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DESIRABILITY, PROBLEMS AND OPPORTUNITIES OF A RELATIONSHIP BETWEEN THEOLOGY AND SCIENCE*

1. Introduction

There is a stubborn common sense idea, that faith (and especially its rational justification) is no longer possible since the rise and certainly since the further development of science. Science is seen as the cause of the disenchantment of the world, and is therefore praised or accused. Whatever the appreciation of it may be, there is little disagreement about the observation itself. It shows up in the hundreds of insignificant details of everyday life: the strike of lightning, sickness, children, the harvest... all this was seen as in God's hand. And now? We now put lightning conductors on roofs, we understand fertility and infertility and can to a certain extent control it, we use artificial fertilizers and agricultural techniques, etc. *Exit* the God of whose will and agency this all would depend, is the idea. And for many this entails: *exit* theology.

But theology cannot be discounted so easily. When it was discovered that worms – otherwise than what was thought – did not spontaneously originate from mud, or, when it was discovered that the sun – otherwise than thought – did not revolve around the earth also, biology and

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astronomy did not cease to exist. It is proper to each academic discipline that it continually has to revise its insights, and theology is no exception to that.

In this article I will discuss a number of possible reactions of theology on the ('threatening') developments and influences of the natural sciences: the conflict position, the separation position and a 'third' position - which I argue to be preferable - in between the former two, in which some kind of integration between theology and science is looked for (1). However, for many, and also for me, the attempt to integrate theology and science often evokes a feeling of uneasiness (2). The question will be asked, what this uneasiness means, and how it should be evaluated, and therewith what are standards of good theology (3). Two issues that seem to be inherent to the 'theology & science' enterprise but seem to be at variance with the formulated *conditio sine qua non* for a good theology, will be discussed in some more detail. It will be shown that thanks to the achievements of modern natural science and philosophy's reflections upon it, these difficulties can become opportunities (4).

2. Survey of positions of theology with regard to science, and an evaluation of them

From the many positions theology has taken with regard to science in reaction to scientific developments and influences, I will mention and evaluate three (which partially resemble to positions mentioned by Ian Barbour): the 'one-dimensional' conflict position (that sometimes results in a limited period of harmony), the 'two-dimensional' position of mutual independence and separation, and thirdly, the attempt to sail between this Scylla and Charybdis.

A. One-dimensional position: conflict (and harmony)

Throughout the centuries theology has made many attempts to harmonize the scientific facts and views that led to deism or atheism with its theistic vision. If this were to happen then it appeared that these harmonies often after a certain length of time had the opposite effect. The English historian of science John Hedley Brooke describes the irony of the adventures of

the disputing parties with a good sense of humour.¹ He shows that arguments that were first used to support theism later were with a few minor changes used against it. The argumentation for God out of the gaps of our knowledge is the most well-known illustration of this phenomenon. What appeared to be successful for the short term repeatedly appeared to be doomed for failure in the long term.

This ironic pattern is not only evident in the God-of-the-gaps-argument. An illustrative example of a different kind is the following: Since the second century BC God's creation of the world has often been viewed as 'creation out of nothing'. For scientists who viewed this as an informative pronouncement it was therefore considered nonsense, for nothing can come out of nothing. Presently, one of the most sensational matters that belong to the field of quantum physics is that the universe can arise from fluctuations in the so called quantum-vacuum; simply said: zero ('nihil') divides itself into minus-one and plus-one. As a result, in the more or less popular scientific books this insight is used to argue that there is no need of a God, because the appearance of something out of nothing is simply 'natural'.²

Beware, Brooke demonstrates that, on the other hand, the arguments used by deists and secularists against the theistic view exhibit a comparable lack of tenability. For example, the French mathematician and astronomer Pierre Laplace (1749-1827) was able to prove that the solar system is self-correcting, and does not require the corrections by God assumed by Newton. However, the English philosopher and historian of science William Whewell (1839) argued, that if there is such a mechanism for self-correction, then the gift of such a mechanism does not point to a lesser but to a greater wisdom and providence of the Creator. Within the same line of reasoning the Christian socialist Charles Kingsley responded to Darwin's evolution theory: the discovery of the evolutionary mechanism

1 John H. Brooke, 'Science and the Fortunes of Natural Theology: Some Historical Perspectives', *Zygon* 24 (1989) 1, 3-22.

2 See Paul Davies, *God and the New Physics*, New York: Simon & Schuster, 1983, Chapter 16. Polkinghorne rightly notes with regard to the fact that some physicists call the effect of this quantum-fluctuation 'creatio ex nihilo': "There is no area in which the interaction of science and theology is more bedevilled by theological ignorance on the part of scientists than on the discussion of the doctrine of creation" (John Polkinghorne, *Science and Theology: An Introduction*, Minneapolis, Minnesota: Fortress Press, 1998, 80).

gives extra weight to the divine wisdom; for now it appears 'that He could make all things make themselves'.³

The moral of this and many other examples is, that the arguments pro or contra an issue of faith are less coercive than is often assumed. It is always a *specific interpretation* of scientific issues that makes people conclude that a certain view is impossible (and vice versa); not these issues themselves.

The critical insight has gradually grown that this way of conflict-thinking misjudges the specific nature of religious language. This language is, according to this 'one dimensional' view, seen as competing (or in harmony) with the descriptive language of science, and thereby seen as of a similar kind, but as a result her peculiarity and existential depth is unrecognized. This insight has led to the 'two languages'-position.

B. The two dimensional position: separation

Even though the above-mentioned form of thinking still more or less exists, if not openly as conflict then yet subcutaneous in the form of competitive thinking, it is somewhat outdated because we now know better. Namely that conflicts between religion and science are often improper, because they do not take into account the difference in genre between the respective domains.

In this respect it can be valued as therapeutic, when, reacting to the in many ways infertile conflict-position, it is emphasized that religion (including its theology) and science do not have to crash, because they are so different - regarding methods, regarding interests, regarding language games - that they do not touch each other. This view concerning the genre-differences between the two is that science is based on fact and explanation, while the Bible and other religious texts give no factual accounts nor explanations but are concerning with value, meaning, existence. Therefore one speaks of a 'two languages'- or 'two perspectives'-position.

It is a position that was put forth in this century by the German

3 John H. Brooke, *Science and Religion: Some Historical Perspectives*, Cambridge: Cambridge University Press, 1991, 293-294.

theologian Rudolf Bultmann (1884–1976). Bultmann argued that speaking about God's agency, just like speaking about myself as a person, implies a change in perspective. The closed chain of cause and effect is seen as satisfactory in giving a complete explanation for the events that occur in history and nature, so that there is no room left for God's agency (no more than for my own personal existence). And *still* I speak of myself as a person, and *still* I speak of God as acting in the world. Bultmann calls this the paradox of faith: "This is the paradox of faith, that faith 'nevertheless' understands as God's action here and now an event which is completely intelligible in the natural or historical connection of events."⁴

This 'two perspectives'-position is deeply rooted in the continental (especially German) philosophical tradition. Here, ignoring the differences, we can mention Martin Luther, Blaise Pascal, Immanuel Kant, Friedrich Schleiermacher, William Dilthey. In the twentieth century, the emphasis on the difference between the existential perspective and the objectifying perspective was brought to light by the philosophers Ludwig Wittgenstein and Martin Heidegger and the theologians Karl Barth and Rudolf Bultmann, and presently by the Flemish philosophers Arnold Burms and Herman De Dijn, and the Dutch physicist Arie van den Beukel (and more or less explicitly by many others).

Within this position much attention is paid to language, and to the different functions of language. It is emphasized that besides the use of informative language by science, documentaries or newspapers, there also is the use of performative language - language that does not primarily transmit information, but rather evokes certain feelings within the listener. Just as it would be inappropriate to disregard a poem because it speaks of 'black tears', is it categorically inappropriate to disregard a biblical narrative because of its speaking of the sun commanded to be stationary; as if the clue of that text would be a cosmological message! Likewise, according to this theological position, the endeavour to harmonize evolution and creation is nonsensical. Poems and religious texts do not compete with

4 Rudolf Bultmann, 'The meaning of God as Acting', in: O.C. Thomas (ed.), *God's Activity in the World: The Contemporary Problem*, Chico, California: Scholars Press, [1958]1983 61–76, 64. (The English text is the original.)

scientific texts, because they do not claim to give information. To still read them in that way is to do them injustice.

This theological focus is less concerned with the divine origin of cosmological categories such as space and time, than with a personal and merciful God. That is why it can assume that one does not have to be schizophrenic to be both a scientist and a believer. For, if you are aware of the epistemological statute of science, then you realize that its object can not be 'everything'. Therefore, the fact that science does not discover sense or God, does not say anything, because sense etc. is not its object. It does not look for it and therefore will not find it. Issues such as sense, meaning, faith, love or art have their place outside the domain of science. That does not conflict with science, because each has its own domain. The domain of science is that of facts, of reason, of how the world is thought to be; the domain of theology is that of values, of 'heart', of how the world ought to be.

Although we acknowledge that the 'one-dimensional' vision (whether it leads to conflict or to harmony) lacks consciousness of the genre differences between science and theology (and so lacks a suitable hermeneutics), we are still not happy with the above described 'two-dimensional' vision, according to which religion/theology and science do not conflict, because they are separate realms. The division between 'the truth of faith and the heart' and 'the truth of reason', how fertile it may be in overcoming the inauthenticity of many conflicts, still raises important objections.⁵

The first obvious objection is that it does not do justice to theology as a cognitive reflection on faith. In the proposed separation of domains, theology is too easily equated with the act of faith.

But the objection I really would like to discuss here, is more serious. It should be established that theology by considering the relationship between God and the world exclusively in the human existential context, has itself greatly contributed to a god-less understanding of the physical

5 For my discussion of the position of Arie van den Beukel, see: Palmyre M.F. Oomen, 'Natuurwetenschap en theologie: Pleidooi voor een betere integratie', in: W.B. Drees (ed.), *Harde wetenschap: Waar blijft de mens?*, (Annalen Thijmgenootschap 82/2), Baarn: Ambo, 1994, 47-63.

world. The anthropological turn is therefore not an innocent issue for theologians. The German theologian Wolfhart Pannenberg rightly states that theology has paid too big a price for its refusal to rethink and to process the insights of modern science. Because as an effect of this refusal a gap has grown between thinking about the physical world and Christian belief. As a result an atmosphere has been created in which it is perceived as a commandment to intellectual reasonableness to abandon the Christian body of thought.⁶ This is unfortunate for at least three reasons.

- It is unfortunate for the world. Because, “[i]f the God of the Bible is the creator of the universe, then”, as Pannenberg provocatively states, “it is not possible to understand fully or even appropriately the processes of nature without any reference to that God.”⁷ Moreover, as argued by Jürgen Moltmann, when we differentiate between God and the world by defining God as non-worldly and the world as non-godly, then that supplies too easily a justification of the modern exploitation of nature.⁸

- It is also unfortunate for mankind, although at first sight the opposite seems to be true. For, the whole of corporality – with aspects such as starvation, sickness, sexuality – threatens to remain outside the discourse about God (and to be only discussed from a ‘spiritual’ perspective). But a human being without a body is really deficient.

- It is especially unfortunate for God. For, though God may be called a God of human beings, he is no longer thought of as God of heaven and earth. Pannenberg states, once again quite sharply: “If, on the contrary, nature can be appropriately understood without reference to the God of the Bible, then that God cannot be the creator of the universe, and

6 Wolfhart Pannenberg: “Die Theologie hat sich nicht ungestraft von der Aufgabe einer theologischen Durchdringung und Verarbeitung des naturwissenschaftlichen Denkens der Neuzeit abgewendet. Dadurch hat sich das Naturverständnis seinen ursprünglichen, zumindest teilweise christlich motivierten Ausgangspunkten entfremdet, und so ist eine Atmosphäre entstanden, die heute den Verzicht auf die christliche Eschatologie, auf die Botschaft von der Auferstehung Jesu, ja sogar auf den Gottesgedanken selbst geradezu als ein Gebot intellektueller Redlichkeit erscheinen lassen kann.” (Wolfhart Pannenberg, ‘Kontingenz und Naturgesetz’, in: A.M.K. Müller & W. Pannenberg (Hrsg.), *Erwägungen zu einer Theologie der Natur*, Güterlach: Gerd Mohn, 1970, 33-80, 36-37).

7 Wolfhart Pannenberg, *Toward a Theology of Nature: Essays in Science and Faith*, Louisville, Kentucky: Westminster/John Knox Press, 1993, 16.

8 Jürgen Moltmann, *Gott in der Schöpfung: Ökologische Schöpfungslehre*, München: Kaiser, 1985, 28.

consequently he cannot be truly God and be trusted as a source of moral teaching either'.⁹

C. Between Scylla en Charybdis: Searching for commonalities with due regard to genre differences

Should God then have something to do with the areas studied by science? Yes, because theology concerns 'everything' *sub ratione Dei*, according to a classic interpretation of theology, which I adopt here.¹⁰ That is why, in principle all truth findings - whether they occur within psychology or cosmology, in history or mathematics, in physics or in social sciences, in biology or ethics - are relevant to theology. This implies that theology cannot give an adequate vision of man and world 'in respect to God' if it fails to take into consideration the relationship between God and the physical world. Or, as the Flemish philosopher and priest Jan Van der Veken rightly states: "If the God of religion were not *also* the God of the cosmos, He would be unacceptable for religion. He would be an idol, because less than the Lord of heaven and earth."¹¹

Thus there are some theologians and philosophers who emphasize that a separation between religion and science cannot be strictly adhered to, as it would mean that God would not have to do with everything that exists. How different facts/being/reason may be from values/sense/faith, somewhere those two domains must affect each other. As pioneers in attempting to determine these commonalities we can include Nicolaus Cusanus, Gottfried Leibniz and Alfred North Whitehead. As present day representatives we can mention: Ian Barbour, Arthur Peacocke, John Polkinghorne, Ted Peters, Nancey Murphy and many others. And though this more integration seeking orientation has an Anglo-Saxon tint, there are also German representatives, such as Carl Friedrich von Weizsäcker, Wolfhart Pannenberg and Jürgen Moltmann.

9 Pannenberg, *o.c.*, 1993, 16.

10 Thomas Aquinas, *Summa Theologiae*, I, q.1, a.7.

11 J. Van der Veken, 'God ieder morgen weer nieuw: Het proces-denken van A.N. Whitehead en Ch. Hartshorne', in: *Tijdschrift voor Theologie* 18 (1978) 4, 361-398, 365 (my translation).

In accordance with this 'third' position, I hold the view that the separation option is not fruitful in the long run, and that indeed theology, in order to be good theology, must take into account what we think is true about physical reality, without, however, falling back into the one-dimensional dismissal of the genre-difference. To say it with the use of a well-known metaphor: theology has to read both 'books': Scripture and Nature.

If we give exclusive attention to Nature, as deists and many religious scientists do, then God appears mainly or exclusively as an impersonal principle at the meta-level of lawfulness (or not even there), and therefore mainly or exclusively in 'the beginning' (or not even there). In this way the relationship of God to our contingent existence here-and-now, the involvement of God with our misery, with our guilt, with our desire for something better, threatens to disappear. God is only brought up as the creator, not as desire, judgement, forgiveness, trust, peace, unrest, mercy.

If, conversely, we look only at the Scripture and not at Nature, then in the hermeneutical process only an image of a personal God remains, the God of sense and meaning, but without relation to the physical facts that we are daily confronted with. In this way God becomes world-less and therefore irrelevant.

Thus both sources have to be taken seriously. Nevertheless, that is not to say that these two sources smoothly go together. On the contrary, naïveté is not welcomed. For, neither is Scripture an immediate product of a divine self-revelation – because Scripture is God's self-revelation mediated by human understanding and expression; nor is nature an immediate product of God's creation – because nature is God's creation through natural processes and influences.¹² God is no more the direct maker of nature than he is the direct writer of the Bible. Accepting both 'books' therefore requires a critical hermeneutical approach with regard to Scripture as revelation, as well as a hermeneutical approach with respect to Nature as creation. So, Scripture as well as Nature can at best be sources of theological insight in a very mediated or indirect way. This also means

12 That is why, according to Thomas Aquinas and the so called 'theologia negativa', the knowledge about God inferred to out of the creatures, is not knowledge about how God is, but rather about how God is not (Thomas Aquinas, *Summa Theologiae*, I, Introduction to the questiones 3-13, and I, q.13, a. 1).

that the interpretation of one source needs to be continually involved in the interpretation of the other, and vice versa.

Thus, by saying that theology must in one way or another be involved with science, the problems are not solved but rather begin.

3. *A feeling of uneasiness...*

Indeed, the problems seem to begin where theology and science are newly allied. And that alliation has begun. Look in the bookstores. The shelves are laden with books on 'Quantum cosmology and God', and 'Did Jesus die for extraterrestrial beings?', titles with an overabundance of words like 'mind', 'quantum' and 'chaos'. At least for a variety of reasons, which we *a prima vista* cannot differentiate from prejudices, we find them odd:

- They are odd in the light of science. That sober, always sceptical science now sometimes exhibits itself in a rather 'mystical' cloak. Is that not the end of the scientific enterprise? The problem here is that our common sense is insufficient to sift the wheat from the corn, because we know that serious scientific findings can also look very strange. But is the methodical atheism of science here not infringed after all?

- They are also odd in the light of modern theology. For theology has just freed itself from an objectivistic way of thinking and focuses instead on human beings and their existence, as symbolized in the expression 'God is a God of human beings'. Is then this interdisciplinary attempt for theology not a throwback to an outdated phase?

- They are, in connection with the above, at odds with secularization. The 'Science & Religion' literature seems to ignore secularization: God is spoken about in a care-free way, as if it would still be normal to believe in such a 'really existing' God. Counter-voice: "Why should this be a problem? Is 'God' not also frequently referred to in modern literature?" Indeed. But that is something else. Even when one does not believe in a 'really existing' God, 'God' still functions as an idea in areas concerning human desire, protest, happiness, death and misery. Thus, also in our secularized context, a certain plausibility for speaking about 'God' is left, viz. in the sphere of the *condition humaine* and human religiousness. But within the framework of nature, isolated from all religious and existential

contexts...? Isn't that too absurd, too massively objectivistic or substance-like?

In short, where theology and science are in conflict, we find that outdated. Where they ignore each other, that is unsatisfactory, at least for theology. But... where they have started a new alliance (expressed in books with titles like 'Can computers sin?', 'God and the quantum field theory'), that often creates feelings of uneasiness. I would like to take this feeling of uneasiness as a point of departure. Where does this uneasiness come from? Where does it point to? How do we evaluate it?

The uneasiness can simply be a result of the fact that God is spoken about in a new vocabulary and a new, strange context. But 'new' and 'strange' do not have to be perceived as 'wrong', all the more not because that uneasy feeling is at least partly no more than the expression of what we already knew, viz. that the two domains of theology and science have grown apart.

Still this feeling of uneasiness cannot in all cases or all areas be seen as refreshing or understandable. The feeling of uneasiness is then more serious. We then interpret the uneasy feeling as an expression of our not always warranted judgement or presumption that the presented 'Science & Theology' literature (its questions or solutions) does not meet the standards of theology. We have the strong feeling: This is not what theology should be; in this way theology should not ask questions, let alone attempt to solve them (the word 'solve' itself is already rather provocative in respect to theological questions). As a consequence, the question is urgent whether standards can be formulated to which 'Science & Theology' products have to come up to, and if so, what standards.

4. The question of a standard: Is it possible for theology to be a good theology when it enters into a relationship with science?

From the observation that some integrative studies evoke a feeling of "This does not make sense. This is talking about 'God', but is not theology.", we have to determine where this judgement is based upon, and whether it can be justified. The burning question remains as to

whether theology can be good theology when it enters into a relationship with science, or whether a relationship with science necessarily makes 'good theology' impossible.

As starting point we use something what in fact is self-evident. Yet, it will appear that in this way we will soon get to the heart of the problem. The self-evident point of departure is that interdisciplinary studies can only be of importance if the various disciplines involved all meet their own contemporary standard of knowledge and insight. Thus, with the interdisciplinary studies we are concerned with here, this formal criterion implies that they are scientifically, theologically and philosophically 'up-to-date'. It should not be a connection between advanced contemporary scientific insights and an outdated theological-philosophical thinking that has not yet dealt with the subjectivistic and linguistic turns, with the criticisms of metaphysics and modernity (and with the criticism of those criticisms); nor should it be a connection between an up-to-date theology and outdated scientific insights or an outmoded philosophy of nature in respect to causality, determinism, time, space, and so on.

As presaged, with this one formal step we now have reached the heart of the problem(s). Two of them will be discussed:

a. The first problem arises from the fact that the attempt to relate theology to science easily results in a theory in which God is introduced as an explanatory factor (*e.g.* for the existence of the laws of nature). This immediately evokes the question, whether speaking of God within the context of explanation (*Erklären*) does not imply a regression for theology and therefore the failure to meet the criterion formulated above.

b. The second and closely connected problem that arises out of the formulated criterion is the following: Does speaking about God in relation to nature not imply a neglect of the secularized cultural climate, by which twentieth-century theology is so deeply marked, and therewith lagging behind the accomplishments of contemporary theology?

5. Exploration of the problems mentioned and of some opportunities that come to the fore

We will concentrate on these two related problems because they supply

the anchorage for a lot of discomfort and disapproval with respect to 'Science & Theology' literature.

a. 'Erklären' and 'Verstehen'.

The German philosopher Wilhelm Dilthey (1833-1911) introduced the epistemological distinction between 'Erklären' (explanation) and 'Verstehen' (understanding). 'Erklären' indicates the methods that are characteristic of science: phenomena, known by means of an objectifying way of knowing, are causally related to other phenomena. According to Dilthey, the humanities, on the other hand, are characterized by 'Verstehen'. This 'Verstehen' is based not on an objectifying, but on an emphatic way of knowing.

With 'Erklären' the object is considered as independent from the knowing subject: from the knowing subject's contingent particularities there has to be abstracted as much as possible. On the other hand, essential for the humanities' way of knowing, the so called 'Verstehen', is that the knowing subject is explicitly involved as a particular subject in the process of knowing. Knowing here explicitly calls upon lived experience, and it is only by starting from the lived experience that the knowing subject could possibly understand other cultural expressions. While 'Erklären' could be considered as a distant, impersonal way of knowing, 'Verstehen' is the way of knowing for which the existential involvement of the subject is constitutive.

Of course we recognize this to be a nineteenth-century epistemological view, which certainly in part does not confer with the scholarly and scientific practice (because even science is not characterized by such a rigid objectivity). Anyhow, up to the present this epistemological distinction has had a far-reaching influence on the self-understanding of theology.¹³ During the last century theologians have become increasingly aware that one should not think about God's involvement in the world

13 Heidegger's transformation of the epistemological distinction into an ontological one is certainly not innocent of this ongoing influence. This transformation implies that the distinction no longer concerns two ways of knowing, but instead two ways of being: the being of objects on the one hand, and on the other hand, being as it comes to expression in 'Da-sein' (the being of subjects), which for Heidegger is reserved to man (Paul Ricoeur, 'La tâche de l'herméneutique: en venant de Schleiermacher et de Dilthey / II. De l'épistémologie à l'ontologie', in: Id., *Du texte à l'action: Essais d'herméneutique, II*, Paris: Editions du Seuil, 1986, 75-101, esp. 88-95).

in the manner of the objectifying 'Erklären', but in the manner of the emphatic 'Verstehen', thus with and from an existential involvement. If not, then it is not a good theology. We saw this verbalized by Bultmann.

Above we already have criticized this 'two-dimensional' separation between theology and science. So, it is not necessary to repeat that criticism. However, here we have to understand the reason why 'Verstehen' has become such a coercive norm for theology. Or more exactly: it is more or less plausible that existential judgement and personal involvement in the realm of theology can be seen as positive, but why is the other methodical view (the 'Erklären') seen in such a negative light? Well, as said, 'Erklären' usually involves searching for causal relations. However, the combination of 'God' and 'causality' is really troublesome. We will elaborate this in some more detail.

God and causality. Schematized the combination of God and causality seems to be conceivable in only two ways.

The first is, that God functions as an explanatory factor to fill in what would otherwise be a gap in the causal chain. For example, we do not know how the 'spirit' emerged in the process of evolution, and refer to this as 'a special action of God'. This being 'needed' of God in order to close the causal chain, changes sometimes quickly in being 'superfluous', which is the irony of the God-of-the-gaps argument. This is one of the reasons why theology is hesitant about God being 'needed' as an explanatory factor as a link within the causal chain. Moreover, and more essential, there is the fear that seeing God as a 'factor between factors' will lower God to the level of finite things, and will therefore do injustice to the transcendence of God. The idea of God as a gap-filling-factor is for these reasons rejected.

The second possibility arises from the fact that 'explanation' does not always have to lead to causes at the same level. 'Explanation' can also have to do with boundary questions. For example, to the question 'What is the reason why the apple falls from the tree?', the answer can be: 'The reason is gravity'. The question 'What then is the reason of gravity?' is a question of a higher level. Put more generally: scientific explanation involves the subsumption of particular cases under general laws, and the discovery of these laws. But the questions 'Why does *this* lawfulness exist?'

or ‘Why is there even such a thing as lawfulness?’ transcend the boundary of science. It is as an answer to this second category of questions, the meta-questions, that religious scientists or theologians who seek integration with science, easily introduce ‘God’. Of course, here too there is some kind of gap that is filled with ‘God’, but if it may be labelled as such, it is nevertheless a ‘gap’ of a different order. Still, theologians are hesitant of this (‘deistic’) shift of God to such an exclusive meta-level. Especially because this would entail that the existential involvement of God within particular events here-and-now disappears.

As a whole this means, that searching for God in the sphere of ‘Erklären’ leads either to a God who functions as a factor between the factors in some gap, or to a God who is only involved on a meta-level, but who has nothing to do with desire, forgiveness, pain and pleasure. Therefore theologians came to the conclusion that, in order to avoid those problems, God should not be thought of in the sphere of ‘Erklären’, of causality, but exclusively in the sphere of ‘Verstehen’.

Thus, in the context of the debate of theology and science, the urgent question arises whether this conclusion is inevitable. Are the only two alternatives of the combination of God and causality: The God of the gaps who acts here and there between other factors, or the deistic God who acts everywhere on a meta-level? If yes, then the debate is doomed from the start to remain theologically inadequate.

However, it is my opinion that the two alternatives mentioned above are not the only possibilities. The alternatives discussed are based on a mechanistic understanding of causality, in which causes together form a closed chain (or web) and necessarily produce the effect. But this mechanistic concept of causality has already been criticized by philosophers such as Charles S. Peirce or Alfred N. Whitehead (late nineteenth and early twentieth century), especially because this concept was thought to be no longer adequate in respect to the latest findings of science (e.g. those of electromagnetism, atomic physics, field theory or evolutionary biology).¹⁴

14 For Peirce’s vision on causation, see Menno Hulswit, *A Semiotic Account of Causation: The ‘Cement of the Universe’ from a Peircean Perspective*, Nijmegen, 1998. For Whitehead’s criticism of mechanism and for the philosophy that he developed to replace mechanism, see Palmyre M.F. Oomen, *Doet God ertoe? Een interpretatie van Whitehead als bijdrage aan een theologie van Gods handelen*, Kampen: Kok, 1998 [An English translation will be published as *Whitehead’s Philosophy and a Theology of God’s Agency*, Leuven: Peeters, 2002].

Moreover the findings of quantum physics have stimulated extensive discussions about causality, which further sustained the idea of ontological indeterminateness (instead of a closed causal chain). Still another impulse has arisen from the reflection on information as a new category of thought, which points to the possibility of an informational influence next to energetic or material influences.

These three developments suggest that there are more possibilities to conceive of the influence (or causality) of God than just the two mentioned - concepts which perhaps leave room for issues such as indeterminateness, openness, value-orientation, information. This would imply that apart from the two possible forms, mentioned above, of God as cause with regard to the worldly events (which can respectively be characterized as 'of the same order / here and there in between' and 'of a different order / everywhere and above') also a third possibility exists that schematically can be characterized as 'of a different order / everywhere in between'. I will briefly elaborate this suggested third possibility.

The vision of the mathematician, physicist and philosopher Alfred North Whitehead may count as an example of this third possible kind of causal relationship of God to the world.¹⁵ In his view each worldly event creates itself out of its causal influences. Essential for this view is, that, in contrast to mechanism, the causal influences together do not completely determine the effect (in an analogous way as mosaic stones do not determine the pattern of the mosaic made out of them). Each event has an openness as to *how* it will synthesize its causal influences. The nascent event derives its urge towards a specific synthesis from a universal source of orientation. This source of orientation makes the nascent event feel what is the most beautiful possible synthesis for its specific case (i.e. out of its particular collection of 'stones'). The nascent event feels this best possibility as desirable. This possibility only becomes actual not by the causes ('stones'), not by the luring information, but by the many decisions of the occurring event itself. We see here as a reaction to the shortcomings of mechanism

15 Alfred N. Whitehead, *Process and Reality: An Essay in Cosmology* [1929], Corrected Edition, ed. by D.R. Griffin & D.W. Sherburne, New York: Free Press, 1978. A lengthy presentation and analysis of Whitehead's vision on God's influence upon the world can be found in: Oomen, *o.c.*, 1998, esp. 278-410.

a proposal of an indeterministic ontology, in which there is in each event, alongside with the physical causes, room for a different causal influence, viz. one that makes a possibility of synthesis desirable, by virtue of which the event is lured to occur. Also the vision of the quantum physicist and theologian John Polkinghorne (which despite fundamental differences yet shows some similarity with Whitehead's vision) is based on an ontological openness of all events. He works this out in the sense that processes are not completely determined by their physical causes, but that along with these physical causes also a 'pattern-forming active information' has influence.¹⁶

These are only two examples of different causality-concepts worked out by philosophical orientated physicists in an attempt to deal with the shortcomings of mechanicism (and to do justice to the latest scientific findings). There are other conceptualizations that could be mentioned. For example, the model of the biochemist and theologian Arthur Peacocke which is based on the 'top-down causality' that a whole exercises on its parts.¹⁷ Or the model of the theoretical physicist David Bohm in which reference is made to a non-local connectivity related to what he describes as 'implicate order'.¹⁸ The only thing important for this article is that in science the mechanistic concept of causality is so seriously debated, that the theological received view that God should not be thought of in terms of 'causa' may be open to revision too. Thus, in talking about standards for theology, about the rules of the game, the game has already begun...

b. Secularization

Above we said that the feeling of uneasiness is also and importantly connected with the secularization of our culture. We saw that despite our secularized culture God is often referred to in literary fiction, as a means to express some existential tenets of our *condition humaine*. Apparently,

16 John Polkinghorne, *Serious Talk: Science and Religion in Dialogue*, Valley Forge, Pennsylvania: Trinity Press International, 1995, 83-84; Id., *o.c.*, 1998, 89.

17 Arthur Peacocke, *Theology for a Scientific Age* (enlarged edition), London: SCM Press, 1993, 53-55, 158-160, 373-374.

18 David Bohm, *Wholeness and the Implicate Order*, London: Routledge & Kegan Paul, 1980; Id., 'Hidden Variables and the Implicate order' and 'Response to Conference Papers', *Zygon* 20 (1985) 2, 111-124 and 219-220.

the word 'God' evokes a field of meaning that cannot be evoked with another word. But, the same way of reasoning does not seem to hold within the context of science. Does speaking about God in the context of physical reality not imply an objectively really existing God, a God who is no longer plausible in our culture? Is the 'Theology & Science' enterprise then not a neglect of a cultural sensitivity, a cultural sensitivity that has found its precipitation in present-day philosophy and theology, and therewith an enterprise that does not come up to the mark of contemporary theology?

In a different vein the above mentioned distinction between existential and objective here returns. The hard substantivistic concept of reality (related to ideas such as 'objective existence', 'real existence not dependent on something else', and so on) one locates within science, while the existential concept of being (the being that implies being a subject, the being that is constituted by meaning) one locates within the domain of the humanities. For a theology which understands itself in this way, the question of reality is an old-fashioned one, and the objective approach to the question of God is indecent, because it refers to God as a thing. We hear the voices of Heidegger and Bultmann here.

However, it has to be established that this characterization and division of roles is out of date. If anywhere the naive conception of reality has been disposed of, then it is in the late nineteenth- and twentieth-century physics. We mention: the field theory, according to which 'mass' and 'body' are secondary phenomena, namely concentrations of energy within particular places in a field. We mention: matter that together with anti-matter comes out of 'nothing', which of course is not 'nothing' but a 'quantum vacuum ... structured by the laws of quantum mechanics and the equations of the quantum fields involved'¹⁹; particles that exhibit golf characteristics; particles that go through two slits at the same time, or better said: 'entities' that do so, and that achieve particle characteristics only when they are perceived... It is precisely modern science that shows that 'reality' is not the same as 'naive objectivity'.²⁰ We see here that a

19 Polkinghorne, *o.c.*, 1998, 80.

20 Polkinghorne, *o.c.*, 1998, 32.

change in metaphors and models suggests a change in ontology, a fundamentally different way of thinking about reality.²¹ A dialogue with natural science may therefore be just particularly fruitful to theology if, in concordance with secularized culture, theology wants to abandon a thing-like, objective way of speaking about God.

6. Preliminary conclusion.

Having arrived at this point we can say that the formal criterion - that in a 'theology & science' enterprise both disciplines have to be brought in on an up-to-date level - is elaborated here with respect to a few of its material concretions. The preliminary conclusion that can be drawn is: theology which attempts to take into account the results of natural science does not therefore necessarily fall back on its own accomplishments, and said more positively, may even be strengthened in those accomplishments.

Moreover, what surprisingly came to light, is that the filling in of norms that theology uses and has to use, is not just given, but is dependent on the philosophical interpretation and integration of developments in science. This results in the idea that not everything can be secured in advance and from the sideline. Finding the path is in part the result of being on the way.

21 Cf. Paul Ricoeur, *La métaphore vive*, Paris: Editions du Seuil, 1975, 273-325 (vii étude); Polkinghorne, *o.c.*, 1998, 31.