NATURALISM AND MATERIALISM

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This article explores the nature and intellectual argument for naturalism and its dependent attitude, materialism. It touches on some of the alternatives but argues that they are inferior approaches to the manner in which knowledge and understanding are obtained. It extends the argument by touching on two subsidiary questions: the role of mathematics in describing the world and the origin of the laws of Nature.

Naturalism is the view that all the phenomena of the universe are open to investigation by what might be termed 'conventional' techniques and do not require augmentation by more 'spiritual' techniques. In short, naturalism discounts the possibility of a supernatural dimension in the workings of the world. Naturalism does not necessarily demand that there be secular mechanisms that account for the phenomena, merely that they can be studied by what can be broadly classed as standard laboratory equipment ranging from the human eye to instruments as huge as that at CERN. Materialism takes the view a step forward, by asserting that all the phenomena detected by those instruments can be explained in terms of the behaviour of the physical entities that make up the universe. You can have naturalism without materialism, but not materialism without naturalism.

An example of naturalism without materialism is provided by psychology. It is perfectly feasible to bring the techniques of psychology to bear on a problem and to solve it to the satisfaction of the proponents without also attributing aspects of consciousness to the biochemistry of the

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molecules that constitute a brain. Even chemistry could be done without interpreting the formation of new matter from old without understanding what is going on in terms of atoms and molecules. Few would argue, though, that although an atomic theory of psychology might be a stretch, an atomic, materialist theory of chemistry greatly enriches the procedures and transforms it from cooking into science. Naturalism effectively opens the door to the deeper comprehension of the fabric and workings of the universe that materialism represents.

Naturalism and materialism both raise a number of important questions regarding the completeness of observation, the reliability of explanation, and the existence and origin of the laws of Nature. The scientific method depends on these features. Its claim, or at least the claim of those who regard the scientific method as all-powerful and unbounded for the elucidation of Nature, to be applicable to every aspect of existence, stands or falls on the answers.

As to the completeness of observation, a naturalist must defend the position that laboratory instruments, although extending the range and precision of human sensation, either by intention or by accident have not been developed to respond to the presence and antics of angels, spirits, sprites, goblins, leprechauns, devils, and – broadly speaking – the finger of God. Thus, the anti-naturalist might argue, naturalism has shut one eye and has thereby remained blind to a vast ocean of spiritual activity. That is, an opponent of naturalism might claim, a naturalist is spiritually tone deaf and blind to a great corpus of cosmically pervading spiritual activity that leaves the needles on its secular dials undisturbed.

The naturalist's response is that it is so unlikely that such a great corpus of activity would not produce a quiver on its needles, and no unaccountable quiver had ever been observed in the centuries of watching dials, making measurements, and watching out for anomalies. The naturalist might go on to aver that claims of tone deafness and blindness are easily understood to be merely a manifestation of

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wishful thinking and various kinds of cultural conditioning, and thus have no force. The naturalist accepts that their needles do quiver unexpectedly (I write metaphorically, of course), but as the quiver is pursued it leads to a new understanding, more substance for materialism's hopper, and it has never led to the resignation of the intellect and the failure of its programme that acceptance of the quiver must be due to the intrusion of the finger of God. That is, as needles quiver, so comprehension progresses. Moreover, those who do claim to be responsive to that finger are themselves open to naturalist investigation, principally psychology and psychiatry, and thus their objection to naturalism (but not necessarily to materialism) is ironically undermined by their own claim.

That last point is worth emphasizing. Any claim that the finger of God is stirring in the universe, and even stirring in the tiny private, personal realm within a human skull, is itself open to investigation by conventional, secular techniques. Therefore any such claim that it undermines naturalism (but not materialism) is *ipso facto* false. All the anti-naturalist is left with is the possibility of claiming that the nuances of the claimed spiritual experience cannot be captured by conventional investigation. But even that claim is open to conventional investigation. In short, there can be no sustainable objection to naturalism! The anti-naturalist would then be likely to argue that that last claim is more a rhetorical debating point than a convincing argument, for it could still be claimed that the secular pursuits of psychology and psychiatry are impotent in such an investigation. The naturalist would then pursue the point again, and so on, for ever.

The underlying aim of naturalism is to identify the laws of Nature, which are summaries of the regularities of behaviour its probing discovers. In bygone days, 'natural philosophers' have reconciled this pursuit with their faith by regarding their pursuit as 'reading the book of Nature', the book at least metaphorically written by God, a kind of cosmic user's handbook. Once again, it is important to

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keep in mind the distinction between naturalism and materialism, for the former is concerned with the gathering of information not its rationalization. Darwin's identification of natural selection as the engine of evolution was essentially a rationalization of his botanical and zoological observations, fundamentally an intelligent, observant nature walk through the biosphere, not an explanation in terms of the then unknown genetic theory of inheritance. Galileo had no conception of the mechanism of gravitation when he collected data on the swing of a pendulum, the fall of a ball, and the roll of a ball down an inclined plane. Darwin and Galileo were using their eyes as the instruments of discovery, gathering information, monitoring the workings of the world. That scientists have greatly extended the capability of eyes into distant parts of the electromagnetic spectrum and created instruments that eschew analogues of the eye altogether is an augmentation of naturalism and has led to the discovery of laws of great subtlety, often overthrowing laws established by the eye alone.

A great strength of naturalism is that the laws its techniques discover are never in conflict with each other. A law discovered in physics does not conflict with, indeed typically augments, one discovered in biology. Were an angel or devil to be a part of the fabric or an agent of the universe, it is likely that there would be a certain capriciousness of Nature, with deviations from laws established by naturalistic investigation. Indeed, the finger of God as manifest in the exercise of miracles, which by their very nature entail the suspension of at least one law of Nature, would be one example of such capriciousness. That as a miracle has never occurred (except in the imagination of the wishful thinking or the hysterical) it is possible to infer the absence of any supernatural incursion into the workings of the world (or to accept the extraordinary forbearance of God in withholding his finger despite the provocation and exasperation He might experience). That physicians advising the Vatican have ascribed events to miracles due to intercession by candidate saints is a sign of their, the physicians', medical

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incompetence rather than evidence that the intercession was successful.

Materialism provides at least circumstantial support for naturalism. Materialism is built on naturalism, for the formulation of explanations in terms of the constituent entities of the world cannot be achieved without the investigations that naturalism embraces. That materialism works so well, in the sense that it is self-consistent and consistent with the laws of Nature, suggests that the mode of discovery represented by naturalism is complete.

Could materialism be a delusion? Perhaps it could be. The background activity of a busy-body omnipotent spirit could be responsible for staging, like a cosmic marionette show, all the phenomena summarized by the laws of Nature, and that we are being naïve and petty-minded in the assumption that a simple mechanism is at work behind the façade that occupies the attention of the naturalist observers. The only honest answer against such a possibility is prejudice against what seems to be last-gasp grasping at straws to maintain an objection while drowning in a sea of contrary evidence. Moreover, although it is unwise to ascribe to an intrinsically unknowable omnipotent entity the commonplace attitudes of a mere human (although that reticence has not inhibited the writings of many theologians), I suspect that a truly omnipotent entity would have come up with a scheme, a mechanism, that would have saved such effort and thereby given rise to the laws of Nature. This point will get further attention later in this article.

Materialism proceeds by identifying the component entities of the universe, discovering the forces that act upon them, working out how they respond and themselves give rise to the forces, and then establishing how the entities unconsciously conspire to give rise to the phenomena summarized by the laws of Nature identified by naturalism. Materialism supposes that such a procedure is sufficient: just as naturalism asserts that special 'spiritual' equipment is not necessary to observe all phenomena, so materialism

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asserts that special 'spiritual' influences are not needed to account for behaviour. It maintains that view even for considerations of phenomena of the most complex kind, such as consciousness. The ability to explain why matter can be aware of itself, the attribute lying at the core of consciousness, is the touchstone of the validity of the materialist's agenda. It has yet to be achieved. Not having been achieved is not an argument against materialism. Hard problems take time to be resolved, and consciousness is one of the hardest of all. Materialists edge towards solutions; they do not rush in with facile, false claims. (If they do, they are soon found out.)

One of the central questions of materialism, a question that also lies at the heart of naturalism, is how we know that its proposed entities (things like electrons) exist even though we cannot see them and in some cases (electrons, once again) are intrinsically incapable of being seen. Here we are in the realm of epistemology, the branch of philosophy concerned with the nature of knowledge. As far as materialism is concerned, there are three pillars that support the concepts it invokes. One pillar of materialist epistemology is naturalism itself, for it is presumed that conventional laboratory techniques expose all there is to know about the fabric and mechanism of the universe, and by implication that there is no need to invoke the spiritual for this voyage of discovery and therefore, by extension, for any of its explanations. The second pillar is the accumulation of testable, shareable evidence. That evidence might be historical, as investigators have groped their way through a sequence of observations sometimes stretching over decades or even more and have thereby accumulated justification for their view. The third pillar is consilience, the realization that science is science and not sciences: the concepts it invokes, although they spring from many disparate types of observation, are consistent, do not clash, do enmesh, and jointly enrich understanding. Thus, modern biology draws on chemistry; cosmology, the exploration of the biggest, draws on fundamental particle physics, the

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exploration of the smallest. Materialism, in so far as it is a part of the scientific endeavour, is a reticulation of mutually supportive concepts, an ocean in which rivers of knowledge have flowed and mingled constructively.

Take the electron as an example again. It goes without saying that evidence for its existence (gathered in 1897 as it happened) emerged by the application of conventional techniques, not through prayer or revelation. In the following decades its mass, charge, and spin (its only three intrinsic properties, as far as we know) were determined and verified in numerous experiments worldwide and it was established it as a universal constituent of ordinary matter. Then its role in atoms, molecules, and the solids that provide the infrastructure of modern technology was established, with no deviation that cast doubt on its existence or its having covert, spiritual, properties. In due course (and this is still an ongoing project), its membership of the family of what are currently regarded as the fundamental particles was established. Electrons are an essential part of the concepts of physics and chemistry, and are invoked in biology to understand the mechanism of that most important of processes, photosynthesis. Only the most sceptical can still regard the 'electron' as merely a name, a social construct, a fiction for facilitating discourse.

The problem with materialism is that it is asymmetric. Naturalism provides the notions that allow the ever more fundamental to be discovered. That pathway of discovery is relatively easy to negotiate through diligence, imagination, and intelligence. It is far more difficult to travel in the opposite direction, to establish how complex phenomena emerge from the play of simple entities. That is, a challenge for materialism is to show not that complexity emerges from simplicity (for that is the central pivot of the materialist view), but *how* emergent properties arise. It is quite easy to explain (to a patient audience, at least), how the structure of a molecule of water gives rise to water's wetness. It is still not possible to explain how a personality emerges from a genome. The 'assemblist' phase of

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materialism, the accounting for complexity in terms of the concatenation of simplicities, remains a challenge; but where it has been achieved it lends support to the validity of the materialist agenda.

With naturalism and materialism in harmony, it is appropriate to consider an aspect of them that would leave them intact but undermine their foundation in secular reason. Granted that conventional methods are sufficient for the discovery of all there is to know, and granted that materialism represents a reticulation of laws and a panoply of self-consistent concepts with powerful implications, there is still room for a spiritual component once it is asked where the laws came from. A Creator could, in principle, create a universe that could be fully explored by conventional techniques and Himself scornfully have no truck with angels and leprechauns, and yet be the provider of the laws. The completion of the naturalist agenda is therefore to seek to comprehend the origin of the laws of Nature in secular terms and eschew the concept of Creator as legislator.

I have explored this question at some length elsewhere and can perhaps point in the direction of where the answer lies.[1] Instead of the laws being laid down by some act of imposition, I take the view that their origin can be found in a mixture of indolence, anarchy, and – that last resort of the perplexed – ignorance. Take, for example, that most fundamental of all laws of Nature, the conservation of energy, the observation that although energy occurs in different varieties and one variety can change into another, its total is unchanging. The law gathers its importance from being the foundation of the concept of causality, for it polices changes, forbidding some and allowing others, and therefore underlies our ability to discern the workings of the universe; that is, it underlies science itself. The key point is that it is possible to show that any conservation law, any statement that although changes of type might occur, the quantity remains constant, arises from a symmetry embedded in the universe. In this case, the conservation of energy arises from the uniformity of time. Therefore, to

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discover the origin of this all-important law, it is necessary to understand why, on a cosmic scale, time is uniform, flowing at a steady rate second by second, not speeding up now and slowing down then. My supposition (and it is only that) is that when the universe emerged from absolutely nothing (not just empty spacetime, truly absolutely nothing) and acquired the dimension we now recognize as time, then it inherited the qualities of its precursor, absolutely nothing. Absolutely nothing is perfectly uniform because you cannot have lumps of denser nothing in one place and more tenuous nothing elsewhere; indeed, 'place' and 'elsewhere' are meaningless in this context. Therefore, I suppose that the new time dimension that came into existence at the incipience of the universe inherited its precursor's, absolutely nothing's, uniformity. Hence, on a cosmic scale, time is uniform, therefore energy is conserved, and we have causality and a universe that is open to comprehension according to the naturalist agenda.

All the preceding supposings are intended to emphasize is that there is possibly a non-spiritual, secular, coolly rational way to account for the laws of Nature that naturalism exposes and materialism enriches. The argument discounts the need for a creative spirit of some kind to impose legislation. It might be quite wrong, but it shows that it is possible to consider deep questions about the foundations of naturalism and therefore materialism in terms open to human comprehension.

Careful readers of this article will have noticed the omission of one word: mathematics. Where does mathematics sit in the naturalist/materialist agenda? Not all laws exposed by naturalist probing of the universe are mathematical. The most outstanding example is the understanding of evolution in terms of natural selection, where, in so far as it can be expressed as a law, the crude statement 'the survival of the fittest' captures the essence of the argument (without specifying the fittest what?). Undoubtedly, mathematics applied to natural selection greatly enriches our understanding of its consequences, but mathematics is not

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intrinsic to the theory. On the other hand, it is hard to see how general relativity, the theory of gravitation, could be formulated without mathematics. It is certainly the case that mathematics gives spine to hypotheses and enables them to stand up to experimental verification (or, if you prefer, and are a glass-half-empty Popperian, to the prospect of falsification).

Mathematics is perhaps but a tool in naturalism's workshop, being brought to bear when it is necessary to tease information out of data. It is similarly perhaps merely a tool in materialism's workshop too, there being an austere, logical, emotionally uncluttered device for unfolding the consequences of a theory, letting the user stand back to discover an idea's implications without distorting them by prejudice. But perhaps it is more. Others have noted the extraordinary utility of mathematics for exploring (under the guidance of naturalism's experiments) the properties of the universe and have wondered why this supreme achievement of the human mind is so well fitted for this task. One possibility is that what we take to be the universe is in fact a manifestation in some sense of mathematics, so that physical reality and mathematics are structurally identical. If that is so, then materialism melts away and what we take to be its entities fade into abstraction.

There is another 'm-word' that has also not appeared so far: morality. Where does 'ought' lie, as distinct from 'is', in naturalism's and materialism's assertions? Moral questions are open to the naturalist agenda because they can be explored by conventional techniques, specifically psychiatry, psychology, and anthropology. Those techniques are augmented by ethology, the study of behaviour, and discern attitudes common to other species and founded in our evolutionary history. Those who aver that the concept of goodness is essentially spiritual and that mankind's behaviour is rudderless in the absence of God should reflect on the evils that the notion of God has inspired through the centuries. The naturalist approach opens the prospect of understanding human behaviour (as well as that of rats),

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modifying it if that is judged appropriate, and perhaps even forgiving it. Understanding, in a naturalist's opinion, is better than coercion to adhere to the prescriptions of ancient texts.

Materialism's contribution to moral philosophy is a much harder nut to crack. There is no prospect of being able to account for, let alone predict, what is societally acceptable as 'good' on the basis of the behaviour of fundamental particles at any level of discourse, from electron up to neuron. All that can be asserted is that because behaviour is an aspect of consciousness, and consciousness is at root a biochemical phenomenon played out in the awesomely complex interior of the brain, then morality is fundamentally a system-level emergent property consistent with the materialist agenda. This, I accept, is argument by assertion and feeble (but honest) because of it.

Feeble it may be, but there is the prospect of its strengthening. An implication of the materialist attitude is that any process, including that of the material entity the brain, is open to emulation to an arbitrary degree of approximation, that degree improving with progress, effort, and experience. We are far off being able to build a machine such that switching it off would be regarded as murder, but we are edging forward with devices that in some measure display intelligence. Such artificial brains will undoubtedly be different from natural brains, lacking the remnants of our evolutionary history and the pervading chemical environment of our neurons, but they will be open to all kinds of investigation that we cannot perform on natural brains. Thus we shall come to a deeper understanding at a systems level if not at a molecular level of how we think and behave.

In summary, naturalism and its ally materialism should be the starting point for any understanding of the workings of the world, for they ascribe its properties and behaviour, and those of its inhabitants, to underlying, discernible simplicities yet accommodate complex and perhaps unpredictable behaviour. So far, there is no hint that they are insufficient for a full understanding of all there is.

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Note

[1] Peter Atkins, *Conjuring the Universe: The Origins of the Laws of Nature* (Oxford: Oxford University Press, 2019).

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