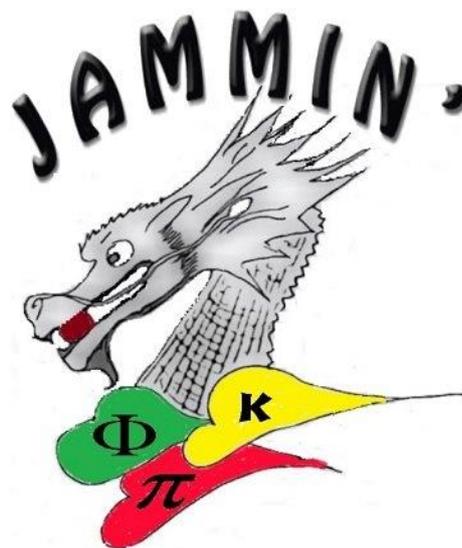


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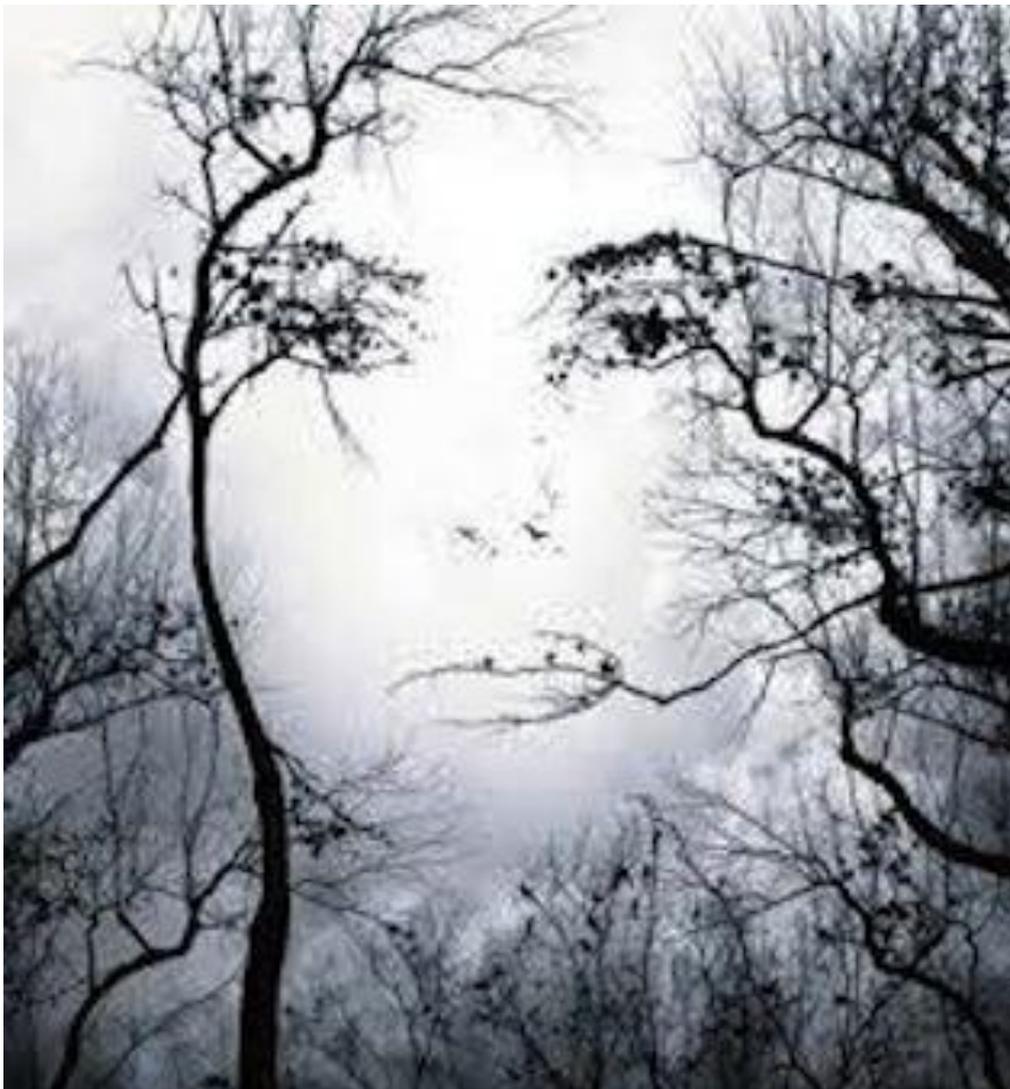
# MONADODOLOGY AND FREEWILL



# Ben O'Hare

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Can idealism be reconciled with our common sense view of ourselves as agents in a material world? Discuss with relation to either Berkeley's immaterialism, or Leibniz's theory of monads.

## INTRODUCTION

In this short paper it is argued that a slightly adjusted theory of 'monads' proposed by the philosopher Leibniz is logical, possible and preserves some of cherished intuitions in religion (idealism) and philosophy (freewill). This will be done using a modified version Leibniz's theory of monads which can also be adapted to unite the scientific fields of quantum physics and relativity which has alluded scientists for several generations.

## LEIBNIZ'S MONADS

Leibniz modified Bruno's theory of monads. Leibniz meant his model to be a superior alternative to the theory of atoms that was becoming popular in natural philosophy at the time. Leibniz was a rationalist and believed one could arrive at truth just by thinking things through.

When Leibniz died in 1716 there were several people talking about atomic theory but it was over 80 years before Dalton produced the first empirical model of atoms and it has gone through many changes since then and today it is impossible to produce a satisfactory philosophical interpretation of quantum physics and although the standard interpretation (Copenhagen interpretation) is materialistic there are other competing idealistic interpretations that are very similar to Leibniz's monad theory.

Monads were an atomic theory in which the world is made up of an infinity of simple substances called 'monads'. As defined in the *Monadology* §1, 'The monad ... is nothing but a simple substance, which enters into composites' (T19. 1). These simple substances are the basic constituents of reality, and it is a requirement that they are immaterial or non-physical.

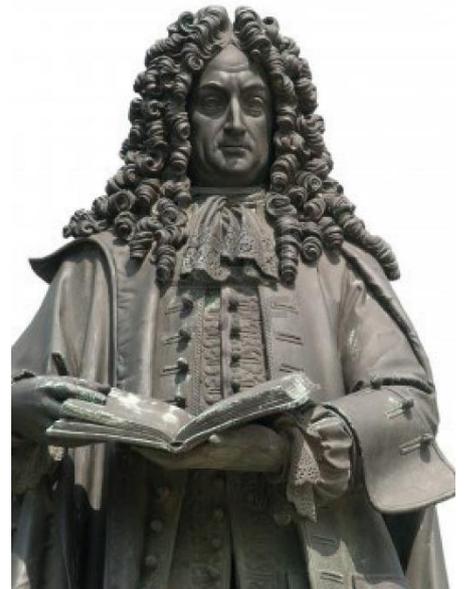
Like the early atomic theory simple substances are capable of being neither created nor destroyed nor divided. They were understood to be substances that that combined to create bigger objects and there are composites, which are collections or aggregates of simples, the features of which are explicable by features of the simples of which they are made up. Yet because these simple substances do not themselves consist of any parts, Leibniz describes them as the 'true atoms of nature; in a word, the elements of things.'

'Atoms of nature' implies that monads are the basic stuff of our universe, in its most simple form, as they have no parts. Leibniz states that because simple substances cannot have parts, they cannot be material, and thus are the only true unities.

However, there are also several ways in which Leibniz's monads were different from atoms. According to atomic theory atoms are made of inert matter whereas monads have mental properties and each monad has a unique perspective on the universe but also contains within itself all the past and future events of the universe.

Furthermore, all monads reflect the whole world, each with their own unique different perspective. So each monad reflects the whole system, but with its own perspective emphasised. If a monad is at place  $p$  at time  $t$ , it will contain all the features of the universe at all times, but with those relating to its own time and place most vividly, and others fading out roughly in accordance with temporal and spatial distance. Because there is a continuum of perspectives on reality, there is an infinite number of these substances. Nevertheless, there is internal change in the monads, because the respect in which its content is vivid varies with time and with action. Indeed, the passage of time just is the change in which of the monad's contents are most vivid.

Can monadology be reconciled with our common sense view of ourselves as agents in a material world?



It is my contention that all of the aspects of monadology mentioned above are a useful way of understanding the real world as science and religion understand it, which will be explained below. There is one more aspect that Leibniz included in order to preserve the western God, which is not necessary and that is "pre-established harmony". Pre-established harmony (*harmonie préétablie*) claims that every "substance" only affects itself, but all the substances (both bodies and minds) in the world nevertheless seem to causally interact with each other because they have been programmed by God in advance to "harmonize" with each other.

## MONADOLGY LIVES TODAY

To those of us brought up in a society that assumes and inadvertently teaches philosophical materialism as a truth Leibniz's ideas seem very strange and counter intuitive. Nevertheless, all of the ideas are accepted, more or less by other cultures.

For example, it is well known in the East that all is contained within everything else and Zen teaches that in order to become enlightened we must realise the ultimate reality which is called 'mind'. 'Mind' is not something external to us but is in us and we are not only in its likeness but we are part of it as a wave is part of the ocean. 'Mind' is part of the world, in the world and beyond leading many to suggest that Zen is a type of panpsychism. As Master Huang Po said:



*"The mind is neither large nor small; it is located neither within nor without...it cannot be said with certainty that the mind either exists or does not exist, for it is Absolute Reality. This is expressed in the Ch'an Sect by the maxim: "If you open your mouth, you are wrong. If you give rise to a single thought, you are in error."*

So, if you can quiet your thinking totally, all that remains is voidness and stillness.

*"The 'mind' is Buddha; Buddha is the 'mind'. All sentient beings and all Buddhas have the same 'mind', which is without boundaries and void, without name and form and is immeasurable."*

Panpsychism is the view that mind or soul (Greek: ψυχή) is a universal feature of all things, and the primordial feature from which all others are derived and this is a common theme in Zen. Panpsychist ideas can be found in many teachers with respect to the doctrine of Buddha nature which is often attributed to inanimate objects such as lotus flowers and mountains. As Master Cheonghwa put it:

*"Shakyamuni Buddha attained the consummation of incomparable enlightenment. However, when realised that it was not only him but all phenomena in the whole universe were also awakened. In other words, he realised the inborn Buddha-nature of all existence in the whole universe including the bodhi tree under which he was sitting, even it's every leaf and stem, the bushes around the tree, etc. It is very important to understand that there is nothing, no matter how trivial and insignificant it might be, in the whole universe that is not Buddha, or that does not possess the innate Buddha-nature.*

*..no matter what it is, the tiny stones or the huge mountains, they are full of life; they are all living things just like us; so teaches the Avatamsaka-sutra. It teaches us that all mountains, rivers, trees, animals, etc. are alive just like us, not a bit different from human beings. They all posses spirit, mind, or the Buddha-nature, just like us."*

The celebrated master Dogen likewise argued for the universality of Buddha nature and claimed that "fences, walls, tiles, and pebbles" are also "mind" (心, shin). Dogen also argued that "insentient beings expound the teachings" and that the words of the eternal Buddha "are engraved on trees and on rocks . . . in fields and in villages". This is the message of his 'Mountains and Waters Sutra' (Sansui kyô) [4] and other teachings.

## DOES ZEN TEACH ROCKS ARE CONSCIOUS?

No form of panpsychism attributes full, human-style consciousness to the fundamental constituents of the universe and Zen agrees with this assessment. Instead Zen teachers often say that 'mind' is the fundamental reality. In the words of Master DaeHeung [5] :

*"Your fundamental mind, your true self is invisibly connected to all things in the world and through it all things communicate with each other and work together as one. In this way, the whole universe is functioning together as one through fundamental mind, so this working together is called One mind (Hanmaum).*

*Fundamental mind... is not the mind that arises and disappears. On the contrary, it is tranquil and unshakable, and has infinite ability to encompass the entire universe. It is the source of unlimited energy, which you can freely use whenever you want.*

*Fundamental mind is within you, is the source of your existence, and has led you over the eons. Thus, that is what you have to believe in and rely upon. Money, fame, relationships, etc. may give you some satisfaction, but it will be short-lived. Only by knowing your true nature will you be able to know true satisfaction."*

Although we are using a western philosophical word to describe an ancient tradition there is certainly strong overlap between Zen and panpsychism and it is useful, I think, to use the strengths and similarities of the two traditions to resist the assumption that materialism is in fact the only option or that idealism is silly.

## MONADOLOGY LIVES IN QUANTUM PHYSICS

Through the lens of Western materialism Leibniz's monads look startling but there are a striking number of things Leibniz suggested but have turned out to be true. For example, Leibniz wasn't an atomist and didn't accept the existence of any fundamental indivisible body stating, "there is no atom, indeed, there is no body so small that it is not actually subdivided" and science has seen that atoms contain protons, electrons, quarks and so on.

Furthermore, quantum physics seems to have conscious experience written all over it with not only the outcome of a process depending on observers but it also looks like quantum particle such as electrons are themselves conscious and make decisions just like Leibniz suggested. In fact there are several lines of enquiry to explain how consciousness can explain the known effects of both quantum physics and relativity. One approach is 'Quantum Monadology' which was created by Teruaki Nakagomi (1992) and takes its inspiration directly from Leibniz although crucially God and pre-determined necessity are no longer required. It is interesting that quantum monadology was created in order to combine quantum physics and relativity which it succeeded in doing.

In quantum monadology the world is made of a finite number,  $M$ , of quantum algebras called *monads*. There are no other elements making up the world, and so the world itself can be defined as the totality of  $M$  monads:

$$W = \{A_1, A_2, \dots, A_M\}.$$

$$-\frac{1}{2\mu} \Delta \psi(r) - \frac{4\sqrt{2}\alpha\pi}{\mu} \psi(r) [v_{10}(r) - v_{20}(r)]$$

$$-\frac{4\pi\alpha}{\sqrt{2}\mu} \sum_{n=1}^{\infty} U_n^*(r) [v_{1n}(r) - v_{2n}(r)] + \epsilon_0 \psi(r) = 0$$

$$\Delta v_{10}(r) + \psi^2(r) = 0$$

$$\Delta v_{20}(r) + \psi^2(r) - c^2 v_{20}(r) = 0$$

$$\Delta v_{10}(r) + \psi^2(r) \frac{U_n(r)}{(1 + \Delta \epsilon_n)} = 0$$

$$\Delta v_{2n}(r) - c^2 (1 + \Delta \epsilon_n) v_{2n}(r) + \frac{\psi^*(r) U_n(r)}{1 + \Delta \epsilon_n} = 0$$

$$\left[ -\frac{1}{2\mu} \Delta - v(r) \right] \psi(r) = \epsilon_0 \psi(r)$$

$$\left[ -\frac{1}{2\mu} \Delta - v(r) \right] U_n(r) = \epsilon_n U_n(r)$$

The world  $W$  is not space-time as space-time does not exist at the fundamental level, but emerges from mutual relations among monads. This can be seen by regarding each monad  $A_i$  as a quantum algebra and the world

$$W = \langle A_1, A_2, \dots, A_M \rangle$$

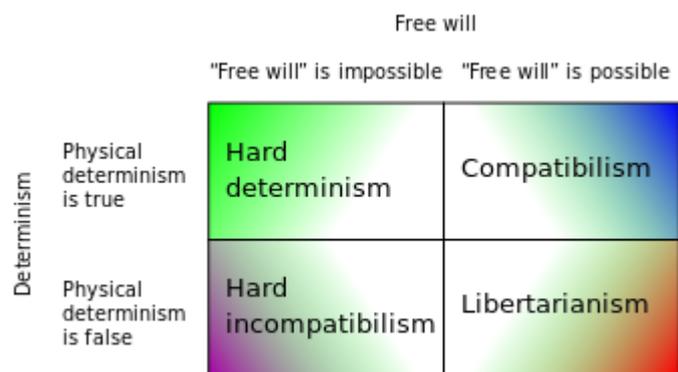
as an algebraically structured set of the quantum algebras called a tensor product of  $M$  monads. The mathematical structure of each quantum algebra representing each monad will be understood to represent the inner world of each monad. Correspondingly, the mathematical structure of the tensor product of  $M$  monads will be understood to represent the world  $W$  itself. To make the mathematical representation of the world of monads simpler, we assume each quantum algebra representing each monad to be a  $C^*$  algebra  $A$  identical with each other, that is,  $A_i = A$  for all  $i$  running from 1 to  $M$ . Then, the world can be seen as a  $C^*$  algebra  $W$  identical with the  $M$ th tensor power of the  $C^*$  algebra  $A$ .

It is interesting to notice that the world itself can be represented as the structured totality of the inner worlds of  $M$  monads. In addition to the individual state, each monad has an image of the world state recognized by itself; it is a world state belonging to each monad. Identifying the world state belonging to each monad with the world recognized by the monad, the conventional representation of the world as a four dimensional space-time manifold can be derived from the above mutual relation in terms of the Lorentz or Poincaré group. Thus the idealistic concept of the unlimited expansion of space-time geometry in conventional physics is shown to be an imaginary common background for overlapping the world image recognized by every monad.

It would therefore appear quantum physics and relativity would work very well under the system of quantum monadology although it would require a philosophical earthquake before the mainstream scientists brought up under a materialistic view of the world would consider it.

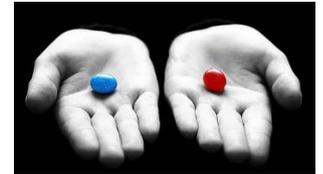
## ARE WE AGENTS IN A MATERIAL WORLD?

Leibniz's original monadology claimed that we have the freewill required for moral responsibility even though all of our future actions are already contained in us (along with the future of the entire actual world as ordained by God). Any awareness of those contingent future actions would follow from the principle of sufficient reason only upon an infinite analysis of my nature. Hence, since I lack knowledge of what I will do tomorrow, it will seem to me as if I act freely when I do it. Like space and time, freedom is a benevolent illusion that adequately provides for life in an uncertain world. I would personally dispute that this determinism and free-will are compatible, but that is not a problem as below I will argue that quantum monadology allows for a libertarianism position which claims that determinism is false and there is freewill.



In quantum monadology freewill is preserved since individual monad states are influenced by the states of the various monads around them and for each monad, say the  $j$ -th monad in a group, the tendency to make a choice of a new group element  $g$  in  $G$  is proportional to a universal constant  $c$  and the expectation value of the jump transformation with respect to the world state belonging to the  $j$ -th monad. Such a change of the world states belonging to all the monads induces the actual time flow, and the freedom to choose the group element is understood as the fundamental element of mind; thus the origin of free will can be identified here.

This means that there is choice going on at the individual level of monads (ie, the electrons and quarks), which, having being partly influenced by the thinking of those around them, but also a group choice. The assemblages of monads will have group memories and the ability to learn and base their decisions on their own and their groups collective memory.



An analogy of the relationship between humans and their society will help explain the situation faced by these monads. Each human has a choice of how to act (ie, free will) as a thinking, aware and conscious being. Take the example of Ben, for example, who went to the park with a football on Thursday afternoon with his son. It is Ben's intention to help his son with his goal-keeping skills and he thus took shots at the goal and after 30 minutes went home. They came back at the next day, but this time there was a game of football already going on and although Ben and his son could have used the same goal for practice it is understood by them, due to their experience that is not what should happen. So in this case Ben asked if he could join in and his son still got his keeping practice and Ben shot and scored in the other end and they stayed until the end of the match, as was fitting in that social situation. There were other things Ben and his son could have done, but they went with the consensus. It remains beyond the scope of this paper to consider how free Ben was to choose to use the goal when there was already a match in progress, but essentially this is the freewill that quantum monadology is suggesting. It is suggesting freewill, but a freewill conditioned by the actions, expectations, and the situations around it.

Monads, then, are the same as Ben in regards to freewill. Monads are endowed with freewill, and have genuine choices, but they also take into account the actions of their neighbours which leads to a group action. In quantum monadology this can be considered the effect of quantum superposition which is roughly analogous to groupthink, peer-pressure and society in the human world.

In this picture the free-will of a human is the aggregate of the decisions of all the aggregated nomads in a particular configuration. In this view there is a hierarchy of consciousness and decision making within any group. In this view the configuration of the monads is critical to the outcome of the decisions being made and so the structure of DNA (plants, animals, virus, bacteria, etc) will have a big influence over the decisions made as will the memories and experiences of the monad group but it does not follow that there is determinism. There is genuine freewill, but there is, depending on the situation a higher probability of one outcome than another due to groupthink. Just as it more likely that Ben and his son would join in a game rather than start their own football game so it is with the probabilities with individual or smaller groups of monads. Improbable things can and do happen because of this freewill, but it is the exception rather than the rule. In fact, in this view it is a natural outcome that you would see a much higher range of uncertainly and randomness when looking at individual or small groups of people or monads than you'd find in larger groups and this what indeed happens in both cases.

**Quantum Monadology:  
A World Model to Interpret Quantum Mechanics  
and Relativity**

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In order to give a new insight to fundamental problems of quantum mechanics, relativity and mind, we propose a world model suggested from the monadology of Leibniz. The world is assumed to consist of "monads" which have their individuality and whose primary attribute is a space-time frame and not a position in spacetime. Each monad has freedom to change its frame. Accompanying this change, the world time is put forward, and the world state jumps of the unitary evolution. This model explains not only the measurement process of quantum mechanics but also the "passing now" and the origin of free will.

**1 Introduction**

In this paper we present a world model which aims to resolve the three following conflicts between theories of fundamental physics and our experience:

(1) The first is the problem of quantum measurement, on which there have been a lot of discussion from the early stage of history of quantum mechanics [1]. The essence of this problem consists in the relation between the reduction of the quantum state which is considered to occur in measurement process and the unitary evolution law of quantum mechanics. If we apply the unitary evolution law to the description of

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**Quantum monadology: a consistent world model  
for consciousness and physics**

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Abstract

The NC world model presented in the previous paper is embodied by use of relativistic quantum mechanics, which reveals the significance of the reduction of quantum states and the relativity principle, and hence consciousness and the concept of flowing time consistently in physics. This model provides a consistent framework to solve apparent incompatibilities between consciousness (as our internal experience) and matter (as described by quantum mechanics and relativity theory). Does matter have an inside? What is the flowing time now? Does physics allow the indeterminism by nothing? The problem of quantum measurement is also analyzed in this model.

Keywords: Origin of consciousness, Quantum consciousness, Now in relativity, Life and matter

**1. Introduction**

Recently, consciousness is becoming one of the most important subjects of scientific research among a small but increasing number of physical scientists in the situation in which various functions of mind are explained in terms of material sciences and the necessity of consciousness has been brought into relief (see e.g. Gilboa, 1993). Among them, quantum-mechanical approaches are particularly interesting. Analogy or connection between the behavior of quantum states and that of mind has been pointed out by several philosophers and scientists (e.g. Whithead, 1929; Bohm, 1951; Riccauti and Utreras, 1982; Cochrane, 1971; Nakagomi, 1992, 1995; Klamstein, 2000, 2002) and moreover, explicit quantum-mechanical approaches to brain, especially, to consciousness are proposed by Jibu et al. (1994).

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1995, 1997, and Vizziello (2001). The author also considers that quantum theory will play an essential role in understanding consciousness. However, there are apparent incompatibilities appearing between fundamental properties of consciousness and presuppositions of physics as given below, and before proceeding to physical study of consciousness, we must first resolve these incompatibilities. Otherwise, physics must deny consciousness.

1. Intersubjectivity: Consciousness is internal experience. We can experience consciousness through introspection, but cannot observe it externally. When we dissect the brain, we will see only material systems such as neurons, neurotransmitters, proteins, molecules, and so on. What is the experience of consciousness of the direct experiences of colors, sounds, smells, pains, and so on? If these are material phenomena, then matter must have an interior, because we are able to experience these only from the inside of

## CONCLUSION

In this short paper it has been argued that a slightly adjusted theory of Leibniz's 'monad' theory is logical, possible and preserves some of cherished intuitions in religion (idealism) and philosophy (freewill). To do this I briefly outlined how quantum monadology was compatible with quantum physics, relativity, freewill and Zen Buddhism.

I do however recognise that in the above paper there is only the briefest description of quantum monadology and a proper description would have to deal very heavily in mathematics as does all quantum physics. As a physics graduate myself, with a specialism and special interest in quantum physics it seems to me that quantum monadology does indeed have promise, and also that it does allow philosophically for rational agents with freewill. That of course does not mean that quantum monadology is correct, but again as an ordained Buddhist monk who has a special interest in panpsychism and philosophy these subjects are close to my heart and materialism and dualism are not even consistent or logically possible so they seem to fare much worse than panpsychism. So as marginal as it is it seems to me that panpsychism has much to offer and at very least I hope it has been shown that a variation of monadology could be compatible with free will although I would argue that Leibniz's original theory isn't because God is not compatible with free will.

In actual fact, I do not think that Zen Buddhism actually teaches panpsychism, but it is the nearest thing that the western tradition has to offer and it is also incredibly close.