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Editorial: Environmental Ethics and Control

- Darryl Macer, Ph.D.
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In the past few months there have been several major international bioethics conferences held in East Asia, including the UNESCO Asia-Pacific Conference on Bioethics Education, 26-28 July, 2006, Seoul, Korea. This was a Joint Conference organized by Ewha Women's University, the Korean National Commission of UNESCO and UNESCO Bangkok. A joint action plan for bioethics education was adopted which is available at the UNESCO Bangkok website. This was soon followed by the Eighth World Congress of Bioethics and Seventh Asian Bioethics Conference (ABC7), 6-9 August 2006, Beijing, China. There were many experts in bioethics at the biennial meeting of the International Association of Bioethics.

Unfortunately there were few papers on environmental ethics, and only one major session on the subject (which I convened). In this issue of *EJAIB* there are a further four papers on the subject, with perspectives from different philosophies and nature religions in India, from Israel, and from the Muslim World.

One of the themes that is found in modern environmental debates is over control of nature. The same issue of control also is applied to the question of designing humans in later papers in this issue. The question of control over "natural" processes is central to ethical reflection, and as evidenced from the papers here, is approached in different ways in various cultures and between different persons.

Asian Bioethics Association (ABA) members should read the **voting procedures** for renewal of the Board, in the section on ABA in this issue. The announcement will also be sent to all members by Email. Please note the deadlines, also for renewal of EJAIB in 2007.

Altruism Beyond Con-specifics: The Role of Nature Religions

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Introduction

Altruism, which literally means unselfishness, an act of benevolence or welfare to others, or in a broader sense, cooperative behaviour, has stirred the imaginations of philosophers, political scientists, economists, psychologists and evolutionary biologists alike. Does altruism come naturally to those living beings in which it is encountered, or is it an example of freak behaviour? If the latter is true, then why is altruism encountered in a wide array of organisms ranging from the lowly protozoa, to the social insects, to the relatively highly evolved vertebrates like fishes, birds, mammals, and among the latter, in humans, who are believed to be the most highly evolved form of life on planet earth? Can a behaviour that does not promote individual or group fitness be nurtured and perpetuated by the ruthless and impersonal process of natural selection?

Altruism posed a stiff challenge to Darwin, so much so that he described it as an apparently "insuperable" problem, a "special difficulty", and consequently "fatal" to his theory of natural selection. Although Darwin managed to come up with an answer to this difficulty, it was Hamilton (1964a, 1964b), who more than 100 years after the publication of the *Origin of Species*, first came up with an evolutionarily plausible answer to the riddle of altruism. Briefly stated, Hamilton argued that altruism would be found more among close relatives who share a large proportion of genes among themselves. This theory of kin selection and inclusive fitness, could, therefore, satisfactorily explain the phenomenon of altruism encountered among social insects, other animals and among human kin. However, altruism and cooperation among unrelated individuals remained largely unresolved, and this was referred to as "the central theoretical problem of sociobiology (Wilson, 1975). Trivers (1971) made a pioneering contribution towards solving the problem of altruism among non-relatives through his theory of reciprocal altruism. Subsequently, Axelrod and Hamilton (1981) showed through their iterated prisoner's dilemma game that a conditionally cooperative strategy called tit for tat (TFT) could constitute an evolutionarily stable strategy (ESS). However, later studies revealed that a strict TFT might not be as robust as was earlier believed, although TFT-like strategies appeared to work well (Nowak and Sigmund, 1992, 1993). It has also been shown that TFT and non-cooperative (defecting) strategies could coexist at equilibrium (Dugatkin and Wilson, 1991; Wilson, 1998). Other proposed pathways to cooperation include those involving trait-group selection (Wilson, 1975, 1976, 1977; Wilson and Sober, 1994), and by-product mutualism that involves indirect reciprocity (Connor, 1986; Dugatkin, 1997). Another fact that emerged from several studies is that reciprocity, indirect reciprocity and even kin selection are most effective in promoting altruism and cooperation in small groups, while increasing group size hindered cooperation (Aoki, 1983; Alexander, 1986; Joshi, 1987; Boyd and Richerson, 1988, 1989). It is also increasingly being realized that cultural transmission via cultural traits or memes is likely to play a significant role in the evolution and development of altruism among humans, especially unrelated individuals (Dawkins, 1976; Boyd and Richerson, 1982, 1990; Richerson *et al.*, 2003; Delius, 1991). In fact, human altruism exhibits so much individual heterogeneity that mere gene-based evolutionary theories are inadequate to explain important patterns of human altruism. The roles played by both cultural evolution and gene-culture co-evolution need to be emphasized more for explaining the evolution of altruism in human societies (Fehr and Fischbacher, 2003). It has also been proposed that altruistic norms that are not individually fitness-enhancing can nevertheless "hitch-hike" on individually fitness-enhancing internal norms and thereby ensure their transmission and continued survival (Gintis, 2003).

Despite the brilliant expositions on various dimensions of human altruism provided by the aforementioned studies as well as many others not referred to here but included in several major recent works (Dugatkin, 1997; Stewart, 2000; Richerson *et al*., 2003), the debate on altruism and cooperation among unrelated individuals still continues. This is primarily because human altruism is extensive and diverse, being characterized by a number of features such as altruism towards total strangers even in one-shot prisoner's dilemma games, the substantial differences in altruism shown by people belonging to different cultures, as well as the differences among the cultural institutions themselves (Richerson *et al*., 2003).

This paper does not intend to address the problem of human altruism among related or unrelated individuals. Instead it wishes to analyze, in the light of the concepts and theories of evolutionary sociobiology, yet another dimension of human altruism, that not only encompasses the non-human living world, but the non-living components of nature such as rivers, forests, mountains and the like, especially in the context of nature religions practiced by many small and indigenous communities the world over. It also aims to probe the linkages that exist between evolutionary sociobiology and normative ethics with relation to the emergence of ecocentric philosophies and lifestyles.

Human Altruism – A Function of Values

Why do humans exhibit altruism towards others, including non-humans? It is basically because they assign some value to the receiver that may be a relative, a nonrelative, a non-human plant or animal, or even a non-living river, a mountain or a forest. Such values could be of two basic types, viz., extrinsic or instrumental value, and intrinsic or inherent value. Extrinsic value derives from the objective properties of something or somebody that has use for others (in this case to the doer of an altruistic act) by virtue of its functions (Martell, 1994). Thus humans can exhibit

altruism to another living or non-living entity simply because they expect some reciprocity, direct or indirect, for present or for future, from the latter. For instance, when we protect an animal or a plant, or an ecosystem, or the entire biosphere, guided by the principles of sustainable development for building a safe and sustainable future for us and/or our progeny, we exhibit an act of altruism emanating from a sense of assigning such extrinsic value to these entities. This is because we expect some reciprocal benefits, direct or indirect, for the present and/or for the future generations, from these entities to accrue to us. These altruistic acts to non-humans are, therefore, essentially anthropocentric. In contrast to such extrinsic values, an intrinsic value is a value in itself regardless of its utility for us. For example we are taught to believe that other human beings have a value in themselves as conscious intelligent beings regardless of their use or value for others (Martell, 1994). When human beings do an altruistic act to total strangers even in purely one-shot prisoner's dilemma games, they do so because of the recognition of some intrinsic value in that other being, and neither because of the latter's relationship with the former, nor in expectation of some benefit or reward from the latter. Such intrinsic value may be nurtured in association with some internal norms(s), which may be defined as a behaviour pattern enforced by internal sanctions such as shame, guilt, sense of honour, empathy for others, and loss of self-esteem, etc., and transmitted both vertically and horizontally. This is opposed to external norms, which are driven by external sanctions like rewards and punishments (Gintis, 2003). External norms and extrinsic values, therefore, may be seen as being explained by the concept of reciprocal- both direct and indirect- altruism. If it is so, how could we then explain the assigning of intrinsic value, especially to non-human entities? And what role could nature religions be envisaged to have played in assigning values, both extrinsic and intrinsic, to non-human entities?

Nature as kin

Hamilton (1964a, '64b) first introduced the concept of inclusive fitness to explain the evolution of altruism among kin. Stated in a simple way, it means that individuals are likely to perform altruistic acts towards those other individuals with whom they share the maximum number of their genes. For example, an individual shares on an average 50 % of its genes with siblings and offspring, 25 % with grandchildren and nephews/nieces, and a mere 12.5 % with first cousins. Hence an individual is more likely to be altruistic towards its sibling/offspring than to a nephew/niece than to a first cousin and so on. If we try to fit in the concept of assigning intrinsic value into the theory of kin selection, then we may say that an individual tends to assign more intrinsic value to his/her offspring/sibling than to a nephew/niece and so on. However, in order to understand the origin and perpetuation of nature worship in the light of the theory of kin selection, we would have to move away from the genetic basis of kinship to subjective and cultural ideas of kinship, as is often understood by social anthropologists. Thus in other words, we have to invoke not only the gene, but the meme as well (Dawkins, 1976). This also enables us to understand the problem of kin recognition in the early hunter-gatherer human societies where correct recognition of parents, offspring or sibling was much more difficult than it is today. Early hunter-gatherer societies (and even later-day tribal societies) operated in a very limited geographical area and were almost totally dependent on the resources extracted from there. Such communities have been termed as the "ecosystem people" (Dasmann, 1988). Nature worship and offering protection to nature through the creation and maintenance of sacred groves, taboos on hunting, and other mechanisms of prudent resource use are the characteristic features of such communities (Gadgil and Guha, 1992; Gadgil and Vartak, 1994; Gadgil, 1995). Ancestor worship is also common in these societies. In such situations, where people lived and moved in a small area, kin recognition was governed by the simple rule that anybody they encountered everyday, was a kin (Dawkins, 1976). Based on his analysis of 25 cultures from all over the world, Wilson (1998) concluded that even those tribal groups that comprised individuals who were not genaeologically closely related could function as integrated units exhibiting cooperation. Thus non-kin could also be regarded as 'kin' provided they were members of the same group. In small areas, people not only came across people, but the same forest, river, mountain, trees or even particular animals in their daily wanderings for food and other resources. It is likely that they began to perceive these entities as their 'kin' as well. It is known that a lot of genetic changes occurred in humans during the Pleistocene as a result of living in groups. Such changes were brought about by a culture-gene coevolutionary process (Richerson and Boyd, 2001; Henrich and McElreath, 2002). The coevolutionary changes equipped humans with cognitive abilities, the ability to cooperate with distantly related people living in the same group, and emotional attachments to symbolically marked groups (Richerson *et al*., 2003). As a result of this 'perceived kinship' and emotional attachment with nature, when people had to extract resources from the plants and kill some animals for food, they did this apologetically, and certain groups even stopped harvesting certain plants and killing certain animals, either totally or at least in certain seasons or during certain life stages. Many tribes all over the world exhibit the phenomenon of totemism. The tribals not only do not harm the totem plant or animal, but also undertake specific rites and rituals to propitiate the totem organisms. They trace their ancestry from totem plants and animals, and hence consider them as kins or ancestors. That the tribal mind is capable of such non-dualistic pattern of behaviour by virtue of which they can recognize non-humans as kin, is also revealed by their myths and folklores. An analysis of these myths and folklores enables us to delve into the tribal mind, or in other words, into the minds of early human societies that lived in small groups as hunter-gatherers. These myths reveal to us that the tribal mind was devoid of any distinction among god, man, plants, animals and even inanimate natural entities. The creatures themselves played an important role in the creation and construction of the world. Man's origin could be traced to plants, animals and inanimate objects, and there was kinship between man and these entities. The tribal myths also

deny the uniqueness of man in the possession of knowledge, as non-humans frequently handed over vital knowledge to him (Saraswati, 1993). A few examples from the tribal myths and folklores from Arunachal Pradesh, North East India may illustrate these points further.

Sacrifice is the basis of many tribal myths of creation found in Arunachal Pradesh. The Apa Tani tribespeople believe that 'kujum-chantu' (mother earth) died voluntarily to lay the basis of creation, the different parts of her body forming the celestial bodies and other elements. Thus a sense of 'primordial altruism' ran deep in the tribal mind. The role of love in creation was also emphasized in a Hrusso Aka myth, which says that when the sky made love to the earth, all trees and other living creatures came into being. Several myths also describe the important role of non-humans in creation and construction. The Hill Miris of Arunachal Pradesh believe that in the beginning, there was water everywhere, with only a gigantic tree raising its head above. A worm gnawed at its wood and the dust fell all around to form the earth. Finally the tree fell to the ground, and the bark on its lower side became the skin of the earth, that on the upper side the sky, the trunk rocks and the branches became mountains. Again, a Gallong myth says that the prawn collected a great pile of rubbish on the surface and the crab dug a hole to drain the water, and thus the land emerged. A number of myths also trace the non-human ancestry and kinship of man, such as from frogs (Dhammai Miji myth), or from a flower (Khampti myth). The great primeval spirits had three children, one a human, another a rock and yet another a gourd. When the rock-child broke open the gourd, the first humans emerged (Singpho tale). In another story (Taraon Mishmi), the first men and women came out of the tusk of an elephant (Elwin, 1958). There are many stories of the marriage and sexual union of humans with gods, spirits, real animals (and not humans in animal disguise) like snakes, monkeys, tigers, etc., and even leaves, trees and fire. In these myths, humans are not even unique in the possession of knowledge, which more than often came to him from animals. Thus the birds (Hill Miri myth) or flowers and bees (Bugun myth) taught the first man and woman the art of reproduction; the spiders taught a girl how to weave (Singpho); and the rat the technique of cultivation (Saraswati, 1993). In another story (Idu Mishmi), the sparrow taught cultivation to man (Elwin, 1958). These myths reveal to us that the tribals could recognize intrinsic values in non-human components of nature. In contrast, any other individual (of a different tribe from a different area) who the members of a given tribe did not encounter regularly was not considered as a kin and hence subjected to conflict and violence, often resulting in ruthless intertribal conflicts accompanied by practices like headhunting. Thus the same tribe members who could be altruistic towards non-human entities and worshipped them as or along with their ancestors, could fail to exhibit this behaviour when in contact with conspecifics from another tribe. Again, ecosystem people become 'ecological refugees' (Gadgil, 1995) when they are displaced from their original territory and forced to colonize new areas. In such situations, they mostly fail to exhibit their original altruistic attitude towards nature because of their lack of attachment to, or in other words, their sense of kinship with, the elements of nature.

Kin selection and reciprocity

It has often been suggested that ecosystem people such as tribals maintain sacred groves and exhibit other mechanisms of protection of nature mainly because they tend to be prudent in their resource use and sacrifice some of their immediate benefits to ensure greater benefits to accrue at a later date. Such behaviours are, therefore, believed to signify the society's recognition of the "bequest value" of the elements of biodiversity (Gadgil and Guha, 1992; Gadgil, 1995). In the language of normative ethics, therefore, the actors displaying such prudence assign only instrumental value to non-humans, and consequently, are governed by the principles of direct or indirect reciprocity. However, people worshipping nature in sacred groves or through tree or animal worship, cannot be said to assign only extrinsic value to the objects they revere, and therefore, there is something more in this relationship than mere expectation of some reward at a later date. Furthermore, it appears more probable that a sense of kinship with nature evolved earlier than reciprocity, as the ability of the ecosystem people of the early hunter-gatherer societies to make any realistic assessment of the resource potential of their habitats was likely to have evolved at a much later date through experiences gained during scarcity of resources due to profligate use. It is also more likely that the host would take some time to counter-adapt against parasitic memes such as the tendency for profligate resource use. Drawing an analogy from genes, it was seen that a partial resistance to myxomatosis could only evolve as a genetic trait among Australian rabbits after the disease had wiped out a large portion of their populations (Delius, 1991). Kellert (1996) has suggested that altruistic acts towards non-humans in many indigenous cultures are often motivated by "sentiments of affinity" and not calculated empiricism. Deb and Malhotra (2001) have shown that the tribals of West Bengal, India, hold as sacred a tree (*Adina cordifolia*) and a shrub (*Euphorbia neriifolia*), which have no direct use values. Similarly, the sparrow, the jackal, the tiger, various species of songbirds, and various species of snakes are held sacred in many indigenous cultures of Assam, Manipur and Tripura (Gupta and Guha, 2002). Such sentiments and beliefs could perhaps be explained by the concept of 'biophilia' (Fromm, 1973; Wilson, 1988). Many cultures, exemplified by the Meiteis of Manipur and Assam, North East India, go beyond biophilia to 'ecophilia' or 'cosmophilia' through the practice of 'Chingoiron' – the worship of hills – and 'Nungoiron' – the worship of rocks (Singh *et al.*, 2003). In Korean shamanism, deities could exist, besides other places, in the trees, the ground, the rocks, the spring, the river, and the sea (Rhi, 1993).

Altruism to nonhumans could be governed, even in the same tribal group, simultaneously by "perceived kin" selection and indirect reciprocity, the former evolving first to be followed by the latter as a mutant meme. For example, the Khasis of Meghalaya, North East India, maintain sacred groves called *Law Lyngdoh* (forests of priests), *Law Niam* (ritual forests) and *Law Kyntang*

(community forests). No exploitation of anything, even dead wood and leaf litter, is allowed in these groves where a number of rites, rituals and religious ceremonies are performed. People believe that the dead ancestors reside in this forest till they find their proper resting places (Dutta, 1986; Syngai, 1999). Thus the Khasis ascribe intrinsic value to all living and non-living entities inside these groves, and no future benefit through prudent resource use could be associated with these groves. The Khasis, however, also maintain other categories of protected forests such as *Law Adong* (restricted forest), *Law Risumar* (nurtured forest) and *Law Shnong* (village forest). Limited extraction of materials from these forests is allowed with proper approval of the community. Any altruism towards nonhumans exhibited in this instance emanates from a sense of reciprocity, that is, from assigning extrinsic values, and should not be equated with the groves that are part of the religious tradition, and hence involve recognition of intrinsic value in nature.

Table 1. Plants worshipped or attributed magico-religious importance by the Meiteis of Manipur, North East India, along with their bequest value (after Singh *et al*., 2003)

Name of the Plant	Status Accorded	Bequest Value
Toona ciliata	magico-religious importance	Timber tree
Dactyloctenum aegypticum	-do-	Fodder grass
Cynodon dactylon	-do-	Fodder grass; Medicinal
Rhus chinensis	Worshipped	Medicinal
Xylosoma longifolia	magico-religious importance	Medicinal
Oroxylum indicum	-do-	Medicinal
Blumea balsamifera	-do-	Medicinal; Condiment
Plectranthus ternifolius	-do-	Medicinal
Mangifera indica	Worshipped	Fruits; Medicinal
Aegle marmalos	-do-	Fruits; Medicinal
Ocimum sanctum	Magico-religious importance	Medicinal
Terminalia arjuna	Worshipped	Medicinal
Adhatoda vasica	Not harvested on Sunday, as it is the birthday of this plant	Medicinal

Altruism towards nature could also exhibit a trend where an altruistic practice might have had its origin governed by reciprocity, and then transcend to be guided by a sense of kinship, and recognition of intrinsic value. A few examples are cited here from the practices of the Meitei community of Manipur, North East India. Table 1 lists plants that are worshipped or accorded magico-religious significance by the Meiteis, and their use or bequest value. However, the primary reasons for worshipping or revering these plants today are their 'divine' associations, while their use values have been relegated to a secondary place (Singh *et al*., 2003).

Group size was found to be an important governing factor in the development of altruism. Small group size promoted altruism, while increasing group size hindered it (Aoki, 1983; Alexander, 1986; Joshi, 1987; Boyd and Richerson, 1988, 1989). Altruism and cooperation were also found to be favoured by long relationships (Wilson, 1998). Thus the small group size of the tribes, accompanied by their long-term relationships with their immediate environment, appear to have played key roles in the evolution of altruism towards non-humans. It has also been suggested that our remote ancestors had only rudimentary culture and lacked cooperation on a scale larger than groups of close kin (Richerson *et al*., 2003). Therefore, the right kind of environment was provided at a very early stage of human evolution for the origin of a feeling of kinship with nature.

Meme vs. Meme

Today, only small isolated communities scattered throughout the world practice nature religion or nature worship. The majority of the world's population adheres to religions that give humans an exalted status, superior to, and different from, the non-humans. This decline of nature religions began with the introduction of settled agriculture, which required extensive clearing of forests. Wild animals were viewed either as enemies or as pests, and consequently were to be killed or driven away. The aim of agriculturists everywhere was to humanize the earth's surface and replace the wild with domesticated forms of life. Nature religions and nature-oriented worldviews were replaced by an anthropocentric worldview that first found expression in Greek philosophers beginning with Socrates and culminated in Aristotle. This view continued to influence the mainstream western philosophy in the 17th and 18th centuries. Descartes put forward his famous 'mind-body dualism' that postulated that only humans had minds, while all the other components of nature were merely bodies or 'machines'. Anthropocentric views were upheld by the other leading philosophical spokesmen of the scientific revolution, such as Bacon and Liebnitz. Even earlier, 15th century renaissance thinkers like Erasmus and Montaigne professed anthropocentric humanism. This trend was carried forward into the 19th and the 20th centuries by Marx, Dewey and Sartre, among others (Sessions, 1995).

Being essentially a replicator, the survival value of a meme, just like that of a gene, depends on its longevity, fecundity and copying-fidelity. As nature religions are practiced by a very small fraction of the world's population, its fecundity is said to be very low. Does it then imply that nature religion or nature worship as a meme is virtually removed from the meme pool of the human species, at least in the mainstream societies? On the contrary, the picture becomes different if we think of nature religion as a meme-complex. The rites and rituals accompanying nature worship is just one such meme in this meme-complex. The other memes that can be said to constitute this

complex are an ability to appreciate nature's beauty and bounty, recognition of an intrinsic value in nature, and a general feeling of biophilia or ecophilia. These latter memes were not lost from the meme pool, in spite of the man-nature dualism meme holding sway in western societies. The Dutch philosopher Baruch Spinoza, for example, developed a pantheistic nonanthropocentric philosophical system in which God was identified with Nature. Unlike Descartes, Spinoza found mental attributes throughout nature. Spinoza's teachings influenced many leading figures of the 18th century European Romantic Movement such as Coleridge, Wordsworth, Shelley and Goethe, who sang praises of nature and found a soul in nature and its various components. In the philosophical front, non-anthropocentric ideas were put forward by Mill, Thoreau, Marsh, Muir, Santayana and others in the 19th and early 20th centuries, and by the likes of Leopold, Brower, Carson, Udall, White, Nash, Ehrlich, Naess and their numerous adherents in the middle and late 20th century (Sessions, 1995). Needless to say, this trend continues to spread and is poised to remain as a significant worldview during the present century and beyond.

Besides the western poets and philosophers, the image of nature in the writings of many Eastern writers also deserves mention. The 'religion of soul' perceived in natural entities like flowers, clouds, seas and mountains found expression in the songs, poems and philosophical musings of Rabindranath Tagore, a Nobel Laureate poet from India. In the Japanese language, the oldest word for beautiful is "kuashi", which means a dense growth of leaves. In mediaeval Japanese poetry, "hana" (flower) is a symbolic term for rhetorical beauty, "tane" (seed) stands for creative moment of poetic activity, and "taketakashi" (tall tree) stands for sublime. Basho, a well-known poet of the 'haiku' (short poem) is reputed to have told his disciples to learn the spirit of the pine tree from the pine tree itself.

The meme of ecophilia not only survives in poets, philosophers and ecocentric thinkers, but in the minds of the common people as well. Trees, animals, lakes, rivers, mountains and the sea, or even a man-made city park, as the case may be, forms an integral part of our childhood associations to be fondly remembered, often mixed with a sense of nostalgia, just like those of old friends and relations. Even the most hardcore development-maniac is likely to find pleasure in watching a flower in full bloom or fish in an aquarium. The flourishing tourist trade centred round wilderness areas is another example of the meme of ecophilia running strong in the minds of countless people all over the world. We may not be very far from the truth to say that the nature religions of our remote ancestors form the memetic core of such properties of the human mind.

The above examples are by no means exhaustive, but merely illustrative of the meme of 'nature appreciation' or biophilia or ecophilia, which in other words, could be construed as a feeling of kinship with nature, continuing to be copied and perpetuated in almost all societies the world over, but running stronger in small indigenous cultures.

Which way would the arrow point?

It has been shown that both exploitative and cooperative strategies can coexist in the gene pool, maintained by environmental heterogeneity and frequency-dependent forces (Dugatkin and Wilson, 1991; Wilson, 1998). It is, therefore, not surprising that diametrically opposite cultural strategies like despotic and exploitative as well as altruistic attitudes towards nature coexist in the human meme pool. This makes us view human populations as multi-strategy communities. It is also an established fact that exploitation is generally favoured in short relationships where repeated interactions are unlikely, while in contrast, long relationships usually usher in cooperation. Both strategies are expected to be present in populations that experience short as well as long relationships (Wilson, 1998). Nature religions evolved and flourished during a period when small societies operated in a limited area, conditions that promoted long relationships. Subsequently, forces like large-scale migration, trade, conquest and colonialism, coupled with vastly improved technologies, led to situations where large reserves of nature were open for exploitation to relatively small human populations. If one forest was clear-felled, or one river became polluted, or one plot of land became infertile, there were others. Such conditions obviously led to the prevalence of the myth of cornucopia, of unlimited supplies of resources, in societies of 'biosphere people' (Kormondy, 1996), and favoured short-term, exploitative relationships. The human cultural evolution has now possibly come full circle, so that it would be advantageous for long-term cooperative strategies to be adopted by local communities for conserving nature in their immediate surroundings. Involving schoolchildren and youth for protecting nature and for inculcating bioethical values in several countries, attempts to prepare 'people's biodiversity registers' in India (Gadgil, personal communication), and the increasing involvement of civil society in conservation initiatives, are examples of long-term, local cooperation with nature being increasingly emphasized. However, if we are optimistic enough to consider human societies, like ecosystems, to be cybernetic in nature, these two strategies could oscillate and alternate as 'exploitation-accelerating' and exploitation-counteracting' (or to view from the other side, 'cooperation-counteracting' and 'cooperation-accelerating') mechanisms, based on positive and negative feedbacks, respectively, operating within certain boundary conditions over a span of time. The human society has had its thrill and excitement of positive feedback for a long time, it is time now to pay heed to the negative feedback signals emanating from all natural systems.

What role could nature religion, albeit in its new 'avataar' as the meme of ecophilia, play in promoting altruism towards non-humans? We often ask, "how to conserve?" The answer to this question may be found by asking another question, "why to conserve?" One major drawback of the anthropocentric approach towards conservation is that in case of any conflict between human and non-human interests, the former almost always receives priority. The conflict between human livelihood versus wildlife conservation in many protected areas are good examples. An increase of the

ecophilia meme in the human meme pool may be the only answer to such dilemmas. This would also require a shift from externalized norms such as rewards and punishments to internalized norms like shame, guilt, fairness, empathy, etc., while taking decisions about conservation. A gene or a meme is individual- or group-fitness-enhancing or fitness-debilitating depending upon the environment in which it operates. Today, a urban community that invests more effort in preserving greenery and keeping down pollution levels, or a rural community that sustainably manages its natural resources, are likely to flourish and prosper than those which do not. Hence, the meme of ecophilia is both individual- and group-fitness-enhancing in the present context. Could we then expect that an all-ecocentric strategy would be favoured by selection so as to become all-pervasive in the human society? Unfortunately, being "blind" and "selfish" replicators, the genes or memes cannot forgo short-term advantages (Dawkins, 1976). Consequently, anthropocentric strategies are bound to invade, inspite of an all-ecocentric strategy being more equitably beneficial to all. A parallel to this may be found in the global 'war and peace' scenario. In spite of the overall benefits of an all-peace, 'all-dove' strategy, invasion by war-monging 'hawkish' memes cannot be done away with. Nevertheless, notwithstanding the selfish nature of our physical and cultural replicators, we could perhaps share the "qualified hope" of Dawkins (1976) on the capacity of human species for "conscious foresight" to defy its selfish replicators, and possibly also their capacity of exhibiting "genuine, disinterested, true altruism". That the humans possess the latter quality is perhaps shown by the ecophilia of nature religions. Whether they possess the former, only the future would be able to tell.

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Tampering with Nature: An "Unended Quest"*

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Abstract

The implementations of biotechnology raise a whole host of environmental and social issues from a broad range of perspectives. After some years of heated controversy throughout the world it has achieved also the status of an ongoing societal issue. The complexity of the subject of the relations between the environment and technology makes it difficult to find an appropriate framework for the discussion of this issue. In order to reach a situation of a reasonable and thoughtful dialogue there is an essential need to achieve the right balance between a clearly defined range of the technology and obtaining relevant and accurate information about its impacts. In order to achieve success in this direction with the large public group – the ordinary citizens - the main way that is suggested is to include the subject of bioethics, of all its broad range of perspectives, in the science education program at all adequate age levels. This should go, jointly, with the vital need to preserve our natural resources and protect the environment.

Key Words: Balance; Challenge; Conflict; Complexity; Decision; Education; Responsibility; Partnership; Tension; Uncertainty.

Since its dawn, western literature is filled with examples dealing with the conflicts between tampering with nature, for whatever purpose of human action, and it's morals. This starts with the Bible that seems to establish two different models for our interaction with the environment[3]. The selection of the words, subdue/rule in Genesis 1 as compared to tend/care in Genesis 2 suggest two alternative models for how we perceive the environment. The first model, the dominance model has, in the past, had a significant resonance. There are other examples for a second model that illustrate the existence of very different views of the importance of the environment and of the criteria for partnership in the environment related decision-making. These may relate to the prevailing balance between 'rule' and 'care'. Thus, we could see that the conflicts between nature care and nature rule by technology, have started long ago, and continue afterwards [4], till nowadays. The pace of tampering with nature has been accelerated at the end of the 20th century with the appearance of the modern biotechnologies like plant genetic modification and with the appearance of stem cells technology and nanotechnology at the start of the 21st century. This situation emphasizes the continuous need for discussion and development of appropriate societal tools that could aid with embedding of such modern biotechnologies in our life. This paper summarizes some aspects of social behavior following the tension caused by tampering with nature. In this sense, some of the key questions that

* K. R. Popper used the expression "Unended Quest" for his book title (1982).

[1] The views presented here are solely those of the author and do not necessarily represent the views of either the ministry of agriculture or the Israeli government.

[3] *In Genesis 1 v. 28 we read 'Be fruitful and increase, fill the earth and subdue it, rule over the fish in the sea, the birds of heaven and every living thing that moves upon the earth'. In contrast in Genesis 2 v. 15 we read 'The Lord God took the man and put him in the Garden of Eden to tend and care for it'.*

[4] Perdita: … Are our carnations and streak'd gillyvors, Which some call Nature bastards. Of that kind our rustic garden's barren, and I care not to get slips of them.
Polixenes: Wherefore, gentle maiden, Do you neglect them?
Perdita: For I have heard it said, There is an art which in their piedness shares With great creating Nature.
Polixenes: Say there be;Yet Nature is made better by no mean but Nature makes that mean; so over that art which you say adds to Nature, is an art That Nature makes. You see sweet maid, we marry a gentler scion to the wildest stock, and make conceive a bark of baser kind By bud of nobler race. This is an art which does mend Nature-change it rather; but The art itself is Nature.
Perdita: So it is.
Polixenes: Then make your garden rich in gillyvors, and do not call them bastards. {W. Shakespeare, *The Winter's Tale* (Act IV, scene IV, lines 81-97)}

were raised around broader participation of the society in biotechnology will be discussed and, in turn, a constructive societal tool that may assist successful integration of these biotechnologies will be suggested.

The Tension

There are among us many who are uncomfortable with tampering with nature. Parts of the public are convinced that it is damaging, risky and even immoral. In spite of this, manipulating nature was always an important part of what civilization and human intelligence is all about. We have been doing it since the invention of the wheel; in addition to that nature and our environment are, all the time, in a situation of dynamism and evolution. Moreover, one could say that since we are part of nature, everything we do and create is in a sense natural too (*previous footnote*). If we will examine this contradictory situation we may find that it reflects concerns toward changes in the environment and their unknown consequences. That leads, in many cases, to a set of rejection responses. Such responses are quite natural if we will remember the concept of "the self" that was introduced to provide a ready and convenient metaphor for deciphering immune reactivity. In the original formulation, normally, host constituents are ignored by the immune system, due to an immunological memory, while the "new" - non-self: pathogens, foreign substances, etc. are processed and destroyed. The concept of "the self" became the foundation of immune theorizing, and immunology dubbed itself the science of "self/non-self discrimination" (Burnet and Fenner 1949; Burnet 1959).

An additional phenomenon that is psychological, and describes the relation of humans with new or changing environments, has been suggested (Wilson, 1984). Wilson related it to be one of the human ancient instincts, *Biophilia*. *Biophilia* is based on knowledge and another component - habitat selection. A habitat from which people can, in a secure position, safely scan the environment, preferably an open topography with unobstructed line of sight.

Apart from being unknown, a new and changing environment can present to us different faces, but are they dangerous or risky? This situation involves decision-making in an uncertainty circumstances. The general philosophy, which dictates toward the most conservative response, is that it is a reason to reject practices that have consequences that would be impossible or difficult to reverse or mitigate. The broad idea behind risk-based decision-making is that in some circumstances accepting some degree of known risk or uncertainty advances the public good.

Some of the most convincing applications of the cautionary approach involve situations where it is fairly clear that human activity is affecting ecosystem process that would function reliably in the absence of impact from human beings. Straightforward cases of chemical pollution of air and water fit this model, as do cases where marine ecology is affected by intensive fishing activity. Here, the default option of "no human activity" genuinely seems to embody a cautionary approach. However, it is not clear how to extend this model to agriculture, where the default option to adoption of biotechnology is an array of farming practices in which humans are already having extensive impact on ecological processes.

The claim that biotechnology threatens to destabilize an ecologically sustainable food system in agriculture can be disputed. Industrial practices in agriculture already utilize chemical inputs, mechanized cultivation, harvesting and irrigation, and large-scale transport of nutrients and genetic resources. Though the point is contested, it is not at all clear that these existing industrial system is ecologically unsustainable or more specifically, that biotechnology would lead to further destabilization of the system.

Avoidance of Uncertainty

Avoidance of uncertainty in a nation or society has been applied in the cautionary approach that is supposed to minimize the risk exposure of in decision-making. That means precise rules and regulations concerning different decisions to be made at each organizational level. This resulted in procedures and policies with a high degree of formalization. Strongly risk-avoiding implies in increasing organizational complexity that involve an opinion given by experts in order to minimize the risk of wrong decision. Thus, such risk avoidance procedure based on professional specialty requires cooperation of three key agents of the society: science and technology, government and the private sector. Another large group, however, that has been left out of this cooperation are – the nongovernmental organizations (NGOs). Apart from acting for environment conservation and nature protection, the NGOs have been distinguished, in some cases, for their violent protests. With the help of the media, which fed the controversy, it led, instead to a democratic and open public discourse on crucial bioethical issues, to an anti-science zealotry activity (Borlaug, 2000) with some undesired consequences.

Opinions given by experts require understanding that scientific knowledge can be justified and made reliable, based on that, the knowledge which scientists possess is conjectural knowledge. That is, knowledge that is some times prone to error, yet, always capable of improvement and correction (Popper, 1959). This methodological approach in science, trial and error, can be used for examining the consequences of ethical notions. Further, this approach can guide the profession away from bad judgement especially when we identify error in environmental policy as manifested in ecosystem destruction. Thus, the maintenance of a self-critical attitude is a matter of duty. Within the rationalist/humanist tradition, the idea of avoiding suffering or averting environmental degradation is one that we can treat as a starting point.

At the basis of the above concerns, that have become real fear might be some disastrous cases. Some examples of technology failures lead us to try to succeed in a not so easy way, of navigating between Scylla of risk and the Charybdis of public demonization, that all interventions in nature run the risk of unanticipated upset of its controlled balance causing unforeseen consequences. On the other hand, from the time that humans with stone axes began felling trees, human tampering with nature has had significant environmental consequences. We cannot imagine,

however, our life without technology. The increasing impact of humans on the environment should have caused more moral responsibility of man towards the environment. Unfortunately this is not always the case and the questions to be ethically addressed are in many cases, quite complicated. Should we avoid technology? Or use it for environment conservation.

But is technology alone to be blamed for much of the environmental degradation, or is it human need or greed causing that forests and fish are disappearing at an alarming rate, formerly livable areas are turning into deserts and the list of endangered and extinct species grows each year. Oddly enough, there are cases when preserving the wilderness and the animals that live in it, there are ignored people, overwhelmingly poor, who often pay the price when land is set aside. In India for instance, people who have had to uproot their families and their villages, often leaving hunting grounds and fertile farmland that they and their ancestors occupied for generations, just to make room for a few Asiatic lions… (MacKinnon, 2003). Thus, the distinctions are not always clear, and the many examples are not strictly "black or white". Any way, no form in which technology gets to us is really environmentally friendly, because wilderness and diversity are eliminated.

How To Maintain A Balanced Perspective?

The above mentioned cases suggest two important issues to be discussed in order to maintain a balanced perspective: a. Integration of democratic forms into science. b. Tampering with nature and science and technology in the world we live in.

a. The above mentioned cases exemplify situations where we may view science and technology outcomes less as a simple input/output device. And instead, we should view them more as a complex social realm in which the full range of human motivations – and attendant opportunities that influence them – are at play. This situation suggests of a new framing of the biosciences arising from the combination of the dialogue and conflict among scientists, government agencies and social groups in directions for future research and development. Such mechanisms for participation and accountability are critical for popular sovereignty. Including democratic forms in science does not mean, as it is occasionally portrayed, voting on the laws of nature. The transition to a model of democratic forms requires participation and accountability in the management of science integrity and responsibility. This model of science integrated with society requires rethinking notions of scientific integrity and responsibility that are further discussed (Maoz, 2005). Supporting democratic participation and accountability for science does not mean being anti-science and neither is it more threatening than other commonly accepted democratic practices. By recognizing the interests present in science, encouraging collaborations between scientists and non-scientists, and attending to the societal out-comes derived from research, we can simultaneously generate a more responsible, reliable, and relevant science.

b. The global nature of today's environmental crisis imposes upon us a realistic perception about the nature of the world we live in and are dependent on. This will oblige us to exercise our judgment as to how to use knowledge for social good. This is not an easy task, since it will need to combine both ecological and technological knowledge with a sense of responsibility for a livable world. Indeed, this responsibility that falls on all levels of human society, individual, state and international, is a sign of maturation for both technological and environmental management. Extending the benefits of technology to the world's citizens is one of the most critical challenges that biotechnology face today. Overall, the available cultivable land per person is declining rapidly and will be reduced by half, once again, over the next 50 years (Nuffield Council on Bioethics, 2004). We have to harness the potential of biotechnology in order to combat hunger and poverty. This technology's legitimacy should motivate us to give the full use of our abilities and resources to meet the many needs of people around the world who are not yet in a position to receive the benefits of biotechnology. Their real needs must take precedence over hypothetical, sometimes paranoid imaginings. The needs for rapidly increased food, feed and fiber production, for the conservation of natural resources and biodiversity, and for poverty alleviation do exist now. In the next two generations our world will consume twice as much as it has been consumed in the entire history of humankind. The amount of arable land cannot really be increased, so we must make the land produce more and we must do it sustainably.

For carrying out this task, agriculture and the farmers seem to be the vital "land stewards" (Aldo Leopold 1949). Most likely to be upgraded by agricultural research attention to a diverse list of aims in: precision agriculture, brackish water reclamation, fighting desertification (by developing stress resistances, soil erosion prevention and no tillage technologies), post harvest technology, integrated pest management and biotechnology. Technologies may contribute to remove the threat of "the world's food supply that hangs by a slender thread of biodiversity" (Wilson, 2002). Mainly three species – wheat, maize and rice stand between humanity and starvation. Attempts to adapt wild plants crops as well as inserting new genes into crop species in order to improve their performance can help creating new strains and increase biodiversity. If we fail, then more marginal land will be put into the service of agriculture, creating more environmental problems, ensuing poverty, and in some cases even disasters. The second need is to preserve our natural resources and protect the environment. Agriculture will remain any society's most important interface with the environment.

Where Do We Go From Here?

Then, how do we make environmental decisions for agriculture? Modes of production, distribution, and consumption take their toll on the environment, from the simple fact that manufacturing uses energy, that distribution requires transportation, and that most consumption is wasteful. Regardless of the details, it is clear that no matter how beneficial a scientific technology remains to this day, its development and implementation, its replacement and maintenance, cost a great deal of money. Efficiency is achieved

expensively even under the promise that great savings will result eventually. Also some of the damage done to the environment cannot be repaired no matter at what price. At the same time, what is the price of not developing certain regions of the world? All of these questions must be addressed economically that is, socially and politically, which, incidentally, is inevitably also philosophically - and not left to spiritual musings.

Agriculture presents a complex array of questions calling for decisions about the balance between one or other outcome and trade-offs between different impacts. Where actions, including the use of technology, harm both people and planet, the ethical imperative is clear. Less straightforward, however, are situations where serving environmental goals may be to the disadvantage of producers. The context of crisis does not make decision making any easier, but it may help to identify some leading issues. We are urged to recognize and respect both people and the earth, to subordinate the pursuit of private wealth to meeting the needs of the poor and vulnerable, and to restrain the concentration of power and control.

From Environmental Education To Ethical Education

Since the spread of technology considerably shapes nature, it is important that the consequences, and the policies, laws and regulations pertaining, that introduce a degree of uncertainty into our life, should be examined democratically involving all parties of the public. This means, that the institutional bodies related, their policies, regulation procedures and decisions should be adequate and transparent; thus a large group of the public will be able to absorb the relevant and accurate information, analyze it (Braun and Moses, 2004) and most important, share the responsibility by following its essence of meanings. This means that, science education must become an integral part of general education to all citizens. Following this approach will give us an important gain, as a good investment in both, economic development and democracy. This will be in line with what has been achieved in the directions of keeping rights of different parts of the public. It seems, however, that it has not been paralleled with the right balance for the duties of certain public groups that have been tainted by their inappropriate and violent actions. In order to achieve success in this direction with the large public group – the ordinary citizens - the main way that is suggested, is to include the subject of bioethics, of all its broad range of perspectives, in the science education program at all adequate age levels (Thompson, 2003). This is an important consideration since understanding of ethical issues develops as an evolving process around real-life situations. Including the subject of bioethics in the science education program may be an important turn that may bring about developing an ethical matrix and a "toolbox" for practical ethics that will make ethical advice to considered judgments of what is ethically acceptable and democratic transparency. These aspects of practical bioethics have been widely discussed in the literature (Carr & Levidow, 2000; Kaiser & Forsberg 2000; Mayer, & Stirling, 2002; Mepham, 1996, 2000a, b, 2001; Schroeder & Palmer, 2003).

The integration of practical bioethics in a democratic process will require first, involvement of three parties: People of biotechnology, the enterprise and the scientific community that must prove that the "promise of biotechnology" justifies their efforts. Than, the large group of the public will be prepared to share the responsibility for the development of the "next generation" of biotechnology products. We have to remember, however, that prior to any discussion of the ethical aspect of any of the biotechnology dilemmas, in any framework, the factual basis has to be sound, due to an appropriate science education. Following this condition will ensure a reasonable discussion and satisfy the need for information of the consumers to make informed decisions. Adopting this approach, of addressing bioethics by the education program, both general and professional, is likely to have an influence on the marketability of the "next generation" of biotechnology products, since it will finally be the consumers that decide on the prospects of the emerging technologies markets, such as recently nanotechnology (Bruns, 2003; Einsiedel and Goldenberg, 2004). In view of this, the aim of the discussion should be to identify specific issues to be addressed in a framework of an education program and the ways and means to achieve this goal.

We have to remember that all technologies have problems because perfection is not the human condition. The answer is to improve technology once difficulties appear, not as some would wish, discard technology all together. Remove the problems but retain the benefits! By adopting this approach, together the moral imperative demands with the respect for every form of life, which should be expressed by the limitation of the intervention only to the level justifiable by the objective human needs. If we transform such basis from the level of an individual to the level of whole society then we will be able to talk about – integration with nature.

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Agenda 21: Bioethics, Global Warming, and the Muslim World

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The issue of global warming and the Muslim world has so far received scant theoretical attention. The fact that Muslims comprise a substantial part of humanity demands greater scholarly analyses. The problem with global warming is that changes are gradual and not apparent in our daily lives. For many, the non-apparent nature of global warming has enabled the continuation of ecologically unsound practices without understanding their future ramifications for the planet. This paper will delve into some of the issues in relation to global warming and the Muslim world. The limited theoretical scope of this paper is to promote more rigorous theoretical explorations into this area. The first part of the paper examines the environmental role of ASEAN and the nature of the UNCED dialogue and its agenda on biodiversity conservation. The second part of the paper will delve into the broader environmental problems which are facing the Muslim world as a consequence of global warming and will indicate possible future scenarios. Furthermore, the paper will develop areas in which Muslims may act to re-introduce ecological practices.

Background

In the 1990s the scientific community of the world was in the middle of an international process of negotiations on a scale that the scientists never experienced before. They were asked to come forward and give their best assessment on what and how the 'environment' and 'development could be brought together. Some would say that it was merely an exercise in the protection of the environment. Consequently, the dialogue was dominated by economic issues, such as poverty eradication issues, health care issues, the problems of technology transfer, and biotechnology-related food production, in particular. The 'global' extent of environmental problems is not being comprehended.

In 1992 the world, with much anticipation, welcomed the UN Conference on Environment and Development [5] in Rio de Janeiro, Brazil. This Conference was pre-ceded by the organizing of complex and difficult Preparatory Committee Meetings [6]. The Conference itself went on relatively smoothly for ten days[7].

The Agenda 21 document as an output of the Conference gives emphasis on the important role given to science in the management of the environment, and the future of humanity living on planet earth. Scientists are improving their understanding in areas such as climatic change, growth in rates of resource consumption, demographic trends, and environmental degradation. Changes in those and other areas need to be taken into account in working out long term strategies for development. A first step towards improving the scientific basis for these strategies is a better understanding of land, oceans, atmosphere and their interlocking water, nutrient and biogeochemical cycles and energy flows which all form part of the Earth system (Robinson 1993).

The Association of the South-East Asian Nations (ASEAN) put the management of the environment as a regional priority due to the trans-border character of the environmental problems :"... being a grouping of dynamic developing countries, ASEAN should take a

[5] Although, often called the "Earth Summit"', this name tends to be used in a political context. This conference searched for a basic principle in managing the environment above the sovereignty of states.

[6] This conference was chaired by Ambassador Tommy Thong-Bee Koh from Singapore; and the Preparatory Meetings were held four times in the period 1990 to 1992 (27 months) in New York, Geneva, Nairobi, and New York, three cities in three continents, to prepare the documents to be agreed to in the Conference.

[7] The Conference was attended by 116 Heads of States, 172 states, 8000 delegates, 9000 people from the media and 3000 representatives of accredited non-governmental organizations.

leading role towards achieving a proper balance between environmental protection and economic development... ". ASEAN formulated their common stand prior to the UNCED in Rio, June 1992 in: "ASEAN Common Stand on the United Nations' Conference on Environment and Development and Related Issues". The specifics were: "new and additional financial resources to meet incremental costs of protecting the global environment; the establishment of basic environmental standards for a minimum level of quality of life and environmental protection; and, equitable, balanced and comprehensive solutions to the inter-related issues of economic development and environmental protection".

Environment and international cooperation

The output of UNCED was the Agenda 21 document and two documents, namely (1) Rio Declaration on Environment and Development, and (2) Non-legally Binding Authoritative Statement Of Principles For A Global Consensus On The Management, Conservation And Sustainable Development Of All Types Of Forests. Two conventions were also signed toward the end of the UNCED : (1) United Nations Framework Convention On Climate Change, and (2) Convention On Biological Diversity. These two conventions were the first two important agreements in dealing with the global warming problem.

The Muslim world and Global Warming: Bioethical Issues

Lack of Technological Innovation

The geographic spread of what is commonly known as the Muslim world covers the countries in Southeast Asia, South Asia, Central Asia, Middle East, Northern and Sub-Saharan Africa, and also several countries in the Balkans and Eastern Europe. The size of this Muslim world is approximately 1.5 billion people or one fifth of the world's population. The Muslim world represents an extraordinarily diverse population, comprising three thousand different ethnic groups. The diverse nature of the Muslim world is antithetical to Western stereotypes of Muslims as being a 'monolith.' Such negative constructions are both fanciful and negate the significance of the Muslim world in relation to world events.

Muslims are the fastest growing population with an annual growth rate of 2.9%, as compared to 2.3% for the rest of the world (Muslim Population Statistics). In the last fifty years the population of Muslims worldwide has increased by over 235% (*Muslim Population Statistics*). According to present estimates by 2025 Muslims will make up approximately 30% of the world's population (Muslim Population Statistics). Major population increases are predicted in Muslim countries in Asia and Africa. By 2050, the populations in many Muslim countries will double and even triple, causing unprecedented social change (UNFPA State of the World Population 2004; India Talking Hindustan network).

Many Muslim societies are undergoing rapid social change that is incommensurable with the rate of economic and social reforms. With the exception of Malaysia and some Gulf states, the bulk of Muslim countries lie in the 'south belt' – which consists of the world's poorest countries, commonly referred to as the 'third world'. The south belt region is also represented by countries which have had the highest rates of resource exploitation by first world countries, crippling rates of foreign debt, and minimal adaptive resources in the form of new technologies and scientific innovation. In short, many Muslim countries are unfavourably positioned from accessing key technologies which would mitigate their dependence on dwindling resources (Saniotis 2006a; De Lemos 2006, p. 57; Matthew 2000, p. 110). Lack of scientific innovation is typified by the fact the Muslim world produces minimal scientific research. Nasim (2000) and Saniotis (2006b) state that the Muslim world has a dismal track record in scientific research. "The dismal state of Science and Technology" in Muslim countries is reflected in the statistic that the "entire Muslim world contributes 1.033 percent to the international literature as opposed to 1.059 and 1.64 by small European countries like Belgium and Switzerland" (Nasim 2000). Arguably, this dubious distinction reflects endemic social problems facing Muslim countries such as poverty, lack of intellectual freedom, and over expenditure on military armaments. Another significant fact is the lack of social mechanisms to correct this oversight. The lack of technological innovation is what Enriquez ascribes to as a failure to commit to "power of technology" (2001, p. 71). In his analysis, Enriquez suggests that the "future belongs to small populations who build empires of the mind" (2001, p. 56). If Enriquez is right, then much of the Muslim world will face ongoing poverty and is unlikely to catch up with technologically advanced countries. This is a huge dilemma since the "knowledge component" of countries will be a significant determinant in ensuring societal survival in the 21st century. Muslim countries will face increasing problems as a lack of technological innovation means that their adaptive strategies to tackle global warming will be hampered. Even resource rich economies with a poor knowledge base means that the technologies which would otherwise be available will probably be beyond their capacity to implement.

Global Warming and the Muslim World

Concomitant with high levels of poverty in the Muslim world is the rate of population growth as indicated earlier. Many Muslim countries have burgeoning, poor populations which are chiefly dependent on depleting environmental resources. At present, most of the world climatologists concur that global warming will produce various erratic weather patterns such as increasing storms, typhoon, cyclonic and tornado activity, due to heating of the world's oceans. In many parts of the world, global warming will probably increase drought activity and decrease precipitation rates at record low levels. The likelihood of more intense tropical storm may affect low lying Muslim countries or countries with large Muslim populations such as Indonesia, Bangladesh, Philippines, India, Thailand, China and sub- Saharan Africa. "Tropical storm intensities" may cause massive flooding and increase the spread of water borne diseases such as malaria, dengue fever, while dislocating tens of millions

of people. These populations are likely to become susceptible to communicative diseases as a result of overcrowding and unsanitary conditions (Biermann & Dingwerth 2004, p. 4).

Predicted increasing droughts may have a deleterious affect on poor Muslim countries by exacerbating already diminished food and water resources (Saniotis 2006c). At present, water resources in the Middle-East and North Africa are facing depletion rates. These regions are using more than 50% of their water sources while their populations are increasing (Marcoux 1996). Approximately, 1.7 billion people live in water stressed countries "using more than 20% of renewable water supply"(Salam). Most of these countries are Muslim countries which include: "Afghanistan, Egypt, Iraq, Jordan, Kuwait, Libya, Pakistan, Saudi, South Africa, Syria, Tunisia, UAE, Yemen, Palestine, and several areas of China and India" (Salam). Changes in river flows and runoff and increasing rates of evaporation may "contribute to the salinisation of irrigated agricultural lands," while "rising sea levels may result in saline intrusion in coastal aquifers" (Salam).

Gleik and Homer-Dixon have suggested the possibility of forthcoming "water wars" (Gleik 1991; Homer-Dixon 1994, 1999). For Homer-Dixon, conflicts over water resources will arise in the Middle-East and elsewhere and may be assuaged by ethnicity and religion (1999). Changes "in rainfall distribution is likely to cause a partial drying-out of some of the most fertile regions of the tropics, resulting in a significant reduction in the ecological carrying-capacity of the land and decreases in food production" (Oxford Research Group). Warnings of oncoming conflicts should not be overlooked. Rising levels of carbon dioxide and methane contained in the earth's permafrost may contribute to the melting away of the Arctic ice, which would result in more precipitation falling in the oceans and the arctic and less precipitation falling in the world's tropical regions which sustain a large portion of the world's population (Oxford Research Group).

Future Plans of Action

One of the major problems that Muslim countries are facing is the unfamiliarity with the notion of global warming. For instance only 12% of Pakistanis know about global warming (Pew Global Attitudes Project). One reason for this insouciance could be Muslims' lack of concern for environmental issues in general (Memri 2006). While the *Qur'an* and the prophetic traditions (*hadith*) are noted for their ecological awareness, this is not reflected in present day Muslim societies' environmental attitudes. On the contrary, some of the worst environmental disasters in the last sixteen years have occurred in Muslim countries. During the Persian Gulf War 1990-1991, Iraqi soldiers set alight dozens of Kuwaiti oil wells. The fires continued for seven months and sent poisonous smoke, causing an "environmental and economic catastrophe" (Chilcote 2003). Chilcote claims that Iraqis also poured 10 million barrels of crude oil into the sea (2003). Chilcote attributes high respiratory problems and cancer rates among Kuwaitis as being caused by the aftermath of the war (2003). Another case in point were the repeated mega forest fires in Indonesia in 1982-1983, 1987, and 1997. Each time the forest fires destroyed millions of hectares of pristine rainforest and covered Indonesia and surrounding countries in a layer of smoke. The inordinate extent and length of the forest fires, claimed "by the Paris-based International Union for the Conservation of Nature and Natural Resources as the worst…in recorded history" was even more damnable as they were allegedly caused by logging companies in collusion with officials in the Suharto government (Achmadi 1988; Down to Earth 1997).

The ongoing ecological crisis facing many Muslim countries needs to be curtailed, by firstly, allocating sufficient resources in education and technology. Developed countries need to assist Muslim nations to technologise at rates which are commensurable and sensitive to their specific socio-economic needs. Moreover, developed countries, the World Bank, and IMF, need to assist in alleviating the massive debt burden that Muslim nations have procured. Debt relief is vital in ensuring environmental recovery, since poor people are forced to survive from remaining natural resources. Global poverty is intrinsically tied to global warming since forests are removed to pay off national debt and to provide land for farming. The putrefaction process tied to dead forests releases large amounts of carbon dioxide and methane, both chief contributors to global warming.

One can learn from past experiences on how intra- and inter-group dialogues can be initiated. In the global market economy there are various modalities that have been attempted.

The UNCED-inspired North-South dialogue

What is important here was the political statement made by the EU on technology cooperation and capacity building, which outlined the guiding principles of the dialogue process on technology, technology transfer, and capacity building in technology. All this related to the environment. Among others we notice that : "although commercial transactions will play an important part in the transfer of technologies, technology cooperation cannot be left to the market alone... the European Community and its Member States are prepared to consider purchasing patents and making them available as part of aid package while taking full account of the need to protect intellectual property rights...".

Modality of a South-South dialogue within the Muslim world

UNCED was the beginning of a long journey of what we now refer to as *traditional knowledge*. In the Convention on Biological Diversity and in particular in its Article 8(j) the acknowledgement of the importance for biodiversity conservation was linked to the '*knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles'*. The concept grew from the intended and essential link to biodiversity and traditional lifestyles to a more open concept of tradition-based technology, part of a modern society, not necessarily "localized". While more than thirty years ago, UNESCO, in its General Conference in Paris on 20 November 1974, adopted a

Recommendation on the Status of Scientific Researchers with the observation that:… "scientific discoveries and related technological developments and applications open up vast prospects for progress made possible in particular by the optimum utilization of science and scientific methods for the benefit of mankind and … give rise to complex ethical and legal problems".

In short, these and similar statements are the guiding principles behind what make modern-day SE Asian countries take up the challenge to translate these statements to become an integral part of the development policy on intellectual property and traditional knowledge (TK). The attachment of coherent, proper and acceptable IP rights to traditional knowledge would be suitable as the core of their national development objectives. This is a very important feature of the national development policy and it serves as a protection system that shall be framed within the objectives of serving the best interest of the people. The protection of traditional knowledge, like the protection of IP in general, is provided as a means to these broader policy goals.

Concomitantly, educational regimes need to be developed and promulgated which inform Muslims of the realities of global warming and which place an onus on increasing Islamic ecological values. In Malaysia, the societal blueprint called Vision 2020 sets out measures in which Islamic ecological values are wedded to socio-economic development (Majeed 2003). In Aceh, Indonesia, permission has been given for the implementation of *Shari'ah* (Islamic canon) which will inform "sustainable resource governance" (Saniotis 2006b; World Wildlife Fund 2006). While it is untenable to implement full scale ecological development in most Muslim countries, change in environmental attitudes can be employed at the grass roots level.

The majority of the world's Muslims come from village communities which are dependent on land cultivation and pastoralism. Ecological practices which are central to Islamic values can be re-introduced in a gradual and non-interventionist way with the assistance of non-government organisations, as well as, from government initiatives. Dickinson (2005) cites that Zanzibar fishermen have extensively used Islamic ecological values in response to over fishing practices. Local religious leaders have played a central role in revivifying environmentally friendly practices as prescribed in the Islamic tradition.

One can only hope that the Islamic Educational, Scientific and Cultural Organization (ISESCO), adopted by virtue of Resolution No. 2/11-C of the Eleventh Islamic Conference of Foreign Ministers, in May 1980, can play a significant part. The Islamic world should consider examining the global warming issue in a proper context and perspective. One can certainly see that it is within the grasp of ISESCO to make a difference, as formulated in the organization's objectives, which aims to develop applied sciences and the use of advanced technology within the framework of the lofty and perennial Islamic values and ideals.

Secondly, environmental policies as indicated by ASEAN and UNCED need to be realised. International co-operation between developed countries and Muslim countries is crucial to the establishment of basic environmental standards and equitable solutions. Policy goals need to include protection and encouragement of traditional knowledge.

Finally, and most importantly, Muslims need to re-engage with their Islamic ecological heritage which had informed previous generations of Muslims, and avoid the anthropocentricism which has undervalued the rich environmental teachings of Islam. This will be a gradual process, beginning at the personal level and extending to communal and national levels.

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Towards an Embodiment of Environmental Bioethics

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A major issue arising from the recent UNESCO Bangkok Consultation Workshop on Codes of Ethics in Engineering, Science and Technology (May 2006) was a concern to teach ethics at key social levels. The Sri Lankan participant stressed that an approach towards ethics pedagogy has "to come from the heart" and not be confined to intellectualism. During the course of the conference co-participants concurred with this view due to the massive ethical abuses occurring worldwide. While the transmission of ethics is crucial in present modernity, the systemic entrenchment of non-ethical attitudes reflects both misinterpretations of socio-religious worldviews and the pre-eminence of unbridled materialism.

This paper is a philosophical response to the aforementioned workshop and will elucidate an approach to environmental ethics that concerns itself with human embodiment. A concern with human embodiment not only privileges our perceptual engagement with our life-worlds but also our capacity for self reflexivity. My approach conjoin concepts from the philosophers Martin Heidegger, Michel Foucault, and David Abram. A common feature of each thinker is the recognition of ethical issues in response to human ways of being.

Heidegger's "night world"

The eminent German philosopher Martin Heidegger was concerned with the technological direction of humankind due to the advent of weapons of mass destruction in the 20th century. Heidegger was especially critical of modernity and apparent changes in human embodiment that were increasingly being informed by technology. In Heidegger's vision, the western world is characterised by instumentalism in its engagement with nature (1997). Things become an "object of technique" which are methodically planned and systematically controlled order of action" (Feenberg 2000). In this schema, nature is a means for human ends. Old growth forests are turned to chipboard, animals are mustered for human consumption, nature reserves become tourist arenas, once free roaming animals are confined in zoos for the human gaze, imitation flowers garnish shop fronts.

The onus on quantification gives rise to what Theodore Rozak refers to as "terrible simplification" (Grossman 1999). Here the mainstay of growth gives rise to a "deliberately sustained system of inequalities" or in Illich's words "the modernization of poverty" (Grossman 1999). Heidegger aptly calls the present human condition as "night world".

A poignant viewpoint is offered by Aldous Huxley's Brave New World (1969) where "the radical overextension of rationalization makes human beings into objects of technique on much the same basis as raw materials or machines". The link between rationalization and mechanized modes of being is expressed by Farias (1989:287):

Agriculture is now the mechanized food industry, in essence the same as the manufacturing of corpses in gas chambers and extermination camps, the same as the blockade and starvation of nations, the same as the production of hydrogen bombs.

As Jackson (1996:5) argues, technology's preoccupation with maintaining a rational pattern of order and control is historically constituted by a concern for dominating nature and those human beings (who are) categorised as being inferior. Horkheimer, like Heidegger, wrote on the tie between technological progress and new forms of dominance over nature, leading to "the elimination of all dimensions of "spirit" (Gur-Ze'ev: 9). "Men have to pay for man's domination of inhuman nature by denying the nature within them" (Horkheimer 1985:368). Athanasiou (2003) observes that the apotheosis of this decorporealisation of the body was in the Nazi concentration camps. These camps ushered a new kind of bio-power, "in terms of mechanical economy" – via destructive technologies" (Horkheimer 1985:368).

Like Heidegger and Marcuse, Feenberg avers that the calamity of modernity is "the value-free or neutral character of technology" (Dahlstrom 2004), or more precisely, "the obliteration of humanity's special status and dignity as the being through which the world takes on intelligibility and meaning." (Feenberg 2005:2). From an environmental ethical viewpoint, the value free character of modernity has given rise to misrecognising nature in terms of 'thingness' or to coin Martin Buber a transition from an "I-Thou" to an "I-It" relationship. This alteration has been reinforced by the scientific cartesian model which considers non-humans as 'souless' machines; base, unfeeling and inferior.

Foucault's archaeology of history discloses how in ecological terms the last three centuries have been

concerned with "the development of a taxonomy of living organisms" (Solis 2004: 1). The key concept of this taxonomy is humanity's historical role in its construction (Solis 2004:5).

The belief that humans have the right to envision or construct such a table personifies this notion and the table's material existence allows for a deconstruction of what its presence personifies for contemporary society (Solis 2004:5).

However, the construction of a taxonomy of nature became contingent upon viewing nature as being under the exercise of human authority. Here, Foucault draws a correlation between the governmentality of the body and the governmentality of nature.

According to Foucault, an emerging discourse arose from the 16th and 17th centuries in Western Europe which was concerned less with controlling "a specific territory" and more about administering human populations (Foucault 1991; Darrier 1999). This was to ensure "the abundance and prosperity of the population" (Rutherford, 1999: 47). Consequently, the administering of people demanded that human beings become "the object of scientific inquiry", thereby leading to the rise of social and physical sciences (Darrier 1999). As government resources increased in these sciences, scientists "were deemed holders of "expert knowledges" who represented the power of the state (Darrier 1999; Foucault, 1975; Rutherford, 1999). The views of social and physical scientists were "considered normal" and incontestable, marginalising alternate knowledges (Darrier 1999).

Concomitant with the rise of the social and physical sciences was the emergence of a form of power that Foucault referred to as *biopower*. Biopower was concerned in controlling human populations and relied on "expert knowledges" from "the social and physical sciences to control the human individual in order to create a more docile and productive citizen" (Darrier 1999; Foucault, 1975; Rutherford, 1999). For Foucault, biopower is an "anatomo-politics of the human body, that is concerned with disciplining the "individual body to increase its utility" and manageability (Simon & Aggarwal 2005:8). Rutherford links the regulatory power exercised on the human body by medical science with the attempt by episteme to control and manage nature. However, as Simon and Aggarwal 2005:8) point out nature has a knack of escaping "the technologies of biopower". Take for instance, the recent tsunami (December 26 2004), which devastated parts of South-East Asia, South Asia and the eastern coast of Africa. The tsunami exposed the limits of human biopower of nature, unveiling the 'myth' of human control.

Another significant aspect of present human embodiment is the extent to which human language is detached from "its origins in communal experience" (Grossman 1999). Here, metaphors of market growth supplant existential metaphors that contour our aesthetic engagement with the world. Technological language, based on a linear time/space model adumbrates our daily rhythms. Human dependence on cybernetics is further technologising our embodiment, mediating our social relations to the point that face to face encounters are being mitigated. Dewey saw that the onus on a technological mediated sociality was diminishing traditional ways of knowledge transmission. Take, for instance, Jackson's claim that the art of storytelling, which was central to many cultures has become an anachronism along with the storytellers (1998). The telling of myths was a crucial method in which humans connected with the non-human world. The mythopoeic understanding of nature which our ancestors shared has been deprecated by a cynical modernity.

Furthermore, the western use of metaphors intimates a cleverly crafted euphemistic language aimed at disguising the level of human violations. Euphemisms such as 'collateral damage' (civilian casualties), 'illegals' (legal refugees seeking asylum), and 'non-lethal weapons' (weapons which are not designed to kill but can cause serious injury or death) and many others are frequently used to the extent that they have become normalised. In other words, the use of 'doublespeak' is tied to a prevailing disregard for human rights and indifference towards the environment.

Environmental Bioethics and Embodied Awareness

In the previous section I elucidated the "prevailing *telos*" (James 2002:2) of human embodiment, based on a regimented and technological comportment that has alienated human beings from nature. This kind of "technological bodily comportment" (James 2002:3) has encouraged a distortive outlook towards ecology. Heidegger proposes a way out of this human existential quagmire. He argues that in order to "recover our rootedness in the world" we need to be released toward things (James 2002:2). Releasement toward things' is having an awareness of one's surroundings, or what Merleau-Ponty refers to as "an implicit kind of bodily intelligence" (1996).

In pragmatic terms, then, releasement toward things may come from paying attention to the everyday environment which goes at most times unnoticed from our perception. Heidegger (1971) postulates that things are in their being openings awaiting to be revealed. In creating this concept he borrows the Greek term *poiesis* to mean 'bringing forth' Julian Young (2002:41) states that for the Greeks *poiesis* was "utterly mysterious, incomprehensible"…"the Greeks…experienced their world as brought into, and sustained in, being by an overwhelmingly powerful, utterly mysterious force." Heidegger gives the example of *poiesis* of a craftsperson who is attuned with the wood which he/she is working with. The craftsperson 'answers to' the dimensions within the slumbering wood (James 2002:3). In this way, Heidegger regards the environment as a horizon awaiting to be revealed by our perceptual participation. Environmentally speaking, Heidegger's speculation allows us to treat our everyday lifeworlds with greater empathy. As James (2002:2) declares: "To be released toward a particular stretch of road is to attend to it for what it is in itself, to appreciate the journey, rather than simply passing over it in sullen indifference on one's way to work."

Along these lines, David Abram calls for a sensuous awareness with our surroundings. This entails in attuning our 'animal' senses to the animate world. Abram a la Merleau-Ponty determine the world as a 'sentient other' capable of reciprocating human

engagement. In his work *Spell of the Sensuous* (1996) Abram elegantly peruses the human journey through forests in which we interact with the environment as the environment interacts with us. Such a view coincides with many indigenous and Asian understandings of the environment as a living, sentient being. In bioethical terms sensuous engagement with one's surroundings gives an individual an ability towards empathising with the environment. Indigenous and Asian cosmologies have been attentive to the environment as an interconnected living matrix in which each organism affects other organisms. An ecocentric embodiment would allow humans to dynamically interact with the environment.

Let us examine aspects of Abram's theory in relation to seed technology and women's knowledge in India. At present, there is growing debate in India concerning the introduction of genetically modified (GM) seeds. Multi-national companies have reassured Indian farmers that GM seeds have greater yield capacity than non GM seeds. Even if this is the case, what is significant here is that seed has been passed down by generations of Indian women. Such knowledge has enabled women to carefully select superior seed stock which is insect resistant and environmentally friendly. In other words, knowledge of seed stock is coalesced with traditional farming methods which underscore an ecologic symbiosis. Moreover, womens' knowledge of seed stock contributes "to the viability of the agricultural diversity and production" (Sustainable Development Department, United Nations).

A concerning aspect of the introduction of GM seeds is that it foregrounds "knowledge of DNA" (Saha et al. 2004:454). This means that 90% of resources used are towards the study of DNA (Saha et al. 2004:454). What is missing is an understanding of the complexities of interaction between cultural and environmental processes. Moreso, the absence of altruistic perspectives countermands sustainable development. Saha et al. (2004:454) indicate the central role of human perception in informing "altruistic decisiveness towards the environment" throughout human history. Hence, sound ecological management is interwoven with human perception at various levels.

A perceptual obstacle that is intrinsic to western technological embodiment is the onus on a vision centred universe. Stoller (1989) contends that the Eurocentric importance of sight which is at odds with the way non-western cultures perceptually engage with their environments. In recent western history vision has worked in tandem with technology and science. One reason for this is the role of sight in legitimating facticity. In other words, western science's proclivity towards empirical observation and measurement is more accommodative to the sense of sight than the other senses. What this means is that the unique ways in which the sensory perceptions are used cross-culturally are increasingly being imposed by a western vision-centred universe. In addition, modernity's onus on images is expediting a vision centred imperialism. This has grave consequences from a bioethical perspective since it prompts a shift away from the plurality of experiences in which human beings experience ecology to a homogenous interpretation. If bioethics is, "fundamentally an interpretive enterprise" as Ronald Carson (1990: 250) argues, then an understanding of how sensory perceptions are operative cross culturally needs to be encouraged. "It is in such encounters with difference that one recognizes the merits and limits of "strange" practices, including one's own" (Carson 1999:207-8, 209).

In George Berkeley's explanation, sight experiences external objects in relation to how an individual is "arranged in physical space," whereas the sense of touch experiences external objects as they come into contact with one's body (*Abstract for Touching Shadows* 2006:3). This is illustrated in the following example: When you see the dog approaching from the distance, you are attending to visual cues"…whereas "When you touch a dog, you do not merely touch a sign of the dog; you touch the dog itself" (*Abstract for Touching Shadows* 2006:13). In the latter, one's experience of their lifeworld is existentially more immediate. It is not surprising, then, that in those societies (primarily indigenous societies) where tactility is privileged that their understandings of the world are interlaced with metaphors of sentience. Conversely, western societies' poor use of the tactile sense has reinforced the process of separation from nature. In these societies nature is conceptualized by metaphors of quantity (Grossman 1999).

In the light of Heidegger, Stoller, and Abram I propose for a retrieval of the sensory perceptions in the bioethics debate. Bioethics should not simply be viewed as a form of intellectualism which objectifies the natural world it claims to protect, but rather interdependent with the world of the senses. The globalisation of bioethics is "inextricably entangled with psycho-social, economic, legal, religious" and perceptual issues (Pellegrino 1999:84). "Whatever name we give to moral reflection" in bioethics "such reflection cannot thrive in isolation" from embodied perception (Pellegrino 1999:85). The multi-dimensional nature of the moral life is contingent upon educating the cogitative and perceptual processes (Pellegrino 1999:85). "The rapid emergence of difficult ethical dilemmas" (Pellegrino 1999:85), resulting from technological hubris demand a renaissance of ethics which aim at a "meaningful engagement with the problems of humanity's ethical and biological present and future" (Pellegrino 1999:86).

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Are the Present Day "designer babies" a Threat to Humankind?": Response to "A Christian Response to the Issue of "Designer babies"" by Minnie Sarah, *EJAIB* (July 2006)

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The indiscriminate use of the term "designer babies" by the media only highlights the future danger of producing "designer babies" in the truest sense of the term by altering genes as per ones wish by choosing desirable or cosmetic characteristics and evokes a sense of fear in the minds of the people. It fails to portray the tremendous capacity of this procedure towards betterment of humankind. In the article, titled 'A Christian Response to the Issue of "Designer babies"' by Minnie Sarah, M. Theol, Candidate for Doctorate in Theology at the South Asian,Theological Research Institute (SATHRI), Bangalore, India, published in *EJAIB* Vol 16 (4) July 2006, the author took up a similar role as the journalists without delving deep into the concept and analyzing whether we are really designing babies or how feasible it is to design babies and trade with those.

The argument put forth by the author citing the Hashmi case, as in other papers as well, can be questioned. The child produced as a tissue match of its elder sibling does not need to be treated as a commodity. Such a child who saves the life of the elder sibling is not looked down upon but will be considered a prized family member not only by the parents but also by the sibling whose life is saved, an argument very rationally put forth by the Hashmis themselves. Also the fact raised by the authors that the "saviour sibling" will be mentally traumatized knowing the purpose of its birth is a baseless. Rather than being mentally traumatized the "saviour sibling" will have more reasons to feel proud for being able to save its elder sibling. If we are perfectly comfortable and happy with one person donating an organ to save the life of another person and applaud that person for his/her act, then won't it be setting of double standards if we raise an eyebrow to the concept of "saviour siblings"?

Once again if we set aside our emotions and think of this technique in the light of the French Chamber of Representatives, which has come up with a new law banishing the concept of "designer babies" and replacing it with the concept of "double hope babies"

where the first hope signifies the birth of a healthy child in a family having a chance of giving birth to children with hereditary diseases and the second being that this child, born with the aid of advanced reproductive technologies, could help treat an elder sibling, we will probably see this new technique as a marvel of modern science rather than a threat to humankind.[1]

Moreover the birth of a child affected with severe genetic diseases like Duchenne Muscular Dystrophy, Haemophilia, Cystic Fibrosis, Thalassemia, to name a few is not only traumatic for the parents but also to the affected individual. It is not only the parents who have to incur huge medical expenditure but it is also the affected individuals who have to bear the burden of the disease differentiating them from fellow healthy children as well as suffer the pangs of medical treatment many of which are invasive yet without any hope in the long run. The technique of PGD (Pre-implantation Genetic Diagnosis) which is presently used to screen embryos for genetic disorders and select healthy embryos[2] to produce the so called "designer babies" is thus a marvelous solution.

Presently the very issue of "when does an embryo gain the potential of a human status?' being a matter of much debate, the question, of killing the embryos other than the one selected, raised by the authors is not strong enough. Even if we go by the fact that all embryos are living and thus basic human rights are applicable, this technique of selecting the embryos very early in the stage of development (in the mere 8 cell stage) is certainly more humane than undergoing a legally acceptable Medical Termination of Pregnancy for a foetus which has severe medical defects, at a much later stage of its development when it has more definite signs of life.

Again the fear posed by the authors that these advanced reproductive techniques are only the forerunners of the real "designer baby" - chosen for eye or hair colour, atheleticism or intelligence or some other parental whim like the desire to have a boy or a girl is a rare possibility. Intelligence, athelicism and beauty are not only guided by genes but also have strong environmental influences as well. The existing techniques can only be used to look at one or two genes at a time, on the other hand most character traits we might want to choose – anything from height to intelligence – are influenced by a whole range of genes and are really difficult to be changed at ones free will. It would actually be next to impossible to make a true "designer baby" using the present techniques like the PGD as there is no way of altering the genes inside an embryo using PGD.[3] Moreover these techniques have very low success rates, are too expensive and complex and are still in the rudimentary stages of development. They are used extremely sparingly measuring the pros and cons of success and failure. It is hard to imagine that anyone will undertake it simply for fun. So with the present level of expertise in genetic engineering and also with the existing laws prevailing, the chance of creating real "designer babies" through manipulation of the genetic makeup of the embryo is not a possibility in the near future. The future possibility of the misuse of these techniques can be coped through enforcement of laws and strict vigilance because it would be illogical to ban the progress of science due to the inability to enforce strict regulations and vigilance.

The whole lot of customary apprehensions put forth by the authors like the concept of eliminating the embryos because they are diseased would tempt us to pick babies for their physical or psychological traits as well and in the frenzied act we would land up breeding a race of super-humans who will look down on those without genetic enhancements are baseless in the present context and seems to be a distant possibility only. Moreover based on future apprehensions won't it be unethical to curb the progress of science, which is intended to benefit humankind. Thus considering the present beneficial effects, it seems only logical to permits the rational selection of genetically healthy embryos and the selection of "saviour siblings" especially given that prohibiting those would result in the preventable deaths of many.[4] To conclude, the so called " designer babies" of today are aimed to do more good than bad to the society and instead of criticizing and looking down upon these techniques guided by irrational emotions and theological philosophies, these modern scientific techniques should be appreciated for their capacity to do good.

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Science and Religion

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Often we hear statements suggesting that science and religion are two contesting areas, for example "Religion is superior to science, as it can explain every thing and every phenomenon, whereas science is not able to throw light on many of them", or "Science is fast advancing, and religion is going to become redundant". But this notion is wrongly based, as science and religion represent two different attitudes of human mind, and they should be taken as non-overlapping areas.

Science is an attitude of enquiry through analysis of data, collected through observations in experiments or observations in the field, using normal senses. The analysis of the data is done through simple logic, and inferences are reached. Care and objectivity are expected from the science worker, so that the inferences or results are verifiable (Verma and Saxena, 2000). On the other hand a religion is based on faith. The followers of a religion have to have simple faith on every thing said in religious scriptures about state or form of God, rituals for worship, ethical principles etc.. Leaders in a religion, many of them, are blessed with a special perception, a sixth sense, special intuitions or a metaphysical capacity. According to Rev. Dalai Lama, as per the Budhist concept, empirical experience also encompasses "meditative states as well as the evidence from senses" (Sternberg, 2006). In contrast a person, with normal senses and normal capacity of reasoning, through training, may become a successful science worker.

Do we need science? Certainly science is a human need. Inquisitiveness and trying to understand every phenomenon and to reach an explanation/inferences are a natural tendency of the human mental working. When this tendency is expressed in a systematic and orderly approach, it is science. Science has played a major role in development of civilization. We cannot imagine our life today without electricity, communication facilities, modern agricultural and medical sciences. While applied science makes our life comfortable, healthy and progressive, ecology or environmental science makes us aware of where we are overdoing, and emphasizes the need of sustainable development, and of conservation of natural resources and of biodiversity.

Do we need religion? We do. There is no human population, which does not practice some form of religion or does not worship God in some state or form. In fact religion is a biological necessity of man. His intelligence, which is the basis of science, has its limitations. In spite of all scientific progress, there are experiences and phenomena, which have remained unexplained. We often come across people, who recount such experiences. Humans, as a result, suffer from fear of the unknown. His faith in religion and God gives him strength against this fear; hence the need of religion.

The great philosopher and former President of India, Dr. S. Radhakrishnan has pointed out another reason for why we should have religion. He says that the phase of science and technology in human history has brought with it-self the cult of specialization. For scientific and technological progress specialists are needed. A specialist knows so much about his area of specialization, but often lacks in perception of the broad arena of life. As Dr. Radhakrishnan has put it, "Modern specialization has led to the fragmentation of knowledge". While we need specialists, we also need a wide perspective of life and of the planet supporting it. Every organized religion has this perception and a holistic approach to needs of life and society.

Most scientists are religious. Even in USA, which is having a raging conflict between science and religion (vide infra), about 40% US scientists believe in God, "but Collins (a leading molecular geneticist) says that is not reflected in science's public face" (Editorial, 2006). Most scientists, however regard science and religion as distinct realms. Recently several books on science and religion have been published. Specially notable among them are those by Francis S. Collins, the leading molecular geneticist, Roughgarden, an evolutionary biologist, E. O. Wilson, an eminent entomologist and invertebrate conservationist, and Gingerich, an emeritus professor of Astronomy at Harvard. In essence they all say, "But does science require the abandonment of faith? Not necessarily, and certainly not entirely, these authors argue." (Dean, 2006). At the same time mostly they do not endorse mix up of science and religion,

Unfortunately sometimes there is a bad intermixing of science and religion. During the past some years people in some countries, specially in USA, have started challenging the Theory of Organic Evolution, and trying to replace it with what they call Intelligent Design (ID). ID is only a modified version of the Book of *Genesis* in the Holy Bible, modified to give it a scientific flavour. The controversy between evolution and ID has been blown out of proportion through a huge media coverage in USA. Often reporting on this subject comes from "reporters with no scientific training", and generally equal time/space is accorded to biologists and creationists, "creating illusion of scientific equivalence" (Rosenhouse and Branch, 2006). Evolution versus ID has been discussed in an earlier communication (Verma, 2006). From that earlier paper I would repeat here only what Rev. George Coyne, the Jesuit Director of the Vatican Observatory, said: "Intelligent Design isn't science, even though it pretends to be".

Francis S. Collins completely rejects ID, "… as Dr. Francis S. Collins (in his 2006 book) (has) put it, when religions require belief in "fundamentally flawed claims" about the world, they force curious and intelligent congregants to reject science, "effectively committing intellectual suicide", a choice he calls "terrible and unnecessary" " (Dean, 2006).

Reviewing Hanzen's 2005 book on life's origin, Fry (2006) says, "(the book) written from the careful yet self-confident perspective of an experimentalist, serves as a solid rebuttal to such assaults (from supporters of ID).".

Bonner (2006) has reviewed a book, edited by John Brockman, and published in 2006. The book includes a series of essays, which forcefully demonstrate that ID has no scientific basis. Bonner points out that specially notable are the essays by Jerry Coyne, who masterly sums up the major evidences in support of the evolutionary theory, and the one by Tim White, who describes the remarkably complete series of fossils, showing vividly the course of evolution leading to the modern man.

Overlapping of science and religion is certainly highly undesirable. But there are some ways, in which the two fields may have useful intersection or cross each other's path, without encroaching into each other's area. Instances of such intersection:

1. Sometimes personal ambitions overcome the compulsion of observing science norms, and this results in scams in science (Verma, 2006). A recent example is the case of stem cell "research" by the South Korean scientist Hwang Woo-suk. Such scams are responsible

for loss of funds and time, and hamper scientific progress. Some exposure to a religion, at least in childhood, may reduce the possibility of such scams, as every organized religion has a strong ethical component.

2. Roughgarden, an evolutionary biologist, in her recent book, points out that religion has a role in ethical consideration of biotechnological developments or Bioethics. She says, "I'd love to discuss the moral issues of biotechnology within a community of faith" (Dean, 2006).

3. E. O. Wilson opines that, "if religion and science could be united on the common ground of biological conservation, the problem (of conservation) would soon be solved" (Dean, 2006). Hindus in India worship some trees, and in some parts they protect forests with a religious zeal.

4. A logical and analyzing attitude of mind of a scientist should help in sieving out genuine religion from superstitions and deviations, introduced by those with personal ill-based ambitions. This role of science should be helpful in reducing conflicts between different religions.

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Designing Humans

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Abstract

It is said that the present situation in human history is a challenge to philosophy to vindicate its traditional claim to the possession of a vision of humans that can help, integrate, and enrich human experience. Standing on the threshold of the biological century, we find that more than physics or mathematics, it is now biology that has turned aggressively useful, and that bio-thinking will shape our vision of ourselves in the years to come. If all our distinctive human traits, our sensitivity and emotions, our altruism and compassion, are written in our genes, if these are identified as our weak points that need to be corrected, human designers will replace the sport of nature with models of human fancy. Genetic engineering will provide genetic therapy provided these are not culture laden terms but are similar to the problems in mathematics to be solved in a matter of fact way by the disengaged and detached man of reason. Designing humans as an artificial and a mechanical process assures perfection since the humans so designed are no more blind victims of genetic lottery. Combining sperm and egg in a dish test tube babies are made, or a genetic duplicate is made cloning human beings. In this transition from biology to bio- and gene technology, many complicated questions will remain unanswered: questions about human manipulation and personal identity, the question of surrogate mothers and pre-natal embryo transfer, about intolerance for diversity and for imperfection, about obsessions for becoming God like and perfect, about attaining knowledge that is absolutely certain and exact. This paper will make an attempt at exploring some philosophical issues in light of recent trends in gene technology with special emphasis on the human genome project and its ethical dimensions.

Introduction

Genetic engineering raises issues about the nature of life itself, about what it is to be human, about the future of human race and about our rights to knowledge and privacy. "Until now we have all been children of nature, the progeny of evolution". [1] We were neither designers of the flora or the fauna, nor responsible for the being of humankind or of nature. With genetic engineering at our doorstep, we are not only physicians and healers acting midwife to assist birth, we are basically active manipulators and skillful surgeons with sophistication and excellence.

On the other hand, this biological turn in our thinking could take a positive turn with its due recognition of our historical and situational limitations. Unlike other homothetic society of sciences, a product like physics, chemistry, and mineralogy, and geology etc., biology is idiographic to Earth. We can expect only on this Earth historically derived genes and their Earthly generated products. A human designer can only narrate the story of these particular and historical genes. Our knowledge here is more of stories than law-like; knowledge here is an instrument of biological and cultural adaptation. This scientific story of nature is also constituted by the dominant sociology of science, a product of Western, European culture. In this background, this article is a humble attempt at unfolding the story of the Earth bound humankind that cannot be separated from the story of the Earth. It is a story about the relation between the two. Human designers should

take note of our historical and situational limitations while designing.

The first part of the article is a gradual exploration of what will make sense of our being human and how this is lately being challenged. I present here some rudimentary understandings of what it is to be human from some philosophical perspectives.

Humans as the contemplator: the visionary person in Plato, Socrates, and the Greeks

Plato's ideal human is a contemplator and a lover of the eternal Forms of the Good, Justice, and Virtue. Episteme is achieved through the exercise of reason that, for Plato, was intellectually and morally superior to techné. The realm of the real is superior to the realm of the appearances. For Plato, the material world, upon which techné operates, belongs to the realm of appearance. The pursuit of wisdom and virtue through grasping the forms of the Good, Justice and Beauty, remains the ultimate philosophical goal. The highest intellectual/moral life is the life of contemplation inspired by the love of such forms. The desire to dominate the material/natural world through techné is not a part of that ideal. The role played by the techné in such a conception of the good life and the good society is a very limited one. The highest human fulfillment and flourishing is not to be found in the mastery of the sensory world or in the comforts that such control may bring. For Socrates, human flourishing is not predicted upon 'the realm of necessity', which is taken care of by techné (technology).

For modern people such as Marx, intellectual and artistic flourishing is only meaningful and possible if structured upon a material base of abundance. There is a transition here from normative concept of humans to value neutral pure descriptive one, from humans as spiritual to people as functional, from people as thinkers to being essentially a doer. Both the thinker and the doer are free subjects in their own right. The one is a contemplator, the other, a manipulator and a reformer; both remain natural humans and free agents either as designers or as manipulators. They are specimens of 'the natural', not yet reduced to some artifacts. However, all manipulators are not always so privileged. There is always some exceptions to any rule whatsoever.

A drug addict's art of manipulating others is not a free agent's planned act for which they owe responsibility. It is their addiction or clinically diagnosed compulsion that has transformed them to a patient, and an object designed, rather than a free designer. Something is lacking here which takes away something vital from the human way of doing an act, or even from a biotic way of doing it, which was definitely different from the robotic performances of mindless machines. This was one significant fields for philosophers to differentiate biotic life forms from abiotic ones.

The plant did not come into existence for the sake of providing seeds to the insects or to the humans. The insects did not come to provide food for the bird, nor is the nightingale here on earth to sing melodious songs for the pleasure of humankind. All these exist, primarily to unfold their own telos. Only biotic entities have a good of their own. "The lake is found by glacial action, and then dries one day so does a tree. Each entity follows its own manner of persistence, change and decay; we can cut a tree ultimately, but all biotic entities exist for themselves, striving to maintain their functioning integrity and to realize their own tele." [2] the top of the food chains to an entirely herbivores biosphere. That amounts to humanizing nature with a vengeance.

This is common in all forms of biotic life. Take the emperor penguins in Antarctica when the female has hatched its egg, both the female and male penguins strive to ensure that hatched egg is successfully transferred from the former to the later. This operation must be completed within a very short period as the egg would nod strive the cold if exposed for the two minutes. When the transfer has taken place, the male then protects and hatches it during the next four months, while his female partner travels about a hundred miles or so to get to the sea in order to feed and fatten herself. "At the first stirring of the Antarctic spring, the egg is hatched. The hatching is timed to coincide with the return of chick's mother from the sea but in spite of the long separation, the partners successfully recognize and locate each other. At this point, another intricate transfer begins -----the mother takes over straightaway and must feed the chick, as any delay would cause it to die of cold and hunger. When the offspring has been handled over then it is the turn of the male partner to walk the hundred miles or to the sea to feed himself-he had endured hunger and extreme cold for months, all through the depth of the narcotic winter protecting and hatching the egg."[3] But an abiotic entity, a mountain, if it is eroded by natural forces, does not send any recognizable signal to another part of it to replace what is being eroded.

One of the most significant changes within the twentieth century and early decades of the twenty-first century is the development of our ability to manipulate life through genetic engineering. Biotic artifacts imply that non-humans are neither 'for themselves' nor 'by themselves'. Humans now have re-coded the internal design of these biotic entities; the formal cause is already taken over. Biotic entity may continues to exist for itself, provided humans allow them to exist the way they should, following their respective trajectories, independently of human interests and intervention. It is significant that nature has only instrumental value for humans. Even for Bergson, it is even more significant that human consciousness and intelligence, as embodied in instrumentation and manufacture as well as the scientific reasoning, which stands behind these, so effectively breaks down any recalcitrance and resistance of non-human nature against the penetration and imposition of human intentions upon it. In other words, the transformation of the natural into the artifact truly affirms humanity's mastery of nature. Homo faber reigns supreme.

With genetic engineering, organisms that produce asexually can have genetic material spliced into their genes from individuals other then themselves. The same holds also for those that reproduce sexually. Animals, on the other hand, reproduce sexually, while some plants reproduce asexually. That means that under genetic engineering a major difference between some plants and most animals can be obliterated. Science promises to achieve in overnight laboratories

the process of natural selection, which would otherwise take millions of years in nature. Research predicts that, one-day, geneticists may be able to remove traits from human beings that are considered undesirable and replace them with more acceptable ones. However, that is in our future. Currently, the battle is to be able to freely and legally complete the research that will eventually lead to this kind of genetic engineering of humans.

Now that we come close to such an understanding, greater progress becomes possible. Embryology is a science of tomorrow. This is a shift from holistic to atomic conceptions of human and of nature; the shift from the macro to the micro, from organizations to un-connected atoms. Biotechnology has therefore tempted many to consider putting right what they perceive to be severe limitations in nature itself. One such limitation, which 'designer proteins' and transgenic organism hope to overcome, is that natural evolution can capitalize errors during DNA replication. Furthermore natural evolution necessarily is a slow process, favoring those individual organisms with mutations, which bestow an advantage on their possessors' Like Tudge, these thinkers are eager to 'help' nature during anticipated periods of extreme atmospheric or ecological stress when the necessary random mutation may not be forthcoming'. 4

Others, such as Easter Brook, go even further to talk about overcoming 'design flaws' in nature, replacing nature with 'New Nature'. For instance, the 'New Nature' envisaged is one in which predation by animals against animals would have been eliminated. Modern civilization holds it to be axiomatically correct that pain is an absolute evil, and the removal (or diminution) of pain an absolute good. That amounts to re-designing the existing biosphere in which carnivores operate at, the top of the food chains to an entirely herbivores biosphere. That amounts to humanizing nature with a vengeance.

In this journey of man as contemplator to man as Homo faber, both the one who designs and the one which is designed, has undergone change. Natural evolution is in danger of being superseded by human control and manipulation of biotic nature. Instead of natural selection, it is now possible to have human selection of characteristics deemed to be desirable to be spliced into the genomes of different life forms. Biotechnology makes it possible (at least in principle) for Homo faber to rearrange genetic material in ways, which please it. Organisms no longer inherit genetic material that cans even come from other unrelated species. Their genetic composition can be humanly designed and engineered in the laboratory. This may marginalize the gap between natural human and their image, the biotic artifact, between human and their replica, the similar other.' Robert Sinsheimer, a leading molecular biologist and a key figure in the initiative to establish the project, wrote in 1969: "For the first time, a living creature understands its origin and can undertake to design its future". [5]

Defining humans

We should pose the basic question: 'in genetic terms, what makes us human?' This is now synonym to,' what actually specifies the human organism?' Molecular biologists have estimated that there are 100,000 to 30,000 genes, which make up a human being. The lower estimate assumes about 30,000 base pairs per gene; but as some genes may only be 10,000 base pairs long, there could be as many as 300,00 genes, according to the highest estimate. That means that the human DNA sequence is composed of three billion base pairs.

But whatever the estimate of the number of genes, the number alone underestimates the complexity of the human organism, because many genes encode ten to twenty different functions in different issues. Some of that genetic inheritance may turn out to be unwelcome-for instance, Tay-Sachs disease is a common disorder among some groups of Ashkenazi Jews in North America who, through many generations of marrying within the groups, have increased the chances of their offspring inheriting the deleterious gene from both parents, who might each be a heterozygous Tay-Sachs carrier. The therapeutic aspect of gene-technology is always welcome but there are other exciting possibilities that ask for human restraint and in- depth understanding of a holistic picture of humans and our interconnections with things and beings around us than a simple identification of defective genes. In this journey from contemplation to manipulation, what is left behind in this process is the spiritual realm that gave rise to holistic vision of man and his counterparts. With our piecemeal knowledge and fascination for details, we have lost that sense of wonder to celebrate life as a gift. This needs recognition of the dreamer and the planner, along with the skilled artisan and the craftsman and his practical know how. Or else, either the technical man is transformed completely to the human of technology who will solve life or death problems in the same spirit that solves a problem in mathematics.

Life has lost its mystery and its sacredness, as birth is no longer a mystery, nor is death. Now the human story and the Earth story is found to be simply coded in genes in complete ignorance of the fact that this Earth story can not be only that which is simply coded in human genes. Even genes, as they spin a natural history that they also record, are placed in larger events of climate, geomorphology, or marine hydrology. The story takes place at multiple levels, of which the microscopic genes are only one, the level of smallest scale." There are, on smaller scales still, atoms, electrons, quarks, on which the story motifs are superimposed, but we do not know of any cybernetically transmitted accumulating historical coding, that is registered in structures and processes at these lower levels. There are, on larger scales the native range events with which the phenotype must reckon, the blooming, buzzing confusion of life on land and in the sea."[6]

This gene-story cannot take account of the cultural and the spiritual realm of humans. It has no explanation to the fact that in culture, people can act in ways that decreases their fitness. The self is not simply biological and somatic but cultural and ideological. Along with biological reproduction, there is cultural reproduction of what one values most. That is equally required since humankind has relied, in the main (and still does), on

cultural means to regulate and determine human reproduction. "Once the cultural selection is in place, the only technique relied on is copulation, helped in some instances by subsidiary techniques, which vary from culture to culture, like eating the right foods, or saying the right prayers in the hope that there would be success in conception and that then offspring turn out to have certain desired values ".[7]

We may once again distinguish here the processes of techniques from technologies, reproduction from human production, and humans as cultural from humans as natural as well as humans viewed from a holistic perspective to the atomic and microscopic picture of humans. This is also a shift from the joy of creativity to the mechanical act of manufacturing humans in a factory. This technological manner of human making process can be compared to as artificial a process as cake –making." The formal cause and the material cause appear to lie within the union of a particular sperm and particular egg to form the embryo, which develops into the infant born nine month later. The production, unlike the reproduction of human offspring, literally involves the making of babies. Such babies, like cakes, are true artifacts except that one is biotic and human, whereas the other is abiotic. 'The super session (in principle) of reproduction by production even in the context of human reproduction is the true measure of the ontological transformation humankind has effected, and the extent to which it has not only humanized nature but in the process, using the same technologies, has also naturalized humanity itself".[8]

In contrast, human reproduction, under non-technological conditions, does not approximate or satisfy at least one special condition that characterizes process of production of babies under artificial conditions. James Kimmel describes how this unique relationship between mother and child is missing in an artificial environment that is deprived of this special bond between the two. Under natural circumstances, mother and baby are structurally separate, and without a placental attachment after birth, but they are not physically or emotionally separate. "They evolved to be a nursing couple in close, physical contacts day and night – a couple who are reactive to each other's moods and feelings. A mother smiles when her baby smiles, laughs when her baby laughs, is anxious when her baby is anxious, content when he is content, peaceful when he is peaceful, and sad when he is unhappy. A baby smiles when his mother smiles, laughs at her sounds of delight, becomes upset when his mother is upset, anxious, distant, angry, or not available when he wants to be with her". [9]

"The human individual, as compared to other animals, is poorly endowed to survive in nature. We have no claws or fangs that can serve as weapons, we are slow moving, and we have no protective armor. Even our superior brain, coupled with the manual dexterity that allows us to create what we can imagine, would have little survival value if we were not able to act collectively. Indeed, the human brain, with its capacity for language, empathy, and the ability to imagine and to play at being another, evolved as it did to enhance our capacity for collaborative and collective behavior. Those traits that allow us to survive in the modern world, such as self-sufficiency, independence, competitiveness, selfishness, and indifference to the plight or misfortune of others would have had little adaptive value when we lived in small groups as hunter-gatherers. Our adaptive strength then was in our ability for combined and unified functioning, not in our individual and separate skills, powers, possessions, or wealth". [10]

The nurturing mother-infant interaction, rooted in the mother's capacity to care about the life she creates, was for most of our existence the model for all human relationships and the foundation for human society. It allowed the newborn to be born in an immature state and to slowly develop his brain and mind in relation to loving others. The nurturing process, predicated on the unity of mother and baby, developed individuals who would find it natural to function in unison with others. We would be a very different kind of species - a very unsocial one - if we were born fully developed and did not require mothering.

Donald Winnicott, the English psychologist, has said that, " 'There is no such thing as a baby, there is a baby and someone.' This statement captures the reality of the human baby – a reality that is often overlooked in our society because babies are inaccurately perceived from the moment of birth as separate individuals. We no longer value and support mothering or the babies' critical need to develop in relation to a tender, nurturing mother. We have deviated from the nurturing aspect of reproductive biology by changing the baby's "someone". In a society where a baby lives and develops without her mother's presence and without human tenderness, some babies, if not most, become a different kind of human than they were meant to be. They must adapt to and fit the substitutes that have replaced natural mothering: formula, pacifiers, cribs, playpens, security objects, and substitute caregivers. In doing so, they are, as adults, different from adults who develop in relation to a nurturing mother. Inappropriately and poorly nurtured children grow up without the internalization of tenderness. We evolved to pass on to the newborn our tender feelings for them." [11]

The moral dimension

The rise of applied and practical ethics as a field in philosophy has created a need to give answers to many such concrete moral problems that must be addressed from these changing perspectives on production, reproduction etc. There is, however, no consensus about what ethical theory (utilitarianism, deontologist, virtue ethics etc.) should be adopted. Moreover, most ethical theories seem to be disconnected from cases. Thus the question what role ethical theories should play in moral practice is one of the most important issues in applied and practical ethics with the understanding that moral problems cannot and should not be viewed as rational decision problems, but should be compared with (industrial or engineering) design problems. By presenting moral problems as well-structured or multiple-choice problems, ethicists have implicitly suggested that we should choose one of the given alternatives through a rigid analytic methodology. This historical context of conceptualizing the human challenges the importance of humanness as a fixed entity. The emerging perspectives of cyborgism, post

humanism, Trans humanism seek to reject humanness as guiding, normative concept, taking it as a process toward disembodiment throughout cybernetics.

But then, the question remains: 'what roles do humans play'? Is it normative, or value neutral functionality, that defines man? Is human dignity a natural possession like one's beautiful blue eyes, or just a vulnerable body? Are humans an incomplete process that is in the making, and that is to be rewritten and recomposed many more times? Do they possess subjectivity, or, inter-subjectivity? Are we the sole author of our life, or only one of the co-authors, working as a team with other seen or unseen designers? Is a person one or many? Are we basically static, or dynamic? Is everything about a human just in the genetic code that can be easily decoded by intelligent designers? Humans might be genetically disposed to grow bald, fear strangers, and avoid incest; men to dominate women; both to want many children or to be selfish. But how should we modify these traits in our genetically improved future? To make people wish for fewer children?

In enhancing such traits as intelligence, memory or altruism, there might be unforeseen consequences. "There exists a genetically engineered strain of the fruit fly Drosophilae that learns ten times faster than the normal strain. At first sight, the application of these technologies to humans sounds marvelous. Imagine learning ten times faster; think of all the benefits it could bring. However, there may be costs. Improved learning implies improved memory and if you have a far superior memory you will forget far less. Most of us have experienced unpleasant happenings that we are only too grateful to forget." [12] Further, there is some evidence to suggest that the handful of people who have total recall or perfect photographic memories find life difficult. For a start, they don't always find it easy to know what day, month or even year it is. If one has perfect memory, events that occurred a year ago may be almost as fresh in one's mind as events minutes ago. This can lead to confusions and can make social relationship difficult.

Conclusion

I have made attempt at defining these two processes of reproduction and production as the phase of transition from techniques to technology. While the use of techniques might lead to creations such as songs and poems, the use of technology may, on its own, lead to artifacts." The former falls into the domain that requires deliberate and intentional creation, but only the making of things leads to the production of an artifact, which is defined as the material embodied of human intentionality". [13]

Perhaps what is objectionable to Plato's contemplator man should be equally objectionable to those of his fellow travelers who were left behind in the cave. One thing, that is common to both, is the initial blindness, of darkness or of light. Taken in isolation, much light and sunshine is as bad as too less of it. The only happy solution remains, the return of the Platonic humans to our own inner cave and to re-search its interior with this light of wisdom. This is also a recognition of the fact that no person can become God like perfect designer unless and until one gives due recognition of the fact that people are both God and beast, both the one who knows, and the one who does not know.

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Medically Assisted Procreation: Legal Framework in Portugal

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1. General Considerations

Medical Assisted procreation (PMA) has been performed in Portugal since 1984 but is was only on the 25th May 2006 that the Parliament (Decree 64/X) set the legal rules and legislation subsequently announced by the President of the Portuguese Republic. The Left Wing Parties voted favourable (Socialist Party, Communist Party, Extreme Left Block and the Green or Ecological Party) along with eight deputies of the Social Democratic Party. The Central Social Democratic Party, the Popular Party and the rest of the Social Democratic Party voted against the Decree 64/X. The new law aims the problems of infertility afflicting a great number of couples filling in an important gap of the Portuguese legal System.

In 1998 the Parliament approved the Decree nº. 415/VII to legislate about PMA. The Decree was vetoed by at the time President Jorge Sampaio. The ex-president thus responded to the appeals of the Portuguese scientific community which strongly opposed one of the most controversial issues of the Diploma which restricted insemination to a limit of 5 oocytes. Another reason for the then President's veto was the insufficiency of the Public Debate concerning PMA. On May 2006 the now supreme Chief of the Portuguese State pointed out that he had found no "special or meritorial reasons" to demand a statement from the Constitutional Court.

However the President alerted to the need of further legislation within the scope of an "effective protection to the human embryo!". The President emphasized the need to an effective protection concerning cryopreserved embryos (which are considered viable within the framing of the new Law) regarding which there might occur "before a lag time of

three years a commitment break of the beneficiary in using the embryos in another transfer procedure simultaneously with the refusal in consenting to the donation to another couple"?!! It was also pointed out by the President that the embryo dignity should be guarantied out of the scope of a parental project "even though the new Law allows in vitro research in embryos "!.The National Council for Medically Assisted Procreation (CNPMA)It is recommended that this Council should include nine personalities of renowned merit to guarantee special qualification within the range of ethical scientific, social and legal aspects of PMA. The CNPMA will be the fundamental instrument ruling these subjects with the responsibility to analyze the research Projects implying that these embryos may contribute to the goodness of humanity. The independence, multidisciplinarity and pluralism of these members of the CNPMA should be guaranteed along with the transparency of procedures and the existence of conditions for an adequate performance regarding the competence of the CNPMA. However the possible resource to the Courts should be an open possibility.

1. Five of the CNPMA members will be elected by the Parliament and the remaining shall be nominated by the holders of the Ministries of Health and Science. The president and vice-president will be elected among the nine members. The mandates will last for 5 years but each of the members may fulfill one or more mandates. The following are considered competence of the CNPMA:

1. Updating of scientific information concerning PMA and of the technques approved by legislation.
2. To establish the conditions that should rule the Centers where the PMA technology is performed as well as the Centers where gametes and embryos are preserved.
3. To issue statements about stem cells Banks and the final disposal of biological material in case the Banks should be closed.
4. To appreciate, approve or report the research projects involving embryos and to develop the PMA technology within the range of the National Health Services.

Beneficiary Scope

The resource to PMA according to the Law may only be performed in infertility cases and also for the treatment of a serious disease or considering the risk of transmission of genetic diseases, impending infections or other diseases. The beneficiaries may only be married couples not separated by law regarding welfare or properties or couples of distinct genders living in conditions legally similar to the married couples at least two years before they seek PMA. The law encompasses artificial insemination, in vitro fertilization (IVF), sperm intra-cytoplasmic technology, transfer of embryos, gametes or zygotes and also pre-implanted genetic diagnosis. IVF is focused in Article 24ª which refers that "only the number of embryos considered sufficient to a successful IVF should be bread in accordance to a good clinical practice and within the principles of informed consent." Regarding the number of oocytes to be inseminated in each procedure the Law specifies that "the clinical situation of the couple should be taken in account as well as the general indication to prevent multiple pregnancies". Article 22ª dwells on the use of sperm after the death of the spouse or living companion as above focused referring that it is not lawful to carry on sperm insemination from the dead notwithstanding the fact that such consent was given in life ! Issue Nº.2 of the same article establishes that the sperm which may be collected for insemination purposes from a spouse viewing a future sterility scenario will be destroyed if the spouse or man with equal legal status dies during the period established for the semen preservation!

However issue Nº.3 considers lawful a port-mortem embryo transfer to fulfill a parental project clearly established in writing before the father's demise once the lag time considered adequate to " thoughtful considerations of a righteous decision has elapsed "! Regarding donor insemination it may only occur viewing the fact that with the ongoing medical, scientific knowledge it is not possible to achieve a pregnancy with the husband's sperm or with the legal partner of the woman who will undergo insemination.

2. Research

In the present Law only cryopreserved exceeding embryos may be considered for research purposes as long as they are not carriers of any serious genetic anomaly within the context of preimplantation genetics diagnosis or further reserved to any parental planning.

For these two situations research will depend on the prior consent, duly expressed and informed of the correspondent beneficiaries.

According to the Law, research is also allowed in embryos that are not appropriate for transference or cryopreservation for PMA or in embryos obtained without sperm fertilization. Article 3 points out that the " resource to embryos for scientific research may only be considered if it brings human benefits. Each scientific project depends on the recognition and decision of the CNPMA.

The article 9th of the Law (issue nº.1) relating to embryo research specifically points out that "the creation of embryos through PMA with the purpose of scientific research in embryos is considered lawful if it aims at the purpose of prevention, diagnosis or embryo therapy, as well as the improvement of PMA techniques, establishment of stem cell Banks regarding transplantation programs or any other therapeutic purposes "

What Referendum?

The discussion about the PMA law now decreed triggered a reaction from the People in favour of a National Referendum; the petition signed by 82.000 people was presented to the Parliament on the 25th May 2006 on the very same day that the PMA law was approved by the Parliament and the Petition was shoved in a drawer !The subjects to be submitted to a referendum focused on three major issues and were addressed to controversial themes like the "creation of super-numerary embryos", the "legitimacy of the access to PMA" and "surrogate maternity". The Petition wasn't only subscribed by lay people but by Medical University Professors members of the National Ethical Council for

Life Sciences. The basis for this petition was the claim of a lack of Public debate on one side and the argument that "only the Public opinion should count on such subjects" and that such questions are not scientific but dwelling with situations where public opinion is crucial!. The Petition claimed that the Government had no legitimacy to legislate about the side damages of PMA. The Petition defended that regarding the two issues above focused "legislation should prohibit the creation of supernumerary embryos although addressing this" particular issue to a separate Law and forbidding the donor gametes fertilization (male or female)".

3. Portuguese Physicians feedback and closing remarks

If in the past there were some doubts about the "beginning of human life" (even Hippocrates did not have such doubts when he strongly opposed Abortion), nowadays due to the DNA knowledge these doubts are definitely bypassed ! Life begins with the embryo! The embryo has all the potentiality of an adult; the embryo is a being with individuality following a predetermined program towards adult life. The right to life peculiar to a newborn child may thus be identical to that of the embryo unless one chooses not to consider the latest scientific achievements! The embryo of course doesn't think or feel although it is known that there is sensitivity, memory, etc. inside the maternal womb. It seems that according to the Hippocratic tradition extended manipulation of germ cells may not be accepted due to the risks that it may involve to the human being namely when it reaches its complete development! Although the President of the Portuguese Medical Board favoured the existence of the new Law, the majority of the Portuguese physicians claimed that "the human being had the right not to be artificially manipulated or even destroyed as will happen to the supernumerary embryos or to the embryos with anomalies", focusing homologous as well as heterologous fertilization! Their opinion expressed that germ cell manipulation regardless of the product of conception "being out of wedlock or the outcome of a marital relationship entailed an extremely high risk to the future newborn". That to "abuse such human rights did not seem" appropriate of a Estate of Law but rather endeavored to Estates with Eugenic Policies ! In general, Portuguese physicians seem to be confronted with two problems:

1. The medical performance to improve conception after intercourse between a married or lawfully registered couple.
2. The use of manipulation of ova or sperm viewing the same purpose but regardless of marital intercourse.!

Portuguese Medical Professionals feel that the Law should respect the ethics of the health professionals. To make things worse Portuguese Health Professionals emphasize that the subject endorsed by the new Law was not even discussed by the media which may at times be very selective defending certain points of view while totally disregarding other issues! Whatever the legislator may think or wish the practical resolution of the subjects endorsed by the new law is in the physicians hands concerning as well other health professionals. Therefore the Law should respect the Ethics of the Health Professionals, who were definitely not consulted by the Legislators of the Decree 64/X/06.

News in Bioethics & Biotechnology

http://www2.unescobkk.org/eubios /NBB.htm

Codes of Ethics

http://www.unescobkk.org/index.php?id=4008

UNESCO Bangkok is compiling a database of Codes of Conduct in Engineering, Science and Technology currently implemented in the Asia Pacific region. There is a list with files and links to codes that have been identified on the website.

International Bioethics Education Project News

<http://groups.yahoo.com/group/Bioethicseducation/>)

IAB Genetics & Bioethics Network: On-line

The complete address list is updated on the Internet. Send all changes to Darryl Macer. A website will be established at the IAB website soon.

UNESCO Asia-Pacific School of Ethics

http://www.unescobkk.org/index.php?id=4913

The "School" is a regional network of individuals, institutions and associations that are working on projects and meetings together with the Regional Unit for Social and Human Sciences in Asia and the Pacific (RUSHSAP). The Unit collaborates with numerous partner organizations to carry out projects and activities, in addition to UNESCO field offices and HQ. RUSHSAP also consults and collaborates with non-governmental organizations (NGOs), intergovernmental organizations (IGOs), institutions and individuals with special expertise.

While UNESCO is compiling an on-line and open access Global Ethics Observatory of databases (www.unesco.org/bioethcis/geobs) as a comprehensive information source for individuals, ethics committees, organizations, teaching programmes and laws, the members of this regional School of Ethics are actively working on projects together with RUSHSAP. Additional members are welcome and enquiries including the nature of the proposed collaboration should be addressed to rushsap(at)unescobkk.org.

Institutions working on Bioethics Education projects include:

- Arul Anandar College (Autonomous), Karumathur, Madurai District, India
- Ateneo de Manila High School, Loyola Heights, Quezon City, the Philippines
- Beijing Normal University, Attached High School, Beijing, China
- Centre of Biomedical Ethics and Culture, Sindh Institute of Urology and Transplantation, Karachi, Pakistan
- Eubios Ethics Institute
- Ewha Institute for Law and Bioethics, Ewha Woman University, Seoul, Republic of Korea

- Indonesian National Bioethics Commission, Sasana Widya Sarwono LIPI, Jakarta, Indonesia
- Jayaraj Annapackiam College for Women (Autonomous), Periyakulam, Tamil Nadu, India
- Ministry of Science and Technology, Thailand
- National Bioethics Committee, Colombo, Sri Lanka
- Sophia Polytechnic, Mumbai, India
- St. Teresa's Institute of Education, Mumbai, India

Associations and individuals are listed on the website, together with their current main fields of collaboration with UNESCO Bangkok programmes and projects in the region.

Asian Bioethics Association (ABA)

Report of ABA Board Meeting (7 August 2006)

Presided over by Sang-yong Song (President of ABA)
Also present: Jayapaul Azariah, Darryl Macer, Renzong Qiu, Noritoshi Tanida
Absent: Sahin Aksoy, Leonardo de Castro, Yeruham Leavitt, Un Jong Pak, Hyakudai Sakamoto, Xiaomei Zhai
The meeting was held in the evening during the Seventh Asian Bioethics Conference (ABC7), and the Eighth World Congress of Bioethics, Beijing, China.
1) Apologies were recorded from absent members.
2) The Board thanked Prof. Renzong Qiu, the president of the 2006 International Association of Bioethics (IAB) World Congress and the Seventh Asian Bioethics Conference, for the arrangements for the successful meeting.
3) Sang-yong Song gave his president's report.
4) Darryl Macer gave the Secretary's report on membership and fees. The situation was that 20 members of 140 members had paid fees to the secretary in 2006. Further persons had requested free copies of *EJAIB*, and these were being continually subsidized by Eubios Ethics Institute. Also some Board members had not paid any fees. Arrangements were also to be explored for collecting ABA membership fees at the time of registration for the ABC8 conference, which would have a 20% reduction to all fee classes for ABA members.
5) There was discussion of ABC8 (chair: Dr. Soraj Hongladarom, Chulalongkorn University, Thailand 19-23 March 2007). There was not further follow-up from Indonesia about ABC9 in 2008 or 2009. The Board accepted in principle an offer from the National Ethics Committee of Singapore to host an ABC in the year 2010.
6) The Board adopted the agenda for ABA General Meeting at ABC7, to be held at lunchtime on the 9 August during the congress.
7) The procedure for receiving nominations for elections during October, and conducting voting by email in November 2006 was confirmed. There would be a number of persons whose terms would be ending in November 2006, and new nominations were called for. There was also a discussion that a growing number of activities were happening in South East Asia, and the may need to be increased representation from that region in the future.

Report of ABA General Meeting (2006)

Minutes of the ABC7 ABA General Meeting

Presided over by Sang-yong Song (South Korea) and Darryl Macer (Thailand)
Held on 12:00-13:00, 9 August 2006 in Beijing, China concurrent with the Seventh Asian Bioethics Conference (6-9 August 2006).
60 persons were in attendance, and non-members were welcomed.
1) There was an explanation of ABA, its history. There was appreciation expressed to the ABC7 congress president, Renzong Qiu, for the current congress.
2) Self-introductions of ABA Board Members who were present.
3) Secretary's report. Persons were reminded of the optional fee structure of the ABA. It was noted that most members of ABA do not contribute financially to the ABA, but that there was growing interest in bioethics in many Asian countries.
4) President's report, with an appeal for membership made by Sang-yong Song. He reviewed the history of the ABA, noting that by nature it was a much less formal structure than IAB, which had certain advantages.
5) A presentation of the forthcoming ABC8 conference was made by the conference chair, Dr. Soraj Hongladarom of Thailand. The next Asian Bioethics Conference will be held in Bangkok Thailand at Chulalongkorn University 19-23 March, 2007.
6) The meeting welcomed the prospects for regular conferences to help serve the members. Those persons who volunteered to be country or regional representatives should contact the secretary, Darryl Macer, and they would be posted on the website. The website for ABA is <www2.unescobkk.org/eubios/ABA.htm>

Call for Nominations for ABA 2006 elections

Election Notice

For registered ABA members as of 31 October, 2006.
According to the Constitution of ABA every two years there is an election for the Board of ABA. Please see the constitution for reference. In particular articles:
"6.1 Officers of the Association shall be the President, seven vice-presidents (one from each of China, India, Japan, Korea, South Asia (East of India), West Asia (West of India), and Asian Ethnic and Religious Minorities, and a General Secretary. They are nominated and/or elected by members of the Association. The President can serve a maximum of two years in office. The Other Officers should stand re-election every two years."
"6.4 A vice-president can be elected for a maximum of two successive terms as a vice president."

Every member of good standing (=has registered with the secretary as a ABA member for 2006) can nominate candidates for the Board, stand for Board elections, and vote in the elections. The following board positions are up for re-election in October, 2006 with the new board to be announced on in November, 2006, for the next two year period. Those nominated need to confirm their willingness to be ABA Board members and to be members.

The board positions seeking nominations are:
1) President: vacant
(under the constitution a president stands only two years and thus Prof. Sang-yong Song will retire, but be a member of the future Board as immediate past president)
A nomination has been received and accepted for the election of Jayapaul Azariah as the next ABA President. Alternative candidates for this Board post and all the other Board positions are welcome.

2) Vice-presidents requiring new persons
Due to the limitation for vice-presidents of a maximum of two terms, the following positions need to be renewed (*the current Board members whose terms are ending are listed*), and nominated persons are listed below [at the time of printing].
Vice President for China: *Xiaomei Zhai [nomination received for Yanguang Wang]*
Vice President for India: *Jayapaul Azariah [nomination received for Abnik Gupta]*
Vice President for Japan: *Noritoshi Tanida [nomination received for Atsushi Asai]*
Vice President for West Asia (West of India): *Sahin Aksoy (Turkey) [nomination received for Aamir Jafferey]*
Vice-President for South Asia (East of India, excluding other named regions): *Leonardo de Castro (Philippines) [nomination received for Soraj Hongladarom]*
Vice President for Asian Ethnic and Religious Minorities: *Frank Leavitt (Israel) [nomination received for Alireza Bagheri]*

3) Other board positions
Two other board positions exist who can be relected, which are also open to nominations for contesting.
Vice President for Korea: *Un Jong Pak*
Secretary: *Darryl Macer (Thailand/New Zealand)*
The Board also welcomes persons who wish to act as *country or regional representatives*, and volunteers are requested by the secretariat.

The responsibility of Board members includes attending ABA Board meetings, and to attend ABC conferences, noting that this may mean finding your own funds to participate in the conference.

The **closing date for nomination and acceptance of candidates is 25 October**. Candidate names and acceptance from the candidates should be Emailed to: asianbioethics@yahoo.co.nz

In the event that there is only one candidate nominated by 25 October, the position will not need to be subject to election. The positions which are contested will be subject to a secret Email ballot between 4-20 November. Every paid up ABA member as of 31 October, 2006, can make one vote for each contested position.

ABA Membership

http://www.unescobkk.org/index.php?id=41

Membership fees are usually payable at the time of renewal to *EJAIB*, the official journal of ABA. **A three tier system exists for annual fees:**
a) Regular price (US$50 Euro 50 Yen 5000).
This includes the *EJAIB* journal subscription and free associate membership of Eubios Ethics Institute.
b) Reduced contribution (the amount is up to the member, and is also suggested for students)
This includes the *EJAIB* journal subscription.
c) No fee, because the person is not in a position to pay the fee.
This does not include a hard copy of the *EJAIB* journal, but anyone can apply to Eubios Ethics Institute separately for a hard copy of the Journal, to be considered case by case.

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Persons who want to confirm their membership of the ABA must send their completed membership form and fees to the secretary (copy the form in this issue), Darryl Macer, (by Email, fax or airmail).

PLEASE RENEW ABA membership fees if you wish to continue to receive *EJAIB*! Also if you wish to vote and be eligible to stand in the November 2006 Board elections.

Send papers to *EJAIB* Editorial Office

Editorial address:
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Email: asianbioethics@yahoo.co.nz
d.macer@unescobkk.org

Conferences

A bioethics conference calendar website is: http://www.who.int/ethics/events/en/

World Philosophy Day, 15-16 November, 2006, Palais des Congres, Marrakech, Morocco. Please note that the inaugural session is scheduled for the evening of the 15 November. The following roundtables will occur during the 16 November: I.

Philosophy, cultural diversity and communication; II. Modernity and the condition of women; III. Philosophy and the obstacles to a coalition of cultures; IV. Philosophy: teaching, discussing and translating; V. Philosophy and the North-South dialogue: What difficulties? What future?; VI. Citizenship and human rights; VII. What bases for a just and cooperative world order?; VIII. Religious reform, open society and human rights. Then immediately followed by: *Asia-Arab Inter-regional Philosophical Dialogues: Encounters of Asia and the Arab Regions with Modernity,* 17-18 November, Marrakech, Morocco. Contact: d.macer@unescobkk.org

UNESCO Bioethics Dialogue, 14 December, 2006; New Delhi, India. Contact: d.macer@unescobkk.org

UNESCO Bioethics Forum, 21-22 February, 2006; Islamabad, Pakistan. Contact: d.macer@unescobkk.org

UNESCO Bangkok is currently planning meetings in Vietnam, Australia, Bangkok, Apia, Suva, Kyoto, Dubai, Laos, Malaysia, India, Indonesia and central Asia for 2007. Proposals are also welcome. Contact: d.macer@unescobkk.org

Eighth Asian Bioethics Conference (ABC8), and the *Second UNESCO Bangkok Bioethics Roundtable (BBRT2),* 19-23 March 2007, Chulalongkorn University, Bangkok, Thailand. Contact: Dr. Soraj Hongladarom Email: hsoraj@chula.ac.th

The goals of EJAIB include:

1. *EJAIB* is the official journal of the Asian Bioethics Association (ABA) and the IUBS Bioethics Program.
2. To review and update news and trends in bioethics from around the world. Bioethics is broadly defined as life ethics, including both medical and environmental ethics, and environmental, ethical, legal and social issues arising from biotechnology.
3. To pay particular attention to issues raised by genetic and reproductive technology, and other news for the International Association of Bioethics Genetics Network. To publish letters on such topics, promoting international debate.
4. To publish research papers, and relevant news, and letters, on topics within Asian Bioethics, promoting research in bioethics in the Asian region, and contributing to the interchange of ideas within and between Asia and global international bioethics. Asia is defined for the general purposes of this journal as the geographical area, including the Far East, China, South East Asia, Oceania, the Indian subcontinent, the Islamic world and Israel.
5. To promote scientific responsibility, in coordination with MURS Japan (Universal Movement for Scientific Responsibility); and the International Union of Biological Sciences (IUBS) Bioethics Program**.**

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Send papers to the editor in electronic form if possible. *Please use numbered reference style, do not use automatic footnotes or endnotes. Papers are peer reviewed.*
The journal is independent of UNESCO and the contents are not endorsed by either Eubios Ethics Institute or UNESCO, but are published in the spirit of academic freedom.
South-South dialogue is encouraged, and papers outside of Asia and the Pacific are welcome.

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by Darryl Macer, Oct. 1990, 421pp. Cost: US$20 UK£10 NZ$30 A$25 C$22 ¥2500 Others or credit card **NZ$30**

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by William Lesser, May 1991, 150pp. Cost: US$15 UK£8 NZ$20 A$20 C$17 ¥1500 **NZ$25**

Attitudes to Genetic Engineering: Japanese and International Comparisons (Bilingual)
by Darryl Macer, May 1992 330pp. Cost: US$30 UK£15 NZ$35 A$30 C$30 ¥3000 **NZ$40**

Human Genome Research & Society Eds: Norio Fujiki & Darryl R.J. Macer July 1992 ISBN 0-908897-03-0 (English), 230pp. ISBN 0-908897-04-9 (Japanese), 240pp. Cost: US$20 UK£10 NZ$30 A$25 C$22 ¥2000 **NZ$30**

Intractable Neurological Disorders, Human Genome Research and Society Eds: N. Fujiki & D. Macer
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Bioethics for the People by the People
by Darryl Macer,... May 1994 ISBN 0-908897-05-7, 460pp. Cost: US$30 UK£15 NZ$35 A$35 C$32 ¥3000 **NZ$50**

Bioethics in High Schools in Australia, Japan and New Zealand,
by D. Macer, Y. Asada, M. Tsuzuki, S. Akiyama, & N.Y. Macer March 1996, ISBN 0-908897-08-1, 200pp.(A4)
Cost: US$25 UK£15 NZ$30 A$30 C$30 ¥2000 **NZ$40**

Protection of the Human Genome and Scientific Responsibility (Bilingual)
Editors: Michio Okamoto, Norio Fujiki & D.R.J. Macer, April 1996, ISBN 0-908897-09-X, 210pp.
Cost: US$25 UK£15 NZ$30 A$30 C$30 ¥2500 **NZ$35**

Bioethics in India (includes 115 papers from Jan.1997 conference)
Eds: Jayapaul Azariah, Hilda Azariah & Darryl R.J. Macer June 1998 ISBN 0-908897-10-3, 403 pp.
(Printed in India) Cost: US$30 UK£18 NZ$34 A$36 C$36 ¥3000 **NZ$45**

Bioethics is Love of Life: An alternative textbook
by Darryl Macer, July 1998 ISBN 0-908897-13-8, 152pp. Cost: US$26 UK£14 NZ$34 A$34 C$32 ¥3000 **NZ$40**

Bioethics in Asia (includes 118 papers from Nov.1997 conferences, ABC'97 Kobe and Fukui Satellite)
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June 1998 ISBN 0-908897-12-X, 478 pp. October 1999 ISBN 0-908897-14-6 (Japanese), 320pp.

Ethical Challenges as we approach the end of the Human Genome Project
Editor: Darryl Macer, April 2000 ISBN 0-908897-15-4, 124pp. Cost: US$20 UK£12 NZ$30 A$30 C$30 ¥2500 **NZ$35**

Bioethics Education in Japanese High Schools *(in Japanese only)*
Editor: Darryl MacerApril 2000 ISBN 0-908897-16-2, 112pp. Cost: US$20 UK£12 NZ$30 A$30 C$30 ¥1000 **NZ$35**

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Editor: Darryl Macer Cost: US $20 Euro 15 UK £10 NZ $30 A$33 C$33 ¥ 2000 **NZ$35**

Challenges for Bioethics from Asia Ed: Darryl R.J. Macer
November 2004 ISBN 0-908897-22-7 656 pp. Cost: US$35 Euro35 UK£20 NZ$40 A$38 C$40 ¥3000 **NZ$50**

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