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Natural Aesthetics and Grace: the Reality of the World and the Reality of God

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Abstract

Scientific disciplines seek a truthful description of how things are. One way to think of the way that science does this is to say that science seeks to show how things fit together. In doing this the scientist implicitly makes use of aesthetic and ideal categories, such that aesthetic relationships of things to each other in thought somehow stand for the actual relationships (involving energy, charge, mass and the like). This relationship of ideal thought in the medium of human language to the reality of the world is remarkable. Why is it that we can know anything truthful about the world on the basis of the way we talk to each other? Why is there anything instead of nothing? Scientific practice suggests ways in which these are the same question. It may be that the createdness of the world underlies all truthful human discourses, whether artistic or scientific, mechanical or philosophical.

Keywords

Science, art, faith, creation, wisdom

Introduction

The supposed conflict between a scientific approach to understanding the world and a religious or faithful approach to understanding its meaning and source remains unresolved. Among scientists there is a widespread and very serious ignorance of what faith communities in the main are actually attempting to articulate when they speak of the world as created, and of the purpose of religious language and practice. Religious language and practice are still perceived by many scientists as being competing modes of talking about the same things that scientific language and practice are addressing. This is of course simply wrong, a category error, but it remains the majority impression. More seriously, the perception that this is the case is widespread in the general public and has made a significant contribution to the decline of interest in religious practice and belief in the West. There has never been a more urgent time for it to be shown what scientists

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and scientific communities are attempting to address – which is descriptions that are as accurate as possible about the concrete reality within which we have our lives, the world – and that religious belief, practice and language differ categorically from the scientific. In short, it needs to be shown that scientific understanding and faithful commitment are two modes of living that should each have their full place in every human life, and that any life in which they do not have their full place is radically incomplete. In this article I wish to begin by talking about the practice of science, which gives us a partial view of concrete reality increasing in accuracy of understanding and prediction as we go on: the reality of the world. I will then more briefly allude to what I think of as the goal of faithful activity: knowledge that the world is created, that we are loved, that "gift and dispossession [are] … at the foundation of everthing"[1] – and that the creator, lover and giver is the unnameable, boundless, God. Though we cannot name or define God, God is known as real in our experience of gift, love and resurrection, above all in Christ. In this I will rely heavily on published work, since I am unable to say anything novel or in a better way than those to whom I will refer. Finally I will reflect, in ways in particular stimulated by a recent book by Rowan Williams[2], on how life in the knowledge of the world as created is the most accurate way to understand reality, and how in fact the scientist implicitly, though unconsciously, derives her power to understand things from the world as created rather than otherwise. This shows us that an implicit use of an understanding of creation in the obtaining of scientific knowledge points up the general case that an understanding of creation, of God's Word being the underlying structure of our words, may indeed be the reason we can know anything at all.

The reality of the world

The reality of the world is as it is in itself. Yet what are things in themselves? – and do we have knowledge of them as they really are? If one begins by imagining it is possible to be sceptical about one's ability to know anything that isn't actually confined within one's own mind, then it seems that one cannot actually know very much about things that one observes, that one's observations are irreducibly partial and redacted and that such knowledge as one has is not much worth having. Knowing things as they are in themselves could be thought of by analogy to knowing what it *feels like* to undergo their process

[1] Rowan Willams, *Grace and Necessity. Reflections on Art and Love* (Harrisburg PA/London: Morehouse/Continuum, 2005), p. 169.

[2] *Op. cit.*

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of *being*. From a sceptical position, the only thing I really know is what it feels like to be me; and to know another person as they are in themselves is to know what it feels like to be them. Hence to know the world as it is in itself would be to know what it feels like to be the world. Yet how can we possibly do that?

This point of view is very popular, and very corrosive of an acknowledgement of meaning to individual acts and lives and to the world as a whole. This point of view is, in effect, the point where many people live in the prosperous parts of the world, where individuals are freed on a day-to-day basis from the need to work within any pattern of meaning at all. From this point of view, the insights of science are not actually telling us anything at all. But science gives an increasingly accurate description of things as they really are, that is as they can be observed functioning in themselves, and therefore must be able at least to model the internal processes of things. This point of view also implicitly rejects a truthful understanding of the embodied nature of human being (and how wrong that is; after all, someone else may know what I am thinking before I do myself).

What, fundamentally, are scientists trying to understand? Philosophers of science have tended to worry in particular about how we can show things, scientifically, and have come up with various models, based on ideas of falsification or the possibility of experimental proof (and such ideas have even penetrated to the discussion of religion). But what, in fact, is the goal of a practising scientist – and might answering that question give a more truthful description of what the scientist is really up to and how she does it? One such answer would be to say that a scientist wishes to understand *how things fit together*. This description of what science is really all about, the observation of how things fit together, will here provide the starting point for a discussion of how the work of a scientist in truth shares underlying human capacities with the work of an artist, and how these capacities and their mysterious depth tell us something profound about who we are and how we relate to God. To begin with, however, four broad titles under which the natural sciences can be grouped will be used to show that what a scientist wants is to see how things fit together. These are biology, chemistry, physics and mathematics. Since I am a kind of biologist the biological examples will be more played out, but the basic principle can be extrapolated from the more extensive treatment given to biology to the bare examples given for the other areas.

Biology is a level of scientific study in which whole organisms, their behaviour, and their inner workings, are studied. Organisms vary of course from blue whales and human beings down to bacteria and beyond, to viruses. Blue whales swim in the sea and sing to each other, human beings walk on the earth and talk to each other, bacteria are single-celled autonomous organisms that live in colonies

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(mostly) of one kind or another, whether in your veins or those of your blue stilton. Viruses are different and warrant some further comments because they will provide a particularly pointed case of what biology is all about, and are examples of how the role of chemical, physical and mathematical levels of understanding can give a more complete biological picture – of how things fit together.

Viruses are different from bacteria because they are not cells and cannot therefore grow and divide to replicate themselves, since they lack the machinery for growth and replication found in cells – all cells, yours, mine, the blue whale's and the bacterium's. How do they reproduce, or replicate, then? Answer: by hijacking the machinery of cells, using it to reproduce themselves, and then hopping to another cell to repeat the performance. Consequently viruses are obligate intracellular parasites: they cannot reproduce without parasitic use of host cells, whether your cells, my cells, the cells of the blue whale or the bacterial cell. And obviously, the viruses that infect me are different from the viruses that infect whales, and from those that infect bacteria, because they have evolved to use the things that make my cells different from the blue whale's and the bacterium's, to invade me and not them. And *vice versa*. Some wonder whether viruses, as obligate intracellular parasites, can be considered to be living, given that they cannot divide under their own steam, as it were. But like blue whales, human beings and bacteria (and everything else in between) viruses have been subject to natural selection, therefore have an evolutionary history, and therefore, from a Darwinian perspective, are as alive as anything else.[3] Viruses, as will be pointed out below, are worth thinking about in that they are in a sense microcosms of true, automotive, living systems and therefore the virologist in some ways does his science in a way that highlights what all biologists (and all scientists) are really up to.

There are various levels at which biological study is carried on. One is the observation, estimation and modelling of how an organism is fitted to its environment. This might be carried on at the level of showing how crows fit themselves to their environment by making use of tools[4], or by showing how the chemical balance within an organism is fitted to the abundance of food. A second is how the different aspects of the internal functioning of an organism are fitted to each other. Examples would be the fitting together of the consumption of foodstuffs and their expenditure in activity, and the construction of an organism, whether as a single cell with a defined perimeter or as a hairless ape with reserves of fat and locomotive muscle, as

[3] I am indebted to David Stuart for the observation that viruses are living in the sense that they have evolved.

[4] Gavin Hunt "Manufacture and use of hook-tools by New Caledonian crows", *Nature* 379 (1996), pp. 249-251.

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an entity with a beginning and an end. A third level is the study of how the chemistry of life is carried on by the fitting together of different molecules in the exchange of energy, and how information is transferred between generations by the fitting together of complementary strands of DNA. At this third level we have moved to the molecular level of understanding functioning, the biochemical level. Perhaps the most descriptive way of understanding this underlying chemistry of biology (in providing the most comprehensive information about how function and form relate) is the subdiscipline of structural biology. The structural biologist directly observes the way that molecules are arranged, and indeed their own nature as arrangements of constituent atoms, using techniques that provide atomically-detailed three-dimensional descriptions of how the atoms in them are fitted together. In this sense the structural biologist obtains pictures of how things fit together, but thereby structural biology is just a particularly refined form of biochemistry and then of biology, in which the fact that biology is a process of natural aesthetics is made particularly obvious. And this takes us back to the world of viruses. The phrase "natural aesthetics" was used by David Baltimore, in collecting his Nobel Prize for Physiology or Medicine in 1976. Having observed that within biology as a study in "natural aesthetics" the delight of the scientific eye is often to be found in how "economical, elegant and intelligent are the accidents of evolution", Baltimore notes that a "virologist is among the luckiest of biologists because he can see into his chosen pet down to the details of all of its molecules".[5] Indeed since the atomic structures of viruses can be determined this is explicitly true. At such a molecular level of description the way in which many copies of a single protein molecule can self-assemble (fit together) into the coat of the virus, and the way in which the enzymes of a virus can help in the reproduction of its genome by fitting themselves to its own nucleic acid, become observable, directly. When this description is achieved it becomes clear just how economical and elegant viruses are, for example – and how the economy and elegance are themselves objects of selection during evolution, providing space that constrains the random variability of genetic information. In this viruses again give detailed cases that illustrate a general theme in biology. Previously it was thought that "selfish genes" might be the main players in evolution, and that the organisms through which they played were pointless by-products of the gene's (or genes') natural selection.[6] Viruses have now shown cases of how an evolving entity as a whole is selected for, not any one of its particular genes, and how viruses maintain an "identity" through hundreds of millions of years despite the fact that their genetic codes vary so completely

[5] David Baltimore, Nobel Lecture, 1976

[6] Richard Dawkins, *The Selfish Gene* (Oxford: Oxford University Press, 1989)

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that no similarity between related viruses at the level of their genetic sequences may be discernible.[7] So, the survivability of the organism itself, as a whole – in this case understandable because of the great simplicity of the virus – is seen to be selected for during evolution, not a particular gene or set of genes. This is molecular top-down causation, or rather limitation which in a randomly and continuously varying system is much the same thing. The importance of this insight for the rest of biology is substantial and two pointers will show why; firstly since 97% of the human genome is not made of genes in the accepted senses of the word, and secondly since the genome is modified chemically during a lifetime above the level of its simple sequence in ways that can be passed on to subsequent generations and which affect how genes are deployed.

One of the aspects of a virus that may be selected for at the level of the whole organism is its overall structure, which turns out to be highly geometric, as we would say (viruses cannot talk). Platonic symmetry describes how a single kind of polygon can be assembled into a closed structure. There are only five ways in which this can be done, the five Platonic solids[8]; the tetrahedron (four triangular faces), the hexahedron (six square faces), the octahedron (eight triangular faces), the dodecahedron (twelve pentagonal faces), and the icosahedron (twenty triangular faces). Kepler thought the Universe might consist of a series of nested Platonic solids, on ideal grounds; while this is not true, it is true that viruses, among other systems, use (icosahedral) geometry that we can appreciate as economical and elegant, and describe using our mathematics, to assemble themselves. This starts to hint at a consonance between the ideas of the human mind in terms of beauty, economy and mathematical logic, and the way the world is: between what we say to ourselves from within a culture that has the medium of human language, and how we are structured physically in a way defined solely by the physical universe as brute fact not fine understanding. Or, in other words, the fact that things which we can express in language and agree to be the best way our logic suggests they could be, in fact turn out to be the way the world is. Or, more interestingly, that ideas of beauty and symmetry turn out to be good ways for us to discover how the world is. There is no reason why they should have done.

So, structural biology has made explicit the fact that there is an agreement between what we think is beautiful, in terms of its

[7] Dennis Bamford, Roger Burnett and David Stuart, "Evolution of viral structure" *Theoretical Population Biology* 61 (2002), pp. 461-470.

[8] Michael Atiyah and Paul Sutcliffe, "Polyhedra in Physics, Chemistry and Geometry" *Milan Journal of Mathematics* 71 (2003), pp. 33-58. The Platonic Solids are demonstrated in Book XIII of Euclid's *Elements* and form the basis for Plato's discussion in *Timaeus* of the nature of the elements Earth, Air, Fire and Water along with a fifth, Quintessence.

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elegance, economy and expressibility through mathematics (and even more important its *predictability* through mathematics and geometry[9]) and the way things are. But in doing so it is simply making especially manifest and explicit, is just a more clear-sighted version, of what all of biology is after, which is a description of how things fit together, how they pull together to achieve something concrete and as a whole the cheating of the entropy that threatens all order and structure and natural life. Studying the behaviour of birds, or the metabolic balance of the living cell, can equally well be subjected to such exercises, and has been.

In descending from the behaviour of whole organisms in community to the observation of molecular events within the study of biology we have essentially moved to the gates of chemistry, simply understood, physics, and mathematics. While those three other broad areas of scientific study have already been alluded to above in relation to their importance in an understanding of biology, as how things fit together, some examples from the fields of pure chemistry, physics and mathematics will serve to strengthen the case that what scientists are after is an understanding of the harmony, or fitting-together, of things. In chemistry, the molecules that atoms are fitted together into are smaller and more susceptible to the mathematical techniques of prediction than biological molecules are, but their essential natures are only different by scale, not by kind. Thus in coming up with new kinds of small carbon-based molecules for the binding and sequestration of given ionic species, or in the use of chemical groups to protect others during the process of synthesising given molecules using the high temperatures and pressures needed outside a biological – enzymatic – system to generate certain kinds of interatomic bonds – or in understanding how these things were adventitiously found in the past – the whole business is, how things fit together. In physics, seeing how things fit together is no less fundamental. The Pauli exclusion principle states that two electrons cannot occupy the same space, essentially, which expands up to statements about their spin and energy; from this principle the electronic structure of matter is built up. Only two electrons can fit into a single kind of atomic space, defined energetically and by motion. In quantum mechanics, one of the very strange pieces of evidence supporting the contention that Heisenberg's uncertainty and Schrödinger's cat are genuine perspectives on reality is that two formerly-associated electrons, even though

[9] Icosahedral symmetry for viruses was predicted before it was known. Francis Crick and James Watson, "Structure of small viruses" *Nature* 177 (1956), pp. 474-475; Don Caspar and Aaron Klug, "The structure of small viruses" *Advances in Virus Research* 7 (1960), pp. 225-325. Crick and Watson actually claimed to have discovered the structure of DNA on ideal grounds, although of course the pre-existence of actual experimental data from Rosalind Franklin and Maurice Wilkins which Crick and Watson are known to have been aware of rather questions that claim; see *Nature* 171 (1953), pp. 737-738.

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at the point of measurement separated by an astronomical distance, will determine each other's states when their states are measured. This quantum entanglement shows things fitted together even when they are very far apart. Moving from the tiny scale at which quantum mechanical phenomena are apparent to the scale of the whole universe, symmetry[10] and a lack thereof[11] even appear at this scale – again, how things fit together. Finally, in mathematics we have a language based on trying to say as logically and clearly as possible how things fit together, which manages to do so in a way that allows us to talk from the ideal environment of our minds or our computers in descriptive and predictive terms about how things fit together in fact and in physical reality. Thus the truths of mathematics reveal the world to us as it is in ways that we cannot otherwise know, making predictions that are unprovable at the time of prediction but which turn out to be true. From the 20th Century, perhaps the Dirac equation for the electron would be a prime example; more eye-catchingly maybe Fermat's Last Theorem, seen in 1630 and unproven until 1995.

How things fit together is a question of natural aesthetics, and the reality of how they do is what they are, and is frequently to be apprehended in our ideas of elegance, beauty, ideality and coherence. This is what we can predict and later observe (or observe and later model, depending on the mode in which our science is operating). But in observing/predicting we are not knowing things in themselves, but watching them from outside, as it were. What is the object in itself? To show this we build (or simulate in our computers) models – as Wittgenstein said, we use something with the same rhythm[12], something like what we are describing, to say what it is, what it is like. But in fact the thing in itself is a process involving what we can observe played out in time, and that process is something we cannot inhabit. Since we cannot inhabit a process we observe we cannot really know it in itself. So we observe and predict and build models of increasing accuracy and precision but never entirely see or describe things as they are. Our experience of our selves is itself a process, and so this explains our difficulty in doing science with our self-consciousness. It is as if the perspective is altered, and rather than looking from the outside into another process (the life of the virus or of the blue whale) we are within a process trying to look outside and back onto ourselves. We are in any one moment what our history makes us. We are how we have been formed through our time of living; this formation gives us the ability *now* to be *thus*, and yet "we"

[10] Jean-Pierre Luminet, Jeffrey Weeks, Alain Riazuelo, Roland Lehoucq and Jean-Phillipe Uzan "Dodecahedral space topology as an explanation for weak wide-angle temperature correlations in the cosmic microwave background" *Nature* 425 (2003), pp. 593-595.

[11] Paul Davies, *The Cosmic Blueprint* (London: Penguin Books, 1995).

[12] Ludwig Wittgenstein, *Philosophical Investigations* (Oxford: Blackwell, 1973) §527.

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are "between" what we have experienced (which has become how we are structured, or how we fit together) and what we are to become and in moving from before to after we are being.[13] Given this it may be even clearer that our knowledge of the world, perhaps especially our scientific knowledge, is a very odd thing indeed, particularly since it enables us to make accurate predictions even in the absence of evidence.

Our knowledge of the world is gained through our minds-in-our-bodies, as Herbert McCabe pointed out. "The understanding of meanings is the work of human intelligence, by which we transcend our individuality, but it comes about by a power of the human soul, which is always the substantial form of an individual human body. For Aquinas, concepts, unlike sensations, are not the private property of individuals but do arise from individual material animals transcending their individuality and hence their materiality. As Aristotle knew, thoughts, unlike sensations, have no corporeal organ. Brains do not think; they are the coordinating centre of the structure of the nervous system which makes possible the sensual interpretation of the world, which is itself interpreted in the structure of symbols, language, which we do not inherit from our genes but create for ourselves in community."[14] So it is much better to think of the brain as something like a liver – whereupon our ability to use language and mathematics, in community, is all the more astonishing.

One philosophical response to this problem has been explored in an article by Ralph Walker that deals with Leibniz's Principle of Sufficient Reason.[15] "To suppose that ... preferences of ours yield truth about the world is to suppose something rather remarkable: that there is some kind of built-in correspondence between the way we think and the way the world works." We have apparent scientific laws, which in truth are regularities we happen to observe in the world and happen to be able to describe in our languages; instead of scientific laws we could speak of "determining sufficient conditions".[16] We are seeking repeatedly to explain why something has occurred (and in doing this we will be showing how things fit together) and "many people feel they would be content to give up the search for further explanations once they had reached basic scientific laws. It seems to them gratuitous, inappropriate or even incoherent to seek ... for a sufficient reason why these laws should hold. However this is an odd position to take, because it is arbitrary."[17] What is being dealt with is an infinite regress in explanation that either has an arbitrary limit, or

[13] *cf* Robert Gilbert "The Riot of the Mind" *New Blackfriars* 87 (2006) pp. 357-363
[14] Herbert McCabe OP *God Still Matters* (London: Continuum, 2002) pp. 126-127.
[15] "Sufficient Reason" in *Proceedings of the Aristotelian Society* 97 (1997), pp. 109-123.
[16] *Ibid.* p. 113
[17] *Ibid*. p. 113

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a necessary and sufficient one. Walker argues that the necessary and sufficient limit – or reason – is to be found in Leibniz's argument that God is the determining sufficient condition of both necessities and possibilities. "The existence of God cannot depend upon any condition, because the existence of the condition depends upon God."[18] Thus "...if anything is a condition or reason for anything it owes that status to God, and would lack it without him. God is prior to everything in the order of explanation, since without God nothing can be an explanation of anything."[19] Walker is maintaining that we are "committed to the search for reasons, and committed to thinking that our best explanations give us truth – or approximate truth – about the world. But because our best explanations encapsulate standards and criteria that are our own, there is something lacking from them, unless they can say something about why these standards should give us truth about the world." We are urgently required "to do something to explain the match between the way the world is and the standards that govern our thought. Otherwise none of our explanations would really be adequate; they are all incomplete until an account has been given of this match between the world itself and the simple and systematic theories we construct in accordance with our own standards and values."[20] Walker's final flourish is to say that in searching for sufficient reason we are brought "to a place where nothing that could count as a reason – nothing that could match the epistemological requirements on an explanation – could ever, in principle, be found."[21]

Ralph Walker's prime focus here is to show how we can know things – for example how science can say meaningful things about the world. In scientific practice it is as if this question and the question of why there exists anything rather than nothing become unified, become one problem. The Anthropic Principle, for example, is concerned with the apparent fact that the structure of reality is so very 'finely tuned' that variation by an infinitesimal amount in the charge on an electron, for example, or in the cosmological constant would have resulted in a non-viable universe or one that ceased to exist before humanity evolved[22]. For some, this has become a way of seeking to show that God exists, which is a simple argument from design, and thus not in the end conclusive; it may be more useful as a way of reflecting on the wonders of creation. Nevertheless, such reflection indicates that the Anthropic Principle is simultaneously asking why we can know anything (such as the charge on the electron and the

[18] *Ibid*. p. 118
[19] *Ibid*. p. 120
[20] *Ibid*. p. 121
[21] *Ibid*. p. 123
[22] Bernard Carr and Martin Rees "The anthropic principle and the structure of the physical world" *Nature* 278 (1989), pp. 605-612.

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cosmological constant and a host of other terms that fitted together give a description as far as we can of the physical basis of the way the world works; terms which point up the absurd *precision* with which we can know things but not *why* they are so *accurate*) and why there is anything (why did the universe come to be, why did it survive long enough to become self-conscious, why did matter ever hold together, why was the cosmic symmetry between matter and antimatter at the moment after the Big Bang broken by just enough to give rise to *all this*?).

The reality of God

Herbert McCabe, of course, also persists in asking the question: Why is there anything instead of nothing? For him to stop asking why things are *thus* at some point where we can show how they are fitted together and to deny the possibility of meaningful talk beyond that point is arbitrary, and points us towards God and towards acknowledgement that what God is, in Godself, is beyond our capacity to imagine, let alone know.[23] As Ralph Walker put it "no*thing* that could count as a reason ... could ever, in principle, be found."[24] As Herbert McCabe put it "the only God who matters is the unfathomable mystery of love because of which there is being and meaning to anything that is; and we are united with God in matter, in our flesh and his flesh. These thoughts only bear repetition because they are perennially forgotten: [my] ... two targets are, respectively, the view that we can speculate about what sort of being God is (and even how he should behave), and the view that our link to God is an especially non-bodily or 'mental' affair."[25] Why is there anything instead of nothing is inevitably a question about creation; and it is through creation that we have any hope of knowledge of God; but it is the idea that the world is created that is fundamentally rejected by most practising scientists, and which many of those who have sought to write at the science:faith interface have sought in address. Yet in addressing what it means to say the world is created and how we are to conceive of God's relationship to the world, most scientific writers seem to end up dealing with a God that is idolatrous, that is no God, that is somehow seen to be constrained or defined or whose action is too closely modelled. Some writers with a background in theology or philosophy by contrast seem to me to be not serious enough about the world as it is, how it fits together and how we can in principle

[23] McCabe *God Still Matters* pp. 15-16, 36-38; *God Matters* (Continuum: London, 1987) pp. 3-7.

[24] Walker, p. 123, my italics

[25] McCabe in the Preface to *God Matters*.

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describe how everything material about it fits together without any necessary reference to God. In writing this despatch from the scientific coalface I am bound to say that I find in the strong Dominican tradition exemplified by Hebert McCabe but of course emphasised and explored in many other modern writers, and recently by Timothy Radcliffe[26] a most helpful way to insist on the great seriousness with which the reality of God should be taken, with all that that means in terms of God's Otherness and unconfinability in any set of human terms, while also having the greatest respect for the material world and for our part in it as linguistic and ceremonial animals. Within this tradition we are freed from the need perceived by others to make science subordinate to faith or *vice versa*, in a way that doesn't apparently require us to say of science what it cannot meaningfully address about the world, or to say of God what God cannot be like or do because of scientific knowledge. I have a further purpose, which is to suggest that this theological tradition is also fruitful for understanding what scientific knowledge is and how we come by it. James Alison writes:

> . . .when we speak of creation we are not speaking in the first place of the process by which things came, or come, to be. That description is proper to scientists, especially those not limited in their empirical observation by the hidden filters of pagan theological notions (normally held implicitly and unconsciously) [and here he has in mind an Oxford biochemist, so I should be extra careful[27]]. It means that when we speak of creation we are speaking of a relationship, a relationship of purely gratuitous giving, without motive, with no second intentions, with no desire for control or domination, but rather a gratuity which permits creatures to share gratuitously in the life of the Creator. The relation of gratuity is anterior to what is and has ever been.[28]

Another interesting voice is that of Fergus Kerr, who suggests we think of God, the Creator, more as verb than as noun[29]. This is of course a natural expansion of Thomas Aquinas's definition of God as self-subsistent being, with no distinction between essence and act. So, God is pure action; God *is* justice, God *is* giving – and as we are used to saying, God *is* love. Or we could think of God as "structuring spaciousness" – interesting when one remembers the empty Holy of Holies in the Temple in Jerusalem – "The glory of God always shows itself in an empty space . . . The ultimate throne of glory is an empty

[26] Timothy Radcliffe OP, *What Is the Point of Being a Christian?* (New York: Continumm/Burns&Oates, 2005).

[27] Arthur Peacocke, *Theology for a Scientific Age* (London: SCM Press, 1993) pp. 106-110.

[28] James Alison, *The Joy of Being Wrong* (New York: Crossroad Herder, 1998) p. 99.

[29] Fergus Kerr OP, *After Aquinas* (Oxford: Blackwell, 2002) pp. 187-200.

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tomb"[30] – or as the origin of freedom[31]. Or, remembering what has been said about science, God *is* understanding (of how things fit together); God *is* knowledge; God *is* Word. As Timothy Radcliffe puts it, "[i]t is our belief that everything now receives its existence from God and this is why we can understand it. . ..The universe is created by God's word, and so it can be understood."[32]

Really, another way of making the same point is to be found in the thought of René Girard, but argued from anthropology to the fact that we do science effectively rather than from the fact the world is rationally understandable to its nature as created. Girard's argument is that science arises when we abandon ways of talking about the world that involve blame and the identification of explanations for the occurrence of events with victims. "We didn't stop burning witches because we invented science; we invented science because we stopped burning witches."[33] The discovery that humans are not to understand the world in terms of mimetic conflict over shared goals resolved by the creation of a shared victim is the same as the discovery that the existence of the world is utterly gratuitous. In being freed through Christ from an oppositional, victimary way of structuring society, we are freed to understand the world as logically comprehensible without recourse to mythical explanations, and this gives birth to scientific objectivity in scientific community; I suppose the same thing is to be understood from the rejection of Manicheeism, also a failure to see the unutterable givenness of existence. The moral content of scientific activity – the perception that it is right to seek the truth, that it is wrong or immoral to falsify data, to fail to pursue research honestly; that the givenness of creation places moral burdens on us to undertake objective enquiry into the nature of things: this too is a gift, from a non-mythological understanding of the world as created, to the exercise of human enquiry. Human moral living gives rise to the disinterestedness that is necessary for science.

I want to mention these various ideas, ways of trying to say the unsayable, so that I can build a more complete picture of the internal basis for scientific thought and discovery, and how that relates to everything else. To reach that conclusion I wish to turn to the recent book by Rowan Williams, *Grace and Necessity – Reflections on Art and Love*[34], the reading of which in fact prompted the collection of

[30] Radcliffe *I Call You Friends* (New York: Continuum, 2001) p. 100.

[31] Radcliffe *What is the Point of Being a Christian* pp. 29-48; McCabe *God Matters* p. 15

[32] Radcliffe *op. cit.* p. 121.

[33] René Girard *The Scapegoat* (Baltimore MA: Johns Hopkins University Press, 1986) p. 204. See also Girard with Jean-Michael Oughourlian and Guy Lefort *Things Hidden Since the Foundation of the World* (Stanford CA: Stanford University Press, 1987) pp. 259 and 438-441.

[34] Harrisburg PA/London: Morehouse/Continuum, 2005

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thoughts set out in this article[35]. My point is to say that what the artist engages in is the same thing that allows a scientist to understand the world. As Rowan Williams says,

> The artist imagines a world that is both new and secretly inscribed in all that is seen ('There is another world but it is the same as this one', in Rilke's famous phrase). . .[36]

In *Grace and Necessity*, Rowan Williams discusses the artistic process, with reference to the work of David Jones, Mary Flannery O'Connor and, overall, Jacques Maritain, essentially picking up the theme from Maritain that things are not only what they are, physically, but there is more to them. The structure of things reaches beyond itself, there is something *superstructural* but *real* about the work of art. There is no "for itself" hidden in what is perceived, but "the inner life of a reality is what unfolds in time not a timeless and relation-free definition."[37] So, a painting is not simply a depiction of what is 'there', but an attempt at narration, at the description of context and meaning; a novel is not just a story of real folk doing regular things but a story of real folk doing regular things that somehow stretches beyond itself to embrace greater meaning and significance, such that the characters of a novel take on their own reality or dignity.

> The presence in art is . . . a presence *within* what is made that generates difference, self-questioning, in the perceiving subject. It makes us present to ourselves in a fresh way, and so engages us in dialogue with ourselves as well as with the object and with the artist and with what the artist is responding to.[38]

We have the same problem in knowing what a piece of art is *in itself* as we have knowing how the world is in itself; so comments such as these throw us back to the question of how we know things, and how their reality is to be found in *process* – as Rowan Williams says, "the inner life of a reality is what unfolds in time" (see above) – and as being found in the interstices of what we can observe. We *are* between what we have experienced and what we are to become and in moving from before to after we are being. Essentially Rowan Williams is suggesting that in the model of the creation by an artist of an autonomous, gratuitous piece of art – a picture, book, poem or fugue – there is a fruitful model, or analogy, for how the real God whom we cannot name relates in giving, in gratuity, to the real world we can observe darkly (and miraculously). "Art is not functional to the self but it does *function*; and any account of what the production of

[35] In preparation for a talk on science and religion at Magdalen College, Oxford; I am grateful to Michael Piret for the opportunity to give that talk.
[36] *Ibid.* p. 167
[37] *Ibid.* p. 135
[38] *Ibid.* p. 150.

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art involves has to recognise that it is also the production of a self. Art always thus approaches the condition of being both recognition and transmission of gift, gratuity or excess, but it always *approaches*."[39] Great art gives rise to a truthful understanding about how things are; the (scientific) pursuit of truth gives rise to modelled descriptions of aesthetic value. The aesthetic value of these descriptions is somehow a guarantor of their truthfulness, as frequently demonstrated by the construction of hypotheses on aesthetic grounds that later can be shown experimentally to be true, in a concrete and not just an ideal sense. "There is the implication that the world is not yet as it 'really' is; that the act of representation is bound up with the actual life of the material order. There is the possible hidden assumption in that idea that the world's reality is always asymptotically approaching its fullness by means of the response of imagination – the assumption of an 'ideal' fullness of perception in which things reach their destiny."[40] Science too is always approaching, asymptotically, a description of how the world is. But never quite getting there. "God has nothing to discover, no self to shape. There is a sense in which God *can* be said to 'exhaust' what he is in the mutual giving of the life of the trinity."[41] ". . .[T]he world comes into being by God's free decision, both gratuitous (it is not for God's private purpose) and continuous in some way with the order of the divine mind. Its life is grounded in God, in God's wisdom, to use the traditional language, and just as radically different from God (and hence vulnerable to change and chance). It is loved by God, to paraphrase St Augustine, for the sake of what God purposes to do with it."[42]

Love, then, creation, is the making of things to be themselves. "[T]he way reality is would be unintelligible without the doctrine of God that Christian theologians have elaborated, a doctrine that puts gift and dispossession at the foundation of everything."[43] "[T]heology has a story to tell about artistic labour which provides a ground for certain features of it and challenges it to be faithful to certain canons of disinterest and integrity. That this helps to foster art which is intensely serious, unconsoling, and unafraid of the complexity of the world that the secularist too can recognise might persuade us to give a little more intellectual house-room to the underlying theology than we might at first be inclined to offer."[44] Or, as I might say: the difference between a purely material and a created view of the world is like the difference between seeing a painting or whatever as just

[39] *Ibid.* p. 163.
[40] *Ibid.* pp. 153-154.
[41] *Ibid.*
[42] *Ibid.* p. 159
[43] *Ibid.* p. 169
[44] *Ibid.* pp. 169-170. And here it is worth mentioning Girard again: the release from a mythical worldview through revelation has given us the ability to do science.

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its structure – canvas, oil paint – and seeing it as something that has meaning beyond its physical actuality. The fact that such a view – in science to be found in the apprehension of mathematical precision, economy, elegance and coherence and in the belief in truth – is creative of serious knowledge about how the world is, is astonishing. Previously it has been suggested that superstructural realities embrace not only works of art – symphonies as well as poems and novels and paintings – but also natural physical objects such as the human being[45], the human being is fugal[46]; then the ability to understand human being is a spiritual ability. In as much as the world is understandable scientifically, by so much also is art possible, and forgiveness and love. Their origin is the same. But none of this is so strange.

> "All wisdom is from the Lord God, and hath been always with him, and is before all time.
> Who hath numbered the sand of the sea, and the drops of rain, and the days of the world? Who hath measured the height of heaven, and the breadth of the earth, and the depth of the abyss?
> Who hath searched out the wisdom of God that goeth before all things? Wisdom hath been created before all things, and the understanding of prudence from everlasting.
> The word of God on high is the fountain of wisdom, and her ways are everlasting commandments.
> To whom hath the root of wisdom been revealed, and who hath known her wise counsels?
> To whom hath the discipline of wisdom been revealed and made manifest? and who hath understood the multiplicity of her steps?
> There is one most high Creator Almighty, and a powerful king, and greatly to be feared, who sitteth upon his throne, and is the God of dominion.
> He created her in the Holy Ghost, and saw her, and numbered her, and measured her.
> And he poured her out upon all his works, and upon all flesh according to his gift, and hath given her to them that love him.
> The fear of the Lord is honour, and glory, and gladness, and a crown of joy."[47]

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[45] Robert Gilbert *op. cit.*
[46] Rowan Williams p. 135 *et seq.*
[47] Ecclesiasticus ch. 1, vv 1-11.

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