scheme in light of the total evidence that creatures are to strive toward a purpose that they can refuse. The first mention of Swinburne's idea in *The God Delusion* takes place following an assessment of the "non-overlapping magisteria" proposal of S. J. Gould, and Dawkins brings in a quote from Swinburne suggesting that God has the power to do whatever he wants, since he invented the laws of nature, and hence can change them as he pleases.[61] Dawkins takes this to be an intrusion on science's turf, as it suggests that our scientific knowledge, at any one time, could be thrown in the air.

We know matter to be at bottom systems of molecular assembly, with wide ranges for variations. This aspect of contingency and risk of malfunctioning gets even higher in the perspective we just considered, that of a God taking the route that would *restrict* simplicity. If indeed God allowed for there to be an invention of material particles, bodies, and ultimately minds as a place for the inscription of freedom in action, could we not question Dawkins's assumption (deemed "Neo-Cartesian" by Rod Swenson) that all of this would have to happen to heaps of mindless particles, or self-programmed algorithms (of the sort hinted at through the metaphor of "it is raining floppy disks," which one can read in *The Blind Watchmaker* in one of the moments where Dawkins waxes lyrical?)[62] It would indeed invert Dawkins's program if one were to demonstrate that only by being intelligible, housed in a mind, can complexity make any sense to us. This means that complexity, in the sense of algorithmic information theory, needs a correction before it can enter a debate such as this one. Otherwise, we would end up going in circles trying to clarify the result of an equivocation.

The argument that strikes out any reference to God, arguing that that would only leave organized complexity unaccounted for or at best transferred onto God, can

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[61]*The God Delusion*, p. 82.
[62]*The Blind Watchmaker*, p. 111.

be taken to mean that God's being has organized complexity. Then the Humean objection could be raised: how are we to account for *that* organized complexity in the mind of the designer? To this objection, responses can say either that this complexity is indeed thought about by God, and communicated, or that God's being is that of a simple substance such that nothing can be simpler.

Let us look at variations on these two options, which we will present following a discussion of God's capacity to subvert the natural order as he wills, or the "nature" of things shall we say more philosophically. In an interesting article, Erik Wielenberg asked that we consider more closely what he termed "Cleanthes' gambit." Dawkins's gambit, which says that theism is improbable in the light of evolution, might be judged weak in the end, since it turns out failing the moment one introduces other pieces of the total evidence and assesses their likelihood in the light of theism.[63] For Wielenberg, we need to consider how, in the fourth part of Hume's *Dialogues on Natural Religion*, the suggestion is made that the universe might very well be necessarily existing, and thus not in need of explanation. In other words, there would be a regress-stopper for the universe just as for traditional theologians there is a regress-stopper for God. Theologians say that God does not need an explanation as his existence is necessary, but couldn't the universe be said to take on that same quality? The answer to that, as has been recalled by Patrick Richmond, is to say that traditionally thinkers such as Aquinas or Leibniz have thought that, even if the universe was eternal, there still would be a justification for its existence that would be needed.[64]

To argue this viewpoint, one would rely on the fact that the modal qualifier, about a necessary versus a contingent sort of being, would make sense, and then question whether it would require that there be a God distinct from the universe. To give that other gambit more plausibility, Wielenberg will ask: if God can exist necessarily despite the fact that his non-existence is conceivable, why isn't the same true of the natural universe? But since when is God's non-existence conceivable? Wielenberg claims that Plantinga, in a response to Michael Tooley, after stating that God exists necessarily had to grant that it is a non-obvious necessary truth, one that cannot be seen to be true simply by considering it.[65]

This point is mistaken, however, since on closer review one finds that Plantinga is explaining what Aquinas meant when he denied the value of the ontological argument for us, in our pilgrim situation, by talking about God's existence that would not be self-evident *to us*, although self-evident in itself, for the blessed as it were.

None of this entails that one could conceive of existence as being necessarily given to any material reality. Plantinga has made clear elsewhere that he does not

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[63]See G. Ganssle, "Dawkins's Best Argument: The Case against God in *The God Delusion*," p. 49, where four aspects are discussed that fit well with a theistic universe: the orderliness of the universe and its susceptibility to rational investigation; a world with consciousness; a world with significant free agency; and a world with objective moral obligations. See also D. Glass, "Darwin, Design, and Dawkins' Dilemma," pp. 52–55.

[64]P. Richmond, "Richard Dawkins' Darwinian Objection to Unexplained Complexity in God," *Science and Christian Belief* 19 (2007): 108–09.

[65]E. Wielenberg, "Dawkins's Gambit, Hume's Aroma and God's Simplicity," *Philosophia Christi* 11 (2009): 118, referring to A. Plantinga and M. Tooley, *Knowledge of God* (Malden MA: Blackwell, 2008), p. 154.

endorse this as his own position.[66] Wielenberg tries to by-pass the problem by talking about a four-dimensional universe that would necessarily exist. If we are to argue this way, we need to scrutinize the total evidence. There are many indications that the course of the universe's expansion can be cyclical, and thus never at rest, lacking the stability one would associate with a truly self-existing and autarkic being. Our knowledge of thermodynamics precludes giving too much credibility to a self-explanatory universe, even in the context of an expanding/colliding grand scenario, as Penrose pointed out in his search for the applicability of the thermodynamic arrow in that context.[67]

The question remains that indeed it is possible that Hume meant to show, in these *Dialogues* he considered his "most artful" work, that the universe could be eternal, as Aquinas thought, since its beginning in time could not be proven. The universe could be eternal and yet would still need its relationship to God ascertained.

There is a more interesting point made by Wielenberg concerning God's simplicity, another way of saying that God is the wholly other, ungraspable by us. Wielenberg rightly suggests, by contrasting the characters Demea and Cleanthes in Hume's *Dialogue*, that, for God to play an *explanatory role*, he would have to be thought about as capable of transferring some sort of complexity from a conceived pattern in his mind to the materially inscribed complex structures and organisms of this universe.[68] If we argued (or felt) like Demea, and wanted to vindicate God's simplicity, we could not grasp his nature by concepts that proceed from definitions, divisions, and reasoning. As such, we would be led to a more *mystical* understanding, rather than a strictly speaking *scientific* one. We could not use him as an explanatory principle, because then God would indeed fall under Dawkins's gambit, in that he would have to bear in himself the complexity that is in the world.

Richmond attempted to find a solution to that problem. Since in God all the different possibilities are contemplated together, there is never a need to find a restricted funnel-like relationship between complexions and their need to fit in some specified complexity working only for this one context.

The adaptability of specified complexity to particular problems and contexts might be inescapable for human designers, but for God there are many more functional schemas he can use. In consequence of this, to argue as to why there are failures of design is not to voice a compelling argument. To ask how God can fabricate a finger, as was once done by Alan Olding,[69] would be for Richmond to miss the mark. For God, the many ways in which fingers, or other things that would replace them and be functional, are efficient at their task require that the universe *has hit upon* the right functional schema. God knows why the other seemingly equally promising alternatives are not the ones to implement. The examples of disuse, of dysteleology and the like, forget that action is the decisive factor and not just mere possibility.

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[66]See his "Augustinian Christian Philosophy," *The Monist* 75 (1992): 314–17.

[67]See Roger Penrose, "Singularities and Time-Asymmetry" in *General Relativity: An Einstein Centenary Survey*, ed. S. Hawking and W. Israel (Cambridge UK: Cambridge Univ. Press, 1979), pp. 581–638.

[68]Wielenberg, "Dawkins's Gambit," pp. 122–23.

[69]*Modern Biology and Natural Theology* (New York NY: Routledge, 1991), pp. 134, 143.

CONCLUSION

In *The God Delusion*, Dawkins's strategy, when one looks away from angry attacks at the alleged stupidity of Christians regarded as fundamentalists, has been to recycle an argument first presented in *The Blind Watchmaker* concerning the wrongful use of statistical improbability considerations by theists.

The problem seems to be immersed in the mysticism of what Henry Gee has called "deep time." Dawkins keeps coming back to the scandal of Christian particularity, with talk of such things as atonement for the sins or the resurrection of Christ, and treats those as an offense to the grandeur of the universe. In his 2008 debate with John Lennox at the Oxford Museum of Natural History, Dawkins admitted early on that a pretty good case for a deistic God could be made.[70]

In the end, one will find that Dawkins's crusade for scientifically-based atheism has served the cause of theism by giving it a greater philosophical respectability. If the problem with God is one of absence of evidence, or if, as Dawkins has stated, we can never tell when a process is "undesigned" which would supposedly rule out any possibility of an argument from design,[71] the possibility of things to be *made to look* undesigned stands in need of an assessment. To be able to make the statement that something is undesigned, one would need an infinite amount of information and something like the coexistence of all the thought-patterns in the mind of God as explained by Richmond.

Dawkins knows this. He is aware that one cannot give a watertight proof that there is no God. What he is left to operate with is a universe that would "look different" should a designer be responsible for it. The very idea of a God creating by retreating, by leaving spaces of free exploration, is for him an occasion to reject such a God's empirical verifiability, in other words a God that leaves no traces is no different from no God.

The problem is that, as William Vallicella argued, commenting on Plantinga's 2011 monograph *Where the Conflict Really Lies*, and more recently David Glass, Dawkins's argument is not empirical at all. It is a mere abstract consideration of concepts posited a priori. Glass has stressed that it has nothing particularly Darwinian about it. Vallicella stated that it is a futile exercise to argue that a designer explaining organized complexity would have to be itself complexly organized since what is at stake is *terrestrial* complexity.[72] If complexly organized structures in the physical and biological realms are the *explanandum* (what stands in need of an explanation), there is nothing false nor contradicting our empirical experience in having recourse to a mind to account for them. As stated earlier, the question of whether or not this mind is itself complex is not part of the question as it presents itself to a conditional probability assessment. In that sense, Dawkins's argument

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[70]About five minutes into the debate "Has Science Buried God?" (held on 21 October 2008).

[71]R. Dawkins, "Reply to Michael Poole," *Science and Christian Belief* 7 (1995): 47.

[72]See the entry for 16 January 2012, "Plantinga versus Dawkins: Organized Complexity," on the Maverick Philosopher website, http://maverickphilosopher.typepad.com/maverick_philosopher/2012/01/plantinga-versus-dawkins-organized-complexity.html, accessed February 4, 2012; for Glass, see "Darwin, Design, and Dawkins' Dilemma," pp. 38–39.

is Humean, not Darwinian, since talks of complexity in the mind of a designer not only does not involve natural selection, but could be said to deny it.

Unlike his noble predecessor, Bertrand Russell, Dawkins has not been prudent enough to disengage himself from theological speculation.[73] What we end up with is an argument that uses semantic counterparts of information theory (something about which nothing very clear has emerged despite efforts of many from Carnap/ Bar-Hillel to Hintikka) while assuming, for his argument to get going, their non-existence.

Once one has stepped in the life of the mind, it is too late to keep pressing the materialist doctrine and try to lead it where it is ill-prepared to go. As Thure von Uexküll noted, with information theory, mankind has entered a realm where orders, thoughts, patterns, cues to planning matter as much as the simplicity of the laws of physics. Those simply cannot do all the work.

To get this debate anywhere, one will have no choice but to envision it in the light of what we ourselves learn from being builders, architects, in shorthand designers. If we do this, we will come to realize that to organize complexly always means, and is always done, through finding the right pattern or schema that is akin to the principle of least action. Any other point of departure is mystical obfuscation, attributing powers to "nature" or "time" that can never be demonstrated nor understood.

Let us conclude by further clarifying a few points. When we are told that selection is the conjoined operation of the laws of nature, the laws we are talking about are simple. In the language of algorithmic information theory, they cannot be compressed further. So how then can they produce complexity? How can they even be conjoined since, as Braithwaite made plain, they require us to always unify by climbing upwards in the direction of fewer explanatory laws.[74]

We have been forced to ask a question which, restated, inquires as to whether there is an objectively existing realm of natural semantically-rich information, information meant to follow some blueprint, or if any information *as complexity* is only disorder kept in bounds through nature discarding the non-functionally possible. A reflection on the open-ended meaning of the laws of nature has been contrasted to the accounts of philosophers who reacted to Dawkins's *The God Delusion*, in order to show the difficulties one could end-up with if the denial of God having control over nature, or his non-detachment from nature, were in either case affirmed unrestrictedly. Either God would violate the integrity of the causal powers, something deemed dubious since we know of no mind detached from a material complex system that communicates with our physical world, or God would be all the complexity, so that our entire reality could be preserved even upon our death as we would exist, as suggested by John Leslie, in the "fourth dimension."[75]

Perhaps one should extend the reflection by asking what is behind the performative contradiction of those who, like Daniel Dennett, deny there being an agent type of causality at the very moment when they are typing on a keyboard or lecturing in

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[73]See Russell's debate with F. Copleston on the existence of God in *The Existence of God*, ed. J. Hick (London UK: Collier-Macmillan, 1970), pp. 167–68.

[74]R. B. Braithwaite, *Scientific Explanation* (Cambridge UK: Cambridge Univ. Press, 1968), p. 349.

[75]See John Leslie, *Immortality Defended* (Malden MA: Blackwell, 2007), pp. 57, 88.

front of a public to defend a thesis, *A* or non-*A*.[76] Or, for that matter, what on earth has happened that, through the neglect of the semantic study of information, we can end-up with respected scientists denying the *increased* conscious and internal probability of an answer, in saying such nonsense as that undergraduates in physics nowadays know as much as Einstein.[77] In their eagerness to eliminate God, it is human freedom that such thinkers render unintelligible.

[76]See Daniel Dennett, *Freedom Evolves* (New York NY: Viking, 2003), pp. 100–01.
[77]S. Weinberg, "Without God," *The New York Review of Books* (25 September 2008).