The Receiving Context: Neuro-anthropology

Paul MASON / NEUROANTHROPOLOGY

Our methods of thinking are a product of thousands of years of cultural evolution. These patterned thoughts and behaviours may be a handicap in our rapidly changing world. Our culture-influenced mindsets can be evaluated in the light of brain science and cultural anthropology. Neuroanthropology, a multidisciplinary field integrating neuroscience and anthropology, answers the need to assess our culture-bound behaviours. It is the study of the cultural basis of mind and the biological basis of cultures—a cohesion which unites the realms of art, religion and science. The scope expands existing paradigms and explores new perspectives that may break cultural barriers and cultural mindsets.

What you see is dependent upon your perspective. The physicist Heisenberg demonstrated that photons of light appear to behave as either a particle or a wave depending upon how the observer sets up the experiment. In a similar manner, our understanding of the human brain also depends upon our subjective gaze. Philosophy is to physics what culture is to consciousness. My aim is to expand our perspective to gain a deeper understanding of the human brain.

In a world where our social habits are rapidly exceeding our ecological constraints, we need to re-evaluate our cultural mindsets and the behaviours they perpetuate. Neuroanthropology is a multifaceted approach which acknowledges that 'Human beings are social, cultural and historical creatures as much as we are neurological, psychological and computational creatures'.[1] Culture is a learned phenomenon that shapes the mind. Our mindsets in turn generate culture. In observing the individual and society, neuroanthropology harnesses the objective and reductionist approach of science with the subjective and holistic approach of the arts. The field exists in recognition of the fact that no one culture holds a monopoly on an understanding of the human brain. The brain is multifaceted, so is the way we must understand it.

The brain is one of the largest organs of the body. Each organ maintains a homeostatic balance between the body and its environment. While the lungs interact with a gaseous environment, the brain interacts with a social and cognitive environment. Since the early work of Hubel and Wiesel on the visual system, evidence has been collected to confirm that experience and environmental factors play an important role in shaping brain structure. Unlike other organs that function innately, the brain must learn how to interact with its environment.

The scientific cornerstone of neuroanthropology is best summed up by JP Changeux who understands that we are a product of the biological evolution of our species and the cultural evolution of humanity: 'The Social and Cultural world impregnates itself into the infant mind. Thus, we have cultural creations which may develop through history'.[2] His understanding highlights a critical link between society, culture and neurobiology. Genetic, epigenetic and extragenetic processes collaborate in a complex interdependency to sculpt a person's brain.[3] Human behaviour depends upon creativity, learning and the transmission of culture from generation to generation.

The many facets of culture are mental adaptations and mental constructs that have perpetuated themselves over successive generations supposedly due to their evolutionary success. However, with growing bodies of knowledge from ever more specialised streams of research, we should now reassess the effectiveness of our cultural habits. Not only are our habits impacting on our own psychological well-being, but also on the health of the earth. We have to study the dynamics and coherence of the brain in this context.

Studying the retroactive causality between mind and culture will eventually contribute significantly to bioethical issues and psychotherapy. As Derek Freeman states, we need to establish 'in an evolutionary perspective the nature of the linkages between biology and culture'.[4] Freeman's definition of culture as 'essentially a socially sanctioned accumulation of alternatives that have been selected from the vast range of human possibility'[5] is comparable with Changeux's idea of 'cultural creations'. Cross-cultural research embraces the variety of selected-alternatives that we can choose from to change and evolve our culture. We now have the opportunity to learn and choose from the vast range of selected-alternatives or memes. The term 'meme' and the description of ideas as competing, self-replicating entities were introduced by Richard Dawkins in 1976.[6] An earlier analysis of the 'selection of ideas' was done by Nobel Laureate Jacques Monod in 1970.[7] Memes are building blocks of our minds and culture, in the same way that genes are the basic building blocks of biological life. They are units of cultural transmission and evolution.

The brain is culture's primary vector. Philosopher Daniel Dennet believes that human consciousness is itself a huge collection of memes.[8] In her book *The Meme Machine*, psychologist Susan Blackmore asserts that the design of our minds can only be understood in terms of memetic selection. Consequently, are we 'the prisoners of ideas' that the poet and philosopher Ralph Waldo Emerson once claimed we were? Have we become trapped by learned patterns of thinking? On the expanding horizon of consciousness and in a limitless plane of experience, we are standing still. Cultural diversity is just as important as biodiversity. By understanding mind and culture as constituted by certain memes (and that memes are essentially carried by the brain), we can then take advantage of the larger, cross-cultural pool of memes and break free of our cultural moulds.

ART AND SCIENCE

> The greatest enterprise of the mind has always been and always will be the attempted linkage of science and the humanities.
>
> Edward O Wilson

The separation between art and science has been described as 'one of the saddest and most artificial divisions in modern life'.[9] This rift can be traced back to Descartes, who advocated breaking down reality and problems into constituent parts. Initially, Descartes's philosophy allowed science to free itself from the constraints of organised religion. However, in contemporary society, what once freed us intellectually is now imprisoning us. We need, once again, to break free of these invisible mental barriers.

It was Descartes's contemporary, Pascal, who may have better understood the concept of interdependency and retroaction. He argued that 'everything being linked by an invisible link that binds the parts most distant from one another, I hold it to be impossible to know the parts without knowing the whole just as it is impossible to know the whole without knowing the parts'.[10] We experience consciousness as a unitary phenomenon even in cases where it obviously is not (for example, in visual neglect where patients are unaware that they disregard the left-hand side of space). Similarly, we experience culture as a unitary and synchronous phenomenon even though it is not. Cognitive research has confirmed that our internal representations of culture are formed from a collection of disparate bits of information.[11] The whole is indeed greater than the sum of its parts.

An integrative and holistic approach to understanding the functions of the human brain is not new; it is merely undeveloped. In his 1939 book, *Psychotherapy Scientific and Religious*, Marcus Gregory advises that:

> What is needed more than anything else to give form and an object to the material of which human life is made up is a philosophy sufficiently inclusive to find a place and significance for the various psychological types, so that even those activities which at first sight appear to be relevant to the main strivings of humanity, may be seen to take their place as integral parts of the great whole.[12]

Gregory expresses the necessity to weave an intellectual thread between a holistic understanding of life and science in order to create a rich and dynamic tapestry that binds all disciplinary knowledge and cultural activity. Being interdisciplinary, neuroanthropology calls upon the culture-bound knowledge and ideas from many fields. These ideas are not reducible to each other. They share a common property that can only serve to enrich our attempts to understand the world and our place within it.

In his Rede lecture of 1959, the physicist CP Snow pleaded for a reconciliation between art and science, lamenting the increasing gulf between 'literary intellectuals' and 'scientists'. CP Snow's efforts to join the 'two cultures' were resurrected in EO Wilson's 1997 book, *Consilience*. Journalists argue that 'works on evolution, like Wilson's *Sociobiology* and Dawkins's *The Selfish Gene*, have been absorbed into western cultural life as neatly as any neo-Darwinist could have predicted'.[13] In the Richard Dimbleby Lecture of 1996, Richard Dawkins pointed out that 'science needs to be released from the lab into the culture,' stressing how important this cultural shift is regarded within scientific circles.

RELIGION AND SCIENCE

> Do you believe then that the sciences would ever have arisen and become great if there had not beforehand been magicians, alchemists, astrologers and wizards, who thirsted and hungered after abscondite and forbidden powers?
>
> Friedrich Nietzsche, 1886

In response to the growing recognition that science needs to consolidate itself with other modes of explanation, many academics are becoming interdisciplinary diplomats. The merging of religious thought and scientific data will be one of the greatest challenges. I believe that religion and science are complementary methods of understanding the human mind. Of fundamental interest is the integration of their counterparts—analytical and systemic thought. Analytical modes of thought break systems down, while systemic thought rejoins them.

Both sociologist Edgar Morin and physicist and systems theorist Fritjof Capra advocate the union of analytical and systemic thought.

Morin promotes the coming together of physics, biology and anthropology as fields of enquiry, and of science and philosophy as means of enquiry. Capra has extended complexity theory (the analysis of the interactions between the many parts of a system) to the social domain. Additionally, through his many books, he has explored the many parallels between ancient mystical traditions, Christian theology and new ways of thinking in science.

Einstein also supported the union of systemic and analytical thought. He once said that 'Religion without science is lame, Science without religion is blind'. His point of view is similar to the belief, once expressed by the biologist JBS Haldane, that progress in science will bring enormous confusion and misery to humankind unless it is accompanied by progress in ethics. Ethics embraces the art of balancing our short-term desires with our long-term needs. According to the physicist Freeman Dyson, the 'two human institutions that can think about long-term issues are science and religion'.[14] When Dyson received the Templeton Science and Religion Prize in March 2000, he commented:

> Science and religion are two windows that people look through, trying to understand the big universe outside, trying to understand why we are here. The two windows give different views, but they look out at the same universe. Both views are one-sided, neither is complete.

In the Dhammapada, Buddha stated: 'We are what we think. All that we are arises with our thoughts. With our thoughts, we make the world'.[15] That is why neuroanthropology is well placed to comprehensively explore the mechanics of culture and the brain. This perspective can be used to look at how what we think and what we are taught to think affects who we are and what we do both as individuals and as societies. Patricia Duffy notes that 'Just as anthropological and educational research has promoted our understanding of the variety of ways people process and interpret information from the external world, so researchers in neuroscience have been doing much to introduce us to the variety of forms of mental processing that have evolved on this earth'.[16] Focusing on how we think—our forms of mental processing—helps us to understand the culture that arises from these thoughts.

In his book, *How the Shaman Stole the Moon*, theoretical neurobiologist William Calvin argues that science and religion arose from the same human tendency. He proposes that the first scientist was probably a shaman. Shamanic practices subdivided into philosophy (a scientific explanation of the known world), and religious philosophy (now known as theology). Calvin states: 'Looking back, these splits suggest that philosophy–religion–science were all mixed up originally—that what we call science was once part of religion, that scientists were once priests. Or vice versa. But before the priest came the shaman'.[17] Religion has been continually confronted by scientific progress, most notably in the Christian Church, which has had to adapt to the discoveries of scientists like Galileo and Kepler. The gap between the Church and science has now grown extremely wide. I would argue that the contribution of contemporary science to religious thought will force us to deepen our sense of spirituality.

One of the greatest needs of the present day is a rethinking of the Christian faith in the light of modern discoveries about the human mind. As long ago as 1857 this need was foreseen by the Reverend Frederick Temple, afterwards Archbishop of Canterbury, who said: 'Our theology has been cast in the scholastic mode, that is, based on logic. We are in need of, and we are gradually being forced into, a theology based on psychology. The transition, I fear, will not be without much pain. But nothing can prevent it'.[18]

While modern science provides us with knowledge, it is religious and systemic thought that provides us with a system of reference. I suggest that the reconciliation of analytic and systemic thought is a necessity for a 'philosophy sufficiently inclusive to find a purpose in life'[19] and on a larger scale to contribute to the evolution of modern society. We need to readapt our philosophy to recent scientific advancements, because 'all that we are is the result of what we have thought'.[20] To make critical changes throughout society, we have to change the way we think.

In a world where we have the capability to destroy biodiversity and disrupt the ecology so dramatically, at no point in history has what we thought had such a huge impact on our environment. New ways of thinking need to be carried out and, as Gregory suggested in 1939, 'When religion touches philosophy it sets philosophical principles and sanctions on fire'.[21]

COMPLEMENTARY THEORIES OF MIND

The most widely acclaimed global theory of mind is the Theory of Neuronal Group Selection (TNGS) put forward by Gerald Edelman. TNGS situates brain science in relation to physics and evolutionary biology. Edelman's fundamental position is that mind is a special kind of process depending on special arrangements of matter: 'In modern science, matter has been reconceived in terms of processes: mind has not been reconceived as a special form of matter'.[22]

This view is similar to Tantric wisdom, which considers all life as a process, without a formal beginning or a formal end: a continuum of life in keeping with an order of structured development, and a state where the process of being and the process of becoming are one and the same. Tantra is an instrument that seeks to awaken, to expand and to harness the field of ordinary consciousness in order to reach supraconsciousness, the possible root of one's being and the wellspring of unknown powers.[23] It is above all the expansion of one's awareness.[24] Although tantrism has classically been used for theurgical goals, its major aims (control of emotions and associations) are just as applicable in today's society.[25] The Tantric view shatters borders, or rather dissolves them, for they only exist in the mind.[26]

TNGS firmly embeds psychological behaviours in neurophysiological mechanisms through a function of the brain called perceptual categorisation. The brain samples the outside world, creates patterns from the relationship between these bits of encoded data, and then links these signals into new wholes and constructs schemata. Perceptual categorisation is the ability to selectively discriminate between objects or events within an unlabelled environment. Buddhist meditation is the process of looking past these mental schemata and into the unitary nature of the world.

Buddhism is compatible with the advancement of science, and much research is being conducted to integrate it into mainstream science. The Buddhist approach to knowledge is similar to that of modern science.[27] Buddhism has a high regard for logical reasoning and practitioners have the right to examine the teachings.[28] Questions are examined and analysed, and only those findings that are experimentally tested are accepted.[29] In the face of this rigorous selection process, Buddhism is practiced widely. The Abhidharma, the earliest compilation of Buddhist philosophy and psychology, still remains the basis for both Theravadin and Mahayana Buddhism

after a millennium and a half, while our modern neurology textbooks are out of date almost as soon as they are written.[30] Therefore, as the Dalai Lama suggests, 'there may be matters for which Buddhist tradition has an explanation that science has not yet discovered'.[31]

IDENTITY: THE ENIGMA OF THE IMAGINED ENTITY

Consciousness is a construction built upon selective processes. It arises from the contemporaneous activities of distributed populations of functional neuronal groups. Human consciousness has evolved the ability to deal with memes and is itself a meme/memeplex. TNGS provides a biological platform upon which the memetic 'self' can be placed. Susan Blackmore, who is also a Zen practitioner as well as a psychologist, has suggested that meditation is a 'meme-clearing meme'.[32]

Similar to the Buddhist perspective, TNGS provides a theory for the operation of consciousness that lacks a superordinate co-ordinator or homunculus. Buddhists have found that there is no essential Self. Self is an illusion. TNGS comes to the same conclusion. Buddhist insight is the absence of identification with the Self that evolution has given us. The contents of that Self can and do vary, but the absence of the synthetic construction of the Self based on our symbolic world reveals a basic process of consciousness.[33] The Hindu concept of Maya, that 'things and events ... are concepts of our measuring and categorising mind',[34] also resonates nicely with TNGS. Thus the leading philosophers of mind might agree with the ancient wisdom of mystic sages that identity may be an imagined entity and that the external world may be an internal construct.

POTENTIAL BENEFITS AND APPLICATIONS OF NEUROANTHROPOLOGY

The neuroanthropological approach has important implications both on a socio-cultural level and a neurobiological level. The approach takes into account both perspectives in order to offer a comprehensive understanding of the socio-cerebral evolution of humanity. On a cultural and species-specific level, we can see that the brain offers humans escape from genetic determinism. On a neurobiological level we can see how the brain adapts to its environment, acquires skills and, as a consequence, possibly manifests certain psychological conditions or syndromes.

We adapt to differing social environments by constantly defining and redefining the boundaries of our sense of self. Self, as a derivative of evolution, is the foundation of identity, discipline and responsibility. It is a method to delineate where our inner landscape ends and the external world starts. However, these internal parameters only exist because of reinforcing behaviour. We create our own mental barriers. Subsequently we perpetuate behaviour that serves to protect and reinforce these defence mechanisms.

Our perceptual boundaries are kept within self-determined reference levels. A dynamic balance is kept between internal reference levels and external disturbances, both physiological and psychological. The borders of our sense of self are a cultural construct. Inevitably, the Self, whilst being a useful social tool, can limit our being and our becoming. In an expanded sense of reality, those restrictions don't exist. I submit that we can expand our internal parameters to embrace a larger reality; that we can break down mental barriers and create larger spaces for human thought and creativity to occupy; that culture may influence the set-up of these controlled perceptions and thus that certain mental illnesses may be a product of certain states of mind. I suggest that we may have to acknowledge a cultural effect on mind.

On a personal and psychological level, we can recognise that the human brain is our greatest asset as long as we harness its ability to be adaptable. Until now, many of us have been at the mercy of cultural impregnation. The personality, and possibly certain forms of mental disease, manifest themselves according to their surrounding environment. Many of us interact with our social environment by creating defence mechanisms. Breaking down these internal walls, increasing our awareness and responsibility of the surrounding environment, and building character instead of personality will allow us to embrace a larger form of reality.

Culture-bound syndromes and possibly other forms of mental disease may reflect a flaw, not in the brain but in its surrounding socio-cultural context. Unlike our ancestors, we no longer live as nomads, but rather are surrounded by urban socio-economic habitats, a highly synthetic environment. We have had to adapt to an environment that we ourselves have created. Just as we have had to adapt to this environment on a physical level by developing methods to maintain personal hygiene, we now have to adapt on a mental level to maintain emotional and psychological hygiene. The specific conditions of our

synthetic environment are the product of our adaptive strategies, and we need to foster our adaptability, not the synthetic environment.

So, how do we address these issues? What are some of the selected-alternatives that exist throughout the diverse range of cultures around the globe? Professor Fontana points out that 'if one strips out the spiritual side of Buddhism ... we are left with a set of practices designed to alleviate mental suffering—in other words a form of psychotherapy and personal growth movement'.[35] Scientists have found that Buddhist-style meditation helps to prevent the recurrence of depression, thus supporting Fontana's observation.[36] Sadly, our contemporary scientific mindset overlooks the folk-wisdom of shamanic cultures, ostensibly because the societies from which these traditions flow are unsophisticated and technologically simple.[37]

Different religions around the world can be considered as different forms of psychotherapy coherent to their respective culture. Healing, both emotional and physical, is evident in many religious and shamanic cultures. In the introduction to *Psychotherapy Scientific and Religious*, Dr William Brown makes the insightful observation that:

> Psychotherapy must be firmly based upon the findings of scientific psychology and of scientific medicine, but, by its very nature and purpose, it is destined to pass beyond these limits and make its contribution to the science of ethics and find its full illumination in the realms of philosophy and religion.

So how do our self-destructive modes of thought gain resolve from Eastern traditions? In his book, *Parallel Thinking: From Socratic to de Bono Thinking*, Edward de Bono asks:

> Is it possible that some of our troubles are actually caused by inadequate thinking habits?
>
> Is it possible that our ... inability to put things right is due to inadequate thinking methods?
>
> Is it possible that better thinking could make things better?[38]

In his lecture, 'The Tao of Neuroscience', Dr Stephen Larsen expresses a similar desire to answer these fundamental questions:

> The brain, something potentially very smart, has gotten stuck in its dysfunctional pattern! It is now ... very stupid in certain ways. (Not only are we messed up, we try to stay that way—the neurosis, stuckness). The citadel of the Central Nervous System (CNS) defends itself against the onslaught of what it thinks are destructive insults or life-threatening disruptions![39]

Both Dr Stephen Larsen and Edward de Bono are touching on a deeper issue. They are both suggesting that we are slaves of habit and habitual patterns of thinking. The cross-cultural approach of neuroanthropology allows us to see past these culture-influenced habits and break the cyclical patterns that generate them. It can turn to other cultures for solutions that don't exist in our own.

Diverse cultures have recognised the importance of developing the art of attention as a way to expand the repertoire of our experience. That is why they have developed a range of rituals and exercises—from meditation, martial arts and Japanese tea ceremonies to Chinese garden viewing and European labyrinth walking-systems—designed to focus and reorient our attention so we can see aspects of reality that may have previously eluded us. Cultivating the art of attention is also a way to gain greater insight into how our minds work.[40]

Subjectively paying attention to those parts of our being which are natural and those parts which are instilled is the focus of an ancient ninja technique of 'stilling the mind' known as 'The Immovable School Passed Down from the Gods'. It is claimed that 'once you have "killed your ego" you have total control of your emotional states ... The preferred state is neutrality or no desires—mushin or no-mind. The "way of death" ... actually refers to subduing the personality or learned self'.[41]

Sadly, we are trapped by our own patterns of thinking. We have imprisoned ourselves in buildings and cities and we have imprisoned our minds with mental barriers. Perhaps Eastern techniques like Nin-jitsu and Tantrism have been developed to resolve the separation between the cultural self and our true being. Buddhist scholar and former monk B Alan Wallace, president of the Santa Barbara Institute for the Interdisciplinary Study of Consciousness, says that Buddhism 'has had a very strong emphasis on refining the attention, enhancing attention skills, and developing very sophisticated

means for investigating the nature of the mind from a first-person perspective'.[42]

Instead of continuing to suppress the internal disharmony present throughout Western society, we should deepen our sense of spirituality in light of the latest scientific discoveries. Through neuroanthropology, specific channels can be created to make this inner conflict explicit, and methods set up by which the conflict is resolved.

THE MEEK SHALL INHERIT THE EARTH

> Our cherished belief in the specialness of human consciousness has not prevented us from thoughtlessly treating people as throw-away tools.
>
> Terrence Deacon[43]

> Recognising our uniqueness as reflective, communicating animals does not require any human 'exceptionalism' that must shake a defiant fist at Darwin and shun the insights to be harvested from that beautifully articulated and empirically anchored system of thought. We can understand how our freedom is greater than that of other creatures, and see how this heightened capacity carries moral implications: noblesse oblige.
>
> Daniel C Dennet[44]

In an ever-changing world, it is vital that we live in social and environmental cohesion. We play a pivotal role in current global environmental changes, but we do not have control over the planet. It is arrogant to assume that we have power over this planet. We falsely believe that we will be the first species to live forever. We are parasites and if we destroy our host, we will perish as well. Only if we begin to accept our uniqueness on this planet with a humble mindset rather than an arrogant attitude will we be able to live as symbiotic partners with the earth.

The current freedom that we have to choose among a vast range of available options is the result of preceding generations who have made choices that amplify our freedom rather than constrain our options. It is irresponsible to abuse that freedom and reduce it for future

generations by ignoring the warning signs from science and nature itself. We constrain our future freedom through greed.[45] Our greed stems from a culture of fear: a fear that these choices won't be there some day, a fear that breeds our consumer mentality.[46] Ironically, it is because of this fear that our available choices will diminish.

The relationship between brain and culture is co-evolutionary and co-developmental. The way we interact with our environment creates the way we perceive it, and the way we perceive it in turn defines the way we interact with it. A new way of perceiving this environment is essential. These new perceptions must permeate throughout every aspect of our existence for changes to occur. We have infinite knowledge but only finite wisdom. We have a responsibility to imbue the growing bodies of knowledge with this wisdom. A new mindset must saturate the private culture of individuals and the collective culture of societies in order for the myriad of opportunities to continue to expand.

For example, animal research is approved by ethics committees depending on its potential contribution to the health of humankind. However, animal research should not be performed for the sole benefit of humankind but for the benefit of all species on this planet. Only when we accept our pivotal role in the ecology of this planet through humility, not arrogance, can we truly justify our Machiavellian use of animals in research.

Science is the cultural extension of natural selection. New ways of doing things that have proven successful in the laboratory are distributed throughout society and culture. Today, the scientific method has become increasingly reductionistic. It has divided systems into constituent components in order to study them. The more we learn about these constituents, the more it becomes apparent that we do not understand how they work together as systems. What we need, when it comes to a comprehensive study of humanity, is a science that can look reflexively upon itself. This can be achieved through a holistic science that reassembles the many systems that traditional science has broken apart.

The ultimate aim is to understand brain activity, not in isolation but in interaction with its environment. The human environment is both ecological and cultural. Neuroanthropology will give us insights into the origin and very nature of our species. Additionally, it will enlighten our role in relation to the other animals and the elements of this earth. One of the biggest criticisms of contemporary brain

research is the reductionist approach that tries to understand the brain out of context. However, this is merely a reflection of how modern man has separated himself from his original environment. We live in societies disconnected from the animal kingdom. We have taken the mind out of nature: not just in the laboratory, but in society as well. By minimising anthropocentric bias, neuroanthropology seeks not only to study the brain in context, but also to place the understanding of humanity back in its original environment. In the words of Edelman, it is an effort to 'put the mind back into nature'[47] and human nature back into society.

A NEW MINDSET

> We cannot solve the problems we have created with the same thinking that created them.
>
> Albert Einstein

At a cultural level, the neuroanthropological perspective highlights the importance of intelligence and creativity in the survival of our species. Invertebrates with hard-wired nervous systems (or no nervous system at all) are able to adapt to changing environments at a genetic level through mutations that are carried across rapidly reproducing generations. Vertebrates, most particularly humans, who do not reproduce as fast, have to be able to adapt at the level of the phenotype. We adjust to changes in our environment through finely tuned adaptations invented at the cerebral level and transmitted, without correspondingly precise genetic prescription, at the cultural level.

By using our intelligence and creativity we have been able to control disease, live in harsh climates and survive natural disasters. But will that intelligence be the cause of our own demise? The role our applied intelligence will play in the future of medical practices will always have to be under constant assessment and will lead to neuroanthropology's eventual role in bioethics and morality. As EO Wilson suggests: 'A science of sociobiology, if coupled with neurophysiology, might transform the insights of ancient religions into a precise account of the evolutionary origin of ethics and hence explain the reasons why we make certain moral choices instead of others at particular times'.[48]

Science alone will be insufficient to answer the fundamental questions. Edelman asserts that scientific misconceptions arise mainly 'because experts in various subdisciplines have remained confined within their own specialties'.[49] Although he acknowledges that this is not the only reason, doesn't this assertion express a need for a new field of human endeavour, a new area of research with which to consolidate scientific thought and reason?

The field of neuroanthropology will be a specialty of systems-generalists. It has arisen in response to the increasing demand to answer questions previously only touched upon, to provide new scientific insight, discovery and progress. Furthermore, as EO Wilson's life research has helped demonstrate, a study of the world from both a biological and social perspective can help bridge the natural and behavioural sciences.

In 1977, John Blacking acknowledged 'the need to study the biological and affective foundations of our social construction of reality'.[50] The study of the socio-cerebral evolution of consciousness is concurrently the study of mind, memes and the material world. Therefore, as Steven Mithen states: 'The list of whom we might turn to for answers about the human mind is indeed long. Maybe it should be longer still with the addition of artists, athletes and actors—those who use their minds for particularly impressive feats of concentration and imagination ... almost all disciplines can contribute towards an understanding of the human mind'.[51]

Anthropologist Charles Laughlin, genetic epistemologist John Piaget and psychiatrist Gene d'Aquili advocate combining anthropology, the neurosciences and contemplation as the most productive way to explore and model consciousness.[52] Neuroanthropology has firm foundations in both the humanities and science. As traditional disciplinary boundaries dissolve, a mixture of laboratory work and field studies will contribute to the successful integration of intuitive-emotional and rational-deductive explanation. The subsequent multidisciplinary framework of knowledge will lead to new areas of research. It is a viable path to reconcile and harmonise the observational with the experiential, the being with the becoming and the structural with the process.

Our productivist civilisation neglects the relationship between our Self and our being, and our consumer mentality impacts negatively on our planet. Neuroanthropology, a field of enquiry at

the intersection of science and culture, can be applied to create both better ways of living and a sustainable culture that satisfies them. In doing so, it is important that we explore ideas and observations whose import and ramifications have been overlooked. Presenting this vision is necessary to break old dogmatic beliefs and thinking methods in order to generate new scope. With room to develop theory and methodology, the potential of neuroanthropology will be to allow us to better understand the relationship between the neurobiological processes of the brain and the behaviour of ethical and cultured, social human beings. ❖

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