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## The Virtual Time Machine: Part II - Some Physicists' Views of Time Travel

### 2.1 Examples of Media Coverage of Physicists' Views

Ever since the publication of "The Time Machine" in 1895, time travel has become a theme that is very widely used in science fiction. In the popular media, perhaps the best known series of time travel stories are those featuring Dr Who and his time machine the Tardis, whose exterior looks like a London police box!

This led to a news story with the remarkable headline "Time lords square up to do battle over the grandfather paradox"!, which appeared in The Sunday Times



(Lloyd, 1994). Here, the time lords concerned were not Dr Who and "The Master" but various theoretical physicists, who had been arguing about whether or not time travel could occur, at least in principle. Both the general theory of relativity and quantum mechanics, according to some of these physicists, opened up theoretical possibilities for time travel. Lloyd cited the theories of Dr Amos Ori, who revived the idea that black holes could provide gateways through time, Professor Kip Thorne, who proposed a network of wormholes in space that act as gateways for time travel, and Richard Gott, who proposed a similar theory based on infinitely long "cosmic strings". Quantum physicist David Deutsch was quoted as predicting that the theoretical obstacles to time travel would be removed slowly during the next few years. In contrast, physicist and cosmologist Stephen Hawking at that time argued strongly against time travel.

In his article in the Weekend Financial Times, nearly a year later, Clive Cookson (1994) said that some theoreticians, whose name he did not mention, had obtained new solutions to Einstein's relativity equations, which suggest that "closed timelike curves" (CTCs), which are loops in four-dimensional space time, could provide routes backwards in time. However, the "paradoxes" of time travel still had to be addressed, and they suggested that time travellers would have to lose some of their normal free will. However, entirely different resolutions of the paradoxes of the paradoxes are possible by turning to quantum physics, and especially its "many worlds" interpretation.

### 2.2 Stephen Hawking's Views

Professor Stephen Hawking originally said that time travel was "against all the laws of physics", because he found the "paradoxes of time travel" too strong to overcome. In his book A Brief History of Time he made specific objections to some theories claiming the theoretical possibility of time travel. He produced his "chronology protection conjecture", which argued that some agency in nature "forbids" time travel and "makes the universe safe for historians". He said that the best evidence that time travel will never be possible is that we have not been invaded by crowds of tourists from the future.

Only last year, just as I was about to complete the extended version of this paper, the popular media featured the remarkable news that Stephen Hawking had reversed his previous opposition to time travel (Law, 1995 and Leake & Syal, 1995). His astonishing change of viewpoint comes in his foreword to a new book by

American astronomer Lawrence Kraus (1995). There, he says that one of the consequences of rapid (faster-than-light) interstellar travel would be that one could also travel back in time. He says that, some time in the future, it may really be possible to travel back in time. He even suggests that the British Government should invest some money in time travel research; not very much money would be needed, as the main requirement is for a sufficiently open mind to consider "fantastic" possibilities! He also said that there was a "two-way trade between science fiction and science". However, there is still one snag: even physicists who believe in time travel, for example Dr Michio Kaku, says that a workable time machine would require very special fuel sources, of a type that could be found only in deepest outer space!

**2.3 Kip Thorne's Studies of Possible Time Travel**

By far the most detailed semi-popular exposition of the possibilities of time travel by a physicist is by Professor Kip Thorne in Chapter 14, "Wormholes and Time Machines" of his book Black Holes and Time Wraps (1994). His ideas have been summarised, for example, in an article in a leading newspaper (Radford, 1994) and in a popular science lecture (Stewart, 1994).

Thorne became especially interested in "wormholes" in space time, when he was asked by astrophysicist Professor Carl Sagan to advise on the scientific accuracy of a science fiction novel. Thorne realised that it was impossible to travel through hyperspace from a black hole's core to another part of the universe, but that one might be able to make this journey feasible by replacing the black hole by a wormhole through hyperspace, which was a sort of "short cut". This could only be done by using some "exotic" method of holding the wormhole open. Two strategies for doing this could be imagined. A "quantum strategy" would rely on gravitational vacuum fluctuations. A "classical strategy" would have to tear two holes in space and sew them together. Then a young scientist, Tom Roman, remarked to Thorne that, if a wormhole could really be held open, it would allow spaceships to travel over interstellar distances at speeds much faster than that of light. He went on to ask if this would also mean that a wormhole could be used to travel backwards in time.
This conversation led Thorne to start his research on the theoretical possibility of time travel and time machines. In principle, it seemed, an infinitely advanced civilisation could make a time machine from a single wormhole. An objection to this theory had been that a wormhole might be destroyed by an intense beam of radiation if an attempt were made to turn it into a time machine, but Thorne and his colleagues



thought that they could refute that objection. They also thought that they could resolve the usual paradoxes of time travel. Even so, the manufacture of time machines would be vastly beyond humanity's present technological capabilities. Eventually, although Thorne realised the strength of Hawking's objections to time machines (at that time), he concluded that "the laws of quantum gravity are hiding from us the answer to whether wormholes can be converted successfully into time machines. To learn the answer, we humans must first become experts on quantum gravity's laws" (521).

**3 John Williamson's Ideas and Experiences of Time and Time Travel**

I know of several instances where individuals have "time travel experiences", and attempt to explain them. Especially important are the experiences and possible explanations of John J. Williamson, who has been a close friend of mine for many years. If such claims are found to be valid, then science has some hard work to do! John Williamson, who was a radio and electronics instructor during World War 2, had a mystical revelation of great importance while still a young boy. He was shown the fundamental principles of a comprehensive world view and unified philosophy of life, with many practical applications, which he later called "the new metaphysics" and then "neometaphysics". As a result of these experiences, he has made the development, promotion and application of neometaphysics his life work, and, over 50 years ago, founded The Society of Metaphysicians, which is still very active, for this purpose.
On various occasions, he has had experiences of "time travel". This section contains quotations from two of his recent articles, which both refer to his ideas and experiences of time and time travel, together with some additional material which he has kindly formulated for this paper. I am most grateful to him for these very valuable contributions, and for his permission to quote him directly. I have rearranged these extracts, and made a few minor amendments to them, to ensure a logical sequence of topics and concepts through this section.

**3.1 Time and Neometaphysics**

"Neometaphysics starts with an infinitely-dimensioned field, where all coexists and all durations are expressed as eternity. It postulates a degree continuum from unidimensionality to multidimensionality, wherein aggregates (combined patterns of consciousness) occupy degree levels. Each degree level is partially stable between an

upper limit and a lower limit; between neighbouring degree levels, there is a threshold or area of 'chaos', through which transmission of energy occurs.

"These and other neometaphysical postulates suggest that many levels of manifestation, transformation and equivalent durations must be the structure in which all manifestations occur. The Law of Enclosure in neometaphysics states that duration at a given level will include durations at lower levels. Thus consciousness, during psychic or mystical enhancement, will experience 'past' or 'future' duration. Prevision and postvision (predictions of the future, visions of the past, and reincarnation memories) become accessible."

3.2 Time and Consciousness

"That which we call 'consciousness' has the highest dimensionality. Thus the physical world is a function of consciousness, and time is purely relative. Consciousness requires infinite dimensionality (no limits) by which to define its nature and field of operation. The physical world has limited dimensionality. If the mass-consciousness of humankind is physically based, this integration of mind gives 'reality' to the 'physical world'. We share the same illusion of reality!

"Time, as experienced by consciousness, is better called 'duration'. The same period of physical time can be perceived as having long or short duration, according to how awareness is directed at it. The experience of time by our physical body matches that of its environment. The perception by the consciousness of that experience of duration (time of degree) will likewise be attuned to physical time and form, but not limited by these factors.

"Should our consciousness reach beyond its transitory (temporarily experienced) physical conditioning to a greater dimensionality, then it will shift from one dimensioned state to another, e.g. from the physical to the non-physical."

**3.3 John Williamson's Ideas and Experience of Time Travel**

"Travel in time is a function of consciousness. This is true of physical travel in time, which involves a translation from a physical state into a higher dimensionality, wherein duration exceeds,overlaps and includes the duration of a physical level.

"A simple illustration would be a point surrounded by a number of concentric circles. The location of the point is established by the degree (dimensionality) of the individual, within the infinitely dimensioned matrix, and the concentric circles represent various amounts of expansion of the consciousness to a higher dimensionality, dependent on mental energy level. The degree of factual perception,



dependent on level of mental energy, will relate to the circumference of the circles, which share the inner circle. That circle possibly coincides with the physical (sidereal) concept of time with 24 hours in the day. When consciousness is expanded by adding a few dimensions, we might find a 'new' day of higher dimensionality of possibly 30 hours - or even 100 hours - and so on The duration of perception depends on the dimensionality perceived. God has all the time in creation!

"Therefore, it follows that time travel already exists as a transcendental function, and that the psyche, having access to degree levels according to its own degree (dimensionality and energy), can consciously and deliberately move in time. Consciousness can move through time without a physical body moving.

"From the physical point of view, the matrix of energy, dependent on the psyche, which governs our manifestation in the physical world in a physical body, requires to be retained during the translation of the psyche from one linear time manifestation to another. Einstein's reasoning, that the velocity of light, c, is a limiting velocity, is constrained to physical terms of reference. Increase of dimensionality allows points to be less far apart, so that velocities greater than c become possible. Even the concept of 'nonlocality' in modern quantum theory no longer has that limitation, although physicists try to maintain the communication of information in forms accessible to physical observers, it is still not possible at velocities more than c.

"We need to differentiate between linear time (the concept of 'cause and effect' in classical physics) and the higher dimensionality of nonlinear time. The 'chain logic' of the former constrains us to the laws of the physical world, and the 'pattern logic' of the latter places all relative times (durations) within the range of the consciousness. That is, the consciousness can move freely in time, restricted only by its degree of evolution. 'Re-entry' into a physical state, with linear time, occurs when we are born, thus indicating a material possibility of remanifesting in the physical state. Apports and asports are other examples of materialisation and dematerialisation. If directed by consciousness, the time manifestation including time travel has been evidenced.

"One may believe that, with sufficient mental energy and a consistent level of consciousness, one may re-enter different physical states in different dimensionalities, thus in different structures of form, and, of course, our own past or future. Of special interest is the 'granny paradox' (which suggests that a time traveller could move back in time to murder his own grandmother, thus never be born!). However, the fluidity of manifestation, due to its infinitely dimensioned nature and its infinite number of

directions, indicates that, as our own personal time would have changed when we travel back, we could never induce a 'granny situation'. Thus the paradox does not exist!

"Any physicist, like Stephen Hawking, must consider the implications of consciousness and dimensionality, before he can formulate a logical mechanism for controlled time travel.

"Experiential data gained by time travel conform to the neometaphysical structuring. They are mainly understood in terms of degree coincidence, where one's environment and mental structure, by possessing the same dimensionality (range of degrees) are able to react one to the other, in both directions. In physical science, degree coincidence is expressed by the concept of 'resonance'.

"During a transition between states of different dimensionality, there will be little coincidence or 'match' between the psyche and its environment; therefore, little recognisable order will be perceived by the consciousness of the psyche. Thus one's consciousness will appear to have a travel experience, wherein the space and time, through which one passes, seems to be indefinable, like a cotton-wool tunnel or fixed clouds.

"Many, who have experienced time travel, have deliberately moved back into the past through such a 'tunnel of transition', and actually succeeded in controlling their speed of transition. Many similar perceptions have been reported during out-of-the-body experiences (OBEs) and near-death experiences (NDEs). Oliver Fox (106-107) describes his experience of apparent travel back to an incident in one of his past lives. David Lorimer (8, 83, 257) refers respectively to passage through a 'tunnel', emergence from a 'tunnel', and 'flash forward' to future events in experients' lives, during NDEs.

"At various times during my life, I have had experiences of being carried back in time through a 'woolly tunnel' by 'the winds of desire'. To me, any such experience is an adventure, an invitation to a new environment. I did not know what was there before I ventured forth. I experienced the time function as a change of mental patterning. I have had time travel experiences all my life, but not always in the same way. The major experience was when I had a high level of mental energy available. On that occasion, I gained data which caused me to make a deliberate choice to work in the neometaphysical field. This was a path where I faced many difficulties, and many calls on my mental energy, and where I oftimes found myself alone.



"Constant use of time travel depends on our environment as well as on our level and patterning of mental energy. We can extrapolate from existing circumstances, to predict fairly accurately the things that we need to reach a given point in the future. This is the same process as when our consciousness moves forward, extrapolates and is directed to a specific state. Once we have found that state, we know how to reach it again. We all do this to some extent in order to work out what next we have to do."

**Murry Hope's Views on Time and Time Travel**

In her book *Time the Ultimate Energy* (1991), Murry Hope explores the scientific, psychological and metaphysical aspects of time. On page 3 of her book, she, like John Williamson, distinguishes between 'Inner Time', the 'linear' clock time, the time of the physicist, and 'Outer Time', 'nonlinear' time existing beyond the confines of "our own little corner of the universe", which embraces 'timelessness' and subtle 'metaphysical' dimensions, because it is not subject to physical conditions as such. She, like Carl Jung and his successors, views human consciousness as existing independently of the body, and as being "capable of encompassing 'Outer Time', and that means all time, both backwards, forwards, up, down and sideways" (132).

She discusses time travel on pages 181 to 185 of her book. After mentioning Wells's immortalisation of this concept, she considers briefly what light physics might throw on the subject. She points out that certain experiments in quantum physics have suggested that particles can communicate outside the normal boundaries of space and time, so that we should be able to communicate telepathically with people who lived thousands of years ago. If this is so, she wonders, how many "flashes of inspiration" that we have actually resulted from such communications? The same could also be said of time travel from the future to the past. She cites some examples of psychic experiences which suggest that this might have happened.

## 5 Virtual Reality, Virtual Universes and Virtual Time Travel

A possible clue to how the Time Traveller may actually have "travelled" in The Time Machine and "The Virtual Time Machine" may be found in the modern technology of "virtual reality".

### 5.1 Virtual Reality

"Virtual reality" (VR) creates highly interactive, computer-based multimedia environments. It is described in many books, including the book edited by Sandra

Helsel and Judith Roth (1991), which begins to explore the complex and multifaceted nature of the concept of VR. That book considers: (1) the definition and theory of VR; (2) the current applications of VR, and the development of VR concepts and technologies; (3) the promise and potential of VR in such areas as the arts, education and training; and (4) the possible social and cultural implications of VR. Several more recent books have emphasised various practical applications of VR. An especially good brief description of VR is given by Brenda Laurel (1995).

Even with present technology, which is in its fairly early stages of development, each user of VR becomes a participant in an "almost real" world. Thus VR allows people to believe as if they were somewhere else from where they really are. For example, they could be in a computer- generated fictional world, or in a specially created environment that represents another space and another time. VR transforms perceptions by appealing to several senses at once - typically sight, hearing and touch - and presenting images that respond "immediately" to one's movements. In contrast to "ordinary reality", VR makes little or no distinction between body and mind. It aims to represent both the virtual and the actual nature of things in ways that record their structure, dynamics and potential uses.

**5.2 Virtual Universes**

In the book that they edited, Sandra Helsel and Judith Roth consider that the concept of VR could raise more - and perhaps more significant - questions about the nature of reality than humanity has faced hitherto. They even consider its religious and spiritual overtones. If we can create a virtual reality where all things are "perfect", how will this affect the definition and role of human concepts of God?

My anonymous papers in New Paradigms Newsletter (Jul 1991 & Oct 1991) review several hypotheses, including my own (Mayne 1975), that suggest that the universe is like a giant computer, and that the "physical universe" that we experience may indeed be a form of cosmic VR, operated from a "computer system in a superphysical universe".

In his book Words Made Flesh (1988), Ramsey Dukes explores the analogy between the perceived universe and a computer display, with some fascinating results. He considers that, if advances in computer technology successfully develop sufficiently effective "artificial intelligence" (AI),it might be possible to build a computer model of the universe so "complete" that it would reproduce qualitatively many of the universe's actual characteristics. This model would display "super-virtual reality"



(SVR). If we could project our consciousness into it, we might experience the illusion of living in a real universe while actually experiencing only the artificial SVR model universe!

Dukes then proposes the startling possibility that we are already living in such an artificial world, an illusion created by a vast SVR system and computer memory in some "higher" universe. He does this in a fictional context. He goes on to present the very significant and intriguing concept of the possibility of universes within universes within universes .... nested within each other like a sequence of Chinese boxes!

**5.3 Virtual Time Travel**

From the preceding discussion of VR, it is clear how a person using suitable simulated equipment in a sufficiently sophisticated VR system could easily have the illusion of "time travel" in a "time machine"! In my extracts from "The Virtual Time Machine" in the last issue of the Wellsian, I gave a very preliminary idea of how "virtual time travel" of this nature might operate and be experienced in such a universe. Much more research is needed on this question, but it has not yet really begun! In the next paragraphs, I give just a few hints!

In a virtual universe, all locations in the "space time" of that universe are represented by locations in the memory of the computer that generates it. It is not possible for every such space-time location to be represented explicitly; most of them have to be generated by some calculation process, which is in turn put into motion by the super-program, written or commissioned by the "Grand Organiser of Data" who runs the SVR computer. The important point to realise is that, in the "higher" universe, where the SVR computer resides, the representations of the virtual space-time points are all in, or connected with, specific memory locations in that computer, so that they are in the space of that universe.

The experiences of the people in the "higher" universe, and the super-programs of the SVR computer, unfold in the time of that universe. Because any location in the SVR computer can, in principle, be accessed at any such time, this means that a stream of virtual experience could access an "earlier" position in virtual time later on, and also a "later" position earlier on. Thus "virtual time travel" is feasible, and "virtual time machines" could be implemented by super-programs of the right form!

The next important aspect to consider is the question of intervention in virtual time travel. This need not lead to any paradoxes. At any given moment in "higher"

universe time, the whole array of space-time points in the current virtual history of the virtual universe is represented in the SVR computer's memory, either explicitly or implicitly. When a virtual time traveller "reaches" a location in virtual space time that is out of the ordinary virtual time sequence, the SVR super-program will calculate what that intervention does. What will often, if not usually, happen, is that it will cause the pattern of "events" in virtual space time to unfold in an unusual way. Because the state of the SVR computer's memory will be modified, this means that the virtual history of the virtual universe is also modified. This explains why, in "The Virtual Time Machine", the Time Traveller found that he had moved onto a different "branch" of history by travelling back to 1895 and then moving forwards in time again. Due to the nature of the super-program,is seems likely that any intervention in virtual space-time will also be a branch point, so that it would activate another branch of virtual history, represented by a particular transformation in the memory state of the SVR computer.

Finally, some consideration needs to be given to what happens when several people in the "higher" universe use the SVR computer together. The super-program could then allow for mutual interactions between these people, while they are having their virtual reality experiences. Thus these people would experience virtual life as if they were living with each other in an actual universe. For example, in The Time Machine, the Time Traveller met Weena and "fell in love" with her, but then she was killed. In "The Virtual Time Machine", he tries to find her again, in vain, while he is still in the virtual universe. Soon after he "awakes" to the "higher" universe again, he meets the young woman who had been "Weena" in the virtual universe, and with whom he is also beginning to experience love in the "higher" universe.

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