THE STRUGGLE BETWEEN CHRISTIAN THEISM, METAPHYSICAL NATURALISM AND RELATIVISM: HOW TO PROCEED IN SCIENCE?

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SUMMARY

My thesis is that Christians are mistaken in their belief that material reality can be understood without reference to non-material created causes, such as mind, or to non-material uncreated causes, such as God. The reasons I offer are that Christians know of the existence of non-material beings such as spirits and God and that ignoring this leads to a distorted view of reality or even a neglecting of empirical evidence. Broadly conceived, I suggest that materialism can be excused to be methodological only if it is open to revision, but that this is seriously hampered by the psychological and sociological power of beliefs antagonistic to theistic beliefs.

The first set of these beliefs concerns the materiality of the world. Those deeply committed to the belief that reality is nothing but matter (monistic materialists) are extremely unlikely to revise their materialism. Those who accept the existence of a realm in addition to matter (dualists), be it a mental or a supernatural realm, and also believe that this non-material realm has no effects in the material world, have a weaker but still very robust attachment to materialism. For them science is concerned only with matter. Finally, revision is unlikely among dualists who believe that God and mind have effects in material reality (interventionists and interactionists, respectively), but also believe that science ought not to be concerned with this non-material dimension.

I then argue that those who do believe the non-material is the business of science still have a hard time limiting materialism, but that this is due to a second and different set of beliefs. These beliefs do not concern the nature of reality, but the nature and purpose of explanation. I show that the ideal of the unity of scientific knowledge forces a preference for explanations in material terms even when the non-material presents itself as a possibility or when it is in conflict with empirical evidence.

I then suggest that science needs to expand its methodology beyond the current confines. This expansion consists of accepting non-material causes in scientific explanations, and using broader criteria for theory choice. Instead of explanations that use material causes only, science needs multi-dimensional explanations that admit the causal efficacy of purpose and intent. Not only is the pursuit of several different explanations more adequate for a multi-dimensional reality, but it also provides a way of limiting one-dimensional explanations including those developed in terms of matter alone. This is an hermeneutical approach to explanation in the natural sciences which emphasizes "understanding" and sees explanation in material terms as one form of it. Criteria for theory choice include not only the standard consistency with observation,

internal consistency, simplicity, scope, fruitfulness, accuracy, coherence, etc., but also consistency with conceptual and religious beliefs about the nature of reality and about the nature and purpose of explanation. This creates the possibility of accounting for the historic role of beliefs in the construction of knowledge and opens the possibility of proposing rules for the interaction between religion and science. To a large extent the nature of these interactions remains to be explored.

1. INTRODUCTION.

Interpreting natural phenomena is a complex process because contributions come from observation, logic, and a variety of methodological, ontological and religious beliefs. Methodological materialism is a rule of science that tries to simplify interpretation by excluding some of these contributions. It prescribes that, in explaining natural phenomena, one should act as if reality consists of nothing but matter. It assumes that one can act as if the existence of non-material causes, whether created (mind, spirit) or uncreated (God), does not make a difference in our understanding of the material world. The exclusion of uncreated causes (God) is known as methodological atheism, that is the view that "no hypothesis according to which God has done this or that can qualify as a scientific hypothesis".[1]

The meaning of the terms naturalism and materialism depends on the meaning of one's conception of matter and nature. One can have, for instance, spiritualistic and materialistic naturalism. Likewise, there is materialistic monism such as physicalism (there is no other matter than physical matter) and materialistic pluralism (for instance, there is biological in addition to physical matter). The contemporary discussion on metaphysical naturalism in science, however, has a narrower focus. One set of questions concerns the effects in the material world of non-material *created* causes: do they identifiably affect matter? Does the mind act on the body? Do spirits affect matter? In these questions metaphysical naturalism narrows to metaphysical materialism which denies the reality of the non-material. The second set is about effects of non-material *uncreated* causes in the material world. Does God act in the world and can this action be identified as such? Here the interest of metaphysical naturalism narrows to questions about the existence of God.

Methodological materialism raises two more sets of questions. Do *explanations* of material phenomena need reference to non-material *created* causes? Ought the human will to be included in explanations of the movement of an arm? Finally, do explanations of material phenomena need reference to non-material *non-created* causes? Ought God's action in the world to be included in explanations of the design of organisms? Or, if explanations in terms of material causes are sufficient, do they need to be evaluated in terms of what is known about the action of non-material causes, created and uncreated, in matter?

I ask whether methodological materialism can avoid becoming a form of metaphysical naturalism in science. I argue that materialism can be excused to be methodological only if it is open to revision, and that this requires replacing methodological materialism with a methodological pluralism. Methodological pluralism is intended to protect methodological materialism from the falsehood and irrationality conferred on it in combination with metaphysical naturalism and evolution.[2] I also suggest that the combination of methodological materialism and the ideal of the universal validity of scientific knowledge is self-contradictory. I conclude that Christian theism provides the best context for methodological pluralism because of the ontological diversity included in its doctrine of creation.

2. WHY IS METHODOLOGICAL MATERIALISM IMPORTANT?

Methodological materialism maximizes control over nature. It does this by prescribing that the causes in causal explanation must be efficient causes to ensure predictability, and that they must be material causes to ensure the universal validity of knowledge. Efficient causation means that "If C happens, then (and only then) E is always produced by it".[3] Predictability is ensured by letting the cause precede the effect so that when the cause happens the effect can be predicted to happen. In contrast, predictability is diminished or absent in explanation referring to causes that follow the effect, such as goals and intentions. Since Galileo, such final causes have been banned from the domain of legitimate science. Predictability is diminished or absent as well from explanation in terms of causes that are unique (historical) because they cannot be repeated. Finally, no prediction is possible when explanation refers to occult or divine causes because they cannot be known or manipulated.

Further, the belief that causes must be material (and efficient) causes is claimed to ensure the universal validity of scientific knowledge. This follows from the belief that the most universal characteristic of reality is its material basis as opposed to, for instance, goal-directedness which is found only in organisms. Thus methodological materialism makes possible public agreement on the type of phenomena and explanation that characterize science.[4] Minds and divinities are excluded as objects of investigation and as explanatory factors for the same reason occult forces were excluded, namely that one cannot know how they will behave.

Methodological materialism is important because it acknowledges the materiality of creation. It is reasonable and appropriate for Christian theists to refer to the materiality of the world in explanations and theories. Questions about the material dimension of reality minimally require answers in material terms. The importance of methodological materialism also derives from the problems attached to its benefits. I have selected three categories of problems. Methodological materialism destroys theism, it needs theism to prevent it from functioning as metaphysical materialism, and it is inadequate to deal with reality.

3. BELIEFS CONSTRAIN METHODOLOGICAL MATERIALISM.

What does it mean for materialism to be held methodologically? Materialism can be held in at least two different ways. For instance, you can explain human behaviour in terms of material causes. To the extent that it is known or believed that humans are not merely material beings, such materialism is held as a fiction or fruitful error. The fruit consists of predictions about the material behaviour of humans that might otherwise be hard to come by.[5] Heuristic or guiding fictions are common in science and mathematics. The ideal gas in physics, Goethe's plant archetype and the wild-type phenotype of an organism in biology and the average college professor in sociology are examples of fictions used because they help in gaining control over the phenomenon to be studied. Fictions are not hypotheses because the latter are potentially true whereas the former are known to be false.[6] Rather, fictions are a necessary evil to be gotten rid of as soon as feasible. Vaihinger insists that a fiction "is not to be taken for reality, but represents a preliminary system designed for heuristic and practical purposes."[7] Fictional materialism cannot be problematic for Christians because falsehoods cannot contradict Christian truths.

In addition to fictional materialism there is hermeneutical materialism. To the extent that humans are unexplored, materialism is applied provisionally as a method of discovery of the unknown with a mind open to either the truth or the falsity of the result. It is used as a metaphor. That is, one learns about the unknown aspects of a human being by creative comparison with the known material aspects. This involves a transfer of meaning between knowledge of material reality and of the unknown. Human cognition appears to be unable to do without both fiction and metaphor.[8] I will argue that Christians can

hold materialism as metaphor.

I suggest that a necessary requirement for materialism to be methodological in the heuristic sense is that it be revisable. There are two reasons. First, any guide to the study of reality must be appropriate to the subject matter. This introduces beliefs about the subject matter into the methodology of science. For Christians, the contingency of reality upon the will of God means that we must be open to any possible relation between the material and the non-material. We must also be open to the possibility that this duality does not exhaust all of reality. Therefore, materialism should be held as a revisable guide for the study of reality. The grounds for revision must be broad, encompassing experience, logic and metaphysical as well as religious beliefs.

The second reason derives from the metaphoricity of methodological materialism. Looking at reality as if it were an organism or a gas cloud has two simultaneous effects. It focuses attention on one class of possible phenomena and causes such as the material and, thereby, excludes other classes such as the non-material. This is fine as long as a plurality of metaphors is available for use, and the use of a particular metaphor is a matter of free choice. In reality, and this is my main point, the freedom to revise materialism is constrained by ontological, epistemological and axiological beliefs. I will argue that the Christian faith best fulfils the epistemological, ontological and axiological conditions for a revisable materialism because Christians are least likely to be constrained by the beliefs that transform methodological materialism into metaphysical materialism. The transforming effect of these beliefs will be explained in sections 3.1-3.7.

3.1. Logical Independence.

If religious claims would entail scientific claims and vice versa, religious beliefs about reality such as religious materialism would block the possible revision of materialism. The absence of such relations, therefore, is a condition for materialism to be methodological. This condition seems to be fulfilled. There can be no logical relation between a religious belief, strictly speaking, and a logical proposition, strictly speaking, for the same reason as there can be no logical connection between observation and theory or between observation and religious belief. This is because they are categorically different kinds of things. However, they are categorically different only if science were nothing but a logical-empirical

endeavour, if scientific theories were purely logical artefacts, and if religious beliefs were purely emotional or fiduciary phenomena without conceptual content.

These reduced views of science and religion are questionable abstractions. In reality there is more to scientific theory than logic; and there is more to religious belief than trust and emotion.[9] This is evident from the failure of scientific materialists to refrain from drawing metaphysical or religious implications from their observations and theories, and from the failure of philosophers of science to separate science and religion despite their logical independence.[10] Moreover, there must be relations between theory and observation otherwise there would be no science. There must be relations between observation and religious belief otherwise there would be no religion. Likewise, and as a matter of historical fact, there are relations between religious belief and scientific theory.[11]

In other words, the absence of logical relations between religious belief and scientific theory is a necessary but insufficient condition for their independence, and for the revisability of materialism. In addition, there should be no psychological, historical, religious and semantic relations between the two.[12] Some of these conditions and others will be the focus of the rest of this paper. They include the depth of beliefs as well as particular beliefs about the existence of the non-material and of God, about His relation to creation, and about the goals of scientific knowledge.

3.2. Kinds of Belief and Depth of Commitment.

Another condition for the revisability of materialism is that one should not be committed to materialism in an existential or religious way. This concerns the depth of the beliefs present in the context of methodological materialism. The deeper one is committed to materialism the more difficult it will be to revise it. The depth of commitment to a belief depends on how the belief functions and this depends in part on its content. I distinguish between commitment to truth as a relation involving the whole person with God or a pseudo-God (the world) and the conceptual apprehension of truth. True religion is a whole-hearted, undifferentiated and existential commitment of the whole person to God. Quasi-religion involves such a commitment to the world. Such existential commitments are seen to have content that can be conceptualized in beliefs about God and about the world. Theologies are systematic and deepened

attempts at conceptualizing the truth about God or pseudo-gods while the sciences attempt to conceptualize truths about the world.

Only to the extent that a belief can be made explicit, can it be exposed to rational argument and rational doubt. Existential or religious commitments such as religious materialism cannot be made altogether explicit in a conceptual way because it is an existential frame of mind within which one dwells while attending to the business of understanding the world. Existential beliefs are held quasi-religiously with a very deep commitment while conceptual beliefs are held more loosely, comparatively speaking. Materialism as a religious belief cannot be doubted theoretically because it is in the nature of implicit belief to be committed to it. This is not to say that religious materialism cannot be revised, but that such a revision requires a religious conversion. Polanyi observed that "Since the sceptic does not consider it rational to doubt what he himself believes, the advocacy of 'rational doubt' is merely the sceptic's way of advocating his own beliefs".[13] This means that methodological materialism loses its revisability in the hands of philosophical materialists and becomes a philosophical or quasi-religious materialism.

3.3. The Possibility of a Non-Material Reality.

To be open to revision of materialism one must believe in the possibility of the existence of the non-material. Otherwise, the non-material could not be brought to bear upon methodological materialism. This condition excludes quasi-religious materialists because their materialism is prescriptive[14], dogmatic, methodical, and characterized by an unconditional commitment and an all-encompassing scope.

As a conceptual belief, however, materialism has a limited scope and is held with a commitment that is conditional and open to rational doubt. Methodological materialism may be seen merely as a strategy to solve the problems concerning the explanation and control of the material world, having no metaphysical implications. The issue of existential doubt does not arise because the materialism is not held existentially. Agnostics and theists are among those who could hold materialism as a revisable conceptual belief. Agnostics believe that the question whether reality is material, non-material or both has not been decided because the evidence is considered inconclusive.[15] Their primary concern is with the possibility of rejecting one of these possibilities and, therefore, they

hold materialism as a working hypothesis which could be false. However, believing that there might be a non-material realm is only a necessary, but not a sufficient condition for revisability. One must also believe that the non-material affects material reality.

3.4. Can the Non-Material Affect Material Reality?

Revisability of materialism requires that one believes the non-material realm can affect the material realm. This excludes the non-interventionists among Christian theists because they believe God does not act in material reality. It also excludes non-interactionists because they believe that mind or spirit does not act on body. However, the possibility of interaction between body and mind or of intervention of God in nature is given with their belief in the existence of the non-material. This belief weakens their commitment to materialism compared to that of materialists, especially if there are other religious beliefs that require intervention and interaction.[16] For instance, belief in a God who cares for his people requires a God who intervenes in material reality. As well, the religious belief in life after death entails the independent existence of the human spirit which must be capable of interaction with the body.

3.5. Can Science Include the Non-Material?

Also excluded from holding materialism open to revision are those interventionists and interactionists who want to limit science to the study of material phenomena. They hold materialism as a guiding fiction or fruitful error in order to preserve the universal validity of scientific knowledge and predictability. Because they claim to be open to the rejection or limitation of methodological materialism, they appear to be in the best position to hold materialism methodologically. That is, provided the materialism can be rejected or limited. I will argue that this is possible, but difficult due to the priority of explanation in material terms (section 3.6.) and to the power of beliefs about the purpose of science (section 3.7.).

3.6. Can Methodological Materialism be Limited to Appropriate Cases?

One way of finding the limits of methodological materialism is to look for experiences of the non-material. Let us imagine, for the sake of the argument, that God created from nothing first matter and energy without the potential to evolve into life. Then He created life, but without the potential to evolve

into self-conscious and religious beings. This required a final act of creation. The question is, how do we know that the emergence of matter, life and mind needs explanation rather than acceptance as givens of reality? Methodological materialism recommends that whenever the non-material shows itself as a possibility, explanations in material terms are to be preferred over those in non-material terms. Methodological materialism as an ideal of explanation will lead us right past non-material causes and givens and guides us to construct an unbroken chain of material cause and effect across these junctures. It will do this even despite empirical evidence against the possibility of the transition of matter to life.[17] The result may be the construction of a virtual reality consisting of large-scale evolution from matter to man with God at the beginning placing the potential for all of reality's diversity in matter.

Virtual realities are routinely employed in science. The problem is not with their employment, but with their identification and correction. Failure to correct them leads to a lack of intelligibility[18] which can have important practical implications. Excluding non-material causes has resulted in a distortion of knowledge of the material world. In physics, for instance, the existence of a material aether was invented by Kepler and Newton because they could not accept that material bodies would affect each other through a non-material force acting across empty space.[19] In biology, we can think of the distortions introduced by behaviourism in the study of animal and human behaviour. For instance, the study of psychophysical phenomena such as the lifting of an arm requires explanation in terms of will power or imagination. We know about the consequences for health care of ignoring the effects of the mind on the body.[20]

Correction of distortions associated with virtual realities in science is important. Correction is also possible. For instance, the existence of a material aether was rejected on empirical grounds. Sometimes correction requires deeper changes in fundamental beliefs about reality. For instance, science has accepted givens that require no further explanation. The acceptance of inertial motion as a given rather than as something to be explained, heralded the transition from Aristotelian to classical Newtonian physics. Acceptance of such givens usually signals a major conceptual revolution and involves the weighing of observations, of the interpretation of experience, of beliefs about the nature of reality as well as of beliefs about ideals of explanation. Inertial motion, for

instance, was initially accepted as a given for aesthetic reasons and not on the basis of experience, although that came later. Therefore, consistency with various beliefs about reality is as important in such transitions as consistency with empirical evidence. Below I will propose to sanction this situation as methodological pluralism.

So far, however, corrections have been made within the confines of methodological materialism. There has been no revolution questioning this rule. The case of inertial motion did not challenge methodological materialism. Is it possible to incorporate into science potential non-material givens and causes without turning them into virtual material realities? How can complex behaviour in animals, such as feeding or nest building be explained in terms of non-material "drives" or "motivations" while explanation in terms of final causes has been excluded from science (physics) since Galileo. Or take the role of information in explaining the functioning of organisms and societies. It is interesting because information can be measured, but it is non-material. This inclusion of non-material causes is consistent with methodological materialism, however, because the assumption is that eventually non-material givens and causes will find interpretations in material terms and that these interpretations will find support in experience. Prigogine's theory of the self-organization of matter and energy into complex, information processing entities is an example. Methodological materialism forces an anti-realist attitude towards the non-material in science.[21] Clearly, methodological materialism effectively neutralizes any scientific challenges and requires a challenge at the methodological level. Below I propose to provide this challenge by adopting a methodological pluralism in science.

3.7. The Purpose of Science.

Finally, the revisability of methodological materialism is undone by the ideal of controlling nature which is one of the main purposes of science. This purpose is served among others by the ideal of the universal validity of scientific knowledge. Without limitations on the domain of validity, this ideal confers universal validity upon explanations in material terms and thereby excludes revision of methodological materialism.

This creates a trap for Christians. A common strategy for avoiding conflict between faith and science among Christians is to deny the universal validity of scientific knowledge by reducing science to physics. For instance, it is often argued

that the neo-Darwinean theory of evolution has no implications for Christian theism because it deals only with the physical aspect of humanity. Since physics does not deal with religion its explanations have no religious implications, so the argument goes. However, if the claim of universal validity for physical knowledge is not relinquished physics becomes a model for true knowledge in theology. An extreme example is Tipler's claim to have demonstrated the existence of God and of a resurrection from the dead using physics alone. The extent to which physics models his "theology" shows when, after defining the physical universe as "the totality of all that exists" he states: "Thus, if God exists, He/She is either the universe or part of it."[22] Few Christians will accept this demonstration, but this species of argument is common among them.

In conclusion, Christians are among those predisposed to revise methodological materialism: they are not religiously committed to materialism and they believe in the existence of a non-material reality. However, Christians are divided about other conditions for the revisability of methodological materialism such as the reduction of science to pure reason and observation, the reduction of religion to pure emotion, and the effects of the non-material on the material. This is why a methodological pluralism is necessary.

4. METHODOLOGICAL MATERIALISM DESTROYS CHRISTIAN THEISM.

I turn now to the implications of methodological materialism for Christianity. The conjunction of methodological materialism with the ideal of the universal validity of scientific knowledge, when applied to theology, destroys Christian theism. Among other things, it makes religion naturalistic. If God had created elementary matter and energy with the potential to produce today's world without his continued unnatural involvement such as in His personal communication with people, then not only the capacity for religious belief, but also its content would have to be a function of the inner dynamics of matter and energy. Any knowledge of God originating "from below" could never be identified as knowledge of a transcendent God because methodological materialism prohibits an account of religious experience in terms of God's action. Likewise, methodological materialism fails to account for vast stretches of human behaviour that are fundamental from a religious and ethical point of view. For instance, it fails as a rule for the explanation of altruism in humans.[23]

Furthermore, divine action channelled through matter would be limited by the possibilities of matter. For instance, the

possibility of a creation ex nihilo, the virgin birth of Jesus, his incarnation and resurrection from the dead would be excluded. Also excluded would be communication with a non-material being. When Christians communicate with God they would be communicating only with themselves, taking comfort in an illusion that may have only biological or psychological advantages.[24] What I have just described are manifestations of a theology that destroys Christianity. Of course, not all Christians fall into the trap that causes this destruction. A dualism between nature and supernature provides one escape. For instance, if the capacity for religious belief emerged due to the internal workings of matter, and if as a Christian one wants to avoid taking the existence of God as an illusion, then minimally this capacity of having religious belief needs to be filled with specific content from the supernatural realm of God. Therefore, Christian methodological materialists appear to have no choice, but to be dualists. That is, to accommodate God on a second supernatural floor added to the ground floor of material reality.

The division of reality into a natural and a supernatural realm does not necessarily exclude interaction between these realms or between the ways we come to know them, that is between faith and science. In practice, however, a split view of reality is often associated with a split view of knowledge of the two realms. Partly because of the success of methodological materialism, many theists believe the non-material is irrelevant for understanding the material world, even though they also believe that God acts in the material world. They believe that explanations in terms of God's action in the world or in terms of created non-material causes, such as mind, are not appropriate for understanding the physical properties, physical behaviour and formative history of the universe, to use Van Till's categories.[25]

As a result, there is no relation between science and religion. This is problematic because many Christians also believe that their faith ought to affect all the dimensions of their life and this includes scholarship. For many this relation has become limited to exemplifying Christ in how one deals with ethical issues such as the environment, abortion, or euthanasia. Excluded from consideration is how one deals with theory choice, let alone with the influence religious beliefs may have on the content of theories. However, religious beliefs have made a difference in science.[26] Moreover, there are reasons to believe that religious beliefs ought to make a difference in

science.[27] If this is correct, and I believe it is, then the preference of a majority of christian scientists for a dualistic separation of religion and science is a bad omen for christian scholarship. Thus the question whether one can be both a Christian and a methodological materialist is pressing.[28] I have argued that Christians are among those in the best position to hold materialism methodologically because they are least likely to be constrained by beliefs that transform methodological materialism into a form of metaphysical naturalism.

5. METHODOLOGICAL PLURALISM

I propose to cure the maladies of methodological materialism with methodological pluralism. Recently, Plantinga (1995) suggested that methodological materialism may be appropriate for some but not all disciplines. I propose to develop this suggestion into a methodological pluralism for two reasons. First, methodology ought to be shaped by reality, and that reality is, I believe, multi-dimensional.[29] Second, methodology ought to be guided by the goals of science, and there is a diversity of them. Methodological pluralism is, therefore, characterized by the pursuit of what I call multi-dimensional explanation. This is explanation in terms of efficient causes, but also final causes, non-material causes, "language-oriented notions such as meaning, intentionality, interpretation and understanding."[30] Thus, methodological pluralism is associated with methodological forms of teleonomism, mentism, theism and intentionalism and with a hermeneutical view of science.

Methodological pluralism is intended to restore intelligibility to its rightful place among the goals of scientists. Intelligibility and control are equally valid objectives of science. However, methodological materialism in conjunction with the beliefs mentioned above is transformed from a limited and provisional methodology to obtain control over material reality into an imperialistic ideology in which intelligibility has been lost sight of. There is a crisis of intelligibility when the fundamentals of equilibrium and polymer chemistry are ignored in a research program that attempts to reconstruct the course of molecular evolution[31] or when the conjunction of evolutionary biology and ideological materialism is self-referentially incoherent.[32] Science ought not to pursue the domination of selected ideologies such as materialism or physicalism. Intelligibility depends on a broad context that includes observation, methodological, metaphysical and religious

beliefs. Methodological pluralism makes room for a potential role in science of this entire context. For instance, a theist evaluates intelligibility in light of beliefs about created causes both material and non-material as well as a non-created cause (God). Christians have reasons to refrain from references to God's action in explanations aiming at the *control* of material reality; God's action is an uncontrollable factor and the planning that goes into it is unknown. When intelligibility is the goal, however, Christians have every reason to include God's action in their understanding of material reality both as part of explanations and as background against which explanations are evaluated.

An empirical argument for methodological pluralism is provided by downward causation. For instance, a biological cause acting on a physical phenomenon is required to explain why the production of optically active amino acids in organisms results in the L-form only while outside an organism the L- and D-form occur with equal frequency.[33] This phenomenon is an entirely material one explicable with efficient causation, but already there is a need for a plurality of different causes.

Many phenomena cannot be fully explained in terms of material efficient causes. A reference to purpose, the will and the human mind makes the movement of an arm intelligible.[34] Likewise, a non-material cause acting on bodily phenomena is required to explain the changes in heart rate, blood pressure, tone of voice etc., that occur in association with multiple personality disorder in humans. However, including non-material created causes in science reduces predictability. Explaining an asthma attack in terms of a person's psychological and mental state reduces predictability depending on the complexity of the causal picture. However, this reduction is also encountered in purely material phenomena with a complex causal picture such as the weather. Scientists may learn to manipulate the causes both material and non-material in a controlled way. That is why non-material causes belong in science.

No one will ever be able to manipulate God's action in the world. Also, explaining an earthquake in terms of God's will does not make it predictable because we do not know God's will in this respect.[35] This is why "no hypothesis according to which God has done this or that can qualify as a <u>scientific</u> hypothesis"[36] even though this requirement is demanded only by the ideal of prediction and not, for instance, by logic. However, reference to God's will can make things intelligible

for theists. Theists can explain why there is something rather than nothing, why natural phenomena display regularities, why humans can comprehend them[37] and why naturalistic epistemology can produce reliable knowledge.[38] Therefore, multi-dimensional explanation includes theological explanation. I suggest that the givens of science need a theological explanation of the kind that refers to God's originating action in the world. To methodologically exclude any reference to such action[39], is precisely what creates the illusion of an unbroken chain of material causation from matter to man, when there may be none. Methodological pluralism is intended to protect methodological theism from facile references to God's action.

Multi-dimensional explanation employs explanations of different type simultaneously. Including the non-material in science is needed because no one is immune from holding beliefs that block revision of methodological materialism. For instance, metaphysical naturalism and evolution as belief context for methodological materialism render the latter false and irrational.[40] The combination of methodological materialism and the universal validity of science is self-contradictory. Methodological pluralism is intended to protect methodological materialism from degenerating into a self-destructive ideological agenda by combining it with other methodological attitudes issuing from a wider context of metaphysical and religious beliefs.

6. ROLE OF BELIEFS IN SCIENCE.

Intelligibility is normally evaluated in light of, among others, observation as well as methodological, religious and metaphysical beliefs. Since intelligibility is a legitimate goal of science so is the role of these beliefs. My final recommendation is to acknowledge the legitimacy of including such beliefs in evaluating theories and interpretations of experience. This acknowledges the failure of attempts to delimit science from non-science as well as the underdetermination of scientific theories by observation and logic. Once the role of beliefs in science is out in the open, it will be easier to understand what an appropriate role for them would be.

This position does not end up in relativism. According to relativism, if you cannot get at truth by reason alone, then you cannot get at truth at all. This attitude assumes that reason is the only way to truth with rationalists and objectivists

believing it works and relativists it doesn't. The "third alternative" I have presented denies their common assumption and holds that truth can be known holistically. Together with observation and reason, trust and creative imagination, belief plays a necessary role on the way to truth. Explanations and theories in science are relative in the sense that they are related to various beliefs, observations, and theories. This does not make public agreement impossible, only harder to achieve. For instance, in accounting for the fine-tuning of cosmological constants or the presence of information-carrying molecules, the smallest common denominator scientists with different belief backgrounds can have is the hypothesis that an intelligence is responsible. Agreement about whether this intelligence is a non-material created intelligence or God is possible, but the road that leads there requires far more than rational argument.

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Endnotes

[1] Methodological materialism entails methodological atheism (Plantinga, 1991: 27).
[2] Plantinga, 1993: 194-237.
[3] Bunge, 1959: 52.
[4] Plantinga (1996) "Methodological Naturalism?" In: Facets of Faith and Science. Volume I. J.M. van der Meer (Editor). The Pascal Centre for Advanced Studies in Faith and Science / The University Press of America. Lanham.
[5] The idea of fruitful error was introduced by Kant and elaborated by Vaihinger. He develops the role of fiction as a guide in the acquisition of knowledge. Vaihinger believes that "The materialistic conception of the world is a necessary and useful fiction, but it is false as soon as it is taken for an hypothesis" (199). Natural science "proceeds as if the external world did assuredly exist outside ourselves and as if even without a subject , things were as they appear." (200). For instance, the existence of God is a useful fiction because it helps us to think of the world as ordered which stimulated the discovery of this order (xlvii).
[6] Vaihinger, 1924: xlii.
[7] Vaihinger, 1924: 110.

[8] I am holding the cognitive view of metaphor as developed by Hesse (1988), Nersessian (1988, 1992) and Soskice (1985).

[9] Hesse (1985:108) observes that "Those (like philosophers) whose business is logic and argument are too prone to neglect the fact that there can be very important tendencies and plausibilities among ideas which are less than strict entailment, but which are highly influential upon thought, and are not simply exorcized by pointing out that they are not logically conclusive. We should look very carefully at such tendencies to see how far we ought to be pushed for good reasons to accept them, and how far we ought to resist them."

[10] The arguments have been summarized by Brown, 1977: Ch. 5. See also Laudan (1988).

[11] For reviews see: Funkenstein (1986), Lindberg and Numbers (1986), Brooke (1991) and Van der Meer (1996).

[12] Very briefly, I believe such relations can exist between religion and science and can be explained by holding that theories are composite artefacts composed of categorically different entities which allow for connections other than logical ones. I call this the composite theory of theory. For the capacity of semantic relations to connect religion and science, see van der Meer (1995).

[13] Polanyi, 1962: 297.

[14] Fodor (1980) and Miller (1987) use the term in the prescriptive sense.

[15] This is Polanyi's agnostic doubt (1962: 272-279).

[16] Interactionists may include theists and atheists. Atheists were prominent among Victorian intelligentsia who opposed materialism on the ground that it could not express all valid
human experiences and ideals (Turner, 1974: 1-2, 22-23).

[17] Such as presented by Vollmert, 1983 and Thaxton et al., 1984.

[18] Plantinga, 1993: 211-215.

[19] Toulmin and Goodfield, 1961: 257; Dampier, 1971: 131.

[20] Strijbos (1988) provides an extensive and insightful analysis of the dehumanizing effects of a technological approach to health care.

[21] Plantinga, 1993: 211-215, shows that metaphysical naturalism forces anti-realism towards the idea of proper function.

[22] Tipler, 1995:3.

[23] Plantinga (1996) "Methodological Naturalism?" In: Facets of Faith and Science. Volume I. J.M. van der Meer (Editor). The Pascal Centre for Advanced Studies in Faith and

Science / The University Press of America. Lanham.

[24] Berger, 1969: 100, 179-185. His diagnosis of the effect of methodological atheism in the sociology of religion is telling: "Put simply, *methodologically*, in terms of theology as a disembodied universe of discourse, sociology may be looked on as quite 'harmless' - *existentially*, in terms of the theologian as a living person with a social location and a social biography, sociology can be a very dangerous business indeed." (182)

[25] Van Till, 1986: 97-108; Van Till et al., 1988: Ch. 1., 1990: 126-136.

[26] For reviews see: Funkenstein (1986), Lindberg and Numbers (1986), Brooke (1991) and Van der Meer (1996).

[27] Van der Meer (1995).

[28] Professor George Marsden (1987) has argued that what is known as the Kuyperian approach to the relation between Christianity and culture is the most promising candidate for christian scholarship because of its conviction that religious beliefs make a difference in science.

[29] Methodological pluralism is associated with a multi-level (hierarchical) view of reality which is required to account for complex phenomena. A systematic presentation of this ontology is beyond the scope of this paper. See Van der Meer (1989) for a semi-popular rendition.

[30] Von Wright, 1971: 30.

[31] Vollmert, 1983; Thaxton et al., 1984.

[32] Plantinga, 1993: 216-237.

[33] For a detailed discussion of this example, see van der Meer (1996a).

[34] I focus on effects of mind on body because I consider effects of mind on matter too speculative.

[35] Such explanations also do not explain anything, because they can explain everything, but this is not unique to God's activity.

[36] Plantinga 1991: 27.

[37] Theists can also interpret the intelligent causes employed by some physicists in explanations of the fine-tuning of physical constants and by some biologists in explanations of D.N.A. encoded information and of effects of mind on body. Such phenomena are of course open to non-theistic interpretations such as in terms of a non-material superintelligence.

[38] Plantinga, 1993: 211.

[39] As professor Stek recommends (Stek, 1990: 261).

[40] Plantinga, 1993: 194-237.

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