

Principles of Neurotheology

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Chapter 1

The Case for a Principia Neurotheologica (Principles of Neurotheology)

“Neurotheology” is a unique field of scholarship and investigation that seeks to understand the relationship specifically between the brain and theology, and more broadly between the mind and religion. As a topic, neurotheology has garnered substantial attention in the academic and lay communities in recent years. Several books have been written addressing the relationship between the brain and religious experience and numerous scholarly articles have been published on the topic. The scientific and religious communities have been very interested in obtaining more information regarding neurotheology, how to approach this topic, and whether science and religion can be integrated in some manner that preserves, and perhaps enhances, both. However, as would be expected, there have been both positive and negative responses to purported neurotheological studies and perspectives.

If neurotheology is to be considered a viable field going forward, it requires a set of clear principles that can be generally agreed upon and supported by both the theological or religious perspective and the scientific one as well. The overall purpose of this book is to set forth the necessary principles of neurotheology which can be used as a foundation for future neurotheological discourse and scholarship. In time, it would be highly valuable to have added input from a wide range of scholars with regard to these principles so that the field of neurotheology remains dynamic in its scope and process. Thus, it is likely that as this field proceeds, the guiding principles will require some welcome modifications. Also, it should be clearly stated that rather than specifically try to answer major theological or scientific questions, this book intends to espouse a program of scholarship and a methodological basis for future inquiry, thereby laying the groundwork for a new synthesis of scientific and theological discourse. In the end, neurotheology, a term fraught with potential problems, might nevertheless, be a highly useful and important voice in the greater study of religious and theological ideas and their intersection with science.

The relationship between the mind and human spirituality has been considered for at least several thousand years. For example, this intersection was described in the ancient Hindu scriptures of the Upanishads in which it was realized that something within us, particularly within the head, enables us to explore and experience the universe via our cognitive and sensory processes and also to discover our own sense of spirituality:

Between the two palates there hangs the uvula, like a nipple—that is the starting—point of Indra (the lord). Where the root of the hair divides, there he opens the two sides of the head, and saying Bhu, he enters Agni (the fire); saying Bhuvas, he enters Vayu (air); Saying Suvas, he enters Aditya (sun); saying Mahas, he enters Brahman. He there obtains lordship, he reaches the lord of the mind. He becomes lord of speech, lord of sight, lord of hearing, lord of knowledge. Nay, more than this. There is the Brahman whose body is ether, whose nature is true, rejoicing in the senses (prana), delighted in the mind, perfect in peace, and immortal. (Taittiriya Upanishad)

This section from the Upanishads reveals the importance of the body and the brain in achieving spiritual enlightenment. Neurotheology is a more recent attempt at discerning how the study of the human mind and brain (terms we will define later) relates to the pursuit of religions and religious experience. While a growing number of scholars have written a variety of papers and books about this topic, it is still in its nascent stages. One of the greatest shortcomings of neurotheology so far has been the lack of clear principles by which such scholarship should proceed. Thus, in order to establish more thoroughly neurotheology as an academic discipline, it is vital to consider the primary principles necessary for such an endeavor.

It is important to infuse throughout the principles of neurotheology the notion that neurotheology requires an openness to both the scientific as well as the spiritual perspectives. It is also important to preserve the essential elements of both perspectives. The scientific side must progress utilizing adequate definitions, measures, methodology, and interpretations of data. The religious side must maintain a subjective sense of spirituality, a phenomenological assessment of the sense of ultimate reality that may or may not include a divine presence, a notion of the meaning and purpose in life, an adherence to various doctrinal processes, and a careful analysis of religion from the theological perspective.

In short, for neurotheology to be successful, science must be kept rigorous and religion must be kept religious. This book will also have the purpose of facilitating a sharing of ideas and concepts across the boundary between science and religion. Such a dialogue can be considered a constructive approach that informs both perspectives by enriching the understanding of both science and religion.

But it is not an easy task to combine theological and scientific concepts. A primary problem with neurotheology is the need to reach a common starting ground between these two perspectives. This is something that will be attempted in this book. But, by necessity, sometimes one side or the other will have to be oversimplified. After all, there are not many neuroscientists familiar with the most recent theological debates and there are not many theologians who have a detailed understanding of functional neuroanatomy. Thus, another purpose of this book is to provide some starting points for dialogue between neuroscience and religion. Certainly for the theologian or religious scholar, some statements will seem superficial or incomplete. For the neuroscientist, the material may appear “dumbed down,” to use a common phrase among scientists. But neurotheology

represents a beginning such that from two disparate fields a new multidisciplinary field can emerge. As an example for future scholarship, one might hope that the neuroscientist attempting to study morality will be well versed in the ancient texts and the writings of theologians such as Aquinas and Luther who were important in shaping our understanding of the topics of free will and ethics. Conversely, the theologian studying the writings of Aquinas or Luther might consider what was happening in their frontal lobes and limbic system while pondering their influential ideas. It would also be hoped that any of these approaches would not diminish, defame, debunk, or decry one perspective for another. Rather, the new synthesis would ultimately help human beings to relate better to the world around them and to engage both their biological and spiritual dimensions.

Before proceeding with the principles of neurotheology, it is first necessary to review the foundations upon which neurotheology rests. The foundations of neurotheology include a historical analysis of related concepts, a description of the contributions of theology and science to neurotheology, and an elaboration of the goals that such scholarship should aspire to. Following a description of the foundations of neurotheology, a number of definitions are necessary to review, and from there, the principles of neurotheology can be elaborated.

Historical Foundations of Neurotheology

To evaluate the historical background of neurotheology requires us to delve several thousand years back into history to see how religious traditions have considered the relationship between the mind and the person's attempt to interact with some higher level of reality. It is also of interest to observe how the variety of philosophical and theological concepts regarding the universe and God may be recapitulated in a variety of brain processes. In this way, we can see more directly how various concepts considered throughout history connect to our current understanding of the brain. As will be discussed later in the book, the ability to relate theological concepts to mental and brain processes does not mean in any way to imply that these concepts have been reduced to brain chemistry, but rather may provide at the very least, a new perspective, and at most, an important method for further evaluating the true basis of those concepts.

In Eastern traditions there is significant historical development of the psychological analysis of the human being in relationship to both Buddhist as well as Hindu conceptions of the world and of spirituality.¹ The lines of the Upanishads above certainly indicate a strong interest not only in the functioning of the mind

¹ Austin, J.H. *Zen and the Brain: Toward an Understanding of Meditation and Consciousness*. Cambridge, MA: MIT Press, 1999; Austin, J.H. *Zen-Brain Reflections*. Cambridge, MA: MIT Press, 2006; Kelly, B.D. "Buddhist psychology, psychotherapy and the brain: a critical introduction." *Transcultural Psychiatr.* 2008;45:5-30; Davids, R. *A Buddhist Manual of Psychological Ethics or Buddhist Psychology*. Columbia, MO: South

itself, but in the psychological and possibly biological correlates of mental activity that can be utilized to achieve the highest spiritual state.

Buddhist and Hindu writings have made extensive evaluations of the human mind and psychology focusing on human consciousness of the “self,” the emotional attachment human beings have to that “self,” and how human consciousness can be altered through various spiritual practices such as meditation. Buddhism elaborates the important elements of human consciousness which it organizes into the “four seals” of belief.² The first seal, “dukkha,” refers to suffering and is considered a universal aspect of the human condition. The second seal, “anatta,” refers to no-self and in particular that there is no separate existing self in the universe, but everything is interconnected. The third seal, “annicca,” refers to impermanence such that nothing in this world lasts and thus, personal achievement, success, and happiness should never be associated with transitory phenomena. The fourth seal is that “nirvana,” a release from suffering, does exist through the surrendering of attachment to the false sense of self that the mind usually holds.

Each of these seals can also be considered from a neurotheological perspective. For example, one can relate these important ideological concepts to various aspects of the human brain and psyche. Suffering plays a significant role in depression and stress, two topics which are central to current psychiatric research. It is also known that areas of the brain that are involved in the stress response and other negative emotions likely play a role in suffering and ultimately have a long-term effect on the health of the body.³ Studies have also revealed that emotional suffering may be felt in the brain similarly to physical pain.⁴ The second seal of no-self also may have physiological correlates since there are specific areas of the brain and body that contribute to our sense of self.⁵ The third seal of impermanence is interesting in the context of the brain since there are specific brain structures that support our sense of change and permanence. Furthermore, the brain itself appears built for change

Asia Books, 1996; McGraw, J.J. *Brain and Belief: An Exploration of the Human Soul*. Del Mar, CA: Aegis Press, 2004.

² Gyatso, T. (Fourteenth Dalai Lama). *The World of Tibetan Buddhism: An Overview of Its Philosophy and Practice*. Translated by Thupten Jinpa. Somerville, MA: Wisdom Publications, 1995.

³ Liston, C., McEwen, B.S., and Casey, B.J. “Psychosocial stress reversibly disrupts prefrontal processing and attentional control.” *Proc Natl Acad Sci USA*. 2009;106:912-917; Wang, J., Rao, H., Wetmore, G.S., Furlan, P.M., Korkczykowski, M., Dinges, D.F., and Detre, J.A. “Perfusion functional MRI reveals cerebral blood flow pattern under psychological stress.” *Proc Natl Acad Sci USA*. 2005;102:17804-17809.

⁴ Eisenberger, N.I., Lieberman, M.D., and Williams, K.D. “Does rejection hurt? An fMRI study of social exclusion.” *Science*. 2003;302:290-292.

⁵ Newberg, A.B., Alavi, A., Baime, M., Pourdehnad, M., Santanna, J., and d’Aquili, E.G. “The measurement of regional cerebral blood flow during the complex cognitive task of meditation: a preliminary SPECT study.” *Psychiatr Res Neuroimaging*. 2001;106:113-122; Newberg, A.B. and Iversen, J. “The neural basis of the complex mental task of meditation: neurotransmitter and neurochemical considerations.” *Med Hypothesis*. 2003;61:282-291.

via the process of neuroplasticity which refers to the ability of the brain to change its structure and function.⁶ While the neurophysiological correlates of nirvana have yet to be evaluated, various components of letting go and the loss of the sense of self have been associated with specific brain functions.⁷ However, understanding the four seals can also help us to understand the human mind. Thus, understanding the relationship between suffering, the self, and change bears directly on how we might strive to understand the workings of the mind and brain.

It is fascinating that without any of the modern methodologies, Buddhist thought captured so well the intricate inner workings of the mind. Buddhist thought also focused substantial attention on consciousness as an energy that is deeply interconnected with the brain, body, and physical world.⁸ This has set up, in some sense, a separate biomedical paradigm in Eastern thought which is based on how “energy” moves through the body. While not using the same concept of “energy,” current scientific fields such as psychoneuroimmunology and psychoneuroendocrinology have identified many ways in which the interconnection between the brain and body are expressed. These fields might help bridge the gap between Eastern and Western biomedical paradigms, and of course, neurotheology might provide an excellent source for future research.

Another related concept with potential for reconciling differences between Eastern and Western paradigms is that of the *yin* and *yang* that describes the opposing forces that interact within human beings. A corresponding scientific concept of “tone” has been applied to many physiological and neurophysiological systems. Tone refers to the balance between two opposing physiological processes. For example, the autonomic nervous system that governs arousal and calming responses in the body typically rests in a tonal state such that the body is maintained within a certain balance. When one side of the autonomic nervous system is called upon, such as when we need to respond quickly to a threatening situation, the arousal system is activated while the calming system is suppressed. Thus, the notion of opposing forces that govern the mind and body are similar to those found in ancient Buddhist texts.

Similar concepts of the body’s “energy” or “Qi” (pronounced Chi) can also be found in Ayurvedic medical practices that developed in India.⁹ These practices also consider the human body, health, and psychological well being, from the

⁶ Schwartz, J.M., Begley, S. *The Mind and the Brain: Neuroplasticity and the Power of Mental Force*. New York, NY: Harper Perennial, 2003.

⁷ Newberg, A.B., Alavi, A., Baime, M., Pourdehnad, M., Santanna, J., and d’Aquili, E.G. “The measurement of regional cerebral blood flow during the complex cognitive task of meditation: a preliminary SPECT study.” *Psychiatr Res Neuroimaging*. 2001; Lou, H.C., Nowak, M., and Kjaer, T.W. “The mental self.” *Prog Brain Res*. 2005;150:197-204.

⁸ Scotton, B.W. “Treating Buddhist patients.” In Koenig, H.G. (ed.), *Handbook of Religion and Mental Health*. San Diego, CA: Academic Press, 1998.

⁹ Micozzi, M. *Fundamentals of Complementary and Alternative Medicine*. New York, NY: Churchill Livingstone, 1996.

perspective of the balance of energy flow in the body. By manipulating the energy, the appropriate health—physical, mental, and spiritual—can be restored. Ultimately a balancing of energy can allow the person to strive towards an enlightened state in which the mind has the ability to contact a more fundamental level of reality.

While Eastern traditions approached the notion of the mind and consciousness more directly, Western conceptions of religion typically did not focus specifically on the relationship between the mind and religious phenomena. For example, the Bible itself speaks very little about particular mental or physiological processes. However, the description of human beings, human frailties, and the “evil” actions that are perpetrated by human beings, clearly signifies a deep interest in the human psyche. For example, the story of the creation of human beings in the Book of Genesis appears to relate how God infused humanity with a certain intellect and psychological prowess which differentiates human beings from the rest of the world.¹⁰ From the beginning, “the tree of the knowledge of good and evil”¹¹ plays a critical role in the development of human beings. We see throughout the biblical stories how human beings have tried to come to grips with the various intrapsychic forces that compel them to various actions both good and evil, “When I looked for good, then evil came unto me: and when I waited for light, there came darkness.”¹² The Bible itself provides the rules and guidelines by which human beings should live their lives. The Commandments and covenants with God are based on an understanding of human behavior and human morality. With the advent of Christianity, the focus was shifted somewhat to other aspects of the human psyche including issues pertaining to love, devotion, forgiveness, and redemption. For example, the Bible states in Acts, “Be it known unto you therefore, men and brethren, that through this man is preached unto you the forgiveness of sins”¹³ and also in Ephesians I:

According as he hath chosen us in him before the foundation of the world, that we should be holy and without blame before him in love: Having predestinated us unto the adoption of children by Jesus Christ to himself, according to the good pleasure of his will, To the praise of the glory of his grace, wherein he hath made us accepted in the beloved. In whom we have redemption through his blood, the forgiveness of sins, according to the riches of his grace; Wherein he hath abounded toward us in all wisdom and prudence.¹⁴

However, the Bible does not usually specify precisely how forgiveness, love, devotion, and redemption come about other than through religion and religious

¹⁰ Meshberger, F.L. “An interpretation of Michelangelo’s *Creation of Adam* based on neuroanatomy.” *JAMA*. 1990;264:1837-1841.

¹¹ Genesis 2:9. *King James Bible*.

¹² Job 30:26. *King James Bible*.

¹³ Acts 13:38. *King James Bible*.

¹⁴ Ephesians I 4-8. *King James Bible*.

adherence. Nonetheless, there is clearly an important relationship between the mind that allows human beings to be human, and the spirit or soul that allows human beings to connect to a higher, divine realm of existence.

Of course the ancient texts did not have the advantage of more modern scientific analyses of the human psyche and the human central nervous system that can allow for a deeper and richer elaboration of such concepts. Regardless, their rudimentary, and in many ways, highly accurate intuitive analysis of the human being and the human mind clearly demonstrate that psychology and religion were some day going to be integrated in a more profound way.

St. Thomas Aquinas provided an important perspective on the human mind in that he considered all healthy, rational action to proceed from the desire to achieve a good or to pursue an end.¹⁵ Man's end is ultimately for a union with God and thus, a person finds his true perfection in life, only in an everlasting friendship with the God who created him. The evil mind then results from an individual who pursues ends that do not lead toward God. But Aquinas engages the issue of human biology and the mind more directly by distinguishing between the *actus hominis* and the *actus humanus*.¹⁶ The former refers to acts of the body while the latter falls under the domain of reflective, deliberate intelligence. The realization via modern cognitive neuroscience that there is an intricate interrelationship between the body and the mind reveals the difficulty in making the distinction that Aquinas makes and this might lead to a new understanding of how the different aspects of the human being interact.

The Protestant Reformation and the work of Martin Luther (1483-1546) had a significant impact on much of religious as well as philosophical thought over the following several hundred years. The reformation brought about a different perspective on religious thinking and religious doctrine, particularly as it pertains to the individual and the authority of the Christian church. Luther's original conception was intended to restore in each individual the power and authority to hear God's guidance without needing to go through a church authority.¹⁷ In practice, however, he ended up replacing the Pope with a new source of external authority. For Luther would not allow believers to be completely free before God; they could only be guided in ways that were consistent with the Bible. Here again, there are limitations placed on the human mind that constrain how it can help us to be religious.

Luther also had several important interactions with philosophers that resulted in somewhat new perspectives on human psychology. For example, Desiderius Erasmus (ca. 1469-1536) argued that the human being is the center of creation and that the measure of God's goodness is that God created a world in which to

¹⁵ Thompson, C.J. "Preliminary remarks toward a constructive encounter between St. Thomas and clinical psychology." *Catholic Soc Sci Rev.* 2005;10:41-52.

¹⁶ Aquinas, T. *Summa Theologica*. Notre Dame, IN: Christian Classics, 1981.

¹⁷ Plass, E.W. *What Luther Says* (3 volumes). St. Louis, MO: Concordia Publishing House, 1959.

unfold the nature of the human being.¹⁸ Erasmus' heated debate with Luther was triggered by Luther's critique of Erasmus' essay *On Free Will*. Erasmus insisted on a role for the human will and personal responsibility, as well as God's grace, in achieving salvation while Luther argued that grace alone provided salvation for human beings.¹⁹ Interestingly, this debate also centers around the functions of the human mind as they pertain to human salvation since the issue of human free will, which would clearly be a mental process, is of crucial importance in determining the basis for salvation. It would be most interesting to consider how Luther and Erasmus might have responded to current cognitive neuroscience research regarding the nature of the moral reasoning and the identification of parts of the brain that appear to function as the "seat of the will."²⁰

The relationship between the mind and experience extends beyond simply religious and theological issues. Several philosophical movements in the last 500 years had a profound influence on the integration of spirituality and the human mind. This begins most notably with the work of René Descartes (1596-1650) whose meditations were designed to evaluate the world and that which can be known from a rational, contemplative perspective. His analysis went to great lengths to try to exclude erroneous assumptions and to develop concepts in a logical manner.²¹ The result of Descartes' meditations led him to the famous notion that, ironically, lies at the heart of modern cognitive neuroscience—"cogito ergo sum." The fundamental concept of modern cognitive neuroscience is that our thoughts and feelings make us who we are, make up our existence, and can be correlated directly to the functions of the brain.²² This, of course, was not the ultimate goal or conclusion achieved by Descartes, but clearly his meditations led him to ideas that support the development of modern cognitive neuroscience. The notion that thoughts were occurring and that he could identify these thoughts as being related to existence had a clear import into the relationship between human experience and ultimately human understanding of the world.

Descartes also set up an important dualism between the mind and body that would pervade Western philosophy and science for at least 400 years.

¹⁸ Rupp, E.G., Watson, P.S., and Baillie, J. *Luther and Erasmus: Free Will and Salvation* (Library of Christian Classics; Paperback Westminster). Louisville, KY: Westminster John Knox Press, 1995.

¹⁹ Moss, D. "The roots and genealogy of humanistic psychology." In Schneider, K., Bugental, J., and Pierson, J. (ed.), *Handbook of Humanistic Psychology*. Thousand Oaks, CA: Sage, 2001.

²⁰ Ingvar, D.H. "The will of the brain: cerebral correlates of willful acts." *J Theor Biol*. 1994;171:7-12; Frith, C.D., Friston, K., Liddle, P.F., and Frackowiak, R.S. "Willed action and the prefrontal cortex in man: a study with PET." *Proc R Soc Lond*. 1991;244:241-246.

²¹ Descartes, R. *Meditations on First Philosophy: With Selections from the Objections and Replies*. Translated by Michael Moriarty. Oxford: Oxford University Press, 2008.

²² Gazzaniga, M.S. *The New Cognitive Neurosciences*, 2nd Edition. Cambridge, MA: MIT Press, 2000.

Antonio Damasio, a Professor of Neurology at the University of Iowa School of Medicine, has argued that Descartes erred by assuming that the mind and body were independent of one another and that human emotions and rationality were basically opposed to each other.²³ Descartes argued in favor of reason over emotion, but Damasio contends that our emotions are fundamental to our ability to make decisions and interface with the world, a view that is now widely accepted in the field of cognitive neuroscience. Regardless, the philosophical works of Descartes provided an important impetus for understanding the integration between science and religion, and particularly between religion and the human mind.

Another philosopher whose work should be considered an important contribution to neurotheology was Baruch Spinoza (1632-1677), the Dutch Jew who heavily based his theological and philosophical ideas on mathematics and science. In fact, his conception of God as being attributed to the beauty and clarity of design in mathematics fostered a unique integration of science and religion. While this did not specifically relate to the neurosciences, Spinoza had an understanding that the laws of nature were reflected in the divine presence in the universe, “the universal laws of nature according to which all things happen and are determined are nothing but God’s eternal decrees, which always involve eternal truth and necessity.”²⁴ Furthermore, it was believed by Spinoza that through human thought and philosophical and scientific endeavors, human beings could come to know the order of the world and the nature of God. Although Spinoza’s work emphasized the physical sciences, it might be argued that his perspective is highly supportive of neurotheology as a way of understanding the human being and the human perspective of the universe via the brain. For example, Spinoza describes the *conatus*: “Each thing, as far as it can by its own power, strives to persevere in its being.” Damasio describes the underlying neurobiological correlates of this process by which human beings persevere in relation to the sensory and cognitive systems that aid in adaptability and survival.²⁵ In this way, Spinoza might have argued that understanding the mind does help understand the divine presence in the universe, or at least in the human being.

In the eighteenth Century, Immanuel Kant (1724-1804) greatly elaborated the rational perspective in human philosophy. His *Critique of Pure Reason* as well as his other works implied that all the universe, both spiritual and non-spiritual, could be understood through a human rational approach separated from sensorial experience.²⁶ For Kant, there was something inherent in the human mind that

²³ Damasio, A. *Descartes Error: Emotion, Reason, and the Human Brain*. New York, NY: Avon Books, 1994.

²⁴ Spinoza, B. *Theological-Political Treatise: Gebhardt Edition*. Translated by Samuel Shirley. Indianapolis, IN: Hackett Publishing Company, 2001.

²⁵ Damasio, A. *Looking for Spinoza: Joy, Sorrow, and the Feeling Brain*. New York, NY: Harcourt, 2003.

²⁶ Guyer, P. and Wood, A.W. *Critique of Pure Reason by Immanuel Kant*. Cambridge: Cambridge University Press, 1999.

allowed it access to ultimate reality. Thus, “pure reason” was something that could be attainable. However, this rational approach had to be measured and carefully considered. Kant argued that no theoretical argument could prove the existence of God. Kant considered human reason to overreach its powers, and thus in need of self-limitation. The brain itself has its limitations in terms of its cognitive capabilities and capacities. Kant also argued that reason seeks to know what lies beyond the range of “experience”—that is, the apprehension of objects as they are related to one another in a spatio-temporal framework of causal laws.²⁷ But Kant considered any attempt to claim knowledge outside the limits of human experience to be problematic. This, of course, is commensurate with current neurotheological analysis in that the perceptions of the human brain are considered crucial for knowledge. It is also the tendency of human beings, and human reason, to go beyond the limits of experience and this ultimately results in the representation of ideas of the soul, the world, and God.

In spite of the philosophical consideration of the importance of human experience, until the late eighteenth century, there was practically no attempt at considering religion from the perspective of human experience. Religion until that point was evaluated primarily from the perspective of religion itself. Consequently religions, particularly in the West, were defined by their dogmatic formulations and teachings. It was only with Friedrich Schleiermacher (1768-1834) in the late eighteenth century that an attempt was made to define “religion” as such by switching from a doctrinal emphasis to a more cognitive, visceral, or intuitive one. Schleiermacher, in his book *The Christian Faith*, defined religion as a “feeling of absolute dependence.”²⁸ Since his day, more recent attempts at a general conception of religion have emphasized the intuitive, emotional, or visceral aspects of religion. This shift has important implications for bringing a cognitive neuroscientific approach to the study of religion since feelings and emotions can be shown to be associated with specific brain structures and their function.

Another major step in terms of the understanding of the experience of religion came from the work of William James (1842-1910) at the turn of the last century. In *Varieties of Religious Experience*²⁹ James considers the different forms that religion takes in terms of how human beings experience the spiritual. This includes aspects of traditional religious practices such as through liturgy and ritual, through deeply personal experiences, and via practices such as those associated with prayer or meditation. James certainly placed an emphasis on subjective experiences and considered the assortment of such experiences ranging from the more traditional to the more exotic and mystical. In this regard, James discussed the phenomenology and the mental processes related to healthy-mindedness, conversion experiences,

²⁷ *Stanford Encyclopedia of Philosophy* on line.

²⁸ Gerrish, B.A., MacKintosh, H.R., and Stewart, J.S. *The Christian Faith by Friedrich Schleiermacher*. Edinburgh: T. & T. Clark Publishers, 1999.

²⁹ James, W. *Varieties of Religious Experience*. London: Routledge, 2002.

saintliness, and mystical experiences. In addition, James considered the potentially negative experiences associated with religion and their consequences on the mind.

While James' analysis did not specifically relate religious experience to particular brain functions, this most likely was due to the lack of general knowledge that existed within the scientific community of how the brain actually worked. However, the analysis offered by James can be thought of as providing the initial theoretical bases from which a neuroscientific analysis of religious experiences can proceed. Hence, by observing the particular characteristics and experiences associated with religion and spirituality one might then be able to ascertain the neurobiological correlates of such experiences. This would have to wait until a clearer understanding of overall brain function, particularly as it relates to thoughts, feelings, and experiences was developed. Such development would not occur until the latter part of the twentieth century.

A major step forward in the attempt at formulating a general conception of religion was the rise of anthropological and sociological theory. This approach asserted that religion is always embedded in a cultural matrix and that religious beliefs, customs, and rituals must be understood in a radical relationship to the cultures in which they arise. Emile Durkheim (1858-1917), in his *The Elementary Forms of the Religious Life*,³⁰ described religion as nothing more than an expression of society and he is attributed the quote, "Religion is society, writ large." On the other hand, many psychologists, beginning with Sigmund Freud (1856-1939), have seen religion as a projection of various intrapsychic dynamics or of hopes and expectations based on previous experience.³¹ Thus, religion was nothing more than a creation of the human mind, a mind striving for understanding and purpose in a world that appeared to offer little.

Since the turn of the twentieth century, scholars began to devote themselves to the phenomenology of religion on its own terms. They believed that there were phenomena that needed to be explained which eluded both sociological and psychological determinism. An example of such an approach has been to analyze religion in terms of an awareness of the "sacred" and the "holy." Rudolf Otto, in *The Idea of the Holy*,³² defined the essence of religious awareness as awe, described as a mixture of fear and fascination before the divine and referred to as a *mysterium tremendum et fascinans*. Such an approach began to get at a dominant form of Western mysticism but was not so applicable to Eastern religions or to primitive ones. A reworking of Otto's concept of the "sacred" as the central core of all religious experience has been espoused by Mircea Eliade.³³ For Eliade, no

³⁰ Durkheim, E. *The Elementary Forms of Religious Life*. Edited by Mark S. Cladis, Translated by Carol Cosman. New York, NY: Oxford University Press, 2008.

³¹ Freud, S., with Strachey, J. and Gay, P. *The Future of an Illusion*. New York, NY: W.W. Norton & Company, 1989.

³² Otto, R. *Idea of the Holy*. Oxford: Oxford University Press, 1958.

³³ Eliade, M. *The Sacred and the Profane*. New York, NY: Harcourt, Brace, and Jovanovich, 1959.

longer is the sacred to be found almost exclusively in Otto's god-encounter type of experience. Rather, every culture exemplifies the existential sense of the sacred in its rituals and symbols, especially primitive and Asian cultures. However, many anthropologists, linguists, and psychologists question whether the concept of the "sacred" is identifiable in the language, experience, and thought of most primitive societies. Such scholars assert that religious experience is not *sui generis*, but is rather an amalgam of diverse cultural phenomena and experiences.

Paul Tillich should also be considered to have had a substantial impact on neurotheological scholarship. Tillich begins his *Systematic Theology*³⁴ by discussing the definition of religion as pertaining to "ultimate concerns." He also describes the sources of systematic theology as being ancient texts, church history, and the history of religion and culture. Religious experience is considered a conduit through which the sources of theology are presented to individuals. But this recognition of the experiential aspect as critical to the understanding of theology and the development of the norm of theology³⁵ underscores the importance of evaluating how religious experience comes about. For Tillich, the cognitive neurosciences were not yet available for incorporation into his analysis of the interrelationship between the sources of theology and the experience of religion. However, neurotheology might be capable of providing not only a subjective assessment of religious experience, but a biological one as well.

As far as the specific development of neurotheology, several scholars are worth mentioning in this regard who developed and helped to advance this emerging field. Some of the earliest scholars to explore these issues were Eugene d'Aquili (1941-1998) and James Ashbrook (1925-1999),³⁶ whose pioneering work in the 1970s and 1980s ultimately laid the foundation for the work of more recent scholars such as James Austin, Rhawn Joseph, Mario Beauregard, Patrick McNamara, Gregory Peterson, and others.³⁷ The work of all of these scholars has sought to integrate a neuroscientific analysis with a spiritual perspective without losing too much

³⁴ Tillich, P. *Systematic Theology* (3 volumes). Chicago, IL: University of Chicago Press, 1951-1963.

³⁵ McKelway, A.J. *The Systematic Theology of Paul Tillich: A Review and Analysis*. Richmond, VA: John Knox Press, 1964.

³⁶ d'Aquili, E.G. "The neurological basis of myth and concepts of diety." *Zygon*. 1978;13:257-275; d'Aquili, E.G. "Senses of reality in science and religion: a neuroepistemological perspective." *Zygon*. 1982;17:361-384; Ashbrook, J.B. and Albright, C.R. *The Humanizing Brain: Where Religion and Neuroscience Meet*. Cleveland, OH: Pilgrim Press, 1997.

³⁷ Joseph, R. (ed.). *Neurotheology: Brain, Science, Spirituality, Religious Experience*. San Jose, CA: University Press, California. 2002; Austin, J.H. *Zen and the Brain: Toward an Understanding of Meditation and Consciousness*. Cambridge, MA: MIT Press, 1999. Beauregard, M. and O'Leary, D. *The Spiritual Brain*. New York, NY: Harper Collins, 2007; Alston, B.C. *What is Neurotheology?* Charleston, SC: BookSurge Publishing, 2007; McNamara, P. *The Neuroscience of Religious Experience*. Cambridge: Cambridge University Press, 2009; McKinney, L. *Neurotheology: Virtual Religion in the 21st Century*.

sight of one or the other. These scholars have worked hard to evaluate current neuroscientific knowledge as well as neuroscientific methods and brought these to bear on a wide variety of religious experiences as well as religious concepts. Initial analyses by Eugene d'Aquili, with his colleagues Charles Laughlin and John McManus, frequently focused on human ritual and its effects on both the mind and body, as well as how ritual was deeply tied to religious experience.³⁸ Early work also focused on the physiological basis of specific practices such as meditation and prayer. Such analyses were based in part on the existing neuroscientific literature, but also on the growing amount of scientific data obtained by other groups that measured the effects of such practices on various physiological parameters. Researchers such as Gellhorn and Kiely explored the autonomic nervous system effects of meditation.³⁹ Research conducted at institutions as far ranging as Harvard and the work of Dr. Herbert Benson to the Maharishi Institute and the work of B. Alan Wallace have contributed to the understanding of the relationship between the brain and various religious and spiritual practices. The most recent work has included brain imaging studies of a variety of religious and spiritual practices in addition to studies exploring subjective experiential components of religious and spiritual phenomena.⁴⁰

This brief, and by no means exhaustive, review of the historical foundations of neurotheology was meant to show how and when many philosophical and theological concepts arose that pertain either directly or indirectly to how the mind and brain work. While it clearly was not the intent of many of these early scholars to link philosophical and theological concepts to the brain, now that cognitive neuroscientific techniques exist, we can return to these early developments and review them through a new lens of analysis. Therefore, neurotheology may be capable of creating new avenues for scholarship in the future, but may also allow for a reexamining of prior philosophical and theological ideas from a new perspective.

Cambridge, MA: American Institute for Mindfulness, 1994; Peterson, G.R. *Minding God*. Minneapolis, MN: Augsburg Fortress Press, 2003.

³⁸ d'Aquili, E.G. and Laughlin, C. "The biopsychological determinants of religious ritual behavior." *Zygon*. 1975; 10:32-58; d'Aquili, E.G., Laughlin, C., and McManus, J. *The Spectrum of Ritual: A Biogenetic Structural Analysis*. New York, NY: Columbia University Press, 1979.

³⁹ Gellhorn, E., Kiely, W.F. "Mystical states of consciousness: neurophysiological and clinical aspects." *J Nerv Ment Dis*. 1972;154:399-405.

⁴⁰ Newberg, A.B., d'Aquili, E.G., and Rause, V.P. *Why God Won't Go Away: Brain Science and the Biology of Belief*. New York, NY: Ballantine Publishing Group, 2001; Newberg, A.B. and Waldman, M.R. *Why We Believe What We Believe: Uncovering Our Biological Need for Meaning, Spirituality, and Truth*. New York, NY: Free Press, 2006; Beauregard, M. and O'Leary, D. *The Spiritual Brain*. New York, NY: Harper Collins, 2007.

Scientific and Theological Foundations of Neurotheology

The approach to neurotheological scholarship requires an understanding of the contemporary state of scientific and theological inquiry as well as acknowledging the current science and religion debate. Historically, particularly in the ancient world, the rudiments of science and religion were frequently viewed in a unified manner. Most people practicing a religion also relied heavily on science or technology in order to help with the expression of that religion. Structures such as the pyramids of Egypt or Stonehenge in England were built with great engineering and technological detail, all for the purpose of facilitating religious beliefs. Much of the field of astronomy also developed as a way of monitoring the heavens and evaluating the times for specific holidays of religious importance. With the development of the Reformation and ultimately the Renaissance, history began to witness a more antagonistic role between science and religion. In many ways this began with the Copernican Revolution which, with Galileo's help, shattered the Catholic church's view of an earth-centered, perfectly designed universe. This set up an antagonism that would last for hundreds of years up to the present day. Of course, Charles Darwin's elaboration of the theory of evolution was, and continues to be, a significant battleground for science and religion. As such, science and religion have typically gone their separate ways over the last hundred years, at times, the intersection being highly contentious. It remains to be seen what will be the ultimate outcome of the science and religion debate, but it may be that neurotheology as a field can offer an alternative to any hostile relationship between science and religion.

Various categories of interaction between science and religion have been expounded with the most elaborate being that of Ian Barbour who identified four types of interactions.⁴¹ The first type of interaction is one of conflict in which it is perceived that only science or religion can present a correct analysis of the world, exclusive of each other. Examples of this conflict include those supporting scientific materialism such as biologists Jacques Monod or Richard Dawkins.⁴² In their view, religion became part of human behavior as part of evolutionary forces, or even as an epiphenomenon, and does not represent objective reality as does science. The religious counterpart in this conflict involves those who believe in biblical literalism. Here the Bible is considered to be literally true, and thus it supersedes any scientific data that conflict with the statements of the Bible. This has led to great debate in many scientific and religious arenas. Most notable has been the argument between supporters of the theory of evolution and the adherents of Creationism. In this argument, either science is absolutely accurate or the Bible is absolutely accurate. Because of the vast differences between their descriptions of the origins of life and of the universe, both systems seem to be mutually exclusive.

⁴¹ Barbour, I.G. *Religion in an Age of Science*. New York, NY: Harper & Row, 1990.

⁴² Monod, J. *Chance and Necessity*. New York, NY: Vintage Books, 1972; Dawkins, R. *The God Delusion*. New York, NY: Houghton Mifflin, 2006.

A second interaction between science and theology is a mutual independence from each other. In this way, religion and science function in totally distinct domains. This second approach, which many naturalists have embraced, is that of the type described by Stephen J. Gould as “non-overlapping magisteria.”⁴³ The notion here is that religion and science are in some sense both allowable, only that they refer to domains that are completely distinct. In this view, religion should have nothing to say about the scientific world and science nothing to say about the religious. However, they are not viewed to be mutually exclusive only providing information about two separate “dimensions” of human existence. Thus, science and religion do not conflict because science interprets human understanding of the world while religion interprets God’s activity in the world. This notion does preserve both science and religion; however, it does not foster any dialogue between the two, which would at least provide for the possibility of a mutually beneficial interaction. Thus, the domain of each is essentially off-limits to the other.

Barbour defines the final two relationships between science and religion as dialogue and integration. The dialogue consists of boundary questions that exist in both science and religion. Examples include the Big Bang cosmology and quantum mechanics. In these scientific fields, research eventually results in questions that are unanswerable by scientific analysis. Questions such as what existed before the Big Bang, why did the Big Bang occur, and why is the universe here at all, all appear at the edge of present day scientific inquiry. Some of these “why” questions may never be answerable from a scientific perspective, but may be addressed by religion. David Tracy suggested that there are also more subtle examples of boundary questions that occur in everyday human experience.⁴⁴ Examples of such experiences include anxiety, joy, basic trust, and death. Science and religion also share certain methodological principles that are not identical, but similar enough to allow for meaningful dialogue. Holmes Rolston suggested that religion interprets and correlates human experience while science does the same with experimental data.⁴⁵ Science and religion both function within certain paradigms that form the basis of the accepted practice and can only be changed with great upheavals. Again, while science and religion are certainly not isomorphic, they are similar enough that there can exist a beneficial dialogue between the two.

The final relationship that may exist between science and religion is integration in which the two come together to help explain each other and the world. As noted above, natural theology (such as that described in the work of Thomas Aquinas and other scholastics) attempts to explain the existence of God and religion entirely by human reasoning. A classic approach of natural theology is the design argument which proposes that the inherent order of the universe implies the existence of

⁴³ Gould, S.J. *Rocks of Ages*. New York, NY: Ballantine, 1999.

⁴⁴ Tracy, D. *Blessed Rage for Order*. New York, NY: Seabury, 1975; Tracy, D. *Plurality and Ambiguity*. San Francisco, CA: Harper & Row, 1987.

⁴⁵ Rolston, H. *Science and Religion: A Critical Survey*. New York, NY: Random House, 1987.

God. The anthropic principle suggests that the conditions of the universe are too perfectly tuned for the development of human life, and that there must have been divine intervention, if only to get things started.⁴⁶ Another attempt at integrating science and theology is the development of a “theology of nature.” This differs from natural theology in that it begins with a firm religious basis which is then modified in order to accommodate the influx of new scientifically derived information.⁴⁷ Science and religion are integrated in “process philosophy” as developed by Alfred North Whitehead.⁴⁸ This philosophy was formulated with both scientific and religious concepts in an attempt to create an overarching developmental metaphysics that is applicable to the universe as a whole. More recently, Alan Wallace has suggested that a contemplative science be utilized that incorporates meditation and contemplation as an experimental paradigm to support scientific investigation.⁴⁹

Of course, these four relationships between science and religion—conflict, independence, dialogue, and integration—each has its own advantages and shortcomings. It is also likely that the four possible interactions between science and religion as described by Barbour represent nodal points in the relationship so that there may actually be many variations on these themes and even mixtures to one degree or another. For the purposes of this book, it is important to recognize how each of these possible interactions may eventually be manifested in a neurotheological discourse. It may be the case that sometimes there will be direct conflicts between scientific data on one hand and religious belief on the other. However, there will also be times of dialogue and integration depending on the specific issues being addressed. Either way, it is important to begin the neurotheological pursuit with a framework in which an analysis of theology from the perspective of the mind and brain is considered possible as well as an analysis of science from a religious or theological perspective. This will help clarify and interpret how a synthesis of neuroscience and religion may be useful in the evaluation of epistemological as well as ontological problems.

It is at the neurotheological juncture that the science and religion interaction may be most valuable and help establish a more fundamental link between the spiritual and biological dimensions of the human being. Therefore, neurotheology, which should provide an openness to a number of different perspectives, might also be viewed as a nexus in which those from the religious as well as scientific side can come together to explore deep issues about humanity in a constructive

⁴⁶ Carter, B. “Large number coincidences and the anthropic principle in cosmology.” *IAU Symposium 63: Confrontation of Cosmological Theories with Observational Data*: 291-298, Dordrecht: Reidel, 1974; Barrow, J.D. and Tipler, F.J. *The Anthropic Cosmological Principle*. Oxford: Oxford University Press, 1986.

⁴⁷ Barbour, I.G. *Religion in an Age of Science*. New York, NY: Harper & Row, 1990.

⁴⁸ Whitehead, A.N. *Process and Reality*. New York, NY: Macmillan, 1929.

⁴⁹ Wallace, B.A. *Contemplative Science*. New York, NY: Columbia University Press, 2007.

and complementary manner. There, no doubt, will be differing viewpoints that will be raised throughout this process, some of which may be more exclusive of one perspective or the other. However, it should be stressed that for neurotheology to grow as a field, it is imperative that one remains open, at least somewhat, to all of the different perspectives including those that are religious or spiritual, cultural, or scientific.

In addition to the complex interrelationship between science and religion over the years, neurotheological research must draw upon the current state of modern scientific methods and existing theological debates. Science has advanced significantly in the past several decades with regard to the study of the human brain. Neurotheology should be prepared to take full advantage of the advances in fields of science such as functional brain imaging, cognitive neuroscience, psychology, and genetics. On the other hand, neurotheological scholarship should also be prepared to engage the full range of theological issues. That theology continues to evolve and change from the more dogmatic perspectives of the past, through natural theology and systematic theology, neurotheology must acknowledge that there are many fascinating theological issues that face each religious tradition. Neurotheology should therefore strive to engage current theological debate to determine where and how this new perspective might provide some additional value. Neurotheological investigations must also clearly acknowledge neurotheology's own limitations as well as the limitations involved with scientific and theological disciplines.

Foundational Goals of Neurotheology

Now that the historical, scientific, and theological foundations have been considered, there is one more aspect of neurotheology that must be reviewed before discussing the principles of neurotheology. The foundational goals of neurotheology should help provide a compelling case for the pursuit of such topics. These goals are critical to establish how we are going to develop neurotheology and provide a defense for its existence as a field of scholarship. There are many important questions that neurotheology may help address that pertain to the nature of subjective experience, consciousness, the mind, and the soul. Neurotheology will hopefully bring new perspectives to the fields of neuroscience and theology. Neurotheology will also likely enhance many of the fields that contribute to its cross-disciplinary nature including, but not limited to, anthropology, sociology, neurobiology, cognitive neuroscience, medicine, genetics, physics, philosophy, religious studies, and theology. These fields will no doubt bring a richness and depth to the study of neurotheology in that each will provide an important perspective on the various issues that arise. Additionally, trying to integrate neuroscientific and religious or theological perspectives will also help to enhance reciprocally our understanding of the other contributing fields. This will hopefully provide an impetus for future studies and investigations not only in the realm of neurotheology but in all of the other contributing fields as well. The methods that are developed

as part of neurotheology also may have broader applications with regard to health and possibly global sociopolitical problems.

When considering the *raison d'être* for developing neurotheology as a field, we can consider four foundational goals for scholarship in this area. These are:

1. to improve our understanding of the human mind and brain;
2. to improve our understanding of religion and theology;
3. to improve the human condition, particularly in the context of health and well being;
4. to improve the human condition, particularly in the context of religion and spirituality.

These four goals are reciprocal in that they suggest that both religious and scientific pursuits might benefit from neurotheological research. The first two are meant to be both esoteric as well as pragmatic regarding scientific and theological disciplines. The second two goals refer to the importance of providing practical applications of neurotheological findings towards improving human life both individually and globally.

Let us explore these goals in more detail. The first is one that many critics of neurotheology often forget. Namely, that neurotheological research, especially studies that utilize cognitive neuroscience techniques, actually challenges science to develop strong methodologies. As a field of study, cognitive neuroscience links various aspects of human thoughts, feelings, and perceptions to their underlying biological correlates. Techniques developed through the study of cognitive neuroscience have already advanced tremendously over the past several decades with the advent of many types of brain imaging abilities and other techniques to measure how the brain functions during various mental tasks and perceptions. The development of these techniques, specifically in the study of religious and spiritual phenomena, will undoubtedly be a cornerstone for neurotheology in the future. But neurotheological research will also have a potentially strong impact on the methods of cognitive neuroscience. The reason for this is that religious, spiritual, mystical, and theological phenomena are notoriously difficult to evaluate from any kind of scientific perspective. Determining which subjects to study, what to measure biologically, what to measure phenomenologically or subjectively, when to make measurements, and what type of approach is needed to actually make the measurements, are substantial problems for any empirically-based neurotheological research. To perform such studies in a manner that provides useful results will require an advancement or even reworking of cognitive neuroscience methodology which will hopefully lead to a better overall understanding of the human brain.

In addition to helping improve cognitive neuroscience methods, neurotheological research also provides new perspectives regarding the human mind itself. With so many new studies exploring a range of human mental processes including those

relating to morality, love, honesty, and complex behaviors,⁵⁰ a thorough study of one of the most important and pervasive dimensions of human beings—the religious and spiritual—should significantly augment our understanding of the human person. Religion and spirituality has had, and will continue to have, a tremendous impact on behavioral, emotional, and cognitive processes within individuals. Religious rituals are highly complex behaviors that affect the brain on multiple sensory, cognitive, and emotional levels. Similarly, theological analysis requires many different elements of human cognition. Causal, teleological, and epistemological arguments challenge the mind at every turn, and understanding that relationship can only help us to understand better how the human brain works.

The second goal, to improve our understanding of religion and theology, is intriguing since the implication is that theology has something to gain through its interaction with cognitive neuroscientific research. This point was partially made above in the description of the historical foundations of neurotheology. Reflecting upon the neurophysiological correlates of theological ideas and their implications, from the Upanishads to Aquinas to Tillich, has the potential to provide an entirely new perspective on theology itself. Of course, the goal of using neurotheological research to improve theology is often met with trepidation from the religious perspective. The concern is not so much that the understanding of religion and theology will be *improved*, but rather that it will be *replaced* by a reductive, impersonal, and unspiritual version using science.⁵¹ Several attempts at providing such an interpretation of the human soul appear to be antithetical to more traditional views of theology and religion. However, while this concern should be maintained during any neurotheological research program, an *a priori* attempt at reducing religion and spirituality to science would be highly biased and flawed and would not result in a fruitful result in the end.

The third goal of neurotheology is to improve the human condition, particularly in the context of health and well being. This goal derives from the first in that improving our understanding of the relationship between religion and the mind should ultimately yield information that will have practical applications. We will explore this in detail later, but here we might at least consider the range of possibilities by which this goal might be achieved. For example, there is a strong and growing literature regarding the relationship between religion and both

⁵⁰ d'Aquili, E.G. and Newberg, A.B. *The Mystical Mind: Probing the Biology of Religious Experience*. Minneapolis, MN: Fortress Press, 1999; Moll, J. and de Oliveira-Souza, R. "Moral judgments, emotions and the utilitarian brain." *Trends Cogn Sci*. 2007;11:319-321; Gazzaniga, M.S. *The Ethical Brain*. New York, NY: Dana Press, 2005; Talbot, M. "Duped: can brain scans uncover lies?" *New Yorker*. July 2, 2007:52-61; Fisher, H.E., Aron, A., Mashek, D., Li, H., and Brown, L.L. "Defining the brain systems of lust, romantic attraction, and attachment." *Arch Sex Behav*. 2002;31:413-419; Bartels, A. and Zeki, S. "The neural basis of romantic love." *Neuroreport*. 2000;11:3829-3834.

⁵¹ Brown, W.S., Murphy, N., and Malony, H.N. *Whatever Happened to the Soul*. Minneapolis, MN: Fortress Press, 1998.

physical and mental health. Studies revealing how religion might contribute to improved physical health by reducing stress, helping with coping, and improving compliance with medical interventions might improve the overall health of our population. We might also find that specific practices such as meditation or prayer yield improvements in a variety of physical processes including those related to the cardiovascular system, digestive system, and immune system. Neurotheological research might also identify potentially negative consequences of religious and spiritual beliefs.⁵² Some of this research might evaluate attitudes of specific traditions regarding the avoidance of medical interventions, while other studies might reveal how individuals develop a negative perspective of religion or God. These negative perspectives can lead to personal strife, anxiety, and depression. However, at the present time, there is not much known about what factors lead to these negative perspectives.

Another area that would lend itself well to neurotheological study is the growing problem with terrorism and the mind of the terrorist. It is not clear how and why some individuals follow extreme religious or spiritual views.⁵³ Neurotheological research has the opportunity to evaluate thoroughly which type of individual is most likely to follow such a path and perhaps offer methods for appropriately redirecting them. The ability to determine why hatred and exclusivity are fostered and accepted by an individual or group of individuals is information that could have important consequences for global health.

The fourth foundational goal suggests that through neurotheology, it might be possible to improve the religious and spiritual well being of individuals and of humanity in general. Neurotheology might provide a setting in which the improved understanding of religious and theological phenomena lead to practical applications in the ways in which individuals pursue their own spiritual goals. While it is not clear precisely by what mechanism such a goal might be achieved, it could be argued that whenever there is improved knowledge, especially if a new perspective is offered, there is the opportunity to grow. In the context of theology and religion, spiritual growth is always encouraged and neurotheology should be supported as another mechanism by which such growth might occur.

Critics often raise the concern that neurotheology might offer a way of “taking a pill” to become more spiritual. However, human beings have perpetually utilized different techniques from ritual, prayer, and meditation, to starvation, sustained intense physical activity, and pharmacological substances to help induce spiritual or religious states.⁵⁴ Thus, the notion of trying to bring about a spiritual or religious experience via some specified mechanism has existed for thousands of years.

⁵² Lee, B. and Newberg, A. “Religion and health: a review and critical analysis.” *Zygon*. 2005;40:443-468.

⁵³ Juergensmeyer, M. *Terror in the Mind of God: The Global Rise of Religious Violence*. Berkeley, CA: University of California Press, 2000.

⁵⁴ Roberts, T.B. (ed.). *Psychoactive Sacramentals: Essays on Entheogens and Religion*. San Francisco, CA: Council on Spiritual Practices, 2001.

It should be no surprise, nor a problem therefore, if neurotheology uncovers better approaches than those that already exist. The important issue will be how to incorporate these approaches appropriately into a specific religious or spiritual paradigm. This, then, is one of the true challenges of neurotheological research.

We might consider one additional, overarching goal of neurotheology which pertains to the nature of reality. In order to address the four foundational goals described above, we must realize that all of them ultimately rest upon one fundamental question: How do we know the true nature of reality? And the corollary question is: Is the reality that we perceive and are conscious of really the real reality? After all, if we are going to try to advance our understanding about ourselves and the world around us, we must try to address better these fundamental epistemological questions.

With these foundational goals in mind, we are close to elaborating the principles of neurotheology. As might be expected, definitions are a crucial step. And this is particularly the case with neurotheology. Neurotheology itself must be defined in addition to many other concepts that can be assessed in this field of research. An exploration of definitions of a variety of religious and scientific concepts will then provide a starting point for delineating the principles of neurotheology.

Before we engage the definitions and, ultimately, the principles of neurotheology, permit me one additional comment regarding an often undervalued, but incredibly important concept in philosophy, theology, and science—humor. Neurotheology must admit the crucial importance of humor in understanding the human mind and its ability to deal with an ever changing and confusing world. In fact, it may be human kind's greatest legacy to be able to look upon an incredibly short life span, often filled with anxiety, fears, loss, suffering, and death and still find some way of laughing at ourselves and at the very world which causes us so much angst. Neurotheology would certainly make sure to include the neurological and theological basis of humor in any final analysis of the human person. And I cannot help but employ a line from the great comedian Groucho Marx with regard to the principles of neurotheology—"These are my principles, and if you don't like them, I have others!" This is a most well taken point since whatever principles we consider in the following pages, we must keep in mind that these principles can and should change as the scholarship, both scientific and theological, that drives neurotheology develops and advances.

Finally, I would like to add that I truly hope that my representation of scholarship in the disparate fields that may contribute to neurotheology is adequate enough to provide a starting point. I certainly look forward to being advised and corrected by other scholars from fields that are different than my own. And this is perhaps the greatest gift of neurotheology, the ability to foster a rich multidisciplinary dialogue in which we help others "get it right" so that we can advance the human person and human thought as it pertains to our mental, biological, and spiritual selves.