

# WHAT CAN GREGORY BATESON'S 'ECOLOGY OF MIND' TEACH US ABOUT THE HUMAN GENOME?

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## Abstract

The human genome represents a major scientific achievement which will influence human societies in the 21<sup>st</sup> century and beyond. In this article I argue that the use of Gregory Bateson's 'Ecology of Mind' is a relevant theoretical concept for unpacking our understanding of the human genome. Bateson's cybernetic model proffers new ways of constructing the human genome which takes into account human biological and cultural evolution. In Bateson's Ecology of Mind, genes embody unities which are apparent in biological and social systems. Knowledge of such unities demands a certain kind of human gnosis – ways of knowing which avoid Cartesian constructions of knowledge, but rather encourage critical understanding.

The discovery of the human genome has been a scientific leap forward and will have an indelible influence on the life sciences. Francis Collins, the person who was in charge of the Human Genome Project, stated that such a scientific endeavour happened only once in history, thereby placing it among other key human inventions — fire, agriculture, the wheel, the printing press, and cybernetics (Kaku 1998, 140).<sup>1</sup> I also concur that the Human Genome Project is cognate to an evolutionary leap forward which will transform scientific knowledge of the human body and mind. The completion of the Human Genome Project will probably have a greater impact than the discovery of Mendeleev's elemental chart or Einstein's theory of relativity since it will directly affect human lives (Kaku 1998, 141).<sup>2</sup>

While progress into the understanding of genetic processes in the human body and the possible treatment of genetic diseases is now possible, scientific discourses on the human genome need to be unpacked. This is an essential epistemological exercise which beckons our scrutiny. The inherent philosophical and bioethical issues arising from the human genome has been given considerable theoretical attention. For instance, Iftime (2004, 410) endorses the “reiteration of the precautionary principle” in the use of gene therapies due to their use of “potentially toxic biochemicals.” Additionally, a new theory of the transgene proposes that there are “more danger signals that alert the organism resulting in the failure of gene therapy attempts” (Iftime 2004, 411). One of the problems in understanding the human genome is due to our current scientific infancy in this area. Kaku (1997, 144) maintains that while the period up until 2020 will be characterised by a biomolecular revolution culminating in “personalised DNA sequencing,” the period from 2020 to 2050 will determine “the inter-relations of genes.” The scientific gains during this period will much slower, albeit, more crucial to understanding the complexities of the web of life (Kaku 1998, 144). Implicit to Kaku’s thesis is the need for greater theoretical understanding of the underlying processes of the human genome which demand new paradigms of knowledge. Kaku adds that although science has deciphered some of the fundamental principles of DNA molecules, this does not mean that we have mastered its mysteries (1998, 10). As Kaku notes, “We are now making the transition from amateur chess players to grand masters, from observers to choreographers of Nature” (1998, 10).

In this article I will propose that Gregory Bateson’s notion of ‘ecology of mind’ provides a poignant bioethical tool for understanding the bioethical dynamics of the human genome. Bateson’s ecology of mind proffers a philosophical breakthrough to the ways in which human beings develop and interpret the world around them and how it is constituted as mind.

## **Ecology of Mind and Ways of Knowing**

Bateson’s works on cybernetics have influenced the social, cogni-

tive and molecular sciences. As an anthropologist and cybernetician Bateson was concerned by two epistemological issues: Firstly, how biological and social systems organise themselves; secondly, how knowledge of these systems is extrapolated and understood. Bateson's interdisciplinary approach, albeit, not unique, is iconoclastic and insightful. Kernel to his epistemology was his theory called 'ecology of Mind.' Ecology of Mind defines mind as the aggregate of components of a system. The components of a system are characterised by mutuality, cyclicity, and relational symmetry. Mind incorporates mental, living, and social systems (Bateson 2000). Following from Bateson, Bale (2006a) contends that the organisational symmetry embodied in living systems is evident in mental processes (Bateson 2000). The components of a given system constitute whole mind systems and are "also recognised as minds, or sub-minds" (Bale 2006b). Bateson argues that the process of mind is both immanent and emergent "in the interaction of differentiated "parts" (2002, 87). Bateson states: "If you want to understand mental process, look at biological evolution and conversely if you want to understand biological evolution, go look at mental process"(Manghi 2002, xi). He expresses this idea in the following famous passage:

The individual mind is immanent but not only in the body. It is immanent also in pathways and messages outside the body; and there is a larger Mind of which the individual mind is only a sub-system. This larger Mind is comparable to God and is perhaps what some people mean by "God," but it is still immanent in the total interconnected social system and planetary ecology (1970).

Bateson refers to the interconnected patterns of mind as metapatterns – "a pattern of patterns" which connect universal life forms in a cosmic matrix akin to the myth of Indra's net. In this Hindu myth, mind is represented as a cosmic net which is connected by an infinite number of translucent gems that reflect each other, symbolising unity in plurality.

According to Bateson, ideas need to be understood from an ecological perspective. Such a perspective provides a heuristic model for explaining how ideas interact and why certain ideas achieve ascendancy while others vanish. Bateson's Ecology of Mind radically challenges the reader to view nature and mind from a wider perspective, eschewed from "our obsolete habits of mind" (Manghi 2002, xii). Bateson's epistemo-

logical probings led him to re-evaluate human gnosis, the way in which knowledge is constituted and synthesised via human sensory and cognitive processes. His method was, also, an ethical understanding of the processes emergent in mind. For this, he directs the reader to eschew from the scientific Cartesian model, which is “inadequate when applied to describing and explaining the multivariable processes of human and biological interaction” (Bale 2006a). Similarly, Macy criticises the paucity of cognitive approaches towards knowledge which increase ‘anomie’ (Durkheim found in Giddens 1972), ‘disenchantment’ (Weber 1946, 146), and “spiritual and psychic dislocation” (Bale 2006b). Macy states:

either we live in a clockwork universe, wholly predetermined by initial conditions, with no scope for genuine novelty, or the cosmos is a blind and purposeless play of atoms, and determinable only statistically, by the laws of chance(1978, 58).

Furthermore, scientific methodology privileges the ‘objective’ while attempting to avoid “subjective input”, resulting in an understanding of external properties. What this does is hinder “self knowledge”- “a way of knowing” which foregrounds reflexive knowledge (Clark 2001). The ecological mind is self reflexive, a central component of creative thought (Bateson 2002, 172). The idea of self reflexive thought whereby the subjectivity of the observer is also included in the epistemological exercise is central to anthropology.

For Bateson, the processes of knowing point towards the relationship between the knower and known. Bateson asks, “What, then, are the rules for self-knowledge?” (2002, 127). This is a significant question in relation to the human genome. Knowledge of the human genome has been under close scrutiny by geneticists, each vying to unlock the secrets of human genes. Recent discoveries of the human genome indicate that there are surprisingly fewer human genes than first anticipated by various scientists. At first, the number of genes in the human body was calculated to be 100,000. Present estimates have diminished the number of “protein-coding genes” to 21,000 (Gerstein & Zheng 200, 32). In addition, only 300 genes are believed to be uniquely human (Thacker 2001). Theorists such as Thacker point out that this is only surprising if the metaphor of

quantity is used to measure the human genome. In other words, more genes suggests a more complex organism. “The assumption here is that “more is better” (Thacker 2001). The redundancy of DNA is, again, surprising if there is a belief that human genes have a “unique function” (Thacker 2001). Apparently, such a belief fits within the ambit of American individualism and innovativeness. As Thacker (2001) indicates:

Repetition here is taken to be synonymous with redundancy and a lack of novelty, while the icons of American subjectivity - individuality, originality, novelty - are assumed to reside in the very bodies of subjects, down to their biomolecules.

The implications of this kind of discourse are bioethically tenuous since it leads to the commodification of genetic material as is evident in human patenting industry.

Perhaps, a more interesting point is that the discovery of the human genome reaffirms the unity of life on earth, an issue which is embedded in Bateson’s ecological epistemology. “One and the same kind of living filaments has been the cause of all organic life,” Erasmus Darwin tells us (Ridley 2000, 22). Craig Venter, one of the chief scientists on the American Human Genome Project concluded that, “Really, we are just identical twins” (Clark 2001).<sup>3</sup> This simple truth has vast implications for both science and religion. Organic life is exemplified by an elaborate matrix of interdependent systems, each enveloping the other, thus forming a steady communicative symbiosis of a “hierarchical order” (Bale 2006a). If mutuality is synonymous with the creational exercise then Bateson’s call for a new way of approaching this dynamic warrants attention. As I have pointed out, the discovery of the human genome has been equated by metaphors of quantity which are integral to modern consumerism.<sup>4</sup> Bateson’s Ecology of Mind quashes these quantifiable metaphors and draws our foci to the mutual processes that are immanent in biological and social systems (Heims 1991).

Another important point is the way in which the human genome has been constructed as a kind of revelatory text – “a book of promises” (Doyle 1997,63). This is problematic. Bateson a la Foucault claims that the rhetoric of control is inherent to scientific discourses. Such discourses

promise ways of knowing beyond the ken of ordinary perception. Take for instance, Foucault's notion of the 'medical gaze' which legitimises medical ways of knowing. The medical gaze is synonymous to what Foucault refers to as a "regime of truth" which valorises certain techniques and discourses while suppressing alternate discourses (Dawber 2004; Rabinow 1984, 74). The technological oeuvre of the medical gaze penetrates beneath the body's surface and surveys the visceral domain where the underlying causes of disease and molecular processes await to be discovered (Foucault 1973). The body, in this sense, is a predictable machine that renders itself freely to scientific inquiry. Thus, the medical gaze has perpetrated the myth of itself as a doyen of hidden truth. However, the problem with this kind of reading is to view the body as a kind of text – a cryptic language awaiting to be disclosed. As Taylor avers, "the linguisticity of the body might harbour an unknowability that can never be overcome" (1993, 221).

In his textual criticism of the genetic text McGann observes that "textuality is a social condition" and therefore, indeterminate (1991, 16). "Instability is an essential feature of the text in the process" (McGann 1991, 94).<sup>5</sup> In other words there is no correct text, but rather multiple texts which reflect "sociohistorical conditions" (McGann 1991, 9). Moreover, the notion of genetic fixedness ignores the fact that genetic variation is a dynamic process that is constantly evolving. Genetic variation is the norm rather than the exception. Thus, the genetic code in each human being is unique, exhibiting its own genetic mutations and variations, along with the 19,000 identified pseudo-genes (vestiges of old genetic code associated with defunct routines) (Wilson 2002, 27; Gerstein & Zheng 2006, 31). In the case of pseudo-genes, these are linked to "changes in an organism's environment and circumstances" (Gerstein & Zheng 2006, 35), and freely accumulate mutations which would be precarious to normal genes (Gerstein & Zheng 2006, 34). For Ridley, the variability of human genes goes against the scientific tendency "to exaggerate stability, to believe in equilibrium" (2000, 146).

Thus, in the final analysis, arguments that posit a correct genetic script are ultimately teleological: they imply a kind of evolutionary "final intention" that recalls the concept of authorial final intention

that has so troubled modern textual scholars (Wilson 2002, 27).

## **Lessons in Evolutionary Learning**

The noted anthropologist Mary Douglas formulated an approach towards knowledge in terms of purity and pollution. The key point of her model is how human beings subscribe human knowledge and behaviours into socially prescribed categories. Any phenomena which abrogates or blurs these categories is regarded as polluting and is socially proscribed (Douglas 1969). Using Douglas' framework it is evident how present kinds of scientific knowledge making seemingly encourage maintenance of compartmentalisation and rigid adherence to 'traditional' forms of learning (Montuori 1993). Bateson argued that habituated ways of thinking were ecologically threatening since it led human beings to becoming de-sensitized to their environments, and allowing dangerous and rigid ideological trends to remain unchallenged. Bateson considered habituation as being akin to "internal coherence" (2000, 173) – a process which remained uncorrected by "internal rigor or external reality" (2000, 208). The process of correction, for Bateson was a creative exercise, an evolutionary way of learning which foregrounded "co-operative group interaction" (Montuori 1993).<sup>6</sup> The process of correction is also an ethical response to systems of knowledge that dissuade critical learning and perpetuate competition.

An example of internal coherence is the cultural emphasis on dominator learning patterns. Dominator learning patterns create circumstances where "continuous conflict is generated," thereby discouraging conflict resolution strategies (Montuori 1993). In this "fear based system", mistakes are viewed as ambiguous and need to be avoided as they create for ontological insecurity (Montuori 1993). Such conditions inhibit critical learning and maintain the status quo. Dominator learning patterns, are thus, bound to repeat mistakes due to a lack of corrective mechanisms (Montuori 1993). Consider the domination principle underlying scientists' and journalists' ideas of genes. Genes are said "to control," "to program," and "to determine" proteins (Wilson 2002, 29). To continue further, journalists have often used anxiety tropes when reporting on the implications of faulty genes in causing a litany of congenital problems.



Awry genes are said to lurk in the genetic corridors awaiting favourable internal and environmental conditions to become 'switched on.' These 'rebel' genes are constructed as subverting the processes of internal equilibrium much in the same way in which cancer cells overwhelm non-cancer cells. For example, the journalist Emma Ross of the Associated Press quoted: "Genes can promote or cause disease when they don't work properly. Some illnesses linked to genes gone bad include cancer, arthritis, diabetes, high blood pressure, Alzheimer's and multiple sclerosis" (Ross 1999). In the scientific journal *Beyond Discovery* (2003), it notes how genes "are responsible for an estimated 3,000-4,000 hereditary diseases." Genetic flaws increase a person's risk of being struck by one or more disorders. Armand Marie Leroi's article in the *New York Times* (March 14, 2005) points out that certain drugs may not work on some ethnic or racial groups due to genetic differences. Leroi's article leads us towards ambiguity by claiming that modern genetics has been unable to explain why humans show such a high degree of physiological variation throughout the globe. On this theme, *The Nation's* (March 10 2006) Arthit Khwankhom reinforces public fear of genetic profiling by stating that, "The public does not yet appreciate that by giving a few drops of blood they could pass on numerous secrets about themselves to anyone in the world." Such journalistic projections only augment public anxiety and mitigate the processes of critical learning.

This is precisely where Bateson's idea of evolutionary learning is integral in, firstly, recognising the habituated processes of thought and, secondly, in acknowledging that there are alternative ways of thinking beyond socially dominated patterns (Graham 1994). Elaborating from Bateson, David Russell (1994) identifies the use of narrative as a vital pedagogical tool in learning. Whereas science privileges precision and observation, narrative emphasises intuitive and aesthetic modes of analysis (Russell 1994). According to Russell narrative follows holistic principles in that it integrates experience and explanation. Stories, are thus, ways of deriving meaning and for unfolding human experience. Quoting Russell (1993): "Through the continuous integration of narrative into the experience-explanation-experience relationship, the discussion of ethics becomes an inevitable ingredient of the learning process." David Polkinghorne poignantly expresses the significance of stories for social



ecology. “Through the action of emplotment, the narrative form constitutes human reality into wholes, manifests human values, and bestows meaning on life” (Polkinghorne 1988, 159).

In Bateson’s social ecology stories are a means of connectedness between humans and between the human and non-human world. In short, stories embody unities, connecting A and B. Stories are a living, experiential fabric fusing biological and mental systems. As Bateson suggests, “Rather, if the world be connected, if I am at all fundamentally right in what I am saying, then thinking in terms of stories must be shared by all mind or minds, whether ours or those of redwood forests and sea anemones” (Bateson 2002, 12). Bateson was only interested in producing a pedagogy which was bioethically sound, and that meant going back and ‘reinventing the wheel.’ In this way, storytelling pathed the way towards an ecological pedagogy.

With regard to the human genome, how can narratives sway us to thinking in alternate ways? Current scientific narratives of the human genome are preoccupied with the universality of DNA and their life determining qualities (Fell & Russell 1994a). However, as Fell and Russell contend, to describe DNA as a generative life principle “obscures their role, rather than clarifying it” (1994a). No DNA can itself be regarded as creatrix since life is constitutive of the interrelations between “organisms and their environments” (Doyle 1997, 128). If we concur with Fell and Russell’s analogy that DNA is cognate with a country’s constitution which proffers a stable government, but, does not rule society (Fell & Russell 1994a), then we can surmise that genes are a metaphor of life, not life itself. As Doyle poetically asserts: “Beyond the functions and differences of organisms, there is a secret” (1997, 12).<sup>7</sup> In this way, the wise teacher can instruct his/her students that genes are an emergent power of a deep unity that is hidden in the body. From here, a series of narratives can be developed in explaining the principles of knowing how to know. Bateson was peculiarly gifted in using stories for elucidating his ideas. In his famous story of the crab given to some schoolboys, Bateson explains how the principles of mind are evident in the crab’s morphology (2002, 9). One may theorise here that the symmetry and repetition found in the crab’s leg find their homologue in the rhythmic repetition of information within DNA sequences. This is at the heart of Bateson’s idea of metapatterns—

“patterns which connect” (Bateson 2002, 10).

The story of the human genome beckons us to discover nature’s metapatterns via the mergence of intellect with intuition. In the words of Jonas Salk, “knowing about living systems suggests a way of thinking about some of the burning issues of our time for which we seek solutions” (Salk 1975, cited in Fell & Russell 1994b). Salk had reworked Herbert Spencer’s saying “survival of the fittest” to “survival of the wisest”. He concluded that by viewing nature as a metaphor to define the processes which inform humanity, we can attain the limits of our knowledge of the world (Salk 1975). “In this way, Man’s imagination and intellect play vital roles in his survival and evolution” (Salk 1975, cited in Fell & Russell 1997).

Our intellectual systems which have led to a plethora of scientific discoveries have fallen short in unlocking the “mysteries of animal behaviour” and how biological systems co-operate (Fell & Russell 1994b). Irina Pollard’s article on the behaviourome project (mind mapping) reminds us that co-operation is even operative at the molecular level. Genes and memes co-evolve and impel the evolution of ideas (Pollard 2004, 90). These ideas are integrated into various organisational hierarchies that are infixed in the organic (Pollard 2004, 90). Pollard explains how dog sperm from several competing male dogs end up co-operating once impregnated in the female. Once the litter is delivered one can observe how the puppies originated from different fathers, evidence of sperm symbiosis (Macer 2004, 20-21). In other words, competition between the male dogs to impregnate the female dog played only a small part, while co-operation played a greater part. The moral of this example exemplifies Bateson’s Ecology of Mind in that nature cannot survive without co-operation and mutuality.

## ENDNOTES

<sup>1</sup> The “New Goals for the U.S. Human Genome Project 1998-2003,” proclaimed the discovery of the human genome to be “the single most important project in biology and the biomedical sciences—one that will permanently change biology and medicine.

<sup>2</sup> Alternately, the eminent biologist Paul Ehrlich explains that the human genome is

over rated since “information from the human environment is more extensive than that of the human genome” (2000, 126).

- <sup>3</sup> Sagan states that “this shared genetic language is one line of evidence that all the organisms on Earth are descended from a single ancestor (1977, 23).
- <sup>4</sup> Grossman indicates how western socio-intellectual regimes have encouraged the language of growth. Consequently, this has led to the embedding of quantity in our everyday discourses, as well as, quantifiable modes of analysis which ignore the role of human meaning to knowledge (Grossman 1999).
- <sup>5</sup> Ridley goes so far as to claim that the Human Genome does not exist and “is founded upon a fallacy (2000, 145).
- <sup>6</sup> This process of correction, I would argue, represents an evolutionary advancement in homo sapiens which has enabled the neo-cortex to increase over the last one million years. At the same time, Sagan as does Langar (1942) state that the ritualistic and hierarchical nature of homo sapiens is influenced by the R-Complex (hind brain) of the human brain, which plays an important role in aggression, ritualistic behaviour and maintenance of social hierarchies (Sagan 1977, 60-61). If this is the case, then Bateson’s idea of habituation may be due to the human leaning towards the R-Complex. Hypothetically, the lack of internal rigor as specified by Bateson may actually be an evolutionary trait in human beings which is contoured by cultural evolution. For example, Jackson (1998) states that kernel to the formation of the human self is a need to maintain ontological security through the creation and maintenance of ritualised forms. Therefore, the maintenance of ritualism and social hierarchies achieves a sense of existential retrieval amidst a world of random, chance and fate – a world beyond our control.
- <sup>7</sup> “Life withdraws into the enigma of a force inaccessible in its essence, apprehendable only in the efforts it makes here and there to manifest and maintain itself” (Foucault 1971, 273).

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