

A contemporary scientific reading of St. Paul on human duality

Ranjit. A. THURAISSINGHAM

*Research Consultant, Rehabilitation Studies Unit,
University of Sydney, AUSTRALIA
Email: ranjit@optusnet.com.au*

Abstract

The paper attempts to understand the writings of St.Paul regarding the body-spirit nature of human using the holonomic model of the brain, where our experiences in the explicate world arises from a deeper implicate order. Two types of implicate order are distinguished, the ordinary implicate order and the super implicate order which give rise to the worldly and spiritual experiences respectively. They are akin to the language of St.Paul when he speaks of matters of the flesh and spirit. Since the processes that operate in the brain obey the laws of quantum mechanics, the principle of complementarity is then used to discuss the dual nature of man. The model supports an anthropologically monist view of the human.

Key Words: Implicate; Super Implicate; Complementarity principle; Body; Spirit

1. Introduction

St.Paul in most of his letters to the churches speaks about the nature of the flesh and the nature of the spirit. This duality in the nature of man expressed in the biblical writings of St.Paul is the focus of this scientific inquiry. It is an attempt to understand these writings of St. Paul in a scientific context. What the author means as the dual nature of man is not about the behavior related to two different personalities of a person which arise from mental illness, but instead related to the belief that there is a dual nature within an anthropologically monistic man. Humans have been viewed either anthropologically dualist^{1 2} or anthropologically monist^{3 4}. In

¹ J. W.Cooper, Body, Soul and Life Everlasting: Biblical Anthropology and the Monism-Dualism debate, Grand Rapids,Michigan: Eerdmans (1989)

an anthropologically dualist view of the person, one speaks of a separate body and soul. On the other hand in anthropological monism, a unitary, holistic view of the person is involved. Body and spirit are regarded as different dimensions of the same person. Some refer to body as flesh, matter and the spirit as soul. No distinctions are made in these terms in this paper.

The scientific inquiry in this paper is based on the holonomic model of the brain developed by Pribram and Bohm^{5 6 7 8 9 10}. In this model all entities or structures in the visible or explicate world are viewed as being derived from a deeper implicate order of unbroken wholeness. The scientific inquiry also provides an understanding of the term mind based on neuroscience research, a term commonly used in biblical texts.

2. Biblical statements on the dual nature from St.Paul

In this section we look at some of the writings of St.Paul, where he speaks about the contradictory nature of body and spirit, and advises his fellow Christians to follow the path of the Spirit.

In his letter to the Galatians, St.Paul speaks clearly on this issue, distinguishing the dual nature present in man, the nature of flesh and the nature of the spirit. He then describes the characteristics of the flesh and the characteristics of the spirit. He writes:

“But I say, walk by the Spirit, and you will not carry out the desire of the flesh. For the flesh sets its desire against the Spirit, and the Spirit

² I. Smith, “Does 2 Corinthians 5:1-8, Refer to an Intermediate state”, *Scottish J. Theology* 44 (1991): 169- 194

³ W.S. Brown, N. Murphy and H. N. Maloney, *Whatever happened to the Soul? Scientific and Theological Portraits of Human Nature* (Minneapolis: Fortress Press, 1998).

⁴ B. G. Edgar, “Paul and the Person”, *Science and Christian Belief* 12(2000):151-164.

⁵ http://en.wikipedia.org/wiki/Holonomic_brain_theory

⁶ http://www.scholarpedia.org/article/Holonomic_brain_theory

⁷ http://www.vision.net.au/~apaterson/science/david_bohm.htm

⁸ <http://www.theosophy-nw.org/theosnw/science/prat-boh.htm>

⁹ <http://twm.co.nz/pribram.htm>

¹⁰ Pribram, Karl, *Languages of the Brain* (Englewood Cliffs, New Jersey: Prentice-Hall, Inc, 1971).

against the flesh; for these are in opposition to one another, so that you may not do the things that you please. But if you are led by the Spirit you are not under the law. Now the deeds of the flesh are evident, which are immorality, impurity, sensuality, idolatry, sorcery, enmities, strife, jealousy, outbursts of anger, disputes, dissensions, factions, envyings, drunkenness, carousings, and things like these, of which I forewarn you just as I have forewarned you that those who practice such things shall not inherit the kingdom of God. But the fruit of the Spirit is love, joy, peace, patience, kindness, goodness faithfulness, gentleness, self control; against such things there is no law.” [Gal 5: 16-23]¹¹.

A writing of St.Paul similar to the above is also found in his letter to the Colossians [Col 3: 2-14], where matters of flesh and spirit are replaced by things of the earth and above respectively. Another explicit reference is found in Paul’s letter to the Romans where he wants the faithful to set their minds on the things of the Spirit instead of the flesh. Here St.Paul writes: “In order that the law might be fulfilled in us, who do not walk according to the flesh, but according to the Spirit. For those who are according to the flesh set their minds on the things of the flesh, but those who are according to the Spirit, the things of the Spirit.” [Rom 8: 4-5].

To deal with the problems that have risen amongst the Christians in Corinth, St.Paul in his letter reminds them of the redeemed spirit in them: “Do you not know that you are the temple of God and that the Spirit of God dwells in you? If any man destroys the temple of God, God will destroy him, for the temple of God is holy, and that is what you are .” [1Cor 3:16-17].

The dual nature of man recognized in the above passages is the focus of this study. This is carried out here using the holonomic model of the brain.

3. Holonomic model of the brain

We know that the brain is part of the central nervous system, and situated within the skull. It includes two cerebral hemispheres, parallel masses of deeply furrowed tissue, as well as the brain stem, and cerebellum. It is a physical organ. What do we mean by the term mind? A commonly held view of what we mean by the term mind is that it is a thing that is located within the brain. According to the holonomic brain

¹¹ The quotes from the bible are taken from the New American Standards Bible, Reference edition, Foundation press, CA, USA.

model it is a process. When we use the term mind it reifies, that is tends to treat as if it had a concrete material existence. Pribram¹² one of the developers of the holonomic model of the brain uses instead of the term 'mind', 'mental activities' or 'mental processes'. When Pribram¹³ was asked of what he meant by the term mind, he answered: "Well I don't like the term mind, because it reifies, something that's a process. We pay attention, we see, we hear. These are all mental processes, mental activities. But there isn't a thing called the mind. There may be something you want to call yourself, but the mind sort of makes something concrete out of something that's very multifaceted".

In the book, *Languages of the Brain*, Pribram¹⁴ had postulated that 2-dimensional interference patterns, physical holograms, underlie all thinking. The holographic component, for him, represented the associative mechanisms and contributed to memory retrieval and storage and problem solving. The holonomic brain model is based on the principle of the hologram Let us therefore examine the basic process for creating a hologram¹⁵ ¹⁶. One way of obtaining a hologram involves the use of a laser and a beam splitter, an optical device that splits the laser light into two beams. One of the beams is directed onto the object. The light reflected from the object is then directed onto a high resolution photographic plate. The other beam, referred to as the reference beam is beamed directly onto the photographic plate. Both these beams collide at the photographic plate producing a pattern referred to as an interference pattern. This is what is recorded on film when a hologram is made. If you were to look at the film with the naked eye, all you'd see would be patterns of ripples. This fringe pattern acts as a diffraction grating and when the hologram is illuminated by the right kind of light onto it, a light field is diffracted which is identical to the light field which was scattered by the object and the image emerges in its three-dimensional glory. Thus, the object beam has been

¹² http://en.wikipedia.org/wiki/Holonomic_brain_theory

¹³ <http://twm.co.nz/pribram.htm>

¹⁴ Pribram, Karl, *Languages of the Brain*.

¹⁵ D. Gabor, "Microscopy by recorded wavefronts", *Proc. Royal Soc. London* 197 no:1051(1949): 454-487.

¹⁶ <http://en.wikipedia.org/wiki/Holography>

reconstructed. Someone looking into the hologram "sees" the objects even though they are no longer present. There are a variety of recording materials which can be used, including a photographic film. This type of hologram has another very curious property. If you cut the film in half and then expose just one piece to the laser light, you'll still see the entire image. In fact, you can keep making smaller and smaller pieces, and each one will still display the whole image rather than just part of the image—though the clarity degrades as the pieces get smaller.

Until the middle of the 20th century, the conventional view was that memories were stored in a specific group of neurons, in other words they were localized in the brain. This was challenged by Pribram¹⁷ based on his experimental research on the way memories are stored in the brain. Humans with brain injuries or who had portions of their brain removed for medical reasons never lost memories selectively although overall memory sometimes became hazier. Drawing an analogy in the way holograms work, Pribram began to suspect that the brain stores memories in a way similar to holography: by recording diffuse patterns of electrical waves. The fact that information about an image is not localized but instead distributed throughout the hologram; and that one can construct the whole image from a small portion of that distribution, seemed suggestive to Pribram the way the brain encodes memories¹⁸. This was further strengthened by the work of DeValois and DeValois¹⁹ who found "the spatial frequency encoding displayed by cells of the visual cortex was best described as a Fourier transform of the input pattern". This holographic idea led to the coining of the term "holonomic" to describe the idea in wider contexts than just holograms. The Fourier transform is a mathematical technique which transforms the information from the four dimensional

¹⁷ http://en.wikipedia.org/wiki/Karl_H._Pribram

¹⁸ Karen K. DeValois, Russell L. DeValois, and W.W.Yund. "Responses of Striate Cortex Cells to Grating and Checkerboard Patterns", *Journal of Physiology*, vol 291(1979): 483-505.

¹⁹ Russel L. DeValois and Karen K. DeValois, "Spatial vision", *Ann. Rev. Psychol*, 31 (1980):309-41.

space-time into the frequency domain, while the inverse Fourier transform reverses the operation.

The idea is that, the brain implements direct Fourier transformations that distribute information of an episode over regions of the brain and then later refocuses them into a form which we remember, by the inverse Fourier transformation²⁰. The inverse Fourier transform taken of smaller and smaller areas of the spectral domain, is still able to capture the "whole", except that the resolution deteriorates. Thus even if part of the brain is injured or removed one can still remember events. This "whole-in-each-of-the-parts" quality of holograms provided the crucial insight for Pribram into the associative mechanisms that contribute to memory storage and retrieval²¹.

In the book entitled *'The Holographic Paradigm and other Paradoxes: Exploring the leading Edge of Science'* edited by Ken Wilber²², we read:

"Our brains construct hard reality by interpreting frequencies from a dimension transcending time and space. The awesome cleverness of Pribram's research stands at its own beacon. His decision to use the mathematics of Fourier transformations creates in itself a brilliant metaphor. The graphic expression of the results of such a transformation is a mandala—an expression in two dimensions of radial symmetry within the confines of mathematical relationships. Another attribute to the Fourier mandalas is that the entire pattern can be regenerated from any shred of the data bound within the graph. This makes the mechanisms of expressing the analysis of data metaphorically comparable with the model".

The idea that the brain operates in a manner similar to a hologram which is characteristic of waves suggested that the laws of quantum mechanics is operational here. This was shown to be the case from the mathematical structure of the brain data obtained from electrical impulses of the neurons and the patterns they generated, which parallels the

²⁰ J. Prideaux, "Comparison between Karl Pribram's Holographic Brain Theory and more conventional models of neuronal computation", <http://www.acsa2000.net/bcngroup/jponkp/>

²¹ Pribram, Karl, *Languages of the Brain*.

²² K. Wilber, *The Holographic Paradigm and other Paradoxes: Exploring the Leading Edge of Science* (Shambhala publishers, 1982).

mathematical structures of quantum physics. This mathematical structure can be described in terms of waves, or in terms of matrices with vectors in them. Thus the processes that operate to obtain these patterns obey the laws of quantum mechanics. Such a result implies that the many paradoxes faced in quantum mechanics will also be faced at the neuronal and psychophysical level.

4. Implicate, superimplicate and explicate order^{23 24}

When Bohm began to take a closer look at the notion of order, he saw a program that fired his imagination. It consisted of two concentric glass cylinders, the space between them being filled with glycerin, a highly viscous fluid. If a droplet of ink is placed in the fluid and the outer cylinder is turned, the droplet is drawn out into a thread that eventually becomes so thin that it disappears from view; the ink particles are enfolded into the glycerin. But if the cylinder is then turned in the opposite direction, the thread-form reappears and becomes a droplet; the droplet is unfolded again. Bohm realized that when the ink was diffused through the glycerin it was not a state of "disorder" but possessed a hidden or non-manifest order.

In Bohm's view, all the separate objects, entities, structures, and events in the visible or explicate world around us are relatively autonomous, stable, and temporary "sub totalities" derived from a deeper, implicate order of unbroken wholeness. Bohm gives the analogy of a flowing stream: "On this stream, one may see an ever-changing pattern of vortices, ripples, waves, splashes, etc., which evidently have no independent existence as such. Rather, they are abstracted from the flowing movement, arising and vanishing in the total process of the flow. Such transitory subsistence as may be possessed by these abstracted forms implies only a relative independence or autonomy of behavior, rather than absolutely independent existence as ultimate substances".²⁵

The flow is in some sense, prior to that of the 'things' that can be seen to form and dissolve in this flow. The explicate

²³ http://www.vision.net.au/~apaterson/science/david_bohm

²⁴ <http://www.theosophy-nw.org/theosnw/science/prat-boh.htm>

²⁵ D. Bohm, *Wholeness and the Implicate Order* (London: Routledge & Kegan Paul, 1980).

order--the vast physical universe we experience--is but a set of "ripples" on the surface of the implicate order. The manifest objects that we regard as comprising ordinary reality are only the unfolded projections of the much deeper, higher dimensional implicate order, which is the fundamental reality.

This brings us back to the hologram in the holonomic model of the brain. Here we see a good illustration of this implicate order. The complex swirls of the interference pattern recorded on the photographic plate appear meaningless and disordered to the naked eye. Just like the ink drop being enfolded in the glycerin, there is present an enfolding or an implicate order in the interference pattern. When illuminated with laser light the pattern produces a three-dimensional image of the original object, which can be viewed from any angle. Further even if the holographic film is cut into pieces, each piece produces an image of the whole object, though the smaller the piece the hazier the image. Clearly the form and structure of the entire object are encoded within each region of the photographic record.

Thus in the holonomic model of the brain, what we observe or experience in the four dimensional space-time world, which is referred here as the explicate order, is related to a deeper implicate or enfolded order in the brain. This implicate order we are speaking of is the diffuse, spread out, fuzzy holographic picture, which can be described in terms of waves or in terms of matrices with vectors in them. It is spread in spectral form and the mathematical formulations refer to them as spread functions.

In the early 1950's Bohm published two papers what later came to be called the causal interpretation of quantum theory. This he said: "opens the door for the creative operation of underlying and yet subtler level of reality"²⁶. To elaborate on this, he noted that subatomic particles such as electrons are not simple, structure-less particles but highly complex dynamic entities. He rejects the view that their motion is fundamentally uncertain or ambiguous; they follow a precise path, but one

²⁶ D.Bohm and F. D. Peat, *Science, Order & Creativity* (New York.: Bantam Books, 1987)

which is determined not only by conventional physical forces but also by a more subtle force which he calls the '*quantum potential*'. The '*quantum potential*' guides the motion of particles by providing "active information" about the whole environment. Bohm gives the analogy of a ship being guided by radar signals: the radar carries information from all around and guides the ship by giving form to the movement produced by the much greater but unformed power of its engines.

Bohm postulated that the '*quantum potential*' pervades all space and provides direct connections between quantum systems. The phenomenon known as the Aharonov-Bohm (AB) effect is an example of this quantum interconnectedness. It was found that in certain circumstances electrons are able to "feel" the presence of a nearby magnetic field even though they are traveling in regions of space where the field strength is zero.

For Bohm the '*quantum potential*' also corresponds to an implicate order. He suggests that the quantum potential is itself organized and guided by a super-quantum potential, representing a second implicate order, or super-implicate order.

This brings us to the question of spiritual experiences. When the mental activities are ordinary or very human, then the explicate order is the ordinary space time. However not all activity can be classified as such. There are some who want to get into contact with larger issues, such as God, cosmology, and mysticism. Pribram defines this as the spiritual aspect of man's nature. The experiences here are very different. We experience it as our spiritual aspect of our being. It has been suggested that the implicate order that gives rise to this experience is related to the super-implicate order²⁷.

5. Principle of complementarity

In the holonomic model of the brain the processes that operate in the brain obey the laws of quantum mechanics. This implies that many of the ambiguities present in the world of quantum objects will also be faced at the neuronal and psychological level. In this section we look at the

²⁷ <http://twm.co.nz/pribram.htm>

complementarity principle which has been helpful to understand the paradoxes faced in quantum mechanics.

In 1924, De Broglie²⁸ advanced the theory of wave-particle duality of matter. He showed that the wavelength of matter wave was inversely proportional to the linear momentum of the particle, where the proportionality constant is the Planck's constant. The wavelength is a wave characteristic while the momentum is a particle characteristic. A conventional interpretation of quantum mechanics explains this duality as a fundamental property of the universe. This phenomenon has been verified not only for elementary particles such as photons and electrons but also for compound particles like atoms and even molecules^{29 30}. Thus wave-particle duality applies to all objects, even macroscopic ones; but because of their small wavelengths, the wave properties of macroscopic objects cannot be detected³¹.

The principle of complementarity enunciated by Niels Bohr³² is related to the wave-particle duality and applies to knowing, or measuring a property of an object; and to the limits of the manifestation of that property in the physical world. It states that certain physical properties are

²⁸ L. de Broglie, *Recherches sur la théorie des quanta (Researches on the quantum theory)*, (Thesis, Paris, 1924); L. de Broglie, *Ann. Phys. (Paris)* 3, (1925): 22; Reprinted in *Ann. Found. Louis de Broglie* 17, (1992): 22.

²⁹ M. Arndt, O. Nairz, J. Voss-Andreae, C. Keller, G. van der Zouw, A. Zeilinger "Wave-particle duality of C_{60} ". *Nature* 401, (1999): 680-682.

³⁰ L. Hackermüller, S. Utenthaler, K. Hornberger, E. Reiger, B. Brezger, A. Zeilinger and M. Arndt, "The wave nature of biomolecules and fluorofullerenes" *Phys. Rev. Lett.* 91, (2003): 090408.

³¹ R. Eisberg and R. Resnick, *Quantum Physics of Atoms, Molecules, Solids, Nuclei, and Particles* 2nd ed., (John Wiley & Sons, 1985), 59-60. "For both large and small wavelengths, both matter and radiation have both particle and wave aspects. ... But the wave aspects of their motion become more difficult to observe as their wavelengths become shorter. ... For ordinary macroscopic particles the mass is so large that the momentum is always sufficiently large to make the de Broglie wavelength small enough to be beyond the range of experimental detection, and classical mechanics reigns supreme."

³² N. Bohr, *Causality and Complementarity: Epistemological Lessons of Studies in Atomic Physics*, (Oxford Press: ISBN 1-881987-13-2, the 1949-50 Gifford lectures. 1999).

complementary. If two properties are complementary, an experiment that clearly illustrates one property will obscure the other complementary one. For example, an experiment that illustrates the particle properties of light will hide the wave properties of light; an exact measurement simultaneously of the location and the momentum of a subatomic particle is not possible. These two variables, particle, wave; position, momentum form complementary observables; and observation of one variable in an observable obscures the simultaneous observation of its complement.

Another important aspect of complementarity is that it sets a limit on the manifestation of a property of an object in the physical world. For example an electron can manifest a greater and greater accuracy of its position only if it is willing to trade off a complementary loss in the accuracy of manifesting its momentum. This means there is a limitation on the precision of its position, since an infinite precision would mean that its manifested momentum would be infinitely imprecise or not manifested. The ultimate limitation in the precision of property manifestation is quantified by the Heisenberg uncertainty principle³³. This principle of complementarity can be viewed as a relation between two descriptions or set of concepts though mutually exclusive are both necessary for an exhaustive description of the situation. Central to Bohr's thinking is that it is not meaningful to talk about the system at all, separate from the apparatus observing it³⁴. It has introduced a quantum way of knowing. Shlain³⁵ argues that the advent of quantum mechanics dissolved one of the paradigmatic distinctions between physics and art. Shlain in describing this says that until the twentieth century, physicists had concerned themselves with the "*objective arena*

³³ W.Heisenberg, "Über den anschulichen Inhalt der quantentheoretischen Kinematik und Mechanik," *Z. Phys.* 43 (1927)172–198, as cited in Mott, N., & Peierls, R. (1977) "Werner Heisenberg 1901–1976". *Biographical Memoirs of Fellows of the Royal Society*, 23, (1977) 213–251.

³⁴ D. M.Harrison, "Complementarity and the Copenhagen Interpretation of Quantum Mechanics," <http://www.upscale.utoronto.ca/GeneralInterest/Harrison/Complementarity/CompCopen.html>

³⁵ L. Shlain, *Art and Physics* (NewYork: Quill,1991)22.

of motions, things and forces and avoided any mention of the inner thoughts that related to the outer world”, whereas the artists have traditionally been concerned with “external reality” as well as “with the inner realm of emotions, myths, dreams and the spirit”. Quantum mechanics presaged an image of the world as a “network of relations”, rather than a “collection of separate but coupled things”³⁶. Bohm³⁷ identifies this development as a centrally relevant change in descriptive order, namely: “the dropping of the notions of the analysis of the world into relatively autonomous parts, separately existent but in interaction. Rather, the primary emphasis is now on undivided wholeness in which the observing instrument is not separated from what is observed”.

6. A fresh look at St.Paul’s teaching on the duality of human nature

In this section we will examine the relevance of the holonomic model of the brain to understand St.Paul’s writings on the duality of human nature. St.Paul clearly distinguished the dual nature present in man, when he spoke about the contradictory nature of body and spirit, and advises his fellow Christians to follow the path of the spirit. How do we understand this from the holonomic model of the brain?

In this model of the brain, what we observe or experience in the four dimensional space-time world, which is referred here as the explicate order, is related to a deeper implicate or enfolded order in the brain. This implicate order is a diffuse, spread out, fuzzy holographic picture, which can be described in terms of waves or in terms of matrices with vectors in them. The processes that operate to obtain these patterns follow the laws of quantum mechanics.

It is the implicate order in the brain which gives rise what we experience and observe. In section 4, we distinguished two implicate orders, one referred to simply as implicate, and the other as super implicate order. In order to prevent any

³⁶ P. Davies, *God and the New Physics* (New York: Simon and Schuster, 1983), 112

³⁷ D. Bohm, *Wholeness and the Implicate Order*(London: Routledge & Kegan Paul, 1980).

confusion and for clarity we will hither too refer to the order referred earlier as implicate, as the ordinary implicate order, retaining the super implicate order for the other. The mental activities which are very human and ordinary or focused on the material world are related to the ordinary implicate order. The explicate order in this case is the usual human experiences. On the other hand the super implicate order is related to mental activities which are focused on larger issues such as faith, religion and matters spiritual. The explicate order in this case is the spiritual experiences. These two implicate orders, ordinary implicate and super-implicate give rise to two different explicate orders, namely, the ordinary human experiences and spiritual experiences. This is similar to the language used by St.Paul in his letters to the various churches, where he speaks of the experiences of the flesh and spirit [Gal 5:16-23].

Bohm³⁸ suggests that the super implicate order is organized and guided by a super quantum potential that pervades all space and provides connections between quantum systems. This has a striking similarity to the words of St.Paul to Galatians where he refers to 'being led by the spirit and being not under the law', when one chooses to walk by the spirit or follow the spiritual way [Gal 5: 18]. The 'guidance of the super quantum potential' in the super implicate order and St.Paul's language of being 'led by the spirit' when the spiritual way is chosen, is unmistakably similar. When St.Paul speaks about 'walking by the spirit', it refers here to mental activities which activate the super implicate order. Thus when one walks by the spirit, the mental activities are guided by a power which pervades all space, which the Christian refers to as guidance from the Holy Spirit.

Thus the dual nature of man is related to the ordinary and super implicates orders. Mental activities which are materialistic or worldly arise from the ordinary implicate order and those which are non materialistic or spiritual arise from the super implicate order. The characteristics of the experiences from the resultant explicate world for these two

³⁸ D.Bohm and F. D. Peat, *Science, Order & Creativity* (New York.: Bantam Books, 1987)

cases are different. One is related to the ordinary human experiences and the other to spiritual experiences. These are referred to as the experiences of the flesh and the fruits of the spirit in the language of St.Paul. They have contradictory characteristics as seen from the writings of St.Paul. The deeds of the ordinary implicate order lead to immorality, sensuality, idolatry, sorcery, enmities, strife, jealousy, anger, disputes, dissensions, factions, envying, drunkenness, carousings and things like these, while the result of the activities from the super implicate order gives rise to love, joy, peace, patience, kindness, goodness, faithfulness, gentleness, self control, the fruits of the spirit. In order to understand this further let us examine the holonomic model of the brain using the principle of complementarity.

The neuronal and physiological processes that give rise to the implicate order obey the laws of quantum mechanics. This allows us to examine the holonomic model of the brain using the principle of complementarity, a principle that is used to understand the paradoxes faced in quantum mechanics. The complementarity principle states that the result of the observation is dependent on the focus of the observer. Consider the case of a quantum object such as electron or light. This can be perceived as a wave or a particle depending on the situation. When our mental activities are focused on worldly or material things, it is the ordinary implicate order that is operational giving rise to the experiences and observations of the flesh. On the other hand when our mental activities are focused on matters spiritual, such as worship, love for our neighbor then it is the super implicate order that is operational, which in the language of St.Paul gives rise to the fruits of the spirit. It is guided by the Spirit. Thus St.Paul exhorts to his fellow believers to focus our mental activities on matters spiritual.

The other implication of this principle is that when an object has two contradictory natures, we can switch back and forth between the two natures but can never see both at the same time. In reality however the object exists with both natures at the same time. We can however only perceive or view one at a time. The dual nature of man is seen from the

different mental activities man is engaged in, the activities which are materialistic or worldly; and those which are non materialistic or spiritual. These are related to the ordinary and super implicate orders. Activating the ordinary implicate order chooses us to observe and experience the world in one way. On the other hand activating the super implicate order allows us to view and experience world differently. What we observe or experience however depends on the choice of the observer. Thus choosing to observe the world in one way, complementary ways of experiencing becomes hidden or inaccessible. However, changing the choice of our observation, brings forward complementary ways of experiencing previously hidden views. The “out there” becomes real, while the previous reality fades away from our attention. Since our mental activities mainly activate the ordinary implicate order instead of the super implicate order our experience of the explicate order is largely space- time. This does not mean the absence of the spiritual realm. For the multitude of saints, sages, past and present; and for those who spend much time in inner silence, prayer and meditation, the spiritual realm is as real as the ordinary space-time. “O taste and see that the Lord is good” [Psalm 34:8] is experience of the Psalmist. Many rely on physical miracles to prove the truth of spiritual things. One does not need to make spiritual things material or vice versa. This is the source of superstition and idolatry. In order to prove the truth of spiritual things, one should as St.Paul exhorts, to cultivate spiritual activities which will then activate the super implicate order. By developing and growing in our spiritual activities, which will activate the super implicate order, one will be able to experience the truth of spiritual things. This is the way adopted by the saints of the church.

Depending on the experiment an electron or light can be perceived as a wave or particle. They are not separately wave or particle. They are both at the same time. The principle of complementarity is a relationship between two descriptions, though mutually exclusive are necessary for an exhaustive description of the system. Quantum mechanics presents an image of the world as a network of relations rather than a

collection of separate but coupled things³⁹. The experiences from the ordinary implicate and super implicate order though mutually exclusive arise from the mental activities of man. It is the type of mental activities which cause the difference. They activate either the ordinary implicate or the super implicate order. The mental activities arise from the same brain and person. Both experiences, worldly and spiritual which in the language of St.Paul gives rise to the nature of flesh and spirit, are part of what we identify as human. They reflect different aspects of the human nature. This scientific view complements St.Paul's understanding of the human, where flesh and spirit are different aspects of the same person, an anthropologically monist view of the human.

The experiences arising from ordinary and super implicate order though mutually exclusive are necessary to describe man. The complementarity principle is a relationship between two such descriptions, and it states that there is a limit to obtain complete knowledge of these two separate descriptions. Although we can switch back and forth between the different descriptions, we can never fully know each of these implicate orders. Thus we can never ourselves completely. The Psalmist cry, "Search me O God, and know my heart. Try me and know my anxious thoughts; and see if there is any hurtful way in me, and lead me in the everlasting way" [Psalm 139: 23, 24], reflects the desperation of his inability to know himself. St.Paul in his letter to the Colossians expresses this by acknowledging his dependence on Christ. He writes: "That is, Christ Himself in whom are hidden all the treasures of wisdom and knowledge" [Col 2:3]. Our inability to know ourselves completely, and hence our limitations to seek our own salvation, fits well into the central theme of the Bible.

7. Conclusion

The purpose of this study is an attempt to understand from a scientific view point, the writings of St.Paul to the different churches on the dual nature of man. The study looked

³⁹ P. Davies, *God and the New Physics* (New York: Simon and Schuster, 1983), 112.

at the holonomic model of the brain, where what we experience or observe in the explicate world arises from a deeper implicate order. Two different implicate orders are distinguished. They are referred here as the ordinary implicate order and super implicate order. The common mental activities focused on our material world is related to the ordinary implicate order. Mental activities focused on larger issues such as faith, matters spiritual, correspond to the super implicate order. These two implicate orders, ordinary and super-implicate orders give rise to the worldly and spiritual experiences respectively. They show similarities to the language of St.Paul when he speaks of matters of the flesh and spirit. Further the super implicate order is organized and guided by a potential that pervades all space and provides connections between quantum systems, suggesting that spiritual experiences are guided by a power that is universally present. This is similar to the description given by St.Paul when he says that those who choose to walk by the spirit or follow the spiritual path are led by the Holy Spirit and are not under the law.

According to the holonomic model of the brain the processes that operate in the brain obey the laws of quantum mechanics. Such a result implies that the many paradoxes faced in quantum mechanics will also be faced at the neuronal and psychophysical level. Thus the principle of complementarity that is used to deal with some of the contradictory behavior of quantum objects is applicable here. According to the complementarity principle: the result of the observation is dependent on the focus of the observer; an object can have several contradictory characteristics, where we can switch back and forth between the different views but we can never see fully both at the same time; although the different characteristics are not seen the at the same time, the object exists as both at the same time; the inability to obtain complete knowledge of the two complementary variables, and thus of the object.

These results from the complementarity principle have plenty of implications in this study. Depending on which type of mental activities man is engaged, either of the two implicate orders are activated. If the ordinary implicate order is

activated the experience is worldly, or matters of the flesh according to St.Paul. On the other hand if the super implicate order is activated the experience is spiritual. They are two complementary experiences.

The choice is dependent on the mental activities of the person. St.Paul advises us to focus and practice activities which are non materialistic, since they are guided by the spirit and lead to fruits of the spirit such as love, joy, patience and goodness which are above the law. It brings us to a closer union with Christ. On the other hand if our activities are always focused on matters of the world then as St.Paul says, it leads to strife, jealousy, disputes, anger, factions and things like these.

If an object has two contradictory natures we can only perceive or view only one at a time. If we activate the ordinary implicate order we choose to observe and experience the world in one way. Activating the super implicate order allows us to view and experience world differently. Thus choosing to observe the world in one way, complementary ways of experiencing becomes hidden or inaccessible. However, changing the choice of our observation, brings forward complementary ways of experiencing previously hidden views. Since our mental activities mainly activate the implicate order instead of the super implicate order our experience is largely space- time. This does not mean the absence of the spiritual dimension.

The contradictory nature of the experiences that results from implicate and super- implicate order implies that one cannot simultaneously have both experiences. The complementarity principle which is a relationship between such two such descriptions, states both natures co-exist and are different descriptions of the same person. These two experiences arising from ordinary and super implicate order though mutually exclusive, are both necessary to describe man. This is in agreement with the writings of St.Paul where flesh and spirit are different aspects of the same person, an anthropologically monist view of the human. The complementarity principle further sets a limit to obtaining complete knowledge of these two separate descriptions. It sets

a limit in our ability to obtain complete knowledge of ourselves. This result has a strong connection to the central theme of the Bible, in particular in the writings of St. Paul who emphasized the doctrine of grace and the futility of man's effort to know himself and obtain salvation.

Reference

1. COOPER, J. W., *Body, Soul and Life Everlasting: Biblical Anthropology and the Monism-Dualism debate*, Grand Rapids, Michigan: Eerdmans (1989).
2. SMITH, I., "Does 2 Corinthians 5:1-8, Refer to an Intermediate state", *Scottish J. Theology* 44 (1991).
3. BROWN, W. S., MURPHY, N. and MALONEY, H. N., *Whatever happened to the Soul? Scientific and Theological Portraits of Human Nature* (Minneapolis: Fortress Press, 1998).
4. EDGAR, B. G., "Paul and the Person", *Science and Christian Belief* 12(2000).
5. http://en.wikipedia.org/wiki/Holonomic_brain_theory.
6. http://www.scholarpedia.org/article/Holonomic_brain_theory.
7. http://www.vision.net.au/~apaterson/science/david_bohm.htm.
8. <http://www.theosophy-nw.org/theosnw/science/prat-boh.htm>.
9. <http://twm.co.nz/pribram.htm>.
10. PRIBRAM, Karl, *Languages of the Brain* (Englewood Cliffs, New Jersey: Prentice-Hall, Inc, 1971).
11. The quotes from the bible are taken from the New American Standards Bible, Reference edition, Foundation press, CA, USA.
12. http://en.wikipedia.org/wiki/Holonomic_brain_theory.
13. <http://twm.co.nz/pribram.htm>.
14. GABOR, D., "Microscopy by recorded wavefronts", *Proc. Royal Soc. London* 197 no:1051(1949).
15. <http://en.wikipedia.org/wiki/Holography>.
16. http://en.wikipedia.org/wiki/Karl_H._Pribram.
17. DeVALOIS, Karen K., DeVALOIS, Russell L. and YUND, W. W., "Responses of Striate Cortex Cells to Grating and Checkerboard Patterns", *Journal of Physiology*, vol. 291(1979).
18. ¹ DeVALOIS, Russell L., and DeVALOIS, Karen K., "Spatial vision", *Ann. Rev. Psychol*, 31 (1980).
19. ¹ PRIDEAUX, J., "Comparison between Karl Pribram's Holographic Brain Theory and more conventional models of neuronal computation", <http://www.acsa2000.net/bcngroup/jponkp/>.
20. WILBER, K., *The Holographic Paradigm and other Paradoxes: Exploring the Leading Edge of Science* (Shambhala publishers, 1982).

22. http://www.vision.net.au/~apaterson/science/david_bohm.
23. <http://www.theosophy-nw.org/theosnw/science/prat-boh.htm>.
24. BOHM, D., *Wholeness and the Implicate Order* (London: Routledge & Kegan Paul, 1980).
25. BOHM, D. and PEAT, F. D., *Science, Order & Creativity* (New York: Bantam Books, 1987).
26. <http://twm.co.nz/pribram.htm>.
27. de BROGLIE, L., *Recherches sur la théorie des quanta* (*Researches on the quantum theory*), (Thesis, Paris, 1924); L. de Broglie, *Ann. Phys. (Paris)* 3,(1925); Reprinted in *Ann. Found. Louis de Broglie* 17,(1992).
28. ARNDT, M.; NAIRZ, O.; VOSS-ANDREAE, J.; KELLER, C.; van der ZOUW, G., ZEILINGER, A. "Wave-particle duality of C₆₀", *Nature* 401,(1999).
29. L. HACKERMÜLLER, S.UTTENTHALER, K. HORNBERGER, E.REIGER, B.BREZGER, AZEILINGER and M. ARNDT , "The wave nature of biomolecules and fluorofullerenes" *Phys. Rev. Lett.* 91, (2003): 090408.
30. R. EISBERG and R. RESNICK, *Quantum Physics of Atoms, Molecules, Solids, Nuclei, and Particles* 2nd ed., (John Wiley & Sons, 1985).
31. N. BOHR, *Causality and Complementarity: Epistemological Lessons of Studies in Atomic Physics*, (Ox Bow Press: ISBN 1-881987-13-2, the 1949–50 Gifford lectures. 1999).
32. W. HEISENBERG, "Über den anschulichen Inhalt der quantentheoretischen Kinematik und Mechanik," *Z. Phys.* 43 (1927)172–198, as cited in Mott, N., & Peierls, R. (1977) " Werner Heisenberg 1901–1976". *Biographical Memoirs of Fellows of the Royal Society*, 23, (1977).
33. D. M.HARRISON, "Complementarity and the Copenhagen Interpretation of Quantum Mechanics," <http://www.upscale.utoronto.ca/GeneralInterest/Harrison/Complementarity/CompCopen.html>.
34. L. SHLAIN, *Art and Physics* (New York: Quill,1991).
35. P. DAVIES, *God and the New Physics* (New York: Simon and Schuster, 1983), 112.
36. D. BOHM, *Wholeness and the Implicate Order*(London: Routledge & Kegan Paul, 1980).
37. D. BOHM and F. D. Peat, *Science, Order & Creativity* (New York: Bantam Books, 1987).
38. P. DAVIES, *God and the New Physics* (New York: Simon and Schuster, 1983).