

Consciousness-only Theory and Modern Neuroscience

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It is my view that Buddhism should discard its unscientific doctrines, or attempt a modern reinterpretation, in order to be coherent with modern science. In particular, a most unscientific concept is the Buddhist view of 'Consciousness-only,' which is more correctly explained by science as a function of the brain. Contemporary neuroscience cannot accept the Buddhist view that Consciousness-only, or the Eighth Consciousness, exists as an independent substance supporting transmigration. In an attempt to 'set the records straight' I would like to offer a reinterpretation of this concept, in line with contemporary neuroscientific knowledge.

Key words : Consciousness-only Theory, Eighth Consciousness, Mind,
Function of the Brain, Neuroscience.

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I. Introduction

I am a practicing Buddhist and psychiatrist, engaged for forty years in specialized studies of the mind. Through my exposure over these many years to countless Buddhist sermons and other scriptural and associated studies, I have come to see there are, in my view, many aspects of Buddhist philosophy that are contrary to my own scientific viewpoints. Of special concern in this paper, I will consider variances between Consciousness-only theory, which deals with mental conditions, and the relatively new neuroscientific perspective. It's fair to say from the outset that the commonly held dualistic view concerning mind and body as separate entities, is also in extreme conflict with modern psychiatry.

If one insists that religion and science are separate fields with different goals, and there is nothing to be gained by attempting to 'mesh' the two, then no further discussion is required. Humans are bound to be religious, whether faith is scientific or not. Hence, a scientific religion will have scientific and intellectual persons among its adherents, whereas a religion without a scientific base will probably not.

"Buddhism," said Einstein, "is the most scientific religion." Science is also accepted by Christianity, which is generally regarded as an anti-scientific religion. A case in point is former Pope John Paul's acknowledgment of the doctrine of evolution in 1992. In a similar vein, in order to be relevant in the current age, Buddhism should reinterpret its doctrines in order to keep pace with scientific developments. In which case, curricula for ordained Buddhists should include an extensive science component, a subject area poorly represented in the current Korean Buddhist education system. If Buddhist scholars were permitted to reinterpret some of the doctrines, Buddhism would not lag behind other religions and so, offer adherents fresh insights.

This essay does not intend to infer that Consciousness-only theory is historically wrong. One can find a strong causal basis for this theory's emergence around 4th-5th century CE, and there is an equally compelling argument for its survival into the present.

Notwithstanding, science of the brain, or neuroscience which is concerned with mental aspects, is a science that has seen remarkable progress only in the past two decades; in which case it is understandable that older Buddhist monks and scholars who have not studied the brain would remain ignorant of recent developments in this area of scientific endeavor. In such a vein, this essay is attempted in the hope that the field of neuroscience can make some useful contribution towards a reinterpretation of Consciousness-only theory.

II. Consciousness-only Theory

1. Background of Consciousness-only Theory

In the centuries after the Buddha's passing, his teachings gave rise to many schools, each proclaiming its own doctrine. But although there was a proliferation of teachings two main streams emerged: one being the philosophical and analytical Hīnyāna tradition of the Elders, which remained relatively faithful to the original teachings as they were passed down by word of mouth through recitation; the other being the Great Mahā Community, namely Mahāyāna (Great Vehicle), which was marked by a progressive and deeply religious tendency.

The Consciousness-only school belongs to the Mahāyāna stream, along with the school of the Middle Way which has the concept of 'emptiness' at its core. These two schools later developed to become Mahāyāna Buddhism. Mahāyāna Buddhist scriptures were edited in Sanskrit, which is a completely different rendition from early Buddhist scriptures which were recorded in Pali by the Hīnyāna Elders. And, to further complicate things, the sutras which were the foundation for Consciousness-only thought, were edited later than those of the Prajñā (wisdom) school, which has the view of Emptiness of the Middle Way at its heart: (*Prajñāpāramitā Sūtra, Diamond Sūtra, Vimalakīrti Sūtra*) (Im 2001: 435).

Consciousness-only thought rejects the concept of karma based on the Doctrine of Dependent Origination, which is embraced by Hīnayāna Buddhism.

The appearance of Consciousness-only thought was in response to dwindling interest in *Prajñāpāramitā Sūtra* Emptiness, which gained popularity prior to Consciousness-only thought, but had begun to lose its true meaning among the populace, appearing as excessively hollow (Yi, Man 1999: 14).

At this point it should probably be mentioned that both these ideas of Emptiness and Consciousness-only are far removed from the Buddha's rational and scientific ideas (Im 2001: 436).

2. Dharmashāstra and Scholars of Consciousness-only

Maitreya (270-350), Asaṅga (310-390) and Vasubandhu (320-420) are the key proponents of Consciousness-only thought. The major related sūtras include: *Sūtra Unraveling Thought*, *Yogācārabhūmi Śāstra*, *Compendium of the Mahāyāna*, *Thirty Verses on the Manifestation of Consciousness*, *Treatise Demonstrating Consciousness-only*, *Sūtra of Tathāgata Treasurehouse*, *Sūtra Concerning the Great Parinirvāna*, *Śrīmālā Sūtra*, *Theory of Buddha Nature*, *Sūtra on the Descent to Sri Lanka*, and *Discourse on the Awakening of Faith in the Mahāyāna* (Yi 1999: 14; Im 2001: 435-442).

3. Neuroscience Standpoint on Consciousness-only

A. On the Contention that Mind, Known also in Buddhist Terminology as Consciousness-only or Storehouse Consciousness, Exists as a Substance with its Own Identify.

The Consciousness-only school agrees with the Emptiness of the Middle Way School only to the extent that all objects are phenomenal, and all material beings in the world are hollow because they are non-substantial. But it does not agree that the mind or spirit of the human is empty for the following reasons:

If the mind is empty or non-substantial, no rational speculation or reasoning is feasible. Accordingly, all theoretical arguments and viewpoints based on discriminative thinking will be false, which is the false view of Emptiness advocated by the Middle Way School. As a result, if mind is recognized as hollow, non-substantial, the idea of Emptiness itself should also be denied. Hence, to validate human thought, namely speculation and thinking, logic and contention, then substantiality of Consciousness (mind, cognizance) should at least be recognized.

The Consciousness-only school argues that there is no proof that external material objects recognized by the mind really do exist in the world. It is thus advocated that all objects acknowledged by the human mind are nothing but images reflected by the operation of mind. In other words, it is only the mind that substantially exists in this world; everything else is non-substantial, not really existent, and therefore false and empty. The *Samdhinirmocana Sūtra* or the *Sūtra Unravelling the Thought*, claims the only existing consciousness is the Eighth Storehouse Consciousness that dwells subconsciously and unconsciously in the mind, gradually solidifying the mind as the only actual being. This leads on to the contention that all beings have Buddha-nature, the storehouse of Tathāgata, or the supernatural and eternal spirit.

One must conclude then, that if mind is the only substance, a concept advocated by the Consciousness-only school, and all other phenomena are empty, this is spiritual idealism, a notion upheld by later generations of Mahāyāna thinkers who were bewildered by Upaniṣad, an absolute idealism that dominated ancient Indian society several centuries before the time of the Buddha (Im 2001: 435-465).

From a Neuroscientific Standpoint:

Spirit, mind and soul are merely functional activities of the brain, not real entities. Yi, man explains Consciousness-only as follows:

Realism that claims all things really exist independent of mind is itself an image created by mind, rather than an image formed by projection of an external object onto the mind it is an image of the mind's own making.

There is another subjective issue related to the Storehouse Consciousness, which concerns the mind's uninterrupted recognition of phenomena. It is believed that this consciousness constantly dwells unchanged at the root of a human being, influencing not only one's current life but continuing on into future existence. In other words, as long as one 'acts' in thought, word or deed, karma will result, whether good or bad depends on intention. At this point the Storehouse Consciousness will serve as the source of karma which lies as a latent seed in the mind; when the seed meets with appropriate environment or conditions it manifests a phenomenal world. At this point, a self-discipline or virtuous religious practice is needed, in order to cleanse the Storehouse Consciousness. This consciousness is the mind which has been defiled by karma (Yi 1999: 15-25).

Standpoint of Neuroscience:

The source of karma may be considered in relation to the region of the brain that has to do with memory. There is conscious memory (semantic and objective) and unconscious memory (procedural and descriptive). Regardless of good or bad karma, human experience is stored in the memory region of the brain, affecting one's conscious or unconscious bearing. However, psychological karma is not passed on in an hereditary sense. Experience and learning will not affect DNA but does affect the process of the conversion to protein from DNA by means of RNA. That is, learning or experience cannot be passed down, but will influence the brain, and thereby the mind, which is the function of brain.

Further Explanation on Memory:

Immediate memory functions over a period of seconds; recent memory applies on the scale of minutes to days; and remote memory encompasses

months to years. Three brain structures are critical to the formation of memories: the medial temporal lobe, certain diencephalic nuclei, and the basal forebrain. The medial temporal lobe houses the hippocampus, an elongated, highly repetitive network. The amygdala is adjacent to the anterior end of the hippocampus. The amygdala has been suggested to rate the emotional importance of an experience and to activate the level of hippocampal activity accordingly. Thus, an emotionally intense experience is indelibly etched in memory, but indifferent stimuli are quickly disregarded.

I will cite two typical examples representing Consciousness-only theory in order to establish my own standpoint.

(1) View of Mind according to Sixth Patriarch, Huineng (638-713)

It is not the wind that causes the flag to flutter, nor is it the fluttering of the flag that causes the wind to blow; it is mind only that makes the flag flutter or the wind blow.

Mind can be accounted for in many ways.

Firstly, if fundamental particles or waves that constitute the universe are considered to be mind, we can also regard all the aforementioned phenomena as born of such particles. Since the basic materials of the universe are not referred to here, such explanation is wrong. Neither can the small particles that make up the universe constitute mind.

Secondly, mind is believed to be solely responsible for perception of the wind or fluttering of the flag. Such a subjective explanation is wrong because the fluttering of the flag is not due to the existence of mind. A flag flutters when the wind blows, whether mind perceives it or not.

Thirdly, in this case, existence of mind is attributed to the feasibility of a fluttering flag and blowing of the wind itself. From a scientific viewpoint this is completely false. One's mind might have an influence on the flag and wind to some extent (Einstein's Theory of Relativity), but it cannot cause the flag to flutter or the wind to blow.

(2) Explanation of ‘Only mind makes All Beings’:

To begin with, the external world has different appearances depending on one’s state of the mind. For instance, a female patient who did not believe her husband loved her, later had a change of mind when she learnt that her husband was going through terrible hardship and that his love for her was genuine. In which case this woman might say, “The world changes according to my state of mind.”

Secondly, mind, being substantive, creates all beings. In the view of modern science this idea is completely wrong, as mind is non-substantive and is only the function of the brain.

Thirdly, if this argument holds then if I die the world would be meaningless, so to me the world could be the same as not existing. Such an argument is too subjective as we know that the world continues to exist even after the death of one individual. In which case it is best to adopt the first explanation as the appropriate one for “Only mind makes all beings.”

B. Structure of the Eight Kinds of Consciousness

Five sense organs: eyes, ears, nose, tongue, body

The objects of sense organs: realm of form (material), sound, smell, taste and touch

Five types of consciousness: Consciousness of eye, ear, nose, tongue and skin

The sixth consciousness: This consciousness gives rise to cognitive function and is the psychic realm that exists outside the body which cannot be seen by a sense organ such as the eye. Neither can it be touched. Nevertheless, it is not entirely nonexistent; it is a psychic phenomenon that arises in the context of the aforementioned sense organs, either together with them or independently. The object of this consciousness is called dharma or sense objects. Here, dharma refers to all existent phenomena, including both corporeal and non-corporeal.

The Hīnayānists of early Buddhism believed that the Sixth

Consciousness alone is responsible for the principles of cognitive action. But the Mahāyānists later introduced a further aspect of consciousness, an essential and ultimate substance that is permanent and does not change, regardless of relativity. This is what we understand as the Eighth Consciousness or Storehouse Consciousness. The Storehouse Consciousness was introduced as the chief subject of “the Six Gates or Realms, the wheel of life,” because it continues to act while we sleep, when our soul wanders around in death or even when we are in our mother’s wombs. What then, is the chief cause of this Eighth Storehouse Consciousness?

When one acts on thought, word or deed, either intentionally or unconsciously, karma arises and is stored in the Eighth Consciousness. Such an action arises on the basis of four fundamental afflictions: delusion about self, self-view, egotism and attachment to self. The Seventh Consciousness known as *Mano Vijñāna* or Self Consciousness is responsible for the storage of this karma. It is shallower than the Eighth and deeper than the Sixth Consciousness in its degree of unconsciousness.

The Eighth Storehouse Consciousness, on the other hand, has a role in storing all the products of karma. It also contains the seeds of consciousness and the object of attachment. All these aspects of storage consciousness will disappear when one reaches the level of sainthood (Yi 1999: 18-22).

The Storehouse Consciousness is known by different names depending on how we perceive it: whether as the *vipāka* consciousness of retribution or different results, as seed (*bīja*), or the store that is the object of attachment. *Ālaya* is a derivative originating from “a-li,” a verb meaning “to take place” or “storage.” It is generally translated as “dwelling,” “container” or “storage.” *Ālaya* is the storage where all past experiences are deposited as subconsciousness (Ko 1992: 257-264; Ota 1992: 117-150).

On the other hand, China’s Faxiang (School of Marks-of-Existence) maintains that,

In the Eighth Consciousness the powers of all karma firmly take their place. But it cannot be said that this remains unchanged forever, as with suchness or dharma nature.

In other words, if this Storehouse Consciousness were not subject to change, as with suchness, nothing could be created in the phenomenal world, for it would be like immutable truth which has no original action or coming or going. Thus, the nature of Storehouse Consciousness is *saṃkr̥ta dharmā* (conditioned) which creates the phenomenal world. While the Eighth Storehouse Consciousness does not have suchness, the Ninth *Āmala Vijñāna* Consciousness does so. Another name for the Ninth Consciousness is ‘white purity’ (Yi 1999: 22-24).

Neuroscientific Stand:

The idea of seeing with eyes and listening with ears is incorrect; the correct view is to see with the brain through the eyes and listen with the brain through the ears. The Sixth Consciousness itself is only consciousness and is the function of the brain. Attachment to self which is *Mana*, the Seventh Consciousness, and the store which is *ālaya* or Eighth Consciousness, are only functions of the brain. The Ninth Consciousness, *Āmala Vijñāna* which is immaculate consciousness of stainless mind, or white purity, is believed to be everlasting, an unreasonable belief when viewed from the neuroscientific standpoint. It is nothing but an idea, like the idea of God which is created by man.

C. On the Argument that Storehouse Consciousness is the Subject of Transmigration

The Consciousness-only view posits that Storehouse Consciousness actually exists as real substance, transmigrating to other worlds after death.

The theory of transmigration is an idea originating in the Veda or Upanisad beliefs of ancient India, before the advent of Buddhism. Veda adopted the idea of transmigration to justify India’s caste system. This system supports the idea that when one is born into a lower-caste in this life, such fate is due to one’s many sins committed in a former life.

The Buddha rejected this fatalistic view of transmigration. In 6th century India BCE, when Sakyamuni was born, the idea of transmigration was

accepted as a general truth by all, not only the intellectual elite. The idea was then passed down from the original and acquired the theme of a soul, which was the Vedic Upaniṣad view. The Buddha, on the other hand, followed a scientific method of speculation through rational and reasonable meditation, in order to observe the way of nature and human function. This is a rational investigative technique which can reveal natural law as principle and fact. The Buddha would never accept delusive views as fact.

An ascetic named Bachagota asked the Buddha: Where does man go after death? (*Āgama Sūtra*). In answer to this question the Buddha explained the cycle of life and death, using the metaphor of firewood:

When a life is over, it is as if the firewood has burned and the fire is extinguished. Then where does a fire that is extinguished go? Human death is just like this. It would be foolish to make claims as to where the dead will go or will not go (Im 2001: 372-375).

My Viewpoint

Modern medicine has proved that mind and body are not two but one (spirit is a function of the brain). Many ordained clergy and believers think that what we call mind, spirit and soul, has independent existence and can transmigrate to other worlds after death. This supports a firm belief in the doctrine of moral purpose that instructs in refraining from wrong and doing good. Such beliefs can only be beneficial, certainly causing little harm, but they are just not scientific. The question “what is mind” will never be solved, no matter how earnestly we meditate while facing the wall. A better way might be going to the bookstore and purchasing study books on the mind. Buddhism adopted this idea of transmigration to make it an inevitable doctrine. Ven. Kak Mook (Ibulgyo May 7, 2005) is quoted in the Buddhist Newspaper as saying, “It is not the self but the flow that transmigrates.” The enigmatic point is, what is this “flow?” And how should it should be translated? I would translate “flow” as a flow of energy, which is most scientific. When a dog eats of my remains, ‘my’ energy will flow into the dog, which gives rise to ‘me’ as dog. If my remains are sprayed as fertilizer

over an apple tree, then 'I' will grow into an apple. This is scientific and consistent with the law of immutability of energy.

Transmigration can also be translated as a state of mind. Isn't a state of anxiety and guilt after committing a crime something like the hell of the scriptures? If a crime is committed because of ignorance, then wouldn't ignorance itself be what Buddhists call avidyā or delusion? In my view, even the Six Gates or Realms are themselves a reflection of the mind rather than actual transmigration.

D. Confirming Consciousness-only through Meditation Experience

Consciousness-only can never be confirmed with experience. Since Consciousness-only, that is mind, is a function of the brain, it is not substantial. Consequently, it is not possible to apprehend it in meditation. However, meditation can create change and new experiences; this has been proven in studies and imaging of the brain (PET, fMRI).

E. Functions of the Storehouse Consciousness can be Explained as Cerebral Functions.

In the third volume of *Treatise Demonstrating Consciousness-only*, the aliases of Storehouse Consciousness are classified into the following seven: (1) citta (2) Ādāna Vijñāna (3) Jneya Asraya(supporting knowledge) (4) Bīja (seed) Vijñāna (5) Ālaya Vijñāna (6) Vipāka (7) Āmala Vijñāna (Ko 1992: 257).

As Citta, Ālaya Vijñāna and Āmala Vijñāna have already been explained they are excluded from the following accounts.

(1) Ādāna Vijñāna

Ālaya Vijñāna is also called Ādāna Vijñāna, which serves as the source to sustain life. The special term for the source that sustains life is "grasping." Specifically, Ālaya Vijñāna grasps the five sense organs of the body. This can also be expressed as serenity (praśrabdhi) which is the same as agitation in its physiological and organic aspect. To explain serenity = agitation in modern

terms, we can say that “mind and body are one,” meaning that when one is good the other is also good, and vice-versa (Ko 1992: 259).

Ādāna Vijñāna as the source for sustaining life is the very function of the brain. It is the brain that operates five sense organs, and it is the brain stem, life center, that sustains life. Serenity = agitation can also be said to be the brain. If the condition of the brain is bad, the condition of the psyche is also bad, and vice versa.

(2) Support of the Knowable

Support of the knowable is the support for knowledge and intellect; in other words, it is the place on which the main (Seventh Mana) Consciousness depends. The region in charge of the Seventh Self-Consciousness is the part of the brain dealing with parietal lobe and temporal lobe (Sadock and Sadock 2005: 566-574).

(3) Seed Consciousness

The concept of karma is a fundamental Buddhist doctrine. It explains how our present state is the result of past karma, and how we respond to our present state will determine our future karma. In Buddhism Karma is defined as capacity (sāmarthya) - discrimination (viveka) (the different energies in fundamental consciousness) that produces the result of self in Ālaya Vijñāna. Here, capacity (sāmarthya) means “power” or “ability,” and discrimination (viveka) means “special” or “superior.” In other words, the seed is a special power producing itself; power in the sense of energy. Unlike manifested energy that acts on matter, it is a spiritual energy that is latent in the deep recesses of the mind (Ko 1992: 265-267). When the seed is viewed as having the special power to produce itself, it is called a gene. Genes constantly wield power to clone themselves, and the human brain is also affected by genes that influence the future.

(4) Karma-resultant Dharma versus Unmanifest or Neutral Karma

Buddhism upholds an ethical value in the Unmanifest: neither good nor

bad and not recordable. Alaya Vijñāna is Unmanifest, neither good nor bad, for the following three reasons. In short, the characteristics of Ālaya Vijñāna are ① different results (vipāka), ② Unmanifest: neither good nor bad, and ③ vāsanā, that which is imprinted. The original meaning of vipāka is to advance a result unlike the former cause. Here, former cause is past karma and advance result is Alaya Vijñāna. Past karma, good or bad, produces its result, but Alaya Vijñāna is neither good nor bad; that is to say, it is Unmanifest (Ko 1992: 259-260).

In our present time are we are undoubtedly shackled to, and deeply affected by past karma. But even though results of good and bad of past karma are stored in the memory center of the brain, it is also possible to free ourselves from the affects of good and bad if our mind is changed. In this regard, it is Unmanifest, neither good or bad, and existing nowhere other than in the brain.

(5) Permeation since the Originless.

Permeation is the impression left by the past, and the permeation since the originless means evolution. The human brain is a product of evolution; through a process of permeation and learning the brain evolves due to its plasticity. When absorbed in playing the piano, the brain's neurons activate the fingers and branch into new developmental pathways (Edelman 1998: 146).

III. What is Mind?

1. Mind is the Function (Activity) of the Brain

Mind and soul are not substantial. What we call "mind" or "soul" is simply a function of the brain, a process, or concept. In his recent book "The Wonderful Hypothesis," Francis Crick, co-inventor of DNA, argues that what happens in our mind has a basis in our mind. He goes on to say, "to understand ourselves, we have to know how the neurons operate and interact

with one another” (Marcus 2005: 7).

Crick was correct in saying that the mind originates from the activities of the brain. However, this is not a surprise to me, as a psychiatrist who specializes in study of the mind. It is just common sense. As Steven Pinker, a cognitive scientist of MIT, put it “the work the brain does is the mind.”

In our current age we see abundant proof of how the brain influences the mind. Science has already confirmed that the antidepressants such as Prozac stimulate the brain to change moods; a stroke can cause damage to the brain and trigger different behavioral patterns; each region of the brain participates in different cognitive functions. It is also well known that the right hemisphere of the brain is stimulated when listening to music; whereas the left hemisphere is stimulated when speaking; when we experience a fright it is the amygdala that is stimulated; and an orgasm stimulates the right prefrontal cortex.

Although most people would accept that the origin of mind is the brain, few are willing to admit that the origin of the brain is a gene. These particles were deciphered by Crick fifty years ago and his findings have significantly influenced developments in science, medicine and even law. Whereas, when it comes to the theory of mind, genetics has had no influence whatsoever (Marcus 2005: 7-8).

Descartes based his foundation on “substance dualism.” According to his view, the world consists of extended things (*res extensa*) and thinking things (*res cogitans*). He challenged the truth of the famous dictum: “I think, therefore I am,” explaining that brain function is not a faculty of substantive mind (*cogito. ergo sum*), but rather, “I exist, therefore I think” (*sum. ergo cogito*).

In the views of both Freud and Jung, “property dualism” is also wrong; outwardly it may look like monism but it is actually dualism. The individual unconscious, as advocated by Freud, does not actually exist, it is only a function of the brain. It is the subcortical area of the brain that takes charge of such functions. And what Jung calls “collective unconscious” also does not exist independent of the brain, it is a function associated with the subcortex

region of the brain.

2. How does brain substance work to cause mind phenomena?

To understand this, we require some knowledge of the brain's structure. The human brain is 98.7 % similar in terms of hereditary to the brain of a chimpanzee. The 1.3 % variance is due to differences in language and thinking.

The human brain is the product of evolution and a result of natural selection. It operates as a group response rather than locally or generally; that is to say, it works as a circuit, wired into groups of neurons for various functions, like a Swiss Army knife. Some examples of neuron circuits are: seeing, hearing, speaking, thinking, feeling, sentiment, loving, fearing, piano playing, memorizing, dreaming, judging, free will and motivation, and religious feelings, etc.

When the brain dies there is no place for mind to go; in scientific terms, it is wrong to say that the soul goes to the next world after death.

The human brain consists of hundred billions of neurons and hundred trillions of synapses. Gerald M. Edelman, a neural Darwinist, states:

There is no *res cogitans*; particles are not conscious; consciousness is evolutionarily efficacious; the world exists and persists independent of mind and preexisted before its appearance; the brain is a selective system and not a Turing machine; sense data are not the basis of the mind; the 'world' does not consist of classical categories; typology is destroyed by biology. And over the last 300 years, science has already destroyed the more parochial ideas of geocentrism, vitalism, and simple mechanism. The mind is a special kind of process depending on special arrangements of matter. So it is natural to make the assumption that a particular kind of biological organization gives rise to mental processes. Consciousness appeared as a result of natural selection, and the mind depends on consciousness for its existence and function. Consciousness arises from a special set of relationships between perception, concept formation, and memory.

Edelman's main point concerns the Theory of Neuronal Group Selection (TNGS). The three tenets of TNGS are concerned with how the anatomy of the brain is first set up during development, how patterns of responses are then selected from this anatomy during experience, and how recently, a process of signaling between the resulting maps of the brain, gives rise to behaviorally important functions. Experience also forms the selection process of synapse. That is to say that the brain is of neural plasticity, and the nerves of this area are developed by experience and discipline.

It is very important to know that the mind is the result of evolution and not according to God's logical planning. The brain which gives rise to mind is a prototypical complex system, one more akin in its style to a jungle than a computer! The brain is subjected to two processes of selection: natural selection and somatic selection. The result is a subtle and multi-layered affair, full of loops and levels. Some scientists, ignorant about brain morphology and memory properties, have been tempted to explain mental properties at the quantum level. But it is foolish to relate theory of individual behavior with molecular interaction. Is it any wonder that earlier philosophers concerned with the nature of mind, lacking neuroscientific knowledge, were tempted to postulate entities, just as physicists have been tempted to postulate exotic new material fields; or that those in the hope of immortality continue to postulate eternalism?

Glossary of Chinese Terms

(C=Chinese, S=Sanskrit)

Ādāna (S) 執持

Āgama Sūtra 阿含經

Avidyā (S) 無明

Avyākṛta (S) 無記

Bīja (S) 種子

Citta (S) 心

Compendium of the Mahāyāna (S) 攝大乘論

Consciousness-only Theory 唯識論
Diamond Sūtra 金剛經
Discourse on the Awakening of Faith in the Mahāyāna 大乘起信論
Eighth Consciousness 八識
Emptiness 空
Faxiang (C) 法相
Huineng (C) 慧能
Jñeya (S) 所知
Prajñāpāramitā Sūtra (S) 般若波羅蜜經
Sāmarthya (S) 功用
Samdhinirmocana Sūtra (Sūtra Unraveling Thought) 解深密經
Śrīmālā Sūtra 勝鬘經
Storehouse Consciousness 藏識
Sūtra on the Descent to Sri Lanka 入楞伽經
Sūtra Concerning the Great Parinirvāna 大般涅槃經
Sūtra of Tathāgata Treasurehouse 如來藏經
Tathāgata Treasurehouse 如來藏
The Eighth Ālaya 阿梨耶, 阿利耶, 阿賴耶
Theory of Buddha Nature 佛性論
Thirty Verses on the Manifestation of Consciousness 唯識三十頌
Treatise Demonstrating Consciousness-only 成唯識論
Unmanifest 無記
Vāsanā 薰
Vimalakīrti Sūtra 維摩經
Vipāka (S) 異熟
Yogācārabhūmi Śāstra 瑜伽師地論

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