4. Navigating the New World, Not Brave, But Changing

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There are ongoing developments in science and technology that are transforming the very basis of our physical and mental being. An intense transformation is occurring where among others: mental activities are being projected onto artefacts, artefacts themselves outperform humans as mental processors, human senses are projected outward and extended, the body projected outward and introjected inward. What 3 billion years of evolution has crystallised into the human body and mind, and their environment is being re-made, and has to be re-thought.

These new technological changes are thus transforming the world we live in. This transformation is more profound than the Neolithic Revolution which brought us agriculture or the Industrial Revolution. It transforms not only our environment and how we produce and consume, but also our very human status. We are transforming not only physical biological selves but also our mental states and the apparatus through which we process our mentality. These transformations extend also to the environment in which the biological and the mental being (or what remains of it in the transformed world) function. The new environment in which 'humans' operate is increasingly becoming not that what is being delivered to us by billions of years of evolution, but of transformations that at the foundational level challenge that delivered system. Let me give some examples of some of these foundational changes which are a pointer to the immediate future.

Examples of Some Foundational Changes

Brain cells in Petri dishes have been connected to robotic devices, and these 'dish-brain-controlled' robots have been made to do some human-like tasks. Such interconnected networks have 'some

sense of what is going in themselves', a sense of 'self' (Keim, 2006). The brain as well as the body is determined to a large extent by our genetic inheritance. 'Synthetic biology' is being developed to produce artificial life systems using the same molecular basis of living systems. Synthetic biology would use off-the-shelf chemical ingredients, and build living mechanisms like engineers produce computer chips. It would redesign existing genomes and create new life forms (SynBERC, 2011).

This should make us turn to the cloning of the mind or aspects of it through computing, especially Artificial Intelligence related systems. All these aim at cloning the partial behaviour of the mind. In addition, all our senses namely the parts of the nervous system through which we apprehend the world are being changed through technological developments to go beyond nature. At a simple level by clicking on an icon or speaking to a microphone, I can initiate an event remotely, which the event can also feed back to me so that I internalize the fed-back experience. The extensive cloning of human mental capacity through IT aims to spread the individual identity widely over artefacts, say for example over the Internet to persons and things that one has not seen or does not know. One sprays one's identity and one's memory very widely beyond the borders of the body.

In a parallel process, if I was in the early part of the 20th century, most of my information processing would have been through my brain and through manipulations in my mind with possibly a few mathematical operations done through a slide ruler or later through a calculator. But now my data is computed through thousands and millions of artefacts. For example, interrogating a sufficiently sophisticated weather system results in my being delivered hour-by-hour forecasts to wherever I am, through millions of calculations done in the background.

This interaction between human and computer is increasingly becoming opaque, so much so that I would not know what goes behind the computations, partly because it is done at very high speed beyond human capacities, and partly, even if I knew how to follow the computations, it would not be possible in principle to do so, especially in systems that learn.

Even smart phones now have augmented reality, possibilities that show relevant data as I go physically around in the world. I am given data on what I'm passing through as would be available soon through Google Glasses (Greene, 2012). I would be experiencing the world mediated through a computer so that the world of the senses is augmented and mediated by a large stream of inputs from the environment that fits into me, the user. If augmented reality is combined with Virtual Reality, the intimacy of the human and computer generated visual and other sensory inputs becomes far more intimate. Increasingly in such situations, what occurs inside the brain and outside in the sea of artefacts become so intermingled that this intrusion of prostheses turns into a foundational problem at an ethical and philosophical level.

In the coming decades, the era of computing artefacts will accelerate. The trillions of transistors in integrated circuits, the number doubling every two years or so for the last half century ('Moore's Law') is reaching its physical limits of silicon-based technology. New emerging technologies such as quantum, molecular, protein, DNA, and optical computers promise far greater possibilities of shrinking the largest supercomputers today to the size of a sugar cube and probably far more in the future.

Computers connected to each other to form the Internet transmit data around the globe today at around 1.7 megabits per second. Bell labs have already demonstrated transmission speeds,

equivalent to 100 billion megabits per second, nearly 60 *billion* times faster than current rates. This would enable interaction in a sea of information (Strickland, 2011). In addition, most Internet access will increasingly be through mobile devices with possibilities of voice input and output. Computer input and output using other senses (vision, touch, even possibly taste and smell) are increasingly coming to the fore.

Through ubiquitous computing, information processing is progressively being more integrated into everyday activities and artefacts resulting in the 'Internet of things'. Here ICT integrates humans into the very 'fabric of everyday life', and humans become indistinguishable as communicating nodes from computer systems. In that all-pervasive and integrated system, humans will mostly be unaware that they are surrounded by a sea of computing devices. Today's 5 billion interconnected devices are expected in 10 years' time to reach 50 billion (MacManus, 2011) – a processing sea surrounds us. Far more computers would be communicating with each other than would humans with each other, and humans would be unconsciously interacting more with computing devices than with their fellow humans.

Currently, the Western population is spending half of their waking time in front of passive TV screens or interactive computer ones (Ofcom, 2010). Use of interactive 3-D virtual environments, augmented realities and virtual worlds means a considerable number of humans will inhabit artificially constructed realities.

Computing devices themselves are connecting to mechanical systems resulting in robots that perform increasingly human-like functions that contrast to the manufacturing robots of the 1970s. New biological robots that build themselves and could even correct their own mistakes have been demonstrated (Than, 2005). Use of genetic algorithms combined with 3-D printers has already allowed the creation of robots that create themselves (Peels, 2010). These tendencies indicate another aspect of an evolving artificial environment.

Mind reading technology is on the verge of creating consumer goods controlled by the mind. In a different direction, new imaging approaches decode individual words of a person's thoughts, and in principle, become possible to remotely access the visual content of mental processes. In the coming decade, one would be able to increasingly decode thoughts and accompanying pictures (King, 2012).

The Human Connectome Project (2010) hopes to scan a large number of brains to give a picture of the neural structure of the human brain in a few years. Opening the door to changes in the very apparatus through which we perceive the world, mice have been implanted with new genes that help them see the world through the visual spectrum of humans (Minard, 2007). We could in theory change the windows for our physical perceptions.

Genetic and Computer Information No Longer Separated

The examples given above show that genetic information and computer information are no longer separated from each other as they are worked upon by human cultural information. The exponentially accelerating process of merging of these information streams will redefine what constitutes 'social' and what constitutes 'community.' A community's members communicate with their 'significant

others' and change their internal information states (and their internal and external behaviors). Under conditions of all-pervasive merging of information, exchanges occur across all the three systems of genetic, computer and cultural. In this sense, the concept of significant other, that is a communicating entity, is now spread from human communities to encompass also the biological/genetic and the artefactual. A seamless merging between the three realms now occurs (Goonatilake, 1999).

These profound changes will have significant impacts on how we navigate this world, in short on our compass of ethics, of which way to turn and how and when to turn.

Intrusion of Technology into the Biological, Mental and the Cultural

This increasing foundational intrusion of technology into our very biological, mental and cultural selves raises several important questions. Through these admixtures, our very biological and mental being is being rewired. The new technologies and their effects bring about deep ethical questions. What are the ethics that we should use, what is the morality, grounded in what philosophy should be used to navigate this new world where our very biological, mental and cultural ground is being cut under our very feet? These questions are much more profound than similar key turning points in history like the Paleolithic, the Neolithic or the Industrial Revolutions. The reason is that the new technologies and their interventions question the very core of our identity – both physical and mental, body and mind.

Some beginnings of these questions can be traced to for example in the late 1970s when in-vitro fertilisation came about to create 'test-tube' babies. Today, this is a relatively common procedure with by mid-2012 over 5 million such babies existing (Medical News Today, 2012). A similar relatively old technology is surrogate motherhood. All these create havoc in the social identities of people. Let me give an example from what has already happened some time ago in an act of surrogate motherhood. A woman carried her own daughter's child so that the grandmother and mother became the same and the identity of the child was multiple; being at the same time son, grandson, and stepbrother (Gruson, 1993). The identity of a parent can also be reversed by new developments. Let us go to in-vitro fertilisation. Of the 5 million births from this process who would be the parent of the child 'produced' from an egg donated by Mrs. A., combined with a sperm from Mr. B., implanted in Mrs. C's uterus and given for adoption to Mr. D. and Mrs. E.?

These questions have been raised before the period of genetic interventions and developments in IT. These questions would increase dramatically with the ability to excise in and excise out genes from a chromosome. An example would be the removal of a gene responsible for a dangerous disease or the addition of a gene responsible for a desired characteristic. Already people are selecting babies on the basis of ultra-sonic scans (aborting an undesired fetus - most often a girl fetus).

To get at 'good' genes, one could have a variety of donors, for example each for a desired eye, for a desired set of teeth, for a particular form of intelligence, to avoid a particular disease and so on. The required genes need not necessarily be from a living donor but could hypothetically be from a gene bank. The transgenic source could even be from another species as has already

happened for other animals and plants. In such a situation, the 'parent' can be from very different sources muddling the whole parentage affair beyond the current legal system based on humans as agents/creators. This is enhanced especially when the choice of a gene is made through a computer program with Artificial Intelligence and learning characteristics which by definition precludes human agency.

Constructed and Reconstructed, from New Developments

When we are thus constructed and reconstructed, from new foundational developments transforming our body and mind and our environment, deep questions are raised that challenge existing ethical systems, that is, how to navigate this new world. Dominant Western ethical systems for the new technologies are derived from presumably 'secular' roots or from Christianity, Judaism or Islam (the 'Abrahamic' religions). The new developments which have continuous change as the central core challenge some of these ethical assumptions.

Bioethics cover a wide realm of issues varying from abortion, animal rights, the nature of the body and mind, definitions of death, euthanasia, the environment, eugenics and medical ethics in general (I have selected these topics as representative from the *Encyclopedia of Bioethics*). And if one were to bring some other related issues, it would also cover problems in another new technology, informatics, specially emerging discussions on computer based artificial life and attendant issues of rights of robots. These expansions of technology result in challenges to deeply held cultural assumptions. Recognizing their importance, Western ethicists have called for public debates on these and other issues. As in the coming decades the world – its production, consumption and creative bases – increasingly shift to Asia, there has to be Asian thought on these culture-impregnated issues.

Generally, today's area of bioethics in the West uses an interdisciplinary perspective. It incorporates the views of philosophers, theologians, historians, lawyers, writers and scientists. Some of the questions and answers are also influenced by the Hippocratic Corpus which is the tap root from which all Western ethics in medicine is formally derived. Many medical students take the oath on graduation. (One should note that similar, and at times, more comprehensive medical ethics are found in Asian sources such as Susruta, Charaka etc.)

Western Religious Definitions

But the debates that have already occurred have been through the implicit framework of Western religious definitions of life and ethics. Often one sees lurking behind these, implicit assumptions like those of a soul. Some of the issues that have been raised by already existing technology are, for believers in a God only to be seen as 'playing God' as the title of a book on the topic so aptly puts it (Scully and Scully, 1987).

With Christianity, the church had developed a large and highly detailed set of views on birth, based on its perspectives. But even within Christianity, such views had changed. Saint Augustine, for example, had held that human life began at quickening, the mother's first feeling of the movement

of the fetus. This occurs at the fourth or fifth month of pregnancy. Thomas Aquinas, following Aristotle saw the beginning of human life only at the time when the unborn acquires a soul. For males this soul acquisition occurred at forty days after conception, for females after eighty days. Saint Gregory of Nyssa following Plato put the beginning of life at conception. However it was barely hundred years ago, in the late 1800s that after fertilization was understood did the Roman Catholic Church settle on conception as the beginning of life, giving up the en-soulment concept.

In non-Western countries, there has been little debate on modern bioethics, although it is readily admitted by workers in the field that non Western traditions could well give different answers to these questions (Callahan, 1990; Callahan and Campbell, 1990; Campbell, 1990; Kin-ichiro, 1989).

Some of the bioethics related topics discussed today have deep resonances with concerns of the major civilizational strands of Asia, which is before the arrival of simplistic Judaeo-Christian thought with its crude assumptions of a creator etc. These Asian civilizational strands whether they are Taoism, Shinto, Buddhism, Confucianism or Hinduism have much relevant material on some of these topics. For example, contemporary Western discussions on animal rights or issues of the environment do not appear strange to Hindu or Buddhist thought. In fact the modern Western movements in these fields have increasingly borrowed from this thought.

And where a Western frame has not been superimposed, Asian thought has given different answers to the pressing bioethical problems of today. Thus in Japan, which has tended to be relatively independent of Western prescriptions at least in issues relating to human relations, Buddhist ideas and Shinto ideas co-mingle and co-contend. Buddhist ideas tend to propagate an individualistic ethos of the person without any self while Shinto tends to emphasize the interrelatedness of humans (and nature). The outcome has been a slow path to organ transplantations and its partial prerequisite of a brain-death definition of life. Buddhism and medicine it should be noted was closely correlated in Japan – as in other Buddhist countries like Sri Lanka. Up to the 1860s the majority of Japanese doctors were Buddhist monks (Becker, 2000).

So it is necessary that we step out of our Western boxes and think afresh. Western commentators observed this lack of Asian discussion over a decade ago (Wind, 1990). But there are now beginning of some non-Eurocentric discourses on some of these issues of bioethics. For example there has been a foundational Buddhist critique of the Western concepts of human rights in the journal *Philosophy East and West* (Hershock, 2000). Recently there was Keown's book length attempt at Buddhist bioethics, a rather mechanical textual effort, but a beginning just the same on such issues as abortion and time of death (Keown, 1995). There has been the populist writings of Vandana Shiva which has attempted to bring in some broad brush Hindu ideas into feminist and ecological discourse (Miles and Shiva, 1993). And there are the writings of Loy and Barnhart during the last few years on Indian and Buddhist bioethics (Barnhart, 2000; Loy, 2000). Some of these are a beginning. Some of them have not touched some of the very exciting and related issues that have come in certain discourses in human genomics, evolutionary theory and Artificial Intelligence. The present paper, a continuation of some related earlier writings on the topic by the author is an attempt at a foundational dialog on the issue of bioethics brought in by the new technologies (Eide, Eide, and Goonatilake, 1984; Goonatilake, 1998, 1999).

Questions of ethics touch issues in philosophy and belief systems. As most bioethics discourse has hitherto occurred on the Western and partly Judeo-Christian discourse it is useful to delineate the differences between philosophy and belief systems in the Judeo-Christian (and Islamic) and Greek derived Western systems and (South) Asian ones.

Religion, Philosophy and Science: South Asian and West

In discussions on bioethics, the fields of science, philosophy and religion intermingle. But 'religion', 'philosophy' and 'science' have different connotations from a South Asian - say Buddhist - perspective and a Eurocentric one. These themes need to be explored in a cross-civilizational perspective, as a preamble, to see bioethics in a more universal light.

The English word 'religion' has a heavy set of connotations, carried over from Judeo-Christian roots. This same word 'religion' is also carried over by many social scientists as well as by popular English language usage to describe South Asian belief systems. But South Asian belief systems differ widely from the Judeo Christian systems. Some like the Charvaks were out and out materialists. Some like Buddhism could in contemporary parlance be considered to have some characteristics of atheism. As a central feature, all South Asian belief systems possess a heavy overlay of philosophy. Some, such as those of Jainism found mathematics an important ally, in fact mathematizing some of their belief systems and developing important mathematical findings on the way (Goonatilake, 1999, pp. 27, 60). The Buddhists, on the other hand, had important psychological observations.

Over the last few decades, several serious studies have emerged that lay bare from an East-West comparative frame, many Eastern philosophical positions that accompany its 'religions'. University departments have been devoted exclusively to their study and journals such as Philosophy East and West are exclusively devoted to the topic. Generally speaking, South Asia in the formulation of Moore, has an "almost infinite variety of philosophical concepts, methods, and attitudes, ... There are many differing approaches to reality ... [and] ... to truth" (quoted in Bishop, 1975, p. 3).

But modern philosophy in the West arose as an unraveling of the Middle Ages through the Renaissance, the Scientific Revolution and the Enlightenment. All these events of the last few centuries changed Western thinking. There have been many studies in the tradition of East-West comparative philosophy that indicate that although South Asian – say Buddhist - and modern Western approaches may not necessarily agree on the answers to key questions, they sometimes broadly address similar problems.

Let us take Hume who was a father figure in this Post Scientific Revolution philosophy. He influenced the political and social thought enterprise of the Enlightenment by creating a climate of ideas that challenged the status quo. Several commentators, such as Whitehead, Moorthy and de la Vallee Poussin have pointed to the surprising and detailed similarities between some of the thoughts of David Hume and of the Buddha, especially in relation to the idea of the self (Pliny, 1969). (These similarities will come to the fore in our later discussions on non-Eurocentric bioethics).

Pliny observed that in both these philosophical viewpoints separated by over 2,000 years, "there is no thinker but the thoughts, no perceiver but the perceptions, no craver but the cravings.....

The similarity ... is striking" (ibid., p. 18). Pliny has explored further similarities, and has put them in perspective of the European intellectual climate at Hume's time. Pliny pointed out that the years from 1600 to 1769 were the period during which: "the Orient contributed most to Western thought" (ibid.). Pliny rejects the notion of an independent discovery of these ideas by Hume and holds the view that Hume was influenced by ideas from China pouring into Europe at the time. And as part of that transfer from China were also Buddhist ideas (ibid., p. 26).

More recently, studies by comparative philosophers have indicated considerable overlap between key Western philosophers and Buddhism. These include Hegel, Schopenhauer and Nietzsche (Goonatilake, 1999). In the case of American philosophers, Dale observed that there were South Asian influences including Buddhism on William James, Charles A. Moore, Santayana, Emerson, and Irving Babbitt which influences helped enlarge the debate on philosophy in America, for example in epistemology, psychology and on ideas of the self (Riepe, 1967). William James, had ideas of the self 'which could have been written by a Buddhist'. Buddhism's process approach likewise has influenced or found parallels in a set of Western philosophers such as Charles Pierce, John Dewey, William James, Alfred North Whitehead and Charles Hartshorne (Pliny, 1988). Price (1955) has seen significant parallels between Buddhism and early 20th Century thought.

The Questions of King Milinda (*Milinda Panna*) is one of the most popular Buddhist texts in Sri Lanka and Price says of this text that it 'might almost have been written in Cambridge in the 1920s'. Hanna has seen parallels and similarities with Buddhism in the phenomenology of Husserl and Heidegger (Hanna, 1993). Heidegger is quoted as saying, "If I understand [meaning Buddhist ideas] correctly, this is what I have been trying to say in all of my writings" (Kant, 1965).

One of the most seminal philosophical figures in this century, because his ideas deeply influenced Einstein and the latter's theory of relativity, was Ernst Mach. Mach's philosophy was very sympathetic to Buddhism, because like him, it denied a permanent self. There were thus possible indirect backdoor influences of Buddhist ideas on Einstein through philosophical ideas associated with both Hume (another key influence on Einstein) and Ernst Mach. These were two of the few philosophers which Einstein read between 1902 and 1904 immediately before his Special Relativity paper. Hume's book studied by Einstein was *The Treatise on Human Nature* which had strong echoes with Buddhism (Miller, 1987). Einstein gave Mach credit for significant influences on his own thinking, in the development of both Special Relativity, as well as General Relativity (Graves, 1971). Mach himself had an attraction to Indian literature and science, including its mathematics. Some of his friends were Buddhists like Paul Carus and Theodor Beer. Mach also contributed to Paul Carus' journals *The Open Court* and *The Monist* (Jackson, 1968). Mach's first direct appreciation of a Buddhist philosophical orientation, especially with relation to the relativity of the observer (central to Einstein's theories) was revealed when he wrote in his *Analyse der Emfindungen* (Analysis of Sensations) (Blackburn, 1972).

> *But to ask that the observer should imagine himself as standing upon the sun instead of upon the earth, is a mere trifle in comparison with the demand that he should consider the Ego to be nothing at all, and should resolve it into a transitory connection of changing elements (ibid., p. 287-288).*

Buddhism's central thesis denies a permanent Ego and considers both the observing Ego as well as the observed world as transitory. Incidentally, it is significant that Mach's *Analyse der*

Emfindungen was translated into Sinhalese, soon after it appeared; in fact, Sinhalese being the first language, it was translated from the German original (Blackmore, 1972).

The other scientific revolution of the 20th century - quantum physics - also resonated with Buddhist epistemology. The best illustration of this is to quote Robert Oppenheimer, the head of the Manhattan Project in the 1940s which gave the world the atomic bomb. Commenting on the peculiar nature of quantum physics, Oppenheimer wrote: "If we ask, for instance, whether the position of the electron remains the same, we must say 'no'; if we ask whether the electron's position changes with time, we must say 'no'; if we ask whether the electron is at rest we must say 'no'; if we ask whether it is in motion, we must say 'no'. The Buddha has given such answers when interrogated as to the conditions of a man's self after his death, but they are not familiar answers for the tradition of seventeenth and eighteenth century science" (Oppenheimer, 1954). (In a recent article in *Nature* I have traced in more detail the philosophical resonances between modern physics and Buddhist philosophy) (Goonatilake, 2000).

The above examples are only an indication of the fact that, as the West unfolded its philosophy in the last few centuries, there are many areas of similarities between South Asian and Western positions, I have gone out of the way in the above descriptions to indicate from Western sources that Buddhism and other South Asian belief systems in their core are nearer to the Western category of philosophy and is at least partially an observational approach than the revelatory religions of the Judeo Christian traditions. I have also shown that these Buddhist philosophical and observational positions at times bear directly on issues of science.

What appears from the above listing of East-West comparative considerations therefore is that a facile East-West comparison between 'Science' and 'Philosophy' on the one hand and 'religion' has many pitfalls. There are much larger elements of both the philosophic as well as the scientific in South Asian belief systems, some of these elements in fact having deeper resonances with the scientific endeavour in the West, than did Christianity. But, this does not mean that Buddhists, Hindus and Jains were 'more scientific' than Europeans. What these contextual factors raise are wider questions concerning the nature of science, the nature of philosophy in East and West and the nature of belief systems such as the revelatory Judeo-Christian religions and the non-revelatory South Asian ones. These contexts are especially important in considering science induced philosophical issues including those of ethics that are brought about by biotechnology.

Generally speaking, Western religions are revealed systems, presumed to be by a higher power, 'God'. Buddhism is, at least partly, experiential and experimental, built on individual perceptions and experiences not necessarily on another's unverified word of his experience. In Buddhism this sense of personal experience and verification is central to its theory. But practice, let me hasten to add, does not always follow theory (or more accurately, does not follow the popular ideology of what a 'correct' and 'scientific' theory should be). Let me now return to the issue of change that is a common factor in the new technologies.

Change at its Very Core

A major approach that has change at its very core is Buddhist philosophy. Some core Buddhist approaches have direct relevance to a future where the body, mind and the environment is

constructed and reconstructed. The central Buddhist position on both the human person, including his/her body and mind, as well as the environment he/she operates in, is not given or sacred but constructed and changing. This suggests that an orientation from this core Buddhist perspective of continuous change, no permanent self and both human and nature as constructed would fit better as a cultural orientation to examine and live in a future world under continuous change and where man and nature are continuously reinvented and reconstructed. It also suggests that Buddhist ethics derived from such a perspective (which unlike the revealed religions of Judaism, Christianity and Islam is not absolute, but contingent and situational) may better fit as a means of navigating the coming interconnected world of the clone, the robot, the cyborg and the virtual life for a coming trans-human and post-human society.

Buddhism is a mixture of some of the unprovable cultural furniture of the Buddha's time similar to those of other belief systems then prevalent combined with a strong element of observation and philosophy. It is the last two that are important to us.

In Buddhism, the world and the universe is in a constant state of impermanence, of ceaseless movement without any durable or of static being (Malalasekera, 1961a). Unique in the philosophies of the world, Buddhism denies the existence of a soul or of a self (*anatma*). The belief in a permanent abiding 'me' is de-constructed in a radical fashion.

In the Buddha's own words, "there is no materiality whatever ... no feeling ... no perception.... no formations ... no consciousness [these five constituting the five Buddhist aggregates] whatever that is permanent, everlasting, eternal, not inseparable from the idea of change, ... that will last ..." (Malalasekera, 1961b). And, at another time, "When neither self nor anything pertaining to self can truly and really be found, this speculative view [of] a permanent, abiding, ever-lasting, unchanging [self] is wholly and completely foolish" (Rahula, 1978). A disciple of the Buddha elaborated further that what one calls 'I AM' is "neither matter, sensation, perception, mental formations nor consciousness" [- the latter, the five Buddhist aggregates] (ibid., p. 65).

Mental and physical elements change in a state of perpetual becoming, all phenomena become strings and chains of events. As these constituents change, a person does not remain the same for any two constituent moments (Malalasekera, 1961a). In the Buddhist perspective, the individual does not exist, only a stream (Malalasekera, 1961b). Life is a stream, a succession of aggregates without a temporal or spatial break (Kalupahana and Tamura, 1970). The continuity of life is not through a soul, but through a stream of becoming (Jayatilleke, 1980).

In Buddhism, one is expected to observe these through the act of meditation and to realise the lack of self and permanence at the deepest level. Here, identity is not through a snapshot of being, but is a process of becoming and an unravelling. From such a perspective, the foundational questions brought by the new technologies are seen differently. The threat of being a cyborg or of spreading one's self over many artefacts is seen differently - without angst. The contrast with critics of biotechnology not only from fundamental Christians, but also of a secular person like Jeremy Rifkin is seen differently.

Rifkin complained that through developments in biotechnology, living things "are no longer perceived as carrots and peas, foxes and hens, but as bundles of information. All living things are drained of their aliveness and turned into abstract messages. Life becomes a code to be deciphered.

There is no longer any question of sacredness or inviolability. How could there be when there are no longer any recognizable boundaries to respect". Further, he groaned "as bioengineering technology winds its way through the many passageways of life, stripping one living thing after another of its identity, replacing the original creations with technologically designed replicas, the world gradually becomes a lonelier place" (ibid., p. 29). But Buddhism removed the seeming sacredness and identity over 2500 years ago.

This perspective transferred to the new world, one realizes that a gene does not make a sentient being. Only the flowing history of an entity, of the stream constitutes the human or the sentient cyborg. A person is not a unique individual, but a constructed one, part of an ever-changing flow, a moving lineage. In Buddhist funerals, the sign posted on cloth is '*Anicca Vatha Sankara*' – all compounded things decay.

If to this changing lineage, one adds new elements, new parts and changes them, it is a normal nature of all living streams. All such streams are constructed from constituent parts to yield an ever moving process. This is the normal existence of a person, of a constructed being. If one were to artificially add new elements, new genes or new artefacts to this flowing system, it is but a part of the normal construction of such flows. From the point of view of a realist, there is no difference.

But such a perspective makes one squeamish. Raises fright, alarm and even disgust. One would not mind, a set of false teeth, even an implanted one, prosthesis for one's limbs say, a walking stick or for that matter even a motorized electronically controlled one. But messing up one's interiority, ones subjectivity, evokes an entirely different order of emotions. The aliens taking over minds, raises different feelings, of one's own consciousness being invaded. It is after all, putting doubt on one's own subjectively-felt oneness that is at stake.

But in such instances, the Buddha himself had been very firm, rejecting the views of persons who take the thing called the 'mind' or 'consciousness' to be an unchanging substance. In that case, it was better, he argued, for a person to take the physical body as an unchanging 'self', rather than thought, mind or consciousness, because the body was at least more solid in appearance than the mental, which are ephemeral and continually change and so are hardly candidates for permanency (Rahula, 1978). Interiority and consciousness is demystified into mundane components. In the ponderous and archaic language of 19th century European translators of an important Buddhist text: "Were a man to say I shall show the coming, the going, the passing away, the arising, the growth, the increase or development of consciousness apart from body, sensation, perception and volitional formations, he would be speaking about something which does not exist"(Feer, 1884).

But experiencing the intrusion of the new technologies that remake us biologically and culturally, in an internal sense is disturbing. It challenges our sense of self. "This idea that I may not be, I may not have, is frightening to the uninstructed" as the Buddha himself put it. And, as the belief in an abiding self is deep rooted in humans, the contrary position is 'against the current' as the Buddhist texts say on one other occasion.

If then in the coming future, it is inevitable that we be constructed and reconstructed, from biology and artefact, what should be our epistemological, philosophical, ethical and subjectively felt guiding principle. If 'we' would then be cyborgs and hybrids, what should the interiority of robots, of constructed hybrids be, as they navigate reality, and tunnel through time subjectively?

The person is not a 'what', but a process. Being is only a snap shot in the process of becoming, lasting only the length of one thought. "Just as a chariot wheel in rolling, rolls only at one point of the tire, and in resting rests only at one point; in exactly the same way, the [internal] life of a living being lasts only for the period of one thought. As soon as that thought has ceased, the being is said to have ceased".

There is no stable substratum to be considered the self. It just symbolizes a stream of physical and psychological phenomena that is perishing. This is the correct view to be internalized in the inevitable day of the cyborg. As the 5th century Sri Lankan classic of higher Buddhist theory Vissudhimagga put it:

There is no doer but the deed, There is no experiencer but the experience.

Constituent parts roll on. This is the true and correct view (Gunaratne, 1982).

One analyses oneself, knows oneself only to realize that there is no self in the first place. This is not an intellectual knowledge but an internally observed, felt knowledge. This elimination of the sense of self sets one free in Buddhism. This is the highest ethical goal in Buddhism (Malalasekera, 1990). When the realization dawns that I am not a thing but a process, then the future becomes open ended. Buddhism is self-referential, to know oneself is to make oneself, to guide the self that is not there (Kolm, 1985). In the Buddhist analysis, dissatisfaction and anxiety becomes essential to the 'I' because these are the 'I's response to its own groundlessness (Loy, 1992).

This internal experiencing of the non-self does not lead to a loss in integration, awareness or vitality of the mind, that is, of the view from the interiority of the hybrid lineages. On the contrary, perception unclouded by false perceptions leads to perceptual clarity. Perceptions of others are enlarged because there is an empathic openness based on a non-judgemental awareness (Page and Berkow, 1991). The fully mentally healthy person, the *arahat* is expected to have a state of continuous inner delight, attends keenly to all the circumstances of a situation and can respond with skill to every situation.

This is the phenomenology of flow for human thought. These views from the Buddhist analysis of streams and the self are also a pointer to a moral compass to an inevitable future of mergings of streams from biology of different sorts, of culture and computing artefacts. Such a perspective has given rise to a profound moral code and altruism, and it is not entirely far-fetched to think that it could also do so in this case of merged streams in hybrids.

But then, what do we make use of that 'external' baggage that has intruded into us. If it is not 'ours', and if in fact 'we' do not exist, what do I make use of this alien intrusion. How do I internally react to this massive inflow, into my biological and mental interiority, which is in store for me in the new century? Let me recourse to a standard exercise in Buddhism in dealing with that interiority, to 'meditation', Buddhist observational practice.

In the first instance, one trains oneself to observe one's interiority to realize for oneself its constructed nature, its lack of an essential being. Secondly in this process of observing one self, one dispassionately notes also the coming and going away of one's thoughts. One observes them and lets them go.

This is in meditative practice. I suggest that in everyday reality, of the day of the cyborg too, one would indulge in a parallel exercise. One could recognize the constructed nature of our internal and external cyborgs, our own Frankenstein creatures, realize their real ephemeral character and use that as our guiding principle to the external world. But at the same time, one can use our knowledge of the constructions to locate where the constructions come from, from this lineage or that, from this sub lineage or that or from an intertwined mixture. These after all, are some of the techniques we all use when we do analytical thought, incidentally an important branch of Buddhist philosophy, which in some renderings both classical and modern is called a system of analysis. The analytical faculty is retained and can be used in our new circumstances.

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DISCUSSION

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Q1: You outlined some characteristics of South Asian philosophies. As you say, Judeo-Christian philosophy is reflected in Western science and education, in general. What reflections do you find of South Asian philosophies in the way that education is carried out either in education or in science or anthropology or psychology? Do you find a connect between philosophies and practices? In the connection that you have made between future technologies and the Buddhist philosophies, is there a common language or common set of concepts with which this kind of discourse can be developed? Or is it forever doomed to be a separate discourse from what is already existing in this culture?

SG: Yes, I mentioned these two philosophies, and these two belief systems and their discussions about God, hell, or heaven. But the Western philosophies are much more serious. It is basically those belief systems which deviate and contrast with others. The debates on bioethics have gone on secular frames, on Christian frames, and on Islamic frames and Jewish frames. There are debates going on in those cultures. There was a debate going on in Delhi, last year when the Anthropological survey of India organized a conference, wherein the Buddhist, Chinese philosophies discussed on what is life and how it changes. The basic thing is that we have not done our homework. Infact I see the excellent exhibit on 'History of Science' in HBCSE. It is partly Eurocentric. I mention the humanists, these were important for Eurocentrics to introduce the western culture. Many South Asian systems are immersed in that system, and definitely the Confucian system which has a different texture to them as well. But the basic message is that we have not done the homework and we can do our homework.

Q2: We have to do homework but doesn't it happen naturally? A certain belief system, it also reflects in the social system, practices in education in the way that scientist do their science.

SG: Yes, that's true, belief systems are also included in science. I am a believer in science and that practically or tacitly for the moment I accept certain things. But these are different from the other belief systems that give you rigid culture in which we have constraints. But for South Asia and Asia in general, we should do our homework, and we have not done it.

Q3: I would like to know your opinions about the unification of culture through culture that is existing in the world through the emerging of the different environments that you talk about. Do you think there will be a single culture say after a thousand years down the line?

SG: Not a thousand years, say in ten years down the line we will have sixty million various gadgets all over the place with learning capacities totally micro mutualised.

Q4: What is enabling in relating the present science and technology enabled reality to a Buddhist past? Can you explain for example, how this across the century explains of a certain present happening that is now situated by entirely different and a certain past that happened centuries ago? How can that philosophy explain the present? And why do we even want to attempt to do that? I think, because religious explanations, that is, dominant religious explanations are very dangerous whether they are Buddhist. I don't see any Buddhist any more enabling.

A Hindu philosophy could be extremely disturbing. I mean as a dalit, as an Ambedkarite, one might probably take some respite in adopting Buddhist beliefs. But I don't see it as necessarily enabling.

SG: The tensions here are empirical, philosophical and simple blind belief. There is an interesting debate in social epistemology. Around two years ago, Meera Nanda wrote a book on the whole social reconstruction of science. It tries to answer your questions. The thing is that in the Buddhist phenomenon, Buddha carried lot of furniture of his time which is about Gods. But there are elements of the body and mind which have been analysed and basically if you see that type of approach occurs in the west only in the late 19th century and early 20th century philosophies. So these are naturalistic systems very much like having to disaggregate the observational and philosophical from the nonsensical, from the mumbo jumbo. When we copy that and we remake and reconstruct the same. The same metaphor can be applied from Buddhism. If you want, you can read those Buddhist ideas as a metaphorical insight. I know the Indian debates on religion. I do not know the contexts here in India, so I invite conflicts from both sides. There was a Congress outreach and BJP outreach four years ago. I was in Nehru centre only later I found out it was Vishwa Hindu Parishad outreach. Two years ago on Gandhi's anniversary of his text I found it was a Congress outreach.

Q5: I wanted to just get factual information as to which strands of Buddhism are you drawing upon. Secondly, I want to address the issue from the commonsensical notion that we have about Buddhism, it's deeply engaged with notion of detachment and with the notion of both inself and in materiality. When we look at modern science and technology it is governed by totally different impulse which is of the deep attachment and control whereas, Buddhism in many ways stood for detachment, actually giving up control. So how do you address that?

SG: Well, what I said is common to all schools of Buddhism. There is a 19th century invention by Max Weber of the other worldly Buddhism. I just enter the discourse. Max Weber was totally ignorant of Buddhist text. In fact my wife, a Buddhist scholar, also knows Panini's Sanskrit. We have been through all Weber's text, it is total fiction. He misread even the translations. So Buddhism is not other-world, otherwise we would not have major secular structures coming in Buddhist country. Buddhist monks taught mathematics, sculpting, and lot of other things. In 7th century, in Sri Lanka the cadres were divided into two, one depending on city dwellers and the others are the type of people whom you are talking about. So, superficial readings of Max Weber lead into this. In the 21st century, Buddhism has already been spreading and have been also fighting wars. Have you heard of Shaolin temple and so on? People asked how can these kind of texts come into being which is out of mindfulness.

Q6: Are there any similarities between the story of evolution and Buddhism?

SG: Well my talk was not on Buddhism, it was on use of a particular aspect of Buddhism. One should not project backwards. Buddhism is a theory of how the world was formed, has an evolutionary scheme. But it is not an evolutionary scheme like what actually is. It has evolutionary ideas, but is not Darwinian type of evolution. It is also seemingly naturalistic but not like evolution, the kind of how humans came and so on. That's not what I address.