

EVERYTHING IS COMPUTERISED, BUT COMPUTERS ARE NOT EVERYTHING

The relevance of theology in the light of a dehumanising
technological dictatorship *

P J A Fourie
University of the North

Abstract

The formulated topic is a pun on the title of Kuitert's book 'Everything is politics, but politics is not everything', in which he objects to an over-politicising of the church, despite his appreciation for the inseparable link between faith and politics. The present author does not want to underestimate the value of modern science and technology, but wants to raise a few points of concern, and show a possible theological way out of the dead-end of the economic, ecological and psychic self-destruction into which the Western life has landed itself.

In the introduction, attention is given to the dominating influence of modern technology, as is best illustrated by the computer revolution of the last decade. The 'computer theocracy' (Schuurman) with its functionality, relative simplicity and reliability in every-day life (Von Weizsäcker), is symbolic of an age in which technological specialisation and achievement are in greater demand than the more complex, seemingly superfluous and 'irrational' ordinary human spirituality or religiosity. Consequently this has led to a 'fundamental theological crisis' (Altnier). It is further indicated how this crisis is the result of the Cartesian model of 'non-participation' which has ever since dominated Western epistemology.

A plea is made for a new epistemology in which the so-called human subjectivity and scientific objectivity are integrated into a whole - an approach which has become feasible because of the developments in quantum physics. It is believed that in the 1990's precisely this will be the relevance of theology: to form part of an holistic approach to whatever is perceived as reality by society, and to supply a complementary view on that

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reality - unashamedly. This, naturally, will imply that theology itself will have abandoned the rationalistic epistemology of the Cartesian paradigm.

What it is all about

This paper is not about computers. I know too little about them to discuss them in public. I also believe that most of you, like me, find them useful tools when you have to write down your profound thoughts - in fact, that you wonder how you have ever coped without them before, especially when you realise, like I always do, after I have written down my thoughts, that they are not as profound as I had wanted them to be, and that they need a lot of editing! But for the rest, most of us could not care too much about the actual technical functioning of our wonder machines. Oh, and yes, we all know the frustration of failed service being blamed on the modern day Azazel goat: 'Sorry, sir, we are off line today!'

What this paper is about, is the relevance of theology in a world in which man has become dehumanised by technology. To name it differently, in this paper we concern ourselves with the relationship between modern (natural) science and theology. The computer, to my mind presently the star actor on the technological scene, only serves as a metaphor, representative of the scientific and technological age in which modern man finds himself. The title is clearly a pun on Kuitert's well-known 'Everything is politics, but politics is not everything', in which he raises concern about an over-politicising of the church, despite the appreciation for the inseparable link between faith and politics. Despite my own appreciation for science and technology (how ever could I cope without my computer!), I would likewise raise my concern about the over-scientification and technologising of our world.

What's the use?

What is the use of a study like the present one? Professor Richard Feynman, once Nobel prize laureate in physics, refers (1985:279) to his own efforts in this regard as 'a disease of middle age'.

Personally, I have as yet not quite reached the age! To the sceptics in the audience, who now look at us, converts, with a view of 'I have always thought so!', I want to quote further from Feynman (1985:284 - with reference to his attendance of a interdisciplinary conference on science and religion):

There were a lot of fools at that conference - pompous fools - and pompous fools drive me up the wall. Ordinary fools are all right; you can talk to them, and try to help them out. But pompous fools - guys who are fools and are covering it all over and impressing people as to how wonderful they are with all this hocus pocus - that, I cannot stand! An ordinary fool isn't a faker; an honest fool is all right. But a dishonest fool is terrible.

So, perhaps, the sceptics should not take Feynman too seriously - and as long as I am honest, at least our sceptic brothers could try and help us out!

Especially those of us who are living in the West or in so-called Westernised parts of the world, are irrevocably caught up in a process of modernising. Despite the fact that we here, today, live on the African continent, and are all familiar with the call for Africanisation, also in theological circles, we must admit, with or without regret, that modernisation has also become an intrinsic part of our continent, particularly the southern part thereof. This process is aptly defined by Rossouw (1990:66-67):

Onder modernisering verstaan ek die ekonomiese en maatskaplike prosesse waarin die dikwels pynlike oorgang voltrek word van 'n rustige agrariese kultuurpatroon na 'n dinamiese industriële en tegnologies gestempelde kultuurpatroon. U kan dit ook die proses noem waarin die waardes en strukture van die Eerste Wêreld met 'n onstuitbare en onomkeerbare impetus geleidelik die oorhand kry of sal kry oor die tradisionele waardes en strukture van die Derde Wêreld.

Rossouw (1990:67) sees this climate of a 'dynamic industrial and technological culture' as one of the big challenges for the relevance of theology and theological training in future. Formulated differently, in Pannenberg's words (1988:7):

Are the theological assertions about the world as creation relatable to the scientific description of the natural world? This, to Pannenberg, is one of the most challenging questions for the relevance of theology in the 1990's.

The present scene

With the computer as our dominant metaphor, we can understand and agree with Barrett's statement (1987:xiv):

In our culture, now, all roads seem, in one way or another, to lead to the computer.

Schuurman (1977:64) speaks about a 'computer theocracy' which is ruling Western civilisation. Practically this means that according to Barrett (1987:57)

... the achievements in the physical sciences and technology become the invisible standard - and sometimes not altogether invisible - by which to measure thinking in all domains. The discoveries in physics and chemistry, the amazing proliferation of machines and apparatus, seem somehow solid and real; and in comparison with these, any meditation about matters like the human soul are bound to seem ghostly, insubstantial.

The result is: religion and theology disappear into the background of modern thinking and practice. We find ourselves in the situation which Martin Buber (cf Rossouw 1990:68) so aptly described as a 'divine eclipse' - a situation of practical atheism, in which people live as if God does not exist, even if they formally and nominally still confess his Name. It is a situation of which Barrett's description (1987:9) of his university teachers in the natural sciences fits:

My teachers, excellent men, were ... confident and at ease in their lack of faith.

Science and technology are the 'Siamese twins' (cf Von Weizsäcker 1976:5) of our culture, and as such the 'new gods of our time'. They cannot be successfully separated, because, like being caught up in an inescapable and eternal web of cause and effect, the one gives birth to and feeds on the other. In this regard, Heidegger (1962:14) once wrote that not only does modern physics produce all sorts of technical wizardry, but

... also the reverse is true: modern physics, experimental in nature, for its development is dependent on technical apparatus and progress in the manufacturing field of this apparatus (my translation P J A F).

Barrett (1987:73) agrees with the 'twin character' of science and technology when he says:

The hyphen in the compound expression 'science-technology' does not signify the compounding of two independent entities only externally related; it expresses a single historical reality of which the two names denote merely differing aspects.

Wherein lies the fascination of science-technology for modern man? Von Weizsäcker (1976:5) thinks to supply an answer when he refers to three things:

- * the 'functionality' of modern technology (in other words - it works! How did I ever cope without my computer?);
- * it is relatively simple to operate (you learn a few commands and thereafter can run a whole new computer program with endless possibilities);
- * in everyday life, it is relatively reliable (I have used the same keys on my computer already countless times, without them ever having failed me).

Science-technology further fills man with the hope of fulfilling an age-old dream, namely to have control over what used to be seen as a threatening opponent, nature (cf Sachsse 1979:70).

The technical development of modern society has become so encompassing that Herbert Marcuse already some years ago, could say (1970:9):

Technics ... circumscribes an entire culture; it projects a historical totality - a 'world'.

The dominance of the totalitarian scientific-technological world-view also in this country led to constant calls for more and more students to be trained in the field of the natural sciences, with the emphasis on technological training specifically at technikons. Without trying to minimise the validity of some of these calls, it is clear that the way in which they are often presented as if studies in the arts and humanities are economic suicide and scientific folly, tend to devalue these areas of academic pursuit and reveal a typical positivistic view of life, which, I hope, at the end of this paper will be proven also to be scientific folly.

However, despite all the fascination and dominance of modern science-technology, from an increasing number of areas we are presently being made aware that our civilisation is in jeopardy (cf Stretch:1986:ix):

Two series of items stand out from the spate of news nowadays, by their frequency of recurrence and by their dramatic impact. The first records ever more magnificent technical achievements. The second records widespread breakdowns in even the most vital, elementary social relationships. The first puts greater power at the disposal of the savagery inspired by the second.

Almost in the fashion of Spengler's *Untergang des Abendlandes*, telling us that our society has reached a turning point 'because we find ourselves in a state of profound, world-wide crisis' (1982:1). According to Capra, this crisis is 'multi-dimensional', and touches every aspect of our lives - health, environment, social relationships, economy, technology and politics. He tells us about ecological disaster in terms of air, food and water pollution, over-population, inflation and unemployment, rising crime, the spending of billions in the building-up of military-industrial arsenals despite 40 percent of a world population who has no access to professional health services and 35 percent that lacks safe drinking water (1982:2-7).

Particularly from the circles of the Intermediate Technology Group, set up in 1965 by Fritz Schumacher, author of the famous *Small is beautiful*¹, we are being informed about the dangers of growing technologising, particularly in developing countries, but also in the so-called rich or industrialised countries. In the Schumacher Lectures II Rupert Sheldrake uses almost apocalyptic language to spell out the threatening disaster of the world scene:

The whole thing can easily seem hopeless, as if we are helplessly heading towards a collective suicide. ... We now have a choice between a positive transformation of humanity, or a sudden and unintended transformation through death and destruction. We cannot postpone this choice much longer.
2

So, in the beginning of the nineties we find ourselves in a world in which God has been replaced by the machine, the soul has been suspended for the computer. The fear of God and the community of men have made way for the fear of technological disaster and alienation (cf Barrett:1987:xiv):

For the centers of our fear now are technology and science. Because we have developed the technical means to blow our world to bits, we are afraid that in some reckless or beserk moment we might send our world up in flames. In the light, or darkness, of this fear, technology and science emerge as the unique and central facts about our Modern Age.

Paradoxically, the more this world became 'disenchanted' (cf Berman 1988:2) through the control of science-technology over nature and as such lost its character of being man's threatening opponent, the more man himself became alienated from it (cf Barrett 1987:99):

1. First published in 1974. This book was later (1981) succeeded by *Small is possible*, written by one of Schumacher's disciples, George McRobie after the former's death, to complete a task which Schumacher himself had envisaged.

2. Sheldrake, R: A new approach to biology. *The Schumacher Lectures II*, (ed) Kumar, S, 217.

Modern consciousness becomes more separated from nature even as the modern mind, through science, gains more and more power over nature.

Very aptly Bernman (1981:3) describes this alienation when he characterises modern man's dominant mode of thinking

... as disenchantment, non-participation, for it insists on a rigid distinction between observer and observed. Scientific consciousness is alienated consciousness: there is no ecstatic merger with nature, but rather total separation from it. Subject and object are always seen in opposition to each other. I am not my experiences, and thus not really a part of the world around me. The logical end point of this world view is a feeling of total reification: everything is an object, alien, not-me; and I am ultimately an object too, an alienated 'thing' in a world of other, equally meaningless things.

Considering all the foregoing, one cannot else but conclude, together with Altner, that at the root of what he calls 'the crisis of the technical civilisation', lies not merely a superficialisation of spiritual values, but, in the final analysis, 'a fundamental theological crisis as such'³. To address this crisis will be the challenge for theology in the nineties.

How did we get there?

How did we get ourselves into this unfortunate situation? It will take us too long now to make an in depth study. In another publication (Fourie 1989) I have tried to tell the story of the development of the natural sciences from a subdivision of theology to becoming an independent entity. It is the fascinating story of the cutting of the umbilical cord with mother theology, and the growth from infancy to maturity, from dependence to opposition, and finally rejection. It is the story of the maiden who grabbed the throne and became queen. In this short overview, I will only draw a few lines.

The birth of the natural sciences can be dated back to the sixth century BC on the West coast of Asia Minor. People like Anaximander, Thales of Milete, Anaximenes and Heraclitus started asking questions like 'What is the unchangeable, permanent principle underlying all the phenomena of nature?' With this, they changed the mythological concepts regarding nature into rational-logical ones - it was the cross-over from 'Mythos to Logos' (cf Sambursky 1956:11).

There are a great number of names to mention, people who contributed to the process of the coming about of the natural sciences in the first phase of its history. Some of them would sometimes dissent from the main line of thought, men who, precisely by their dissent, also contributed to the development and progress of the sciences, men like Theophrastus (372-288 BC), Aristarchus of Samos (+ 280 BC) and Nicholas of Cusa⁴. Above them all, however, towers the name of Aristotle.

3. Altner, G: *Leidenschaft für das Ganze*, 13. (My translation, PJAF.P

4. For further reading, see Fourie, PJA, 33-38.

Until the end of the 16th century, Aristotle's views dominated the scientific framework. The fundamental principle of his system was to know the essence of events, in other words, to know the purpose or the 'why' of events, and not merely the factuality or the 'how' thereof⁵. When, in the 13th century, Thomas Aquinas combined Aristotle's system with Christian theology, the conceptual framework that remained unquestioned throughout the Middle Ages had been established (cf Capra 1982:37).

The basis of the above-mentioned world view was, in Capra's words, 'organic'. With that he refers (Capra 1982:37) to the fact that people lived in small, cohesive communities and experienced nature in terms of organic relationships,

... characterised by the interdependence of spiritual and material phenomena and the subordination of individual needs to those of the community.

The main goal of medieval science was (Capra 1982:38)

... to understand the meaning and significance of things, rather than prediction and control.

The organic world view changed dramatically by the end of the 16th century. Again it should be said that this was not the result of one man's work only. However, the work of René Descartes (1596 - 1650) was fundamentally important in this regard.

The basic question for Descartes was to find a source of certainty for knowledge. Through what he called Method⁶ he reflected on the question as to how scientific and rational knowledge could at all be attained. Contrary to Aristotle and other predecessors, he did not believe in a direct and naive access of the knowing subject to the object to be known. Scientific knowledge was still only to be attained by means of a mediator.

It finally turned out that this mediator of scientific knowledge was Descartes' reason itself, because that was the only thing whose existence was so secure that it could not be doubted at all. To him, doubting that it is I who have doubt was a logical contradiction. Even if it could be said that there exists a being that constantly deceives me, it still remains certain: it is I who am being deceived. As long as I know that I am the one who is being deceived, no deceiver can bring it about that I do not exist (Haldane 1911:150):

I am, I exist, is necessarily true each time that I pronounce it, or that I mentally conceive it.

Descartes declares (Haldane 1911:221):

That we cannot doubt our existence without existing while we doubt; that is the first knowledge we obtain when we philosophise in an orderly way.

5. Cf Sambursky, S 1956. *The physical world of the Greeks*, 81: 'The guiding principle in Aristotle's view of nature was teleology: the axiom that everything happens is done for a certain end and that the whole cosmos with all that it contains is the result of previous "planning".'

6. Cf his book *Discours de la Méthode*, 1637.

And thus he comes to the conclusion of the celebrated statement *cogito ergo sum* (Haldane 1911:221):

And hence the conclusion 'I think, therefore I am', is the first and most certain of all that occurs to one who philosophises orderly.

Out of doubt, *cogitatio* or reason comes to the fore as the foundation of the I, the *ergo sum*, and is as such the most primary and secure form of existence.

The consequence of this precedence over all things of reason is far-reaching. We get a sharp distinction between reason and matter, between *cogitatio* and *extensa*. Descartes writes (Haldane 1911:190):

... because I possess a distinct idea of body, inasmuch as it is only an extended and unthinking thing, it is certain that this I, (that is, my mind, by which I am what I am), is entirely and absolutely distinct from my body, and can exist without it.

In this distinction lies the seed of what can be called the dehumanising of nature, which is at the basis of the detrimental effects science-technology produced with regards to nature and the alienation of modern man, about which we spoke earlier on. As was indicated, for Descartes all access to nature had happened through a mediator, which was man's subjective consciousness. But instead of nature becoming more humanised in this way, it rather lost all humanity and deteriorated into cold objectivity. The cause for that could be found in the fact that

... die wêreld 'n spieëlbeeld word van sy (die mens) se metodiese gerigtheid, en hierdeur word die illusie gewek van 'n rasonale, planmatige ordening waarin alles berekenbaar en kontroleerbaar word ⁷.

Indeed - calculability and controllability became the key words for Cartesian science. Descartes was filled with the ideal of building a universal science, which meant the ability to bring all the components of knowledge (alias science) under one roof. Mathematics, with its basic principles of *mensura* (measurement) and *ordo* (order), supplied him with the required tool (Haldane 1911:13). The result was: all existence was basically a mathematical reality. From there it was only a small step to a totally mechanistic understanding of nature. Descartes wrote (Haldane 1911:299):

And it is certain that there are no rules in mechanics which do not hold good in physics, of which mechanics forms a part or species.

Everything possibly divine, human or subjective disappeared from the scientific sphere, and nature itself became a mere machine or automat. Therefore, Descartes could write:

It is no less natural for a clock, made of the requisite number of wheels, to indicate the hours, than for a tree which has sprung from this or that seed, to

7. Schoeman, M & van Vuuren, P: 'Filosofiese hermeneutiek in gespek met die vakwetenskappe: Gadamer en Ricoeur', in Snyman, J J & du Plessis, P G W (reds): *Wetenskapsbeelde in die geesteswetenskappe*, 16.

produce a particular fruit. Accordingly, just as those who apply themselves to the consideration of automata, when they know the use of a certain machine and see some of its parts, easily infer from these the manner in which others which they have not seen are made, so from considering the sensible effects and parts of the natural bodies, I have endeavoured to discover the nature of the imperceptible causes and insensible parts contained in them.

The way was paved for the understanding of the universe as a giant cosmic machine which, once it had been set in motion by God, was governed by immutable laws. This further development is clearly revealed in the thoughts of that giant amongst scientific giants, Sir Isaac Newton (1642 - 1727).

The result of the substitution of an organic world view with a mechanistic one was not without its loss for man (cf Koyre 1957:23):

It did this by substituting for our world of quality and sense perception, the world in which we live, and love, and die, another world - the world of quantity, of reified geometry, a world in which, though there is place for everything, there is no place for man. Thus the world of science - the real world - became estranged and utterly divorced from the world of life, which science had been unable to explain.

The words of the psychiatrist, R D Laing (cf Capra 1982:40), are relevant in this connection:

Out go sight, sound, taste, touch and smell and along with them has since gone aesthetics and ethical sensibility, values, quality, form; all feelings, motives, intentions, soul, consciousness, spirit. Experience as such is cast out of the realm of scientific discourse.

Due to this banishment of sense and experience, it can rightfully be asserted that the Cartesian world-view left us with a mentally handicapped world, in as far as the Cartesian heritage (cf Zukav 1979:65) is one of

... left hemisphere bias (it is rational, masculine and assertive). It gives very little reinforcement to those characteristics representative of the right hemisphere (intuitive, feminine and receptive).

According to Berman (1981:161), this 'masculine' society of 'desensualization' erupted in full force on the eve of the Scientific Revolution. The psychologist Richard Ryder, vice-chairman of the Royal Society for the Prevention of Cruelty to Animals in Britain, in a recent conference paper referred to the 'cult of machismo'. He said:

One of the great motors for cruelty to animals and spoiling the environment - and for violent crime - is this cult of machismo.⁸

And the insanity of things like the arms race is

... an inevitable outcome of science performed in a world where men wage war against feminine values, women and female nature. ...humanity's long-

term future depends on a radical revaluation of masculine institutions and ideologies ...

is Petra Kelly's contention (cf Kumar 1984:164). She remarks that even those women in power, such as Margaret Thatcher and Indira Gandhi, have only come to power in this male-orientated world because they have adapted themselves to male values and to male ideologies.

We are back to where we ended our picture of what we had called 'the present scene'. It has become clear that the modern technological world of alienation, non-participation and the dominance of so-called masculine values, is the direct result of an organic world view which was substituted for the schizophrenic Cartesian dualism of disenchanted, objective things (*res*) and disembodied reason (*cogitatio*). How do we move from here?

The dance

We should start dancing. Dancing is not a cerebral, non-participating and analytic experiment for alienated and disembodied, desensualised human machines. Dancing is an experience. Dancing requires of the dancer to feel, to hear, to move rhythmically and with imagination. Zukav calls his dancers Wu Li Masters. They are teachers who do not teach their students by rote and by boredom, by imparting knowledge without the students getting the feel of what they are doing. The Wu Li Masters (Zukav 1979:43) dance with their students,

... now dancing this way, now that, sometimes with a heavy beat, sometimes with a lightness and grace, ever flowing freely. Now they become the dance, now the dance becomes them.

Nolan rightfully remarked:

We seem to be living in a world that is gradually rediscovering the value of experience.

What we need, according to Capra (1982:40), is a reenchantment of our world,

... in which the scientific discoveries of men and women can be in perfect harmony with their spiritual aims and religious beliefs ...

a world in which God, man and nature can dance together because of the beauty of the music that the cosmos plays. In this new world view the masculine and the feminine will combine in complete harmony, to dance with the swing of the natural order, 'to flow in the current of the Tao' as the Chinese put it - or, to speak in a Christian tongue, 'for the glory of God' (Capra 1982:40).

In the Cartesian world-view the organic unity was destroyed and we were finally left with the parts. In classical mechanics it was thought that the parts determine the properties and the behaviour of the whole. What we plead for, is an holistic approach to whatever is perceived as reality, in which wholes as well as parts form an integrated 'holon' (Koestner), in which parts and whole form subsystems of one

another, and as such an integrated unity. Capra explains this system by telling us that each holon has two tendencies: an integrative tendency to function as part of the larger whole, and a self-assertive tendency to preserve its individual autonomy:

These two tendencies are opposite but complementary. In a healthy system - an individual, a society, or an ecosystem - there is a balance between integration and self-assertion.

To put it bluntly: as dancers, our task is to prove 'that the Cartesian paradigm is actually a fraud' (cf Berman 1981:176). It cheated us out of the sacred harmony of the world's music, and maximised one particular variable, namely rational consciousness, out of its sacred context into a mere abstraction (Berman 1981:263). The result was control and mastering of nature, with all its devastating consequences. 'How can I know?' and 'How shall I live?' became two totally unrelated questions (Berman 1981:255). The dancing society will, however, integrate these two questions, because (Berman 1981:278)

... such a society will be preoccupied with fitting into nature rather than attempting to master it. Technology will no longer pervade our consciousness and its presence will be more in the form of crafts and tools, things that lie within our control rather than the reverse.

The world-view built on the Cartesian paradigm will want us feel ashamed of becoming dancers. For so long we have been indoctrinated into believing that only 'sissies' do the dance; men use their heads; men calculate; men analyse; men master and manage. But we do not have to be ashamed anymore. The very same scientists who taught us the laws by which we pretended to control nature, are now telling us a different story. They tell us that the whole of nature is actually participating in the dance, that it is folly any longer to believe that we can know what the dance is like by any means of so-called 'objective observation'; that the only way in which we get to understand nature is to partake in the dance ourselves.

Quantum physicists teach us that the very foundation of the mechanistic world view, the concept of the reality of matter, is in question. At the sub-atomic level, matter does not exist with certainty at definite places, but rather shows 'tendencies to exist'; atomic events do not occur with certainty at definite times and in definite ways, but rather shows 'tendencies to occur' (Capra 1982:69). The particles that used to be regarded as consisting of an indestructible material substance and as such to have formed the 'building blocks' of nature, have turned out to be mere dynamic patterns of energy.

The fact that the mass of a particle is equivalent to a certain amount of energy means that the particle can no longer be seen as a static object, but has to be conceived as a dynamic pattern, a process involving the energy which manifests itself as the particle's mass (Capra 1975:88).

The ultimate stuff of the universe has turned out to be pure energy - not 'made of energy, but 'energy itself'. Sub-atomic interaction, therefore, are interactions of energy with energy. Why things still do appear solid, is only because of the high velocity with which the electrons move between the electric forces which try to keep

them to the nucleus of the atom and the force of their own whirling around. The result is (Zukav 1979:213):

The world view of particle physics is a picture of chaos beneath order.

In the words of Jack Sarfatti (cf Zukav 1979:213):

Particles no longer move stiffly and formally, if not majestically, in predetermined paths. Rather, it is Marx Brothers hyperkinetic pandemonium, Charlie Chaplin slapstick, Helter Skelter now you see it, now you don't. In fact, it is not even clear what it is that has a path. It's psychedelic confusion - until one sees the subtle order.

Indeed - the world is fundamentally dancing energy:

Modern physics pictures matter not at all as passive and inert but as being in a continuous dancing and vibrating motion whose rhythmic patterns are determined by the molecular, atomic, and nuclear configurations. We have come to realize that there are no static structures in nature (Capra 1982:79).

The consequence of this realisation is that our theories can never provide a complete and definitive description of reality, like old-fashioned positivists wanted us to believe. Our theories are merely 'limited and approximate descriptions of reality' (Capra 1982:33). Quantum physics abandoned the idea of natural laws which govern nature and enable us to predict the future outcome because of the determination of these laws. Quantum physics can tell us how a group of particles will behave, but the only thing that it can say about an individual particle is how it probably will behave:

Probability is the major characteristic of quantum physics (Zukav 1979:50).

The best example of the fact that our theories are only approximations of reality, is still the wave-particle dualism of light, whereby in the one instance the nature of light is described in terms of waves, and in the other instance as particles⁹. These two apparently exclusive descriptions can only be reconciled by admitting that they BOTH describe aspects of nature, aspects which reveal themselves only within the context of the particular experiment we perform. Niels Bohr's advice would be: retain both descriptions as useful models to approach nature, and treat them as complementary rather than contradictory, since they do not occur in the same experimental situation, but don't forget to recognise their limitations (cf Barbour 1966:284,290). In so doing, the wave-particle duality marked the end of the Cartesian Either-Or way of looking at the world, whereby something of the complexity of life, which is seldom either black or white, has been put back into science (cf Zukav 1979:89).

The remarkable significance of this conclusion is: quantum physics talks in terms of 'events' (in other words, what may happen to the particles involved during an

8. *Weekly Mail*, 14-20 September 1990, 2.

9. Cf Gribbon, J 1985. *In search of the Big Bang*, 227-232, who describes this experiment in terms of electrons, and calls it the 'central mystery' of quantum physics.

experiment), but tells us nothing about what happens to the particles when they are not observed. So, what is reality? When we speak of photons, an X-ray or electron, wave or particle, it is no use asking whether they are 'real'.

The names 'photon', 'X-ray' and 'electron' are simply labels which we attach to certain natural phenomena (Gribbon 1985:103).

And how can mutually exclusive wave-like and particle-like behaviour both be properties of one and the same light? They are not properties of light. There are no properties *an sich*. There are only properties of our interaction with light ¹⁰. Heissenberg (1977:39 - my translation PJAF) was justified in writing:

On the question 'What happens in nature?' the only answer can be that the word 'happens' simply relates to the observation, and not the situation between two observations.

From the foregoing it has become clear: all so-called properties of nature are observer-dependent:

... what nature is depends on the questions we ask (Gribbon 1985:106).

Gone are the days of the alienated, non-participating observer of nature. We cannot exclude ourselves anymore from reality. Reality is what we perceive it to be. Something of the lost humanity has been regained: the world is truly our world:

Observer and observed are interrelated in a real and fundamental sense (Zukav 1979:115).

Speaking about nature, we are also speaking about ourselves. Indeed - in quantum physics we have become part of the dance!

To be part of the dance of nature, however, is also to take responsibility for her. A value-free science has been revealed as a myth.

The patterns scientists observe in nature are intimately connected with the patterns of their minds; with their concepts, thoughts and values. Thus the scientific results they obtain and the technological applications they investigate will be conditioned by their frame of mind. ... Scientists, therefore, are responsible for their research not only intellectually but also morally. ... They may lead us - to put it in extreme terms - to the Buddha or the Bomb, and it is up to each of us to decide which path to take (Capra 1982:77).

Come, join the dance!

And theology now? How do theologians fit into the new world view?

We should stop regarding dancing as a sin! For too long too many of us uncritically accepted the alienation and non-participation of the Cartesian world-view as the one

10. Cf Zukav, G 1979. *The dancing Wu Li Masters*, 116. According to Berman, a question like 'What is light?' has no meaning. The only valid question is: 'What is the human experience of light?'

and only and unavoidable reality. We regarded it as too bad that God was banished from the scene. We nevertheless adopted this world-view ourselves, and whenever God still mattered, he became the useless 'God of the gaps'. So much so did we make the Cartesian heritage part of our own armour that we often tried to win the battle of the 'divine eclipse' with precisely the same positivistic weaponry of our adversaries. Pannenberg (1973:66) loves telling us that this is particularly true of Karl Barth.

We cannot afford to go into all the subtleties of the debate about the so-called subjectivism in theology and 'true Biblical theology' now. What does, however, remain true and asks for our attention is that, judging from the present scenario on the world front, as indicated in the first part of this paper, the world needs us. What should our contribution be?

We should go and join the dance!

First of all we should unashamedly take our place next to our other scientific brothers and sisters. We should not regard them as adversaries, but as partners, partners in the dance to the tune of the music played by the cosmic band, in togetherness and harmony experiencing the glory of our God. No one is the queen, no one is the maiden. Both we and they are but teachers and learners at the same time, now they teaching us a step, next they learning from us. Holism and complementarity are the lyrics of our new song.

Secondly, the new understanding of particles as merely stable states in the energy spectrum in the interaction of quantum fields, requires of us a new look at the way in which we speak about the theological question of creation, especially *creation continua*. Perhaps the suggestion that matter is eventlike and composed of other events will provide us with a useful metaphor for a future discussion on this most fundamental of theological concepts, particularly with reference to the relationship between the natural sciences and theology¹¹. Only when we speak about creation in a way that it can also be understood by our non-theological partners, can we expect from them to appreciate the fact that the ball room actually belongs to the Creator God.

Lastly, seeing that the distinction between subject and object has become blurred, some people might fear a Schleiermacher (or, horror of horrors!) Feuerbach *redivivus*. Certainly, the problem which we in a post-Barthian period thought to have been settled, is well and alive and living (some would say at least in certain liberation theology circles¹²). I cannot even attempt to try and address this issue now. All that I want to say, is that I have learned that the dance is not an intellectual exercise, a rational agreement in a cerebral and non-participatory way to a series of historical

11. Also refer to Russell, R J: 'Contingency in physics and cosmology: a critique of the theology of Wolfgang Pannenberg', in *Zygon* 23, March 1988, 33.

12. Cf Nicol, W: God in stryd teen apartheid - 'n teologiese gesprek met Albert Nolan oor sy *God in South Africa*, 5: 'Nolan se werklike werkwyse kom egter daarop neer dat sy ervaring van die konteks nie bloot 'n supplementêre bron van Godskennis nie, maar die primêre een'.

facts, but that it is an experience. How to speak theologically about the God experience within a new epistemological paradigm is one of the challenges we face.

And with that, I think, enough talking has taken place. I invite you to switch off your computers and join me in the dance. Certainly, computers are important. But there is more to life than them. The dance has already started. The Wu Li Masters are waiting ...

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