

Revisiting the relationship between mind and genes as a first step towards understanding the origins of the contemporary human mind, its current functioning and problems

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Abstract

This paper aims to explore in detail how the genetic process is responsible for the formation and functioning of the contemporary human mind and the complex and elaborate problems it has created both within and outside of itself. The existing mind of an individual is essentially an unconsciously formed gene-based mental complex whose formation and functioning is largely controlled and dominated by a two-way connection between his genes and mental processes. Due to this the mental autonomy he experiences is more of an illusion than reality.

A brain gene, in addition to the protein template, also contains a non-biological mental template or code made of pre-big bang light quantum energy forms, which programme the brain cells to produce mental processes. There seem to be two main varieties of mental templates or mental genes in human beings and numerous specific sub-types within each variety. One, which contain the template for lower order mental functions (habits, temperament, basic emotional positions, motivations and agendas, and self-centered intelligence) which we share with animals and other living things. The other which do not contain the template for a specific function but only the template for a higher order mental capability (say of complex reasoning and intellectual processing, and developed sensitivities) unique to human beings and which is concretized through a highly developed and on-going learning process. The existing gene-based mind of man is an evolved product of the dynamic and interconnected functioning of all the varieties and sub-varieties of mental genes and brain processes, in a many-sided interaction with the environment. And in our view our mental processes and their experiences have a communication process in place with our mental genes (at the nonverbal and unaware level) and also the capability to

modify them. In fact this communication process is probably the mechanics of mental evolution in general, in living things.

Apart from the proposed involvement of non-biological processes in the formation and functioning of mental processes we are also speculating their involvement, in tandem with the biological processes, in the genetic functioning related to the body. To give some examples, the overall design of the biological body contained in the gene could be existing in terms of a non-biological process, they could be involved in the process of genetic mutations, signaling processes of non-coding RNA which regulate protein synthesis and epigenetic inheritance systems in cells. In fact it was probably this non-biological process which combined with the complex pre-gene organic molecule to give birth to the gene itself as a stable process which then went on to make the initial stable cellular structures in evolution.

The motivation behind our inquiry is to incrementally replace the existing unintelligent mental software and programme in our mental genes, with an intelligent software not controlled by the genes but by our advanced intellectual and emotional processes. It is this transition within an individual which will enable him to intelligently cope with and find long-term solutions to his problems.

1. Introduction

Today, more than ever, one needs to cut through the many-sided and many-layered complexity of contemporary human life and get down to the bare bones so as to get a more clear picture of the current human state. This paper is one such attempt. Its aim is not to provide definite answers or solutions but to raise more questions, issues and maybe new lines of inquiry which can enable us to, as Theodore Zeldin (1996) says, change the spectacles through which we look at the world and ourselves. The main proposition of this paper is that the fundamental causation of contemporary conflicts, contradictions and problems within an individual and in his outer life lies in the existing mechanics of the working of his mind, based on a deep-rooted and very complex two-way connection between his genetic process and his mind. The innumerable causes that are currently in vogue are in our view the secondary causes which emanate from this fundamental cause. It is the ignorance, neglect or half-

baked knowledge of this that adds to these current conflicts in our lives and also breeds the illusion of mental autonomy and free Will.

Contemporary man has so far been looking for the roots of his problems and conflicts primarily outside of him¹. Sometimes in the innumerable social (political, cultural, religious and economic) formations which have evolved during the period of civilization. At other times in the malfunctioning of the minds of other individuals. In the breakdown of morals, ethics, rules, regulations and laws. Then in material and technological progress which has made man's interaction with the environment exponentially complex, volatile and beyond his control.

We are not denying the involvement of any of these factors and their interconnections in our search for the roots of our problems. In fact the current complexity of human conflicts and problems and the numerous shapes and forms it has acquired today would not have existed without these factors and the innumerable permutations and combinations ensuing from each one of them (which we are not mentioning here). However, our plea is that entangling and occupying ourselves totally with these factors is not going to provide a long-term and serious resolution of the problems which plague us today. We need to emotionally and intellectually grasp the urgency and logical necessity of exploring another indispensable and fundamental factor that we have so far neglected—the role of the genetic process in the formation and functioning of our highly sophisticated and apparently autonomous mental complex and in making us what we are.

Today there is no dispute that man's genetic network in a complex interaction with the environment has given birth to his mind and we are continuing to unravel the details of how this process actually takes place in its specifics. However, most of the reigning ideas and concepts about the connection and relationship between the genes and the mind of human beings propose an indirect and somewhat vague connection between the two processes. The vagueness in our opinion could be the result of two factors. One, the fear that if we accept a significant role of genes in our mental life then we will need to say farewell to our cherished notions and concepts of mental autonomy and free will, which are what make us human. Two, the tons and

¹ Distortions, disorders and conflicts within the mind, personality and body are viewed as consequences of external influences and complexity

tons of major and minor facts that we are continuously discovering about the complex structure and functioning of the genetic process, especially the human genetic process and how it makes the human body and mind, which challenge any simple and linear causations and correlations between our genes and mental processes.

The drawback of this situation is that we keep looking for causes and solutions to our problems only at the level of our mental behavior² i.e., in terms of ideas, instead of going down to the fundamental mechanics of how these ideas are produced, what are the limitations and constraints on them, which today are obstructing us from seriously addressing our problems on a long-term basis. There is a jungle of ideas today pertaining to all our problems ranging from simple and crude ideas (related to ones day to day strivings) to extremely complex, sophisticated and esoteric ones (which constitute schools of thought like idealism, existentialism, etc), which are in turn intermingled with and driven by our false (half-baked) ideas about ourselves, our experiences, human life and Nature. In this flood of conflicting ideas there is no clear direction of how to proceed towards real and long-term solutions. Up to now man's predominant response to this situation has been of reconciling and resorting to micro level piece meal doing to resolve his problems in the short-run. This in turn has been creating more emotional confusion and conflict because that doing is both short-lived and has unpredictable backlashes due to man's failure to fully anticipate and grasp its larger consequences, repercussions and interconnections with other issues. So this situation is taking man further away from the doing that is required for actually resolving his problems.

In this scenario, we are suggesting another way of looking at this problem which is that we deal with it at the fundamental level. Mere ideas about Economics, Politics, society, arts, culture, etc and debating, contending and confronting each other at the level of ideas will not lead to a real and long-lasting change. The human problem has

² The problem is that we tend to stay at the manifest or as Steven pinker says the 'proximate' (2002, p. 54) causes of mental behavior instead of going down to the fundamental or 'ultimate' causation. According to Steven Pinker the proximate cause is the '... mechanism that pushes behavior buttons in real time,...'(2002, p. 54), while the ultimate cause is the 'mechanism that shapes the design of the organism over evolutionary time' (2002, p. 54). In this view of the matter the proximate causes of our aggregate mental state could be the complexities and perversities of our ideas and the innumerable environmental/circumstantial factors but the ultimate cause has to be internal, in terms of the design of our mental complex and its numerous departments as it has evolved over the course of human biological and mental evolution. To understand this design we need to zero in on the genetic process.

become so mature that it needs to be tackled at the root level where it is an issue of achieving a different mental mechanics within ourselves. At present our basic emotional process, our intelligence processes (tool of the emotional process) and their products in the form of our ideas, feelings, habits, temperaments, etc are corollaries of our unconsciously evolved genetic mental software and programme and their functioning is still dominated by them. Here we would like to dispel the impression that we are propounding strict genetic determinism and hence a kind of fatalism in relation to our genes and minds. No! we are not. We are only saying that the role of the genome in the making and functioning of our minds needs to be unraveled further so that we can understand our existing mental processes and their problems more deeply and are able to redesign and restructure our genetic mental patterns and their products under the guidance of our higher order emotional and intellectual processes. So that we may gradually, through quantitative steps and stages, replace the genetic foundations of our mental processes with intellectual foundations.

During the transitional phase as we proceed towards the making of new foundations the problem of negative mental products (ideas, feelings, emotions, motivations, intentions, etc) which are a consequence of the conflict between the genetically dominated mental processes and the higher order mental processes will become minimized and the magnitude of positive mental processes will increase which will lead to a more harmonious relationship amongst ourselves, within ourselves and with Nature.

Now a word about the method that we have employed in our inquiry. So far in order to figure out the complex connection between our genes, proteins, brain and mental processes man has been using all kinds of techniques³ and tools⁴. These have certainly taken us forward in this area but a serious assessment will reveal that in reality all these techniques have only managed to provide us with roundabout and indirect information about the interconnections between them. The reason is evident, the connection process we are trying to perceive is not yet tangible to our five perceptual senses and their laboratory extensions. So our contemporary

³ Techniques like the 'shotgun approach' in which chemical and biological agents are applied to produce mutations in certain genes and then their products in the form of unusual behaviors or aberrant nervous systems are observed. (Marcus, 2004, p. 186).

⁴ Tools like brain imaging, computer simulations and x-ray crystallography.

understanding about it is primarily based upon the inferences we draw from this indirect and limited information, the only logically possible route or method at this stage of human inquiry.

Keeping in view the above constraint the methodology that we have used is the known dynamic process of mental perception which precedes concrete laboratory inquiry and results. We have used a combination of inferences drawn from known scientific facts and the contemporary fund of knowledge in various scientific and non-scientific disciplines coupled with an on-going process of reasoning and constructing rigorous hypotheses concerning the composition, history and interactive mechanics between our genes and minds to come up with the hypotheses and conclusions discussed in this paper. We hope they will contribute in some form to the growing pool of knowledge in this area.

1.1. The general nature of contemporary human mental problem

During the four million years⁵ of human history right before man created a variety of complex social formations, which marked the beginning of the period of civilization in human history, he only experienced the problem of his relationship with the external environment as a consumer. His time was divided between two main activities. One, trying to fulfill his basic biological needs of consumption from the environment. Two, avoid becoming an object of consumption himself. The making of tools and weapons in that period was mainly driven by these two activities. Given the clear and limited scope of his two-fold agenda and the relative (compared to the post-civilization period) simplicity of his needs and external environment his emotional and mental make-up was also simple and straightforward. Consequently, he did not experience any deep or serious problems of his inner mental make-up; there were no internal conflicts and contradictions so to speak. Gradually however, we know that his life and problems became much more complex due to his growing needs, intelligence, tool making capabilities and the development of language but their fundamental character remained the same.

⁵ Around four million years ago, in Africa, '... our apelike ancestors ventured onto savanna landscapes...' (McNeill, 2003, p. 9).

After man went beyond the stage of hunting and food gathering and entered the period of settled farming, agriculture and then cities the human problem no longer remained simply of taking directly from Nature through one's own physical (hand, mouth, legs, arm, etc) capabilities but acquired another dimension. Man became dependent on man-made means (a product of his knowledge and its application) for taking from Nature. A process which gradually required him to construct elaborate social relations and structures of cooperation and competition to support, nourish and strengthen this process of dependence. Apart from a dynamic and fast transforming external environment, a major consequence of this shift to mental means of taking from the mere physical means, was the evolution of a complex and many-layered emotional and mental life of man. Which meant a growing list of emotional and mental needs in addition to simple physical needs of food, shelter, etc.

In the pre-civilization period man's failure to take enough from Nature was primarily due to the inadequacy and limitations of his nature made (physical) capabilities of taking. But in the period of civilization there arose two levels of failure. One which he shares with early man and animals; the problem of physical consumption (this includes all basic physical needs) of the majority. Although the causation for it has become different in our case. It is no longer the physical incapability of man to take enough from Nature but the structure of human society and the human relations within it which obstruct an optimum utilization of man-made means for solving human problems and instead promote their limited and irrational⁶ use. The second level is shared neither with early man nor animals. And that is his failure to meet the exponentially grown mental list of desires and requirements which results in his experiencing myriad forms of emotional and mental deprivation, for example, numerous shades of frustrations, jealousies, greed, gratification, subtle forms of enmities, confusions, ad infinitum.

As the complex and unclear emotional and mental experience of failure to meet ones growing emotional and mental needs became a dominant experience in the human mind over and above the clear-cut and simple physical experience in the case of basic physical needs man began to create elaborate thought systems like morality,

⁶ When they can be used optimally and one stays below that level due to the resistance and inertia of existing individual and collective patterns of their existing usage.

ethics, value systems and religious dogmas⁷. These were a manifestation of his submission, resignation and acceptance of his deprivation and at the same time a tool for him to cope with the life he had created both within and outside of him. During this period he began to construct completely new forms of relationships with other people, which were essentially adversarial in nature. Any cooperation and harmony was for a limited purpose and only the surface layer. A fall-out of this adversarial relationship with other individuals was the perversion of his relationship with his own self; between his emotional, intellectual and physical structures, which became colored in the dye of the complexities, complications and perversities he had achieved in his ideas.

To sum up, man has travelled a long way and has made tremendous progress both on the positive and the negative side. Observing the exploded growth of his mental and emotional life and its manifestations in terms of an extremely complex external life, one can say that man's contemporary problems are principally those of his ideas and understanding (about himself, life, Nature, his experience of his problems and their solutions) and not of outside Nature. But unfortunately a long-term and rational solution to these problems cannot be found merely at the idea level. For that one needs to get down to unraveling and comprehensively grasping the mechanics of one's mental complex and discovering how to change these mechanics. This is where the genetic process needs to be zeroed in on. The reason is simple.

While man continues to be what he is so far, it is his genetic process which has largely shaped him. We propose that most of his ideas are a product of thousands of years of genetic domination of his mental processes and even his intellectual and other higher order mental processes have also been operating mainly (although they have ventured beyond the genetic confines or parameters) as tools of the genetically dominated mental processes. Everything he does is traceable back to the logic of the mental functions and capabilities he was genetically programmed to produce coupled with the specifics of his circumstances. His idea and mental processes as they have been and are operating (having produced his history, its facts, his problems and their solutions) are nothing more than the manifestation of the logic of the genetic programming of his brain cells to produce the required mental processes

⁷ With time he also began to discover how to systematically violate these moral, ethical and religious constraints on his mind and body, which added further to the complexity of human existence.

needed at every stage of his life in order to ensure the survival and continuity of his existing biological form. Even the creative record of man should also not be ascribed to his developed and apparently autonomous emotions and ideas only, because the tendencies of those creative emotions and ideas are a product initially of his genes coupled with the specifics of his environment.

2. Genes and human mind: current conceptions and their inadequacy

Is human mind a product of an individual's genetic constitution or his/her environment, i.e., nature or nurture? Majority of scientists, philosophers, and even common educated people today are no longer staunch adherents of the two extreme positions in this age-old debate. The continuously increasing knowledge about the brain, mind, genes and evolution is revealing that the human mind is a complex evolved product of a dynamic interaction between both these processes. Current theories, debates and disputes are therefore primarily concerned with the general and specific details of how our genes and environment together produce the human mind in all its complexity and why, to what extent and in what respects is the role of one process more or less than the other.

The sequencing of the human genome and the ever-increasing knowledge about the detailed functioning of the genetic process has provided us with a wealth of information about how genes make the brain and also influence its functioning. We are beginning to identify the genes⁸ which are responsible for the construction, evolution and functioning of the various areas of the human brain. Increasing evidence is indicating that there are thousands of genes that are involved in making complex proteins (including regulatory proteins) for making the elaborate and many-layered brain structure and for guiding its functioning and evolution. We have also started identifying and zeroing in on genes responsible for various brain diseases like Dyslexia, Parkinsons, Alzheimers, etc.

Alongside an understanding of the genetic formation of our brains we have also been identifying the role of genes in the formation and functioning of our mental functions.

⁸ These include genes that produce those brain and mental processes which we share with other species and those which are unique to the human species, i.e., language related areas of the brain and their mental counterparts.

We have been, for quite some time now, associating specific mental traits, capabilities (memory, intelligence, etc) and behavior with a particular gene or groups of genes. This association however, is neither linear nor simple. In fact the one-gene-one trait concept is now an obsolete and discarded concept which only surfaces in newspapers or some popular science magazines. Where the sequencing of the human genome has imparted to us the conceptual and technical capability to correlate⁹ stretches of DNA with certain mental traits and behaviors or their disorders which breed mental diseases like Schizophrenia, Multiple personality disorder, etc, at the same time it has also revealed that behavior, along with other complex mental traits involves not single genes but complex networks of thousands of genes and their complex system of regulation. Most of our mental traits and disorders are therefore a product of many genes having small effects which are modulated by other genes (Pinker, 2002, p. 48). Due to the immense complexities and interconnections involved in the gene based mental formation of human beings, the entire pathway from genes to proteins and then development of particular mental traits, capabilities and behavior is still largely an unknown area.

However, despite the huge area of our ignorance in this matter there is one clear consensus among behavioral geneticists, neuroscientists, cognitive scientists and philosophers and that is that genes do not determine the mind in every detail firstly because their effects are probabilistic and secondly they can vary depending on the environment (Pinker, 2002, pp. 48-49). It is on the basis of this consensus that work in all these disciplines is being carried out to unravel the relationship between genes and the mind.

There is no dispute today among researchers that the basic¹⁰(or we can say simple) and initial mental processes both of an animal and a human being are determined by the genetic process. In animals we find no language and verbal ideas but voluntary acts, which can only be explained in terms of mental processes which have not been thought out verbally. When animals exhibit a particular temperament or a particular behavior pattern or mental skills and capabilities then they can only be understood

⁹ A note of caution! Correlation does not imply causation. We need to keep this in mind when we associate stretches of DNA with physical and mental traits.

¹⁰ In the case of higher mental functions there is no clear consensus of researchers on the involvement of the genetic process so we are deliberately not mentioning them here.

and explained in terms of the functioning of their genes, which they are born¹¹ with, and not ideas. And the variation in the temperamental and mental behaviors of two animal specimens of the same specie sharing the same environment can again be traced back to their genes.

Similarly, the non-verbal and non-idea based mental capabilities displayed by human newborns can again be attributed only to their genetic process. Child psychologists now do not believe that ‘... the world of an infant is a blooming, buzzing confusion, because they have found signs of the basic categories of mind (such as those for objects, people, and tools) in young babies...’ (Pinker, 2002, p. 55). The fact that newborns can ‘... imitate facial gestures, connect what they hear with what they see, distinguish the rhythms of Dutch from the rhythms of Japanese, and tell the difference between someone who is looking at them and someone who isn’t, [is again] suggesting that even with relatively little experience, newborns are ready to start observing the world...’ (Marcus, 2004, p. 4). These mental capabilities in infants and newborns clearly show that there is some kind of pre-experience (which arises in interaction with the environment) design in the genes which in the absence of dominant environmental stimulation makes these capabilities. Their growth and development then takes place through an adaptive (in the case of humans but rigid and almost fixed in the case of animals) developmental programme (made up of sub-programmes at both the physical and mental levels) during the course of the infant’s lifetime

To counter and undermine a dominant role of genes in the case of infant mental behavior there have been suggestions that there is also learning in the womb which could be responsible for the making of those initial mental processes. But the question arises that normally sensory perception is considered as a prerequisite for any mental activity or processing so in the womb in the absence of sensory stimulus or perception how does that learning take place which then goes on to construct the mental faculties of human infants or newborns? What are its mechanics? One does not find any consensual explanation of this in current scientific and philosophical literature. Detailed studies and experiments in behavioral genetics are also revealing

¹¹ “... Animal studies have shown that aspects of behavior and personality can be genetically transmitted (as ... in studies in which mouse geneticists have bred rodents to be as anxious as Woody Allen)...” (Marcus, 2004, p. 3)

that the human potential for thinking, feeling and learning lies in the ‘...DNA of the fertilized ovum...’ (Pinker, 2002, p. 45). And genes are responsible for variation in ‘...ability and temperament...’ (Pinker, 2002, p. 46). In our view therefore there has to be some in-built (organized before experience and learning) mechanism in the genes which is responsible for the immediately manifest mental capabilities and inclinations of newborns or infants.

Most importantly, as Steven Pinker (2002, p. 75) says and we fully agree:

... Nothing comes out of nothing, and the complexity of the brain has to come from somewhere. It cannot come from the environment alone, because the whole point of having a brain is to accomplish certain goals, and the environment has no idea what those goals are...Information in the world doesn't tell you what to do with it.

What has been happening for quite some time now is that after the settling of the dust on strict genetic determinism most scientists and philosophers have largely been occupied with discovering the details of neuronal organization and development in interaction with the environment and how that gives rise to the numerous human mental faculties and functions and their development. The role of the genes in this process has largely been sidelined and has in fact receded into the background¹². It is referred to occasionally as we refer to our long gone ancestors, who have no operational connection with the lives that we are living in the present. Their role in supplying the basic design (not a blue print but a recipe) for the formation and functioning of our brain processes and mental faculties is acknowledged (conceptually and experimentally) but the current complexity of brain structure and functioning and the complex mental feats it can perform and the problems and conflicts it has created are not traced back to genes. In fact any suggestion of such a connection is normally branded as bad version of reductionism,

¹² It is only a few disciplines like behavioral genetics which are focusing on discovering the details of the relationship between genes and mental behavior. The problem is that they are concerned with observing the functioning, changes and disorders in overt mental behavior which result from the functioning, changes and disorders of certain genes or groups of genes and primarily for the purpose of identifying the causes of and improving the treatment of certain mental disorders and diseases. They are not working to understand in detail the mechanics of how genes make the mind and indirectly influence its functioning and how we can become intelligent about these mechanics and intervene in them so as to change the current functioning of the mind and address its problems. So there is a difference between their approach and what we are proposing.

and viewed as an infringement upon and an insult to human autonomy and the act of free Will.

What has reinforced the above thinking and led us further away from going deeper into the connection of genes with the mind was the discovery of the estimated figure of human genes by the Human Genome Project. The intellectual camp (which includes scientists and some scholars of social sciences) which connects human mental complexity to the human gene count consider the figure, around 34000 genes (Pinker, 2002, p. 78), as too small to count for the dynamic and complex mental life of a human being. This according to them vindicates their theories and concepts about free Will and the dominant role of the environment in shaping the human mind.

At the same time however, a lot of biologists are also countering this argument and the implications drawn from it. The fact that the structure of what counts as one gene is made up of stretches of DNA which code for proteins (exons) interspersed with those stretches which do not (introns), from which exons are spliced together in multiple ways to give rise to not one but different proteins means that there is no linear correlation between a gene and its protein product. And hence between the complexity of the genome and the number of genes (Pinker, 2002, pp. 77-78). Moreover this structure also makes gene counting a problem; it is difficult to demarcate where one gene ends and the next begins. Then the fact that multiple splicing happens much more in higher organisms especially human beings is again indicating that linear correlations cannot be drawn. Most importantly the figure 34000 only makes up '...3 percent...' (Pinker, 2002, p. 78) of the human genome and the rest is classified as 'junk DNA', whose function we do not yet know in detail although there is speculation of its involvement in gene regulation. These arguments are used for countering the 'blank slate' arguments and proposing that the human genome with its existing gene count is capable of making a complex brain and its mental faculties.

There is no doubt today that human mental behavior, faculties and functions, especially higher order and more complex mental processes, need to be analyzed, accounted for and understood at multiple levels which means through various disciplines and the interconnections, interdependence and relationships between the different levels and consequently the respective disciplines have to be discerned. A

word of caution here is that our focus of attention on one level must not be at the expense of the neglect of some other level which might be just as crucial and indispensable for a more holistic understanding of the human mental phenomenon as all the other levels are.

In our opinion it would be a misconception to sideline the genetic process due to the disconnect between the number of genes discovered by the Human Genome Project and the complexity of the human biological and mental life. Because as Steven Pinker (2002) says that would imply that if the number had turned out to be what we expected, say a 100,000 then it would have been correct to equate the complexity of the human mind with the genetic process. When the fact is that it is not logical to reduce the structural and functional complexity of the human mind to the gene count because if you do that then you would also need to explain the roundworm having 18000 genes (Pinker, 2002, p. 76) and some other animals having more genes than us on the same plane. The issue is that the complex formation of the mind and its numerous departments and its many-sided and many-layered functioning cannot be explained merely by the number of genes.

Similarly mental traits like thrill seeking and anxiety cannot just be linked to longer or shorter versions of stretches of DNA, as proposed by some geneticists (Pinker, 2002, p. 48). We are not saying that the number of genes and the lengths of stretches of DNA have nothing to do with the human mental behavior and traits but only that we must not remain at that level of explanation but dig further and deeper into the genetic process and look for a more fundamental process that could account for the many-sided and many-layered complexity of the human mind.

After all when the post- big bang complexity of the universe and certain phenomena within it could not be explained by classical reality; its laws and its methods of inquiry, then didn't we go deeper to a more fundamental level and discover quantum processes/energy forms which today we see as the progenitors of the innumerable layers of phenomena and complexity in Nature. So why are we scared of conducting a deeper inquiry into the genetic process and its integral connection with the mind.

In our view (to be elaborated in the forthcoming parts of this paper) maybe the gene also has a subtle but complex quantum energy process within it which is responsible for the basic (not a complete blueprint) design of the mind and also has a dynamic

mechanism in place of how that design will unfold or concretize in interaction with the environmental specifics of the individual specimen and also develop and modify. The dynamic of such a mechanism could be capable of generating the many-sided and many-layered complexity of the human mind, which we are proposing is also a quantum energy process and not a biochemical process¹³.

It is on this note that we feel that an in-depth inquiry into the connection between genes and the human mind has not yet been undertaken. We have and are continuing to acquire very sophisticated and detailed knowledge of the genetic process and how it constructs the human body and also the brain. But when it comes to the mind and its complex faculties we only pay lip service to the genetic process and are completely focused on trying to explain human mental structure, functioning and complexity only in terms of and through the brain processes with minimum of genetic involvement.

This trend needs to be revisited, it cannot and should not be eliminated but a horizontal and vertical inquiry into the gene-mind complex should become incorporated in it as an integral part of it which would enable a more holistic and three-dimensional view of this whole issue. Before going into the myriad details of this connection we would like to re-examine the existing concept of 'gene' as a biological phenomenon. This reexamination is a necessary prerequisite for acquiring a more deeper and holistic understanding of the relationship between the genes and the mind.

¹³ The detailed explanation of this proposition and its rationale is a separate part of our work and is at present beyond the scope of this paper. So here we would like to just give a brief quote of where the current scientific inquiry into the structural constituents of the mind has reached, which in our view clearly shows the need for further explanation beyond the existing biology based explanation and an incorporation of a possible quantum level explanation. According to the distinguished Neurologist Antonio Damasio '... There is a major gap in our current understanding of how neural patterns become mental images... We can describe neural patterns---with the tools of neuroanatomy, neurophysiology and neurochemistry---and we can describe images with the tools of introspection. How we get from the former to the latter is known only in part,...' (2003, p. 198). According to him therefore '... current neuroscientific descriptions of neural-map activities do not provide enough detail to tell us about the biophysical composition of mental images....'(2003, p. 208). If we accept this then a quantum level explanation of the mind's energy processes is certainly a strong contender.

3. Why the gene is not merely a biological phenomenon but a composite of biological and non-biological processes

If we carefully chart the journey of the changing concept of gene we will discern an interesting cycle. In the beginning, say before the inception of sophisticated tools for observing genes and the inception of molecular biology and Genetics we can say that the concept of gene existed only at the abstract level within our minds and was used as a concept of convenience to explain the process of the transmission of hereditary traits from one generation to the next. With the inception of tools like electron microscope, and then x-ray crystallography, this concept became concrete and tangible at the level of our sensory perception, when we were able to identify the genetic material and its location. But as we advanced further and inquired into the details of the physical location and operation of genes and started making computer simulations of the different genetic functions we made some new discoveries which overturned our existing understanding of the gene only as a DNA molecule and once again made the gene an abstract entity. An overview of the journey of this concept is as follows.

The earliest theory of heredity can be traced back to fifth century B.C. when philosopher Hippocrates proposed that the reason why children possess qualities of their fathers is because ‘... the semen contains tiny samples from all parts of the paternal body...’(Chambers, 1995, p. 25). Since then classical geneticists mostly subscribed to a ‘functional’ concept of genes, which defined genes in the context of the role they played in heredity. For Mendel ‘gene’ was nothing more than an algebraic unit which he used for the calculation of trait combinations, so ‘... Aside from their functions of producing patterns of inheritance, genes were black boxes whose substantive contents were beyond the reach or interest of geneticists...’(Auyang, p. 11).

After 1944, the ‘*substantive*’ concept of genes emerged “... which describes genes by their materials, properties, and interactions...” (Auyang, p. 10). This concept was based on two very important approaches (one at the theoretical level and the other at the practical level) which emerged in the 1920s in the inquiry into the structure of

DNA. First was quantum mechanics which enabled us to understand the subtle characteristics or properties of the chemical bonds between atoms within a molecule. Second, the discovery of X-ray crystallography and its application to ‘...compute the three-dimensional spatial arrangements of molecules in the crystal...’ (Auyang, p. 14). In 1944, Schrodinger in his book ‘What is Life’ ‘... speculated that the aperiodic arrangements of atoms in chromosomes contained some kind of “code-script” for the organism...’ (Auyang, p. 18). And In 1953 both Watson and Crick suggested that ‘... the precise sequence of the bases is the code which carries the genetic information...’ (Auyang, p. 19).

Thus, since 1953, we have been describing genes as bits or segments of DNA which can be ‘... defined and manipulated as chemical entities...’ (Chambers, 1995, p. 187). This classical molecular gene concept according to which stretches of DNA code for polypeptide chains which go on to make proteins is still the reigning concept in all the disciplines which are studying the structure and functioning of genes.

Ever since the equation of genes with DNA molecules and the gradual development of tools and techniques for observing DNA structure and functioning over a period of time, our concept of them as a biological process has been strengthening and is by now largely entrenched in our minds. With the result that research and experimentation in Genetics, Molecular Biology, Molecular Genetics, etc, is solely focused on accumulating specific and precise knowledge of this biological functioning of genes.

This work in the biological domain is no doubt very sophisticated and elaborate and has enabled us to more deeply and comprehensively understand a range of biological processes taking place within the human body. We are beginning to understand how genes determine the color of our skins, the shapes of our noses, eyes, hands and so on. We are also acquiring a more detailed understanding of how they trigger the ageing process. Studying the genomes of viruses, bacteria and RNA mutations¹⁴ in human beings has enhanced our grasp of how diseases like cancer,

¹⁴ A growing understanding of the different types of RNA and their functions is revealing that ‘... the genetic cause for some, and perhaps many, diseases may be associated with mutations within ncRNAs...’ (Mattick & Makunin, 2006, p. 21)

AIDS, liver or heart diseases afflict the human body. This understanding is enabling more precise diagnosis and development of more effective tools, techniques and medicines for treating these diseases. These are but a few among the numerous examples of how the growing understanding of genes as a biological process is enhancing our understanding of the various biological processes taking place inside the human body. We also acknowledge that due to the tangibility of their biological functioning there is more scope for intervention and conventional experimentation and consequently production of new knowledge in that area.

The sequencing, synthesis, manipulation and processing of DNA and RNA through more and more advanced techniques and methods led to an exponential increase in scientific progress. In the 1970s, this progress led to the emergence of genetic engineering which became a stimulus for the growth of the biotechnology industry.

With the formal beginning of the Human Genome project in 1990 the above mentioned process of understanding the biological functioning of the human body got a major boost. This multi-billion dollar project to map and sequence all the genes of the human genome which was completed in 2004 has opened up for human beings a completely new phase of understanding and changing themselves at the biological level.

Apart from the Human Genome Project, the main driving force behind contemporary Genetic Research is the nature of research funding in the Genetic sciences. Today the main motivation and force behind the continuously expanding Genetics research are the numerous biotech companies, pharmaceutical corporations and other private companies. The commercial interests of these companies is leading to the patenting of commercially useful genes and creation of private databases of information on genetic diseases, genes and their location, mutations, etc, which is enabling more productive exchange amongst researchers and accelerating the pace of further research in Genetics (Marks & Steinberg, 2002).

Alongside the growth and promotion of the above trend of focusing on the biological structure and functioning of genes we have made some important discoveries (laboratory and conceptual) in recent years, both in relation to the existing molecular concept of gene and their functioning related to the body, which in our opinion are challenging the existing 'biology only' based view of genes. These discoveries are

pushing us to revise the existing concept of gene and to add to the existing biological explanation of some genetic functions in relation to the body.

Conceptual shift in the understanding of a gene

According to the historian of Genetics Raphael Falk, a gene is a:

...‘concept in tension’ (Falk 2000) ---an idea pulled this way and that by the differing demands of different kinds of biological work. Several authors have suggested that in the light of contemporary molecular biology ‘gene’ is no more than a handy term which acquires a specific meaning only in a specific scientific context in which it occurs... (Griffiths & Stotz, 2007, pp. 1-2).

In the last decade we have discovered that:

... any ‘single’ gene, in the sense of a single continuously read passage of DNA text, is not all stored in one place. If you actually read the code letters as they occur along the chromosome...you find fragments of ‘sense’, called exons, separated by portions of ‘nonsense’ called introns. Any one ‘gene’ in the functional sense, is in fact split up into a sequence of fragments (exons) separated by meaningless introns...A complete gene is then made up of a whole series of exons, which are actually strung together only when they are eventually read by the ‘official’ operating system that translates them into proteins (Dawkins, 1987, p. 174).

This implies that ‘a’ gene like a stretch of DNA does not already exist as a fixed entity with a clear boundary and in a specific location, which is what the classical molecular definition of gene proposes. There is a gap between the genetic information contained in a stretch of DNA and its biological ‘meaning’(Stotz, Bostanci, & Griffiths, 2006, p. 8) which can only be derived from the stringing together of exons by the translating system. And that process of stringing together depends on the elements and factors of the larger environment within the cell. Which in turn is connected with the environment between cells, and then the environment within the body and the mind and then the environment outside the body. Thus ‘... the information for a product is not simply encoded in the DNA sequence but has to be *read into* that sequence by mechanisms that go beyond the sequence itself...’(Griffiths & Stotz, 2006, p. 18). So we can see that the gene is a flexible entity

which cannot be confined to a protein coding stretch of DNA and it acquires a concrete identity only within a certain context, which consists of various factors, elements and relationships beyond the DNA sequence.

Connected with the above insight has been the demise of the other part of this linear reduction—the one-gene-one-protein or one-gene-one-enzyme hypothesis¹⁵—which went a step further and reduced the gene as a particular stretch of DNA to a particular protein product, i.e. it proposed a linear correspondence between one gene and a particular protein. Today we find that the linear concept of the gene as a particular stretch of DNA which codes for a particular protein no longer spearheads or defines the thinking about genes and has in fact receded into the background.

In the light of this already revised picture of the concept of gene and its growing acknowledgement and acceptance in the scientific community we would like to propose another addition to this concept. In our view the gene (of the body) in addition to containing the biological template (the manifest layer of DNA sequence) might also be hosting a non-biological process within its regulatory¹⁶ region (the introns), which would be involved not only in the regulation of protein synthesis but also other processes in the body.

Before moving on lets quickly clarify what we mean by biological and non-biological functioning of genes. By 'biological' we mean the known protein-coding and making function of genes and by 'non-biological' we mean an additional sub-particle or light particle quantum process lying within genes, which would be involved in the biological making and functioning of the body and the brain. This non-biological process in our view is continuously interacting with and influencing the biological functioning of genes but is not currently detectable at the level of existing biological processes. Maybe due to the process of decoherence as suggested by Professor Johnjoe McFadden (McFadden, 2002, pp. 219-220). In his view the quantum level of reality cannot be detected within classical objects because of the decoherence

¹⁵ We need to note that this hypothesis was derived from experimentation on simpler microorganisms like bacteria where you could zero in on important factors and processes without getting bogged down by complex details. And since a lot of famous physicists started focusing on genes and inheritance so this method was adopted in the biological sciences also. (Auyang, pp. 9-10). But discoveries like overlapping genes, split genes and alternative splicing complicated this linear correspondence and forced biologists to rethink what made 'a gene... a gene'. (Darden & Tabery, 2005)

¹⁶ '...Each gene actually has two parts: the protein template, which is widely known, and a second part that provides *regulatory* information about *when that template should be used.*' (Marcus, 2004, p. 59)

resulting from incoherent motion of their constituents. A similar process could be happening in the gene, which acts like a veil beneath which the quantum processes lie. It is possible that within the non-protein coding region of the gene a template of these non-biological quantum energy processes would be existing but not observable due to the process of decoherence (caused by the presence and motion of a large number of other DNA molecules, RNA, proteins and other processes within the cell) which wipes out any evidence of quantum processes. Or conversely these templates could be made up of those quantum energy forms like neutrinos which do not get entangled with the known energy processes within the cell and consequently cannot be detected.

Today a number of scientists and researchers are suggesting the involvement of quantum processes and other non-biological processes like electromagnetic radiation in genes. Professor Johnjoe McFadden (2002) has even suggested that the existing genetic code (which codes for proteins) is actually a quantum code due to the laws of quantum mechanics governing the subatomic particles within the hydrogen atom bonds between the nucleotide bases.

On the other hand, the German Biochemist Manfred Eigen (Davies, 1998, p. 32) questions the suitability of the original nucleic acid bases as carriers of genetic information when he states that the primitive nucleic acid sequence did not have the capacity to accommodate the information required by the replication machinery of a gene. This seems to make sense if we recall Bruce Lipton's explanation of how '... In physical molecules, the information that can be carried is directly linked to a molecule's available energy...Because thermo-chemical coupling wastes most of the molecule's energy, the small amount of energy that remains limits the amount of information that can be carried as the signal.'(2005, p. 112). If we accept this information then non-biological quantum processes in genes would have been needed to store more information and also enable faster processing of that information. (We know today of the increased storing capacity of qubits and the speed of quantum computation or processing. Our genes might have harnessed this quantum capability for performing their innumerable tasks related to the body, brain and the mind).

In view of the above we believe it would be 'bad reductionism' (Pinker, 2002, p. 69) to just reduce the gene to the DNA molecule and rule out the possibility of other non-biological interconnected layers and processes within the gene whose understanding might be vital for a holistic and a seriously workable understanding of the human body and the mind. An understanding which will lead to better application both at the biological level and at the level of the individual as a whole. Because we must keep in mind that man is not only biology. If he has within him more layers than simple biology then why should we reduce the genetic process which has made him and his mind to just a linear and mechanical biological process.

Involvement of non-biological processes in the body

We are suggesting that while making the human body the genes have to undertake a very complex and precise designing and engineering process because they have to not only produce proteins but also deal with hundreds of aspects with respect to every component and part of a body. All this requires some sort of a design, especially when it is being done at an unconscious level. If we do not attribute to genes a conscious autonomy in the sense that they can go on to make say any kind of nose or any other organ for that matter, then there has to be a design in accordance with which every gene has to perform a complex construction job. And that design has to take into account not only all the variations of that construction job but also the exact proportion and timing of every process, i.e. it has to also include a plan for execution.

In current scientific thinking the development process (from genes to the body), is viewed as a highly flexible process acting through local effects and not some centralized process controlling the whole. The question that arises here is that in the absence of some kind of an overall plan (not a completely rigid plan) which would include a coordinating mechanism how would the innumerable local effects coordinate amongst their various layers and levels together with the timing of each process? If each gene acts as an autonomous entity having a protein template and its own regulatory process and operates through local effects only then why did groups of genes and cells gradually become incorporated into cooperative networks and eventually a developed regulatory system was evolved in higher animals. Which in human beings has become a proper management system (for coordinating and

managing all their biological and mental layers) occupying the bulk of their genome. Each gene should have kept on operating repetitively and the need for phenomenon like master control genes, which can trigger the expression of thousands of genes should not have arisen.

In our view an overall design or plan (evolved over the species life-span) of an organism might be stored in the gene in the form of a quantum hologram kind of process in the non-protein coding or regulatory part of the gene. It has been suggested that ‘... genes have a holographic history of the organism’s development--a sort of 3-D biography from the moment of conception...As you grow, your chromosomes slowly build up data through the 3-D information carried and stored as waves.’ (Mc Taggart, p. 51). There are several characteristics of holograms which in our view make them the most appropriate candidates for this purpose: ‘... The pattern holds the form. [They] contain all the information needed to reconstruct a whole image. They contain many dimensions of information in far less space, like a compressed file. They hold that information in a subtle network of interacting frequencies...’(Miller & Miller, 2003, p. 3). Most importantly they inform us of an invisible fundamental reality which is not made up of parts but an ‘inseparable interconnectedness’. (Miller & Miller, 2003, p. 3).

Thus each gene would be holding the form (basic design) of the organism in a quantum pattern (a holographic image) existing at an invisible fundamental level. This quantum holographic image would contain many dimensions of information in a compressed form (occupying far less space) and would be connected to the holograms of other genes through a process of quantum wave entanglement. This entanglement would create a kind of subtle network in which the local effects (which would include RNA signals) generated by single or groups of genes will become synchronized and coordinated through this process. During the development process this holographic image would be converted or transformed into physical matter guided by more fundamental and lighter quantum signals in addition to the light and sound signals as currently proposed.

A crucial process integral to the execution of the design process in genes is the many-layered process of regulation which regulates gene expression across three diverse time spans; evolution which operates from tens to millions of years,

development from hours to tens of years and physiology from milliseconds to weeks. (Hood & Galas, 2003, p. 446). In our view this regulatory system of genes would also be involving non-biological processes. Considering the enormous challenges it has to confront like coordinating the numerous tasks carried out by cells, interpreting different chemical and physical signals, modulating the expression of hundreds of genes in response to cellular needs and environmental stimuli. This would have required the capability ‘... to respond precisely to *specific signals*...’ and also a ‘...sufficient *dynamic* character to fine-tune the level of expression for hundreds of different genes...’(Stotz K. , 2006, p. 12). And that can only come from a more subtle and efficient process existing at the non-biological level within the gene.

It has been proposed by some scientists that this regulatory function is being performed by regulatory proteins while others think it is a mechanism involving an elaborate system of Digital signaling and communication through ncRNAs¹⁷. Even if we accept the idea of regulatory proteins the question arises that why would a specific set of proteins instead of making cells and other components of the body become solely catered towards managing and regulating the protein-making genes. We still do not have an answer to that. The latter suggestion seems more plausible but it does give rise to a further question that what is the energy composition of the digital signals emanating from ncRNA molecules, which regulate the on/off function of protein making genes. Logically it cannot be the same as the composition of a digital signal in a transistor based electronic equipment or a computer.

It cannot be chemical because as (Pitkanen, 2002) says ‘... chemical expression is very slow, the translation rate being twenty aminoacids per second, and one can wonder whether life might have invented faster modes of gene expression and

¹⁷ Mattick and Makunin (2006) have shared an important information which in our opinion is suggesting the involvement of non-biological processes in the regulatory system of living things. In their view the increased complexity of eukaryotes, which went on to make multi-cellular organisms and human beings, led to a change in the physical basis of the regulatory mechanism. Instead of remaining protein-based (analog), it became a digital mechanism operating through non-coding RNA (ncRNA) digital signaling. They explain this transition in the physical basis of the regulatory system very appropriately in the following quote: “... prokaryotes have been limited in their complexity by their reliance on a protein-based regulatory architecture, probably for most of their evolutionary history...Conversely, it appears that the eukaryotes breached this limit by the co-option of RNA as a digital regulatory solution, in concert with the evolution of the necessary protein infrastructure to recognize and act on these signals...both logic and evidence suggest that both developmental programming and the phenotypic difference between species and individuals is heavily influenced, if not fundamentally controlled, by the repertoire of regulatory ncRNAs,..., which are only now being recognized and beginning to be studied in any systematic way.” (2006, p. 18).

control of gene expression.' We know that energy signals are much more efficient than physical signals so there must be some signals composed of non-biological light quantum energy processes which would be guiding this complex process. More so in the case of human beings where the regulatory system has to manage and regulate the most complex living species that exists in Nature.

Let us assume if there was neither a design nor an effective regulatory system had evolved then there would have been no concept of a particular shape or size of a particular organ as there would be no instructions for terminating the replication of DNA strands, eventually resulting in an unstoppable chaos and destruction. The entire process would have proceeded randomly and would not have resulted in the formation of a meaningful biological form.

Fortunately for us, reality operates otherwise. We did not only evolve one simple instruction for designing and regulating this process but a whole complex of instructions, like the design documents of a skyscraper, which is responsible for the design and execution functions of genes. And this complex, as mentioned above, compared to the protein-coding regions occupies a greater area of the genome.

Up to now we have been under the impression that the main function of genes has been protein-making whereas in reality that is a small part of what the poor gene has to do. It would have been the most important thing before that capability emerged. But afterwards just the making of proteins no longer remained important. Because the most important thing then became the making of different kinds of proteins in a designed way and for a specific purpose. This is why we have been emphasizing that in complex living things and especially in human beings the primary function of genes became to carry the detailed design of the whole biological body including all its components and parts (in the form of a quantum hologram) and execute that design in a specific manner and in a certain time period through a complex non-biological system of regulation.

The reason why we have not yet been able to detect these non-biological processes involved in the design and regulation functions of genes is that our positive knowledge about a phenomenon cannot go beyond the capability of the tools we use for examining that phenomenon. Renowned Physicist Brian Greene says '... one way that we learn about the structure of an object is by hurling other things at it and

observing the precise way in which they are deflected ...' Then he adds '... As a general rule, the *size of the probe particle* that we use sets a lower limit to the length scale to which we are sensitive... Useful probe particles cannot be substantially larger than the physical features being examined; otherwise, they will be insensitive to the structures of interest.' (2000, pp. 152-154). It seems the current scientific instruments like electron microscope or x-ray crystallography and other techniques and methods used for probing the structure and functioning of a gene are, to use Brian Greene's words, 'insensitive to the structures of interest' due to the massive difference between their own size and the size of what they are trying to probe. To discover and perceive them we would probably need more sensitive and complex tools of observation and perception.

Another very crucial area that would be involving non-biological processes is the process of mutations. According to Mattick and Makunin:

... most mutations in regulatory sequences may be both subtle and difficult to track, particularly given the expectational and practical bias to date in genome scanning projects on exonic lamp-posts of protein-coding genes, and the fact that the relevant mutations may be quite distal to these lamp-posts, hidden in the dark of the vast tracts of intergenic and intronic sequences... (2006, p. 24).

At the biological level we are able to detect mutations in the base pairing sequences of the genes so the question is that why aren't we able to detect these 'subtle' mutations in these intronic sequences? Maybe these mutations could be happening at an as yet undetected quantum level, and sometimes manifesting in the form of 'modified chemical structures' (McFadden, 2002, p. 66), which are detectable.

McFadden (2002, p. 66) also talks of 'naturally occurring mutations' whose source is quantum mechanical. According to him these mutations escape the enzyme based correction machinery which removes incorrectly inserted bases during DNA replication. The fact that these mutations escape the molecular correction machinery is also an indication that these mutations might be taking place at a more fundamental level of quantum processes and not the manifest molecular level of nucleotide bases. The phenomenon of adaptive mutations is also explained at the quantum level by McFadden (2002).

Epigenetic inheritance is another such phenomenon that needs a further level of explanation beyond the biological framework. Its basic concept is that specialization in cells, i.e. the difference between kidney and liver cells, is not passed on to the next generation via the genetic process but through a process of non-genetic transmission of information. It has been proposed that 'Epigenetic inheritance mechanisms "transmit *interpretations* of the information in DNA" and therefore phenotypes rather than genotypes...' (Stotz K. , 2006, p. 13). Concretely this interpretation exists in the form of specific patterns of a gene's on/off switches (which determine its expression) induced by some environmental factors, which are passed on to the next generation and not the actual DNA sequence. The issue is that the mechanics of how and in what form this pattern is passed on and in what form is the pattern itself existing are questions we feel have not been fully and clearly addressed and explained within the current framework of biological explanations. Which raises the question that maybe this process could also be happening at the non-biological quantum level.

According to Jablonka & Lamb (2005) epigenetic inheritance systems originally evolved to enable early cells to survive the constantly changing environmental conditions. There were three reasons why they provided that advantage to cells. One, the rate at which epigenetic variations are produced is much greater than the normal DNA mutations so in a rapidly changing environment which required fast adjustments and adaptations this was a significant advantage. Two, the fact that epigenetic variations are often reversible while the DNA mutations are usually not. Three, the production and reversal of epigenetic variations is functionally linked to the changing environment, which is not considered to be the case with DNA mutations¹⁸ (2005, p. 324). These characteristics of epigenetic systems reveal the functioning of a parallel (but connected) process alongside the DNA mutations which is more flexible and dynamic and probably operating at a more fundamental level which cannot be adequately explained in terms of the observable biological processes. Hence the need for further inquiry into these processes beyond the biological framework of genetic functioning.

¹⁸ Although in our view there is an environmentally induced production and reversal process even in the case of DNA mutations, which we will be elaborating in the forthcoming parts of the paper.

4. Some thoughts on the origin of gene and its non-biological functioning

The existing concepts and theories of the origin of life and the gene from non-living processes fall into two main camps (Shapiro, 2007). One, the accidental or chance emergence of a self-replicating large organic molecule (earlier a rudimentary form of DNA was a likely candidate and after the 1980s some earlier form of RNA molecule became a more probable contender) from random interactions among non-biological chemical processes. The other called 'Metabolism first' (2007, p. 52) theory proposes the chance emergence (from the primeval chemical mix) of small molecules which started forming into growing and evolving networks of reactions driven by some energy source and gradually when they became more complicated and capable of storing information in polymers then a living process was evolved. Both these intellectual camps have strong adherents and critics, and we appreciate that there are innumerable micro details and factors which have been gone into and many-sided analyses conducted with the help of serious imagination and reasoning to step by step construct and critique these theories. In this context we would prefer not to either favor or critique these theories and instead propose our own version of how life and genes would have evolved from pre-living Nature.

Before we do so we would like to voice our concern on a very important matter relevant to this area of inquiry; the concept of chance or accidental nature of the emergence of life and genes. One can understand chance or accident to the extent that there are trillions and zillions of pre-living energy particles and quanta interacting with each other so it is not important that exactly which particular energy particles interacted with which other particular particles. What is important is the ways in which they interacted because certain interactions would produce certain consequences and another set of interactions would produce another set of consequences and so on. Our issue is with the underlying assumption behind the word 'accident', which is that there is no logic to it and it is beyond our capacity to inquire. It would not be a problem if we said that at present we do not know why and how exactly that process would have happened as there is so much that we do not yet know. The other issue is that when we say it was an accident we are in fact conceding ground to all kinds of supra-natural and dogmatic explanations of that

process. So we feel we should neither say it was an accident nor that it is beyond logic only because it is presently beyond our theoretical and experimental knowledge.

Coming back to the era of pre-living Nature, before the emergence of the genetic molecule, the already existing energy and particle processes, atoms, inorganic molecules and organic molecules, at that stage would be entering into all kinds of open ended and reactive (short-lived) interactions¹⁹, with each other and with substances like light and temperature²⁰, with no barriers and regardless of the consequences. And out of this growing mix of interactions through a process of permutation and combination new logical but unstable states and forms would have emerged. Actually it would have unleashed an on-going process of emergence and disintegration of different varieties of unstable organic matter structures or compartments in that dynamic energy-particle and chemical soup. Gradually larger sizes of those unstable structures would also have arisen with more functions and capabilities which would have organized into larger networks. At that stage then there would have been a shift from simple production of those organic matter forms to their reproduction but not yet as a stable process.

To integrate the functions of these developed but unstable organic matter forms a kind of a guideline process would have evolved within it at that stage. Because to pull its functions together there was needed a process similar to the already known processes of attraction and repulsion occurring in pre-living processes (magnetism, salt having an attraction for moisture, etc), a kind of an emotional process if we may say so. If we think a little more deeply we will realize that our existing mental 'emotional process' (its likes and dislikes, pain and pleasure) is nothing more than the cellular (living) form of that widespread process of attraction and repulsion existing in pre-living Nature. It is through these guidelines of attraction and repulsion that those developed organic matter forms probably began to get organized and

¹⁹ Here it would be pertinent to mention that space alone does not determine the existence or absence of interaction. It is a necessary condition but not the only condition. There are two kinds of interactions; theoretical and practical. Theoretical is when space is diminished and things come together and they may interact. Practical interaction will depend on the properties of the things which have come together. As a matter of interest in our case it could be our emotional or cognitive fund or any other state of inquiry existing within us which requires us to interact with other individuals or things.

²⁰ The 'replicator first' (Shapiro, 2007, p. 48) theory also proposes such an interaction between organic molecules and solar ultraviolet radiation and volcanic heat.

integrated. It was therefore the first mental process in its basic sense which began to manipulate and handle the organic matter processes in a specific directed way.

In our view it was the need of this guideline process within those forms to put the entire process of reproduction on a stable and more efficient footing which was responsible for the formation of the first gene, as a process of another quality in Nature. That was the stage when those developed but unstable²¹ organic matter forms became ripe (they had become so dynamic, their functions had multiplied and they had acquired properties of potential interaction) and ready for another order of interconnection and interaction which would enable them to develop to qualitatively new and stable states. Here we are unable to avoid the inference and reasoning that these ripe organic matter forms must have come across some other states in Nature which were neither chemical nor molecular but some lighter pre-atomic quantum states, properties of which happened to be ready for interaction with their own dynamic properties.

There are two reasons why we think this would have happened. One, any new state or form emerging out of logical but reactive interactions between the ripe organic matter forms and other post-atomic energy and particle processes around them would have been just a different category or variety or a higher form of those very organic forms having slightly different properties but fundamentally the same. So the result would have been more of the same. Two, the complex capabilities and properties of the gene are clearly far beyond those of these organic and post-atomic energy and particle processes and cannot be accounted for through just these interactions. The gene is a comprehensive designing factory/ complex which not only has a programme for its own functioning during its life-span but for its own reproduction. With the gene the development of the organic matter forms and states becomes a programmed process, no longer left to the vagaries of the random process. Apart from achieving a stable programmed state having a repetitive designing capability and a capability to reproduce itself it also has the capability to interact with the environment as a whole in the light of the operation of its programme and consequently modify itself (what we call mutations) during the process of its reproduction. Now the dynamism of these functions and their

²¹ What we mean by unstable here is that they do not have a capability of repetitive designing and reproduction.

complexity cannot be explained within the framework of the pre-gene random interactivity and logical reactions of those earlier forms. None of the properties of the post-atomic energy and matter forms are known to have these properties and capabilities. None of them on their own are known to be capable of moving beyond the parameters of the random process to a complex, comprehensive programme for their own functioning and reproduction. It is only the gene which begins to deal with random processes from the programmed standpoint. Which is why we think it is actually proactive and not simply a reactive process.

In the gene one finds complexities of a different order which are inconceivable within the known parameters of the ingredients of the reactive organic molecule mix. The dynamism of that mix is really in terms of mass, and predictability is also to that extent. But in the gene one finds a complexity that virtually operates in three hundred and sixty degrees and their dynamism is of mass-less interactions which are capable of influencing mass forms and setting them into programmed motion.

In the gene, therefore we find a combination of the early universe pre-atomic mass-less energy forms, in which the mass and energy ratio was far more in favor of energy and upon which its programming capability is based²² and other post-atomic energy and matter forms (having mass) whose interaction and reaction would have pulled in these mass-less forms and incorporated them within their own structure. It is only in the gene that we find dynamics of two different orders becoming interactive and capable of influencing each other. In the developed organic molecule mix there was the dynamic of mass and a lot of electromagnetic energy while in the case of mass-less pre-atomic forms there is the dynamic of speed, mass-less interactivity and relatively much more universality. And it is only when these unobservable energy processes interact with mass species that their actual role becomes manifest. And that role is not to directly change the chemistry of the organic matter form but the capability of that chemistry.

²² The programming capability of the gene and the programme functions it produces are a process in which the role of the light pre-atomic quantum energy processes is dominant and decisive. The reason being the non-random level of complexity of operation and interaction that these processes involve. It stands to reason that heavier particles or mass processes would not be able to handle the quantity and quality of functions involved at the programmed level and the speed required to perform them. The protein making code in terms of genetic sentences made up of the four bases is a result of the interaction between these pre-atomic quantum processes and the developed organic chemical mix. It is the manifest layer of the gene while the non-biological programming layer is the hidden layer.

When the complex but unstable ripe organic forms start taking steps towards becoming stable life forms then alongside the observable chemical functions and changes one finds non-molecular and non-chemical functions which cannot be observed but logically those functions are changing the capability of chemical processes and are able to direct them vis-a-vis the environment from the standpoint of the emerging programmed life form. These are the first mental functions which go on to constitute the inception of the programmed living process in Nature. In our view there can be no evolution of life or biological evolution without mental processes, howsoever rudimentary they are.

Thus, all biological and mental evolution ensued from this complex and dynamic interaction of the interactive organic molecule mix with the mass-less pre-atomic quantum energy forms. One type of interaction between them produced the protein making templates or codes (the observable manifest layer of the gene) for the various types of proteins used in the making of biological structures. A process which would have been regulated by the pre-atomic quantum energy process programming layer of the gene²³. The other type of interaction went on to produce first elementary pre-brain mental templates or mental genes responsible for the rudimentary mental feats and functions found in earlier life forms like amoeba or paramecium and then mature mental templates or mental genes (the term we will be using in the rest of the paper) which became a part of the brain genes and programmed them to produce the various mental formations and processes in advanced living organisms including humans. So in living things, as they climb up the ladder of complexity we see a continuously interactive and developing form of this necessary connection between the body and the mental processes well established through the gene, of course for a functional and limited purpose of adjusting with the environment and ensuring the continuity of biological existence.

In addition, whenever the genes reproduce they reproduce incorporating within them the character of their natal cord, i.e. the cellular guideline or emotional process (mentioned earlier), which in fact was responsible for their birth. And this natal cord remains operative throughout the existence of the gene and we find the most

²³ Just an aside! The regulatory template in every gene might not be a simple protein function which it is commonly believed to be. In our view it could be that pre-atomic quantum energy programming layer of the gene, which is not yet visible to our tools of observation.

advanced and developed form of this process in the human mind's emotional process. The following is an account of how part of the cellular guidelines got transferred to the mental processes via brain cells and how due to this fundamental connection between our mental emotional process and genetic emotional process we say that the human mind is still largely dominated by that connection. Because it is the emotional²⁴ process of every living thing which integrates and directs all its mental (also some physiological processes which are not reflex processes) processes including intelligence processes, which evolved as supplements or tools to be used by the emotional process for ensuring its biological survival and efficient functioning.

4.1. The evolution of body and the brain processes; formation of mental genes as a part of brain genes

The continuous and dynamic interaction between the biological and non-biological processes in the primeval organic molecule soup gave rise to not one gene but a variety of early genes. And then there was a process of selection and rejection between them and the ones which were successful²⁵ were selected. By successful we mean those genes whose capabilities began to increase and they became more efficient. Richard Dawkins (1989) has suggested that it was a cumulative process of improvement which became quite elaborate and efficient and the genes gradually discovered more efficient ways of increasing their own stability and decreasing the stability of their rivals (1989, p. 19). This growing efficiency of the genes, in our opinion, was due to their having a response system. A system which could respond to the status of their interaction with the environment as being a more efficient and competitive one, and was able to translate that response internally to modifying and mutating their internal system in quantity and quality, in size as well as in capability. It is through this system that the genes were able to ensure their survival and the

²⁴ Simple like- dislike and satisfaction process in animals and a developed and many-layered emotional system in humans.

²⁵ The commonly accepted criteria of successful selection are genes which can make more copies of themselves, replicate fast and more accurately.

emergence of variety within them during reproduction and eventually form more stable and growing biological structures, which were again a means for them to ensure their own survival.

The survival of the gene on its own would have no meaning unless it was able to make developed and complex 'survival machines' (1989, p. 19), as Richard Dawkins says, which would acquire the capacity and the capabilities to match the growing capabilities and needs of the gene with the dynamic and continuously changing outside environment and its requirements. The gene must have physically experienced a mismatch between its own size and the size required for fulfilling its growing needs (as advanced organic chemistry infected with dynamic pre-atomic quantum processes) and coping with the outside world as it had to be interactive on a variable scale, in different forms, in different ways and in different times. To cope with this it needed functions and mechanisms of a different dimension and these it could not produce within its existing size.

At this point we are reminded of Bruce Lipton's (2005, p. 88) example that when the cell membrane reached a critical size in evolution which became a ceiling for the size of the living cell then in order to enhance its survival chances, and to cope more efficiently and smartly with the environment the cell began to band together with other cells to make multi-cellular communities, a process which increased their awareness of and capacity for coping more efficiently with the changing environment.

Similarly the gene when it reached a critical size could not survive on its own by just continuing to make copies of itself without evolving a more stable and developed process of a larger dimension, so it had to evolve specialized cells which went on to make the body as a supplement and a tool-kit for it to interact more successfully with the environment. The body became a kind of a vehicle within which the genetic complex could grow and develop and explore its potential for dynamic interactivity. So we find the beginning and development of a very complex and subtle relationship of interdependence and two-way interaction between the genes and the biological body.

Once the biological body and innumerable forms of it began to evolve, a need for a correspondingly extended range of guidelines arose to direct the body in its

multifaceted interactions within itself between its growing components and functions and then with its external environment which also started becoming complex. This meant a more advanced management system, with separate specialization with respect to each component of the system, was needed to cope with the dynamic and changing environment within the body and also outside of it. The simple management modes based on reflex stimulus-response²⁶ process available to the cells at that time were simply not enough to handle the quantitatively more and many-sided data arising from interaction of the body with its environment.

At this stage then the gene could no longer remain a mere proactive response system but also had to evolve a proper management and coordinating system to handle the rapidly growing inputs, outputs and feedback loops both at the micro and macro levels. So the gene confronted with this new kind of complexity and its own inadequacy and insufficiency in the face of it must have started making complex proteins for the making of brain processes.

The brain evolved as a more systematized and efficient intermediary between the biological body and the environment. In order to act in this capacity it has both innate and acquired knowledge of what is happening in the entire body, including its own self and about the interaction of the body and brain with the outside environment, in the form of these 'dispositional representations' (Damasio A. R., 1994, p. 94) which are like comprehensive maps about the entire body-brain-environment complex residing in different areas of the brain.

The increasingly elaborate interaction between the body and the brain and their many-sided interaction with the outside world made the perceptual, cognitive and processing capabilities and mechanisms of the post-brain species highly complex. With this the need arose for elaborate planning in terms of the body and its needs and functions and an integrated, efficient, coordinated and uninterrupted management of the growing capability complex of the body. Hence the need for a faster, more complex and proper mental system generated by the brain (instead of the reactive and unstable pre-brain mental functions) which would integrate the

²⁶ According to Bruce Lipton the cell membrane is supposed to have this 'receptor-effector' (2005, pp. 83-84) (which perceive environmental signals and generate appropriate life-sustaining responses) protein complex which acts as a switch, translating environmental signals into cellular behavior. And in his view this complex can not only read detected physical fields but also other undetected vibrational energy fields like thought.

growing perceptual, observation, problem solving, decision making and execution processes of the developing body and simultaneously plan²⁷ in terms of the body and its needs and not the genes.

It is at that stage that in the brain genes through modification another department was added of mental templates or mental genes which programmed the brain cells to generate a repeatable variety of mental processes on a continuous basis, which would constitute an overall management system. With the emergence and development of brain made mental processes the cellular guideline or emotional process (mentioned earlier) got transferred to these mental processes. The genes now delegated to them the authority that existed at the pre-body reactive cellular level. The guidelines coming from the genes now began to operate through the mental emotional process produced by the brain cells as an advanced stage of the cellular emotional process. So the mental emotional process became the focal point or the primary residence of the guideline process.

The contemporary brain cells of advanced animals and humans have, therefore, two software built into them by the genes. One, the software for the production of brain cells. Two, a non-biological software for the making of mental programmes and processes, in accordance with genetic guidelines, which now start operating through the mental emotional process. It is the presence of this latter mental software in brain cells which distinguishes them from other cells in the body and also connects the mental emotional process with the genetic emotional process (the guideline process in genes).

Now a word on how the brain cells would have started making mental processes through their non-biological software. It could be that mental genes in some specific brain genes (which make microtubules) would have provided non-biological

²⁷ Planning which could not be done by the brain cells. The evolutionary agenda of the living body was to neutralize the failure to survive and the brain cells on their own could not pursue that agenda. The primary task of the brain was to provide the software for the stable and repetitive functioning and required modification of the body's various systems like reflexes, glands, organs, etc. And the basic character of these processes regulated by the brain was either neutral, as in the case of glands and organs which were supposed to perform certain functions in a certain way repeatedly. Or negative in the case of reflex processes because they were about what not to do. To address the problem of failure to survive however, more dynamic, creative, and a larger variety of mental processes were needed which could be repeatedly produced so that a proper developed structure of the mind could be made for addressing the problem of survival and of sustaining that survival on a more efficient basis.

guidelines to the microtubules (which are already being cited as a probable structure for quantum activity in the brain cells) whereby they could then through different ways harness and organize the non-biological light quantum energy processes into different dynamic geometrical structures which would constitute a range of mental processes and functions.

The microtubules through evolution would have discovered how to separate the required building blocks of mental processes (light quantum energy forms) from other heavier energy forms²⁸ existing at that time and through evolutionary experience learned how to put them together to perform a certain mental function, which increased the capability of the specimen vis-à-vis the environment and improved its functioning. Then they would have begun to accumulate that experience and build on it. They must have started putting together those non-biological building blocks in different formations to make more types of functions and then they learned how to insulate the different functions so that they do not become incoherent and diffused. Gradually some mental process formations would have acquired the capability to elaborate themselves and harness the stray quantum energy building blocks themselves instead of going back to microtubules every time a certain mental function or act had to be performed. That is how gradually a range of mental functions and processes would have evolved to neutralize the threat and failure of survival of the living form, the problem that the genes started out with.

So when we come to human beings then the entire gene-brain-mind complex reaches the peak of its structural and functional complexity. We find more than half of the total human genes being expressed in the brain and then the fact that there are 100,000 different kinds of neurons in the brain each of which contributes ‘... to a different aspect of mental life.’ (Marcus, 2004, pp. 71-72). So we find a growing quantity and quality of both brain and mental genes and their mental products over the course of evolutionary history of post-brain species.

²⁸ Electron energy, gravity and magnetism would be existing at that time as possible candidates for building blocks of mental processes but in our view these were not harnessed for this purpose because of the unsuitability of their own intrinsic properties, especially the property of more mass (read more inertia). Considering that there was a need for an even faster mechanism than the brain. And in the brain we know that electron energy has already been harnessed in the form of small quantities of electrical voltages carried by ions for performing limited specific functions in cellular signaling. The involvement of the latter two energy forms (in the form of electromagnetic waves and quantum gravity processes) in the brain, mind and consciousness processes is being speculated but is not yet factually confirmed.

In the forthcoming part of this paper we will be discussing how a variety of these mental genes are responsible for making the highly developed human mental complex with its layers of programmes and processes. And how this connection dominates our mental processes and has created this conflict and contradiction within the mind between the gene based and dominated mental processes and those higher order mental processes which have gone beyond the confines or parameters of the genetic programmes. Some suggestions for resolving this conflict will also be shared towards the end of this paper.

5. The types and layers of mental genes and their role in the making of the different layers of the human mind

There are two main types of mental genes that we are proposing in this paper--- lower order mental genes and higher order mental genes. The mental gene of each type is itself in three layers. The upper or top layer contains the template of ideas (in both post-language and pre-language human mental processes). The middle layer contains templates of temperament, habits, habitual preferences and lists of likes and dislikes. The lowest or deepest layer contains the template of survival.

The first type contains the function code for producing specific and basic lower order mental functions like simple and clear-cut perceptions of specific objects, processing (includes problem solving), memory, habits, basic emotions and responses related to survival. The functioning of these lower order mental processes is like a reflex response mechanism based on a relatively rigid genetic programme constituting reflex type mental response patterns to stimuli made and modified over a period of time. In animals this programme coupled with a biological clock is sufficient for their entire life. In our case this programme becomes very elaborate and gets modified especially in interaction with our post-language intelligence and other mental processes. Our ideas, emotions, temperamental responses and habit patterns, evolved to deal with and survive in a complex man-made environment and although they may seem very complex compared to the ones present in animals but they

operate very much like reflex processes. That is why we are connecting them with lower order genes.

The higher order mental capabilities and processes (intellectual process and developed sensitivities) in human beings are not encoded in the same way as the lower order mental functions (which are more dependent on the programme). In their case the mental genes (in the neurons which make the frontal lobe or the prefrontal cortex) contain instead of a linear and limited function code a flexible capability code (only their capability is coded and not their application) in accordance with which the software for their functioning is made and modified during the real time learning process in human beings. This capability code does not include mental processing paradigms. Those we learn as we grow up; how to reason, how to correlate cause and effect, how to manage that correlation from one mental item to another.

The lower order mental genes in human beings, we can say, make our modified genetic mental program (a developed form of the animal genetic mental program) and the higher order genes make our semi-intelligent mental process which has gone beyond the genetic programme framework but is not yet a mature intelligent process and only gives us the illusion of mental autonomy.

In the case of simple lower order mental functions and processes there is no need for a stable or continuous mental function. Neurons capture quantum phenomena and put them together in the form required for performing that function and afterwards that structure is dissipated. So one is left with just the mental template. So these functions arise from time to time and from occasion to occasion and as long as the biological structure stays intact the function template can be used again and again to generate the same function as and when required. This is why probably these simple functions do not require an elaborate storage system or memory. These functions belong more to the animal kingdom and have their human counterparts also in the form of those mental functions which we share with animals

To illustrate the functioning of these lower order mental functions let us take the basic emotion of fear. The template of this emotion lies in the mental gene but the specific emotion of fear as a mental function (a particular organization of quantum energy) arises on a specific occasion and time and then dissipates because the animal or the individual does not experience that emotion all the time.

In the case of higher order mental processes when their developed capabilities operate at a complex level then the mental products they generate have to be stored because they have to be reprocessed during the individual's learning process and one keeps coming back to them. For instance a developed emotion say of love or respect or concern or subtle enmity or suspicion or higher order sensitivity towards the human state would not dissipate but would remain operative at some level and continue to grow and develop. So that would be stored for continuous reprocessing because one would keep coming back to it. Moreover its development and elaboration would not be in accordance with any programme so there won't be any fixed or repetitive functioning in its case. That emotion will keep becoming different with time as one's experience and learning process develops and one acquires an increased memory²⁹ fund of abstracted knowledge.

So these higher order mental processes are clearly not a simple reflex-response process as their software is made and modified in real time through the learning process. The learning process is also a capability whose basic code is in the genes but one goes on developing it. So in a sense one is modifying the mental gene, the template which codes for this capability. One is carrying out genetic engineering so to speak depending on what one chooses to learn and do for better or for worse. This modification is not at present physically visible within the gene but is manifest at the level of physical changes in the synaptic connections and other physical changes in the brain. The genetic programme for these higher mental processes is only the initial programme so it has a lot of flexibility and one can go on adding to it, supplementing and developing it, one can teach oneself new capabilities.

However, what actually happens within an individual is that the genetic mental programmes remain dominant and the higher mental processes remain an appendix of it. When an individual is growing up he just builds upon his in-built or programmed mental capabilities and functions. His growing and developing responses are largely

²⁹ In human beings we find different types of memories distributed in different areas of the brain. We know today that memory is in layers and every specialized learning process has its own specific 'memory store' (Marcus, 2004, p. 103). And in our view the memory store of higher mental processes is capable of storing quantum information. The possibility of this exists if we take into account an important insight shared by Psychologist Randy Gallistel. According to her "... a mechanism suited to store or convey one kind of information is equally well suited to store or convey any other kind..." (Marcus, 2004, p. 101). If that is so then in addition to biological information there can be storage of quantum information in our higher order mental memory store.

determined on the basis of the preponderance of his genetic mental outline and are not deliberated. This is how he discovers his life agenda, ambitions, priorities and preferences.

Some of our mental genes carry outlines of emotional tendencies and inclinations and some our mental or thinking outlines and these are all filled up through our responses, where the basic logic of those responses is coming from our programmed emotional makeup as a part of our mental genes. Once our emotional and other mental modules are made then the whole plan of our life is made. Then our time and energy resources all get connected to them and when we are able to verbally integrate them and identify them with ourselves then that completes the picture of the human being within us. That is the personality which we know and through which we are identified by others. It is primarily a product of our genetic mental programme and not the higher order mental processes.

At this point we would like to clarify and elaborate the concept of a genetic mental programme as distinct from the known concept of a genetic programme in current scientific literature. The genetic programme is considered to be a part of genetic information, i.e., it is viewed as a set of instructions written in the alphabet of nucleotides (A, C, T & G). And it is supposed to sequence genetic activity. This is illustrated in the Evelyn Keller's book 'The century of the gene' (2002, pp. 85-86) through an example of the genetic programme of a plant. There is a 'master' programme (plant as a whole) which is made up of subprogrammes (bud development, leaf development, stem development, etc). And each subprogramme specifies a special task to be performed, i.e. it contains a list of cellular instructions or commands (divide tangentially with growth and so on). This genetic programme (encoded in the genetic material) is also different from the developmental programme which might be located elsewhere outside of the genome and which is increasingly being viewed as more complex than a set of instructions written in terms of nucleotides. (Keller, 2002, p. 87). We find a variety of views and theories on how the two programmes interact in a dynamic manner to give rise to the biological body and mind of animals and human beings.

The mental programmes of animals and human beings are considered a corollary of this main genetic programme and its innumerable subprogrammes made up of

infinite nucleotide combinations and permutations. The issue is that we are not denying that mental programmes of living forms are a part of the overall genetic programme but in our opinion they are specifically a product of a variety of genetic mental templates lying within brain genes which are not written in the form of nucleotide bases but the different sequences and combinations of light quantum energy building blocks.

Let us try and explain the broad structure of this genetic mental programme of an animal. There would be a 'master genetic mental programme' (which would have the template for the mind of an animal as a whole) just as there was one in the above example of a plant. This would be an aggregate or composite programme (not existing on its own and in some particular part of the brain) to ensure the continuous and smooth functioning of the mind as a whole. Then it would have subprogrammes which would contain the templates for the different mental functions and processes like perception, cognition, data processing, emotions, execution, etc). Each subprogramme would specify in the form of specific instructions a special task to be performed (either on a proactive basis or as a reactive response). And these specific instructions keep becoming complex in developed animals and in human beings as more programmes within the subprogrammes are evolved (for example, within the programme of perception there would be separate programmes for all the five perceptual senses and then a separate programme for non-sensory perceptions and so on). In a lot of instances these instructions no longer remain specific or clear cut, especially when we come to the modified genetic mental programmes of post-language man.

The genetic mental programmes are made over a long period of time through accumulation of specific perceptions correlated with specific needs, specific conclusions/results of processing (problem solving and emotional processing) and then specific responses. Genes would have made these programmes first through evolving a micro cognition and response capability at the genetic level and then after accumulating a sufficient number of relevant cognitions and gathering bits and pieces of responses over tens of thousands of years they would have proceeded to work out a programme to express those responses in the light of the problem of replication. That is when programming for templates and templates for programmes arose. After that the genes went on developing and adding more packets and

bundles of functions with division of labour and gradually a multi-layered genetic complex was created which today makes and runs innumerable genetic, biological and mental programmes which constitute a proper management system for coordinating the entire biological, neurological and mental complex of animals and human beings.

Incidentally in advanced animals and human beings we find most of their genes involved in making software and programmes for this sophisticated management system which was evolved to manage their huge biological and mental complex. Probably that is why one finds the human genome consisting largely of non-protein coding regulatory architecture and only three percent (Pinker, 2002, p. 78) of protein coding genes.

The basic character of the genetic mental programs and the emergence of an intelligence based mental mechanism in human beings

Some necessary characteristics of the genetic mental programme are: It operates at the level of the specimen which means that it looks at the world from the standpoint of the specimen so it is at the outset an adversarial programme of that specimen versus the rest of the world. Its parameters are that of the physical being. It operates in terms of specifics and was evolved to address the specific biological needs and problems of a specimen of a particular species. So its main purpose was and still is to ensure the biological survival and efficient functioning of the life-form. It only operates in terms of those realities which are repeated or recurrent. Any variation leads to the inadequacy of the pre-existing design of the programme, which then becomes incapable of handling that variation and breaks down. So then there is set into motion a process of modification of that programme through the evolutionary process. Successful modification leads to selection and a failure to modify leads to rejection.

In the case of developed animals and then human beings we find these genetic mental programmes and the mental processes and functions they produce becoming more elaborate, complicated and at the same time more efficient in terms of coping with their dynamic external and internal environment.

In human beings with the emergence of post-language intelligence and other higher order mental processes, and the corresponding layer of higher mental genes another phase of going beyond the programmed process begins in Nature. In addition to the programmed mental mechanics we find the emergence of intelligence based mental mechanics.

Before the inception of higher mental genes 'capability mechanics'³⁰ had developed through evolution and in fact it was these mechanics which made the emergence of higher mental genes possible. After the beginning of language higher mental genes would have started developing and they must have played a vital role in the maturing of language. With language developed the capability of reasoning i.e., correlating cause and effect, which could not function on the same perception-response basis as mental programmes. In the case of mental programmes perception and response was in terms of specifics; there was specific perception of a specific object which was correlated with a specific internal need and then through processing a specific response was generated; a programme works in terms of specifics. In the case of reasoning one needed a much greater perceptual fund and that too of generalizations and not just specifics, so then the capability of abstraction had to be evolved. These growing abstractions then enlarged both quantitatively and qualitatively the fund of perceptions. So language based abstractions became a tool for semi-intelligent (not sensory) perception, for which reasoning became a tool. These became the new mechanics apart from programme mechanics. But as is always the case, before the maturing of the new the old and new remain side by side in a tug of war.

The maturing of mechanics means that a set of mechanics matures its design and construction, wherein its components are functioning properly, additional components are being added where required and the design of some components which are found to be inadequate is modified while the designs of other components are also improved. This is the process through which a given set of mechanics mature.

³⁰ The specific non-molecular process and mechanics through which flexible mental capabilities could be encoded.

It is through the above process that the maturing of the new higher order (non-biological) mental mechanics of mental genes has to take place. Actually non-biological or non-molecular mechanics were employed when the mental genes were made but in the lower order mental genes their separate identity is not yet crystallized. They are very strongly tied to the biological processes. It is only in the higher order mental genes and the mental capabilities they generate that we see these post-biological mechanics acquiring a separate existence and emancipation from the constraints of biology.

When we come to advanced mental genes and higher mental capabilities then biology has fulfilled its role in evolution; the role of biology is exhausted. Which means that the further development of these capabilities and their modification will not have to go through a biological process. Now we are in the realm of post-biological process and mechanics. So instead of using the biological mechanics of neurons (in the cerebrum or the frontal lobe) we will be using their post-biological capability to produce and harness those energy forms which are the constituents of advanced mental processes. And then make mechanics out of them for the further development of these advanced mental processes in the form of advance cognition, execution, a qualitatively advanced capability of handling complexity. We must keep in mind that biological mechanics have a lesser capability of coping with increasing complexity because they are dependent on heavier and cruder mechanics. Just as in computer chips we gradually learnt to use more efficient and lighter mechanics when we began to put thousands of circuits or transistors on a chip and make modern ICs, similarly we can see the greater capability of the post-biological processes to handle complexity compared to the biological processes.

These higher order mental processes emerge with the beginning of civilization and developed language. That is why the origins of all religions is dated to that period. At that time a lot of changes took place not only in mental genes but also in mental capabilities and functions.

To sum up, mental processes and their respective mental genes must not be seen as one phenomenon. They have to be broken down into compartments or layers where each layer corresponds to a particular stage of the evolutionary process in living things. The evolution of the modern human mind has gone through many

stages and a thorough examination will reveal the continuity of logic and the discontinuity of form. We have not just inherited one layer of mental genes but the entire evolutionary framework or history of the mental genes. Just as we share our biological genes and their products like neural signals and other molecules with living organisms a billion years old, even with bacteria (Marcus, 2004, pp. 115-116). So we have within us the mental genes of animals, cave man, third century B.C. and tenth century A.D. man and then modern man. And if we look deeper within ourselves we will also find the pre-big bang energy forms within us. This is how we can see a continuity of the process and a discontinuity of forms.

Our focus is on higher order mental functions and processes because they are not only the most advanced processes in Nature but the full potential of their capabilities of perception, cognition, data capturing and execution in evolutionary terms is also not yet known. It is the intelligent understanding and knowledge of this area which will enable us to change our mental genes and their programmes and to go beyond them into post-genetic territory.

Before being able to intelligently intervene and make changes in our genetic mental programmes made by mental genes we need to understand the existing steps and stages of how at an unintelligent or unconscious level, experience (physiological and mental) has been modifying the mental genes, the genetic mental programme and consequently the mental processes of advanced animals and human beings.

5.1. The unconscious and unobservable process of evolutionary changes in the design of mental genes and their products through mental experience

According to neo-Darwinian theorists genetic mutations are the main source and raw material for evolutionary change as it is the accumulation of advantageous mutations (that lead to more reproduction of those offspring which are fitter than their parents) which result in the evolution of new species with a changed physical structure and new functions and capabilities. The main cause cited for these mutations is the

random occurrence of errors during DNA replication which in turn are attributed to radiation or other harmful chemicals.

We agree that the manifest physical changes, whether through a gradual process of change as proposed by the Darwinists or the punctuated pattern proposed by some paleontologists, are caused by changes at the gene level but in our view random mutations cannot explain the entire process or mechanics of evolutionary change. There has to be the involvement of another source with its own mechanics along with the currently known sources that generate physical mutations in the DNA.

Quantum fluctuations or the quantum nature of the genetic code is considered a possible source by some researchers and scientists. In fact Molecular Geneticist Johnjoe McFadden (McFadden, 2002) also elaborates the process through which quantum processes at the level of hydrogen bonding between protons and electrons in the DNA bases would be modifying the chemical structure of the DNA molecule. And then he goes on to propose that living cells and even organisms like bacteria would have learnt to exploit these quantum processes to perform directed actions. This brings to light in our view the age-old debate between random and adaptive mutations. We agree with professor McFadden when he says ‘...Whatever their mechanisms, adaptive mutations appear to be able to bias the mutational process to favour certain genetic changes.’ (Mc Fadden, 2001, p. 78). All mutations which are responsible for evolutionary changes cannot be assigned to a random process. Along with random mutations there would have been some adaptive mutations which would have been responsible for some genetic changes. Otherwise how do you explain Cairn Smiths E.Coli cells experiment in which ‘... a starving cell could sense that it was starving and somehow *choose* the gene it needed to mutate to save itself from starvation ...’ (McFadden, 2001, p. 78). Or the capability of a fish to change its gender ‘... according to the presence or absence of a large dominant male...’ (Marcus, 2004, p. 166-167).

The above underscores the need for bringing into the evolution debate the role of the organism and its mental processes, which has so far been ignored and branded as ‘Lamarckism’. We have so far been rejecting the evidence of this role in the form of adaptive mutations because it challenges the central dogma of genetics and also because we have not been able to discover and understand the mechanism through

which this process takes place. So instead we try to somehow explain it within the neo-Darwinian framework of random mutations and natural selection. While in reality because we cannot as yet grasp this process through our existing conceptual and laboratory means and methods so we call it a product of random mutation processes and consequently shut the doors of any further inquiry into it.

While acknowledging and humbly accepting how much more we need to know in this area we would like to share another possible explanation of this process, which will not only explain the phenomenon of adaptive mutations but also trace the probable mechanics of how evolutionary (qualitative) changes have been taking place both at the physical and mental levels in living things.

For purposes of convenience we have divided the explanation of these mechanics of evolutionary changes into three broad compartments because of slight differences in detail although the basic steps are the same in all the three cases. One, the evolutionary changes in pre-brain living things. Two, post-brain species. Three, evolutionary changes in human beings which since the Neolithic period are happening primarily at the mental level and not physically.

The process of evolutionary changes in all living things is basically triggered in consequence of a mismatch between the changed external environment and the pre-existing body design, and capabilities produced by the genetic process of a living thing. The changing external reality requires that the living thing changes its design in order to cope with and survive that changed reality. While the living thing due to the in-built inertia in it wants to preserve its existing form and its pre-existing design. This tug of war at some point of time reaches a crisis situation which is a do or die situation. The living thing has to either adapt to the changing environment by modifying or changing itself or disintegrate.

At that stage the pre-existing body and its rudimentary mental functions begin to experience the difficulties, stress and pain of this situation. This pain is derived by the mental component of the gene which actually experiences the need to change. The body has no 'concept' of changing itself, it is only this mental component within the gene which experiences the need to change the body so that it can cope better with the changing environment. Thus the template of change (of the body) is designed within the mental component of the gene channelized by the cellular

guideline process, which does not suggest a design but leaves that process to the selection and rejection of the different permutations and combinations of experience and their intensity which determines the design changes that are required. The design constructed through this process within the gene is then implemented by other biological genes which make the different proteins for making the body. So the physical changes that we see in evolution are a manifestation of this internal process which originates within the gene and then interacts with the biological process to produce these changes³¹.

Actually this internal process is a distinct general characteristic of all living phenomena. Unstable actions and reactions take place internally within a phenomenon as a result of its on-going interaction with its environment which generate the need to resolve those imbalances, arising out of those reactions, by being proactive vis-à-vis the environment. It is this inherent capability of being proactive which then leads to the formation of a growing response system in living things (which gradually develops capabilities of perception, cognition, problems solving and then responding at various levels) to enable the living thing to keep pace with its continuous and dynamic interaction with its environment.

With the making of the brain process in advanced animals and human beings and then the evolution of mental genes to make and manage their growing mental functions and capabilities we find the above explained process of evolutionary change becoming more complex and elaborate. Now the steps of evolutionary change become something like this. As the mental processes and capabilities of advanced animals and human beings develop and interact in a dynamic and complex manner with the biological processes, the mental experience becomes of vital importance for the genes because it becomes a part of the environment within which they have to survive. The experience of pain or dissatisfaction in the intelligence and emotional processes is transferred via the already existing connection (there is a kind of quantum entanglement between the emotional processes at both levels) to the mental gene which registers that pain and

³¹ In our view the time factor in the manifestation of physical changes is variable. The changes can manifest in the next generation(s) or in cases like E.Coli or the fish which can change its gender, within a specific period of time depending on the intensity of experience and also the nature of change required.

dissatisfaction and then retransfers it to the mental emotional process, where the guidelines now function at the operational level.

The mental emotional process then communicates back to the gene its evaluation and judgment on the relevance, intensity and nature of that experience and then also gives directions on how to cope with it through employing the problem solving and other mental processes, which then give inputs for making the appropriate changes at the design level. This entire process does not take place at the same level of our verbal consciousness wherein we do problem solving and planning regarding a certain task or achieving a certain goal but largely at the level of non-verbal mental processes, which operate at the unconscious level where the concrete mechanics of design changes in genes are carried out.

As mentioned before at the stage of simpler living organisms when mental and emotional processes were not so developed this step of their inputs guiding the genes could not take place. There it was largely the cellular reactive process which signaled to the gene what was suitable and unsuitable at the level of simple experience but did not give input in the design process. In this case the emotional and other mental processes give the gene its conclusions and the mental gene then modifies accordingly its genetic mental programmes and also instructs the biological genes to change their biological programmes and templates. Which eventually leads to physiological changes that we observe.

Now these modifications in the mental genes, mental processes, biological genes and then consequently biological processes depending upon the mechanism available in a particular case can either be implemented in the process of reproduction and manifest in the next generation, or they can be applied within that same specimen during its lifetime. It is the intensity of mental experience of pain, failure, dissatisfaction or unhappiness (in the case of human beings) which determines the extent, level and type of modification. There could be one type of experience with a certain intensity which would modify the mental template but is not able to change the DNA template so one cannot detect that modification. Another type of experience might be of a magnitude that it is able to not only modify the mental template or gene but also interfere with the existing DNA code or protein template and change it so we are able to observe the changes at the physical level

and call it evolution. Then there might be some modifications which might not affect any template and are therefore of no consequence. These might be those 'neutral mutations' which are neither beneficial nor harmful. There can be some mental traumas or stresses that may affect the genetic mental programs and consequently modify the functioning of certain mental processes while others might also affect physical functions. The discovery of links between certain types of mental stresses and cancers is an example of the latter case in which mental pain, stress or unhappiness results in a harmful modification of the DNA template which in consonance with other factors becomes responsible for a certain type of cancer.

The purpose of the above was to make a distinction between evolutionary changes or modifications which through accumulation change the genetic design and physical structure/architecture of a living form, and insignificant modifications which do not result in a qualitative change of genetic design and consequently physical structure/architecture. In both cases the process of evolutionary modifications is a consequence of the many-sided interaction between the external environment, mental processes, brain process, mental genes, biological genes and biological processes. There is a kind of a larger feedback loop of all these processes and then smaller feed-back loops among the different processes within that larger loop which pool into it their inputs. This whole process is what is responsible for what we call evolution in living things.

So by now one will also be able to see the integral and indispensable connection between mental genes, mental processes and biological evolution. An area which was neither explored by Darwin nor is it the focus of attention of the present day neo-Darwinists, who today have far more knowledge of the genetic process and biological evolution and also consciousness and mental processes. The knowledge from both these areas needs to be combined and used for reconstructing the picture of biological and mental evolution of living things, especially of human beings and their mental processes, which are a link in the earlier evolutionary history of living things and also a break from it.

The post-language intellect and the emotions and sensitivities which have interacted with it and consequently developed have added another dimension to human evolution. With evolution of human beings, especially post-civilization man the

evolutionary changes are no longer at the manifest physical level but have acquired a mental form. When the human body and brain reached an optimum biological design in human evolution then from there onward human evolution took another route, i.e., of mental evolution. Thereafter human history is a story of the evolution of mental genes and mental processes. So unlike the Darwinian concept, evolution cannot be confined to the observation of physical changes and limited by that. Now evolutionary changes and modifications, specifically in human beings, have to be observed in mental genes, genetic mental programmes and mental processes.

In human beings these programmes have been evolving in layers through growing mental inputs of the developing mental processes of human beings. Gradually leading to the emergence of a layer of genetic mental programmes (made by one layer of mental genes) for reading the inputs from perceptual organs and making equations out of them with reference to the characteristics and needs of the existing response system which reflect our inner contradictions. Then there arises another layer of programmes---those which evaluate the mental reading of these perceptual inputs to draw conclusion about whether they are relevant or not. And then the programme of how to go about it if they are relevant or to discard them if they are irrelevant. At this stage one will note that these programmes are being developed on the basis of mental inputs and not just one's internal biological contradictions, which produced the response system in the first place. So one finds a very dynamic two-way relationship emerging between one's mental genes, the programs written in them and one's mental processes. As one keeps getting mental inputs one produces corresponding programmes and incorporates them either in new mental genes or modifications of existing mental genes. These then generate further layers of mental processes, whose inputs again go into developing and modifying the mental genes and genetic mental programs. So again a kind of an interactive loop emerges in which both levels of processes develop and modify each other.

The human temperament is a by-product of these mental processes which are generated through this interactive loop between mental inputs, genetic programmes and mental processes. It consists of those mental processes which are not directly related to one's original response programmes, which are about resolving biological contradictions. So it is a kind of a secondary layer of one's mental response system

which also gets incorporated in one's mental genes (the second layer of mental genes mentioned earlier).

Thus human beings develop this dynamic mental capability of making new mental templates or genes for the stable functioning of new mental processes, functions and capabilities and modifying existing mental genes (at the unconscious level). This process at a parallel level is also constantly in a state of interaction with your external environment and your biology. On the face of it, it seems that these modifications have totally changed these mental processes but actually their basic character or initial logic remains the same because the mechanics through which they are emerging is still connected to the unconscious and reactive response mechanism of mental genes (lying in brain cells) and brain genes (which produce brain cells). Which at some stage or another leads to a major inadequacy of the existing genetic mental design to cope with life. So human specimens have to then go through a lot of pain, unhappiness, stress and rejection to make a transition to a new mental architecture.

At this stage the process of forming a new architecture goes something like this. We had mentioned earlier the three layers of the mental gene---top layer which has the code for ideas and other mental processes, middle layer for temperament and habits and a list of likes and dislikes and the lower layer for survival. When the developed human mental processes begin to experience the pain, unhappiness, frustration and dissatisfaction of the inadequacy of their pre-existing genetic mental design to cope with the exponentially changed external and internal reality of human life then gradually that experience begins to accumulate until it reaches a stage where it begins to threaten the genetic system as a whole. At this stage this experience of failure and crisis is first communicated to the top layer of the mental gene, which then gets modified in the sense that it incorporates that experience as its own and not as something alien or external. Because at this stage within the mental gene the two layers of survival and temperament³² become opposing forces, and depending on the intensity of the experience of the crisis if the motion of the survival force is stronger than the force of temperament then the mental gene incorporates the ideas and suggestions of change coming from the mental processes in its top layer. This

³² Before the threat of the disintegration of the genetic system both these forces are not in opposition but promote inertia and stability of the individual.

top layer then teams up with the survival layer against the layer of temperament and habit. And together they are able to succeed and the pre-existing temperament and habits fail. Then a new template is made in the mental gene which then produces a new mental process and architecture, which is able to successfully adapt and cope with the changed reality.

The problem with this unintelligent or unconscious process of modification and evolution is that the individual has to wait until the shortcomings of that design in the fullness of time and experience result in a crisis of the general genetic process. And then the above process is unleashed. Before that the ideas about change are only seen by the mental gene as alien and external. So it resists them, and those ideas just remain at the idea level because they cannot become applicable at the fundamental level as the mental genes do not let that happen. So at the idea level one can change or modify ones ideas, adopt new ones, discard some but when it comes to the application of those ideas in terms of changing oneself at the operational level then we find an insurmountable gap between our ideas and our doing. We are only able to bridge that gap when the experience of pain and unhappiness due to its intensity and accumulation is able to get communicated to lower layers where the roots of our genetic mental process lie. Then those ideas are not resisted by the mental gene. So through these mechanics the human mental processes are able to induce modifications in the design template of mental genes.

Hitherto this process has been happening at an unconscious and unintelligent level with the trigger provided by the crisis of survival. While we are suggesting that this process can become intelligent and for that we have to employ the same mechanics but at an intelligent level and this time without the trigger of the crisis of survival. This trigger has to be replaced by an intelligent understanding of the hitherto costs and losses (wastage of individuals and generations) that we have been bearing in our existing survival and the projection of the profits (of more pleasure and less pain) and gains in our survival if we move on to a qualitatively better mental design and capabilities. This has to get communicated to the survival layer which will then make a united front with the suggestions coming from our new intellectual concepts and understanding via our mental genes and then the balance of power will shift against the middle layers of temperament and habits. This is how the failure of the old concepts and the pre-existing mental design will take place. And then the new

changed mental template will form which will produce a new design of the human mental complex which will include new mental processes and capabilities, this time at an intelligent level.

6. The evolution of the contemporary human mental complex and its crisis in terms of the evolution of mental genes over the course of human history

To draw an analogy, the relationship between human mental genes and mental processes is somewhat like the relationship between a seed and a tree. We know that the tree is not just a mechanical replication of the seed but a product of it, which is formed through a process of the unfolding of the various programmes within the seed in interaction with its environment. And then we observe those phenomena coming out of it which we do not observe in the seed, for instance, leaves, branches, fruit, flowers and then new seeds. Similarly human mental processes in all their complexity are a product of the unfolding of the different layers of programmes in mental genes. And just as one cannot find the leaves, flowers, etc in the seed so the numerous variety and levels of mental processes which have arisen out of the interaction of those genetic mental programmes with the environment cannot be seen or found in the mental genes. Which also generates the illusion that they are completely separate phenomena. One more similarity is that just as the tree, apart from producing flowers, fruits, etc can also produce more seeds, mental processes can also produce more mental genes and in fact have been doing so at an unconscious level over the course of human history.

Human history and evolution is clearly a consequence of the many-sided interaction between mental genes and mental processes of human beings which has modified and changed both the processes. Although on a comparative scale a lot more changes have occurred in mental processes (the products of mental genes) than mental genes themselves.

During the growth of human civilization and the process of maturing of language the relationship between mental genes and mental processes acquired a new magnitude of interactive growth and development. It was in this period that the layer of the second variety (which codes the mental capability) of mental genes was added to the previous layers. And these mental genes then generated a colossal amount of new mental capabilities in man.

With the quantitative accumulation of biological perceptions (based on the data from the five sensory organs) and observations (not of one individual but of many people) and their many stage processing and storage within the mind in terms of systematized and classified word based abstractions, the capability of mental perception or theoretical perception arose within the human mind. With that the reasoning process of man went far beyond the reflex stage: it now had to process large amounts of data (draw inferences, correlate them to experience for verification, sift them, classify them as being valid or invalid, possible, probable or proven, etc) not only in terms of things but also in terms of variable aspects, qualities and situations associated with those things. So we needed more mental processes and capabilities and consequently more mental genes for sustained generation of those capabilities, their modifications and the designing of new capabilities.

A significant fallout of the above was that these continuously increasing capabilities of mental perception and reasoning started operating beyond the territory of genetic mental programmes and their products. The simple lower order mental functions whose specific programmes are installed in the genetic software cannot operate beyond the parameters of the programme because a programme is made up of stored (through accumulated experience) perceptions, processed conclusions and responses and can only handle a certain amount of simple or linear data about specific things for which it has previous referents. So when the programmed mental process of man was confronted with the extremely dynamic inputs from reason, it was not able to modify its software in real time to process and respond to them, and was not able to fit them within its existing programme parameters and paradigms. The capability of reasoning therefore kept operating and growing outside the parameters of the programmed mental process and started to venture regularly into new territories far beyond its existing genetic paradigms of perception, processing and response. This process eventually led to the emergence of developed

intelligence as another quality of mental process. After that it is the story of how man has used his intelligence not only to radically transform his outer life but at the same time mutate his inner life, especially of his emotional processes.

The crisis that man faces in this recent phase of his evolution is actually a product of two different processes happening at the same time---the perverted growth of the emotional process and its destabilization in interaction with intelligence which is keeping us tied to programmed mental processes and mental genes and the emergence of intellect as another category of intelligence which is pushing us beyond the programmed mental processes to higher levels of quality and human existence.

The growing use of intelligence to generate social formations, political formations, financial structures, theological structures and also psychological warfare has created a degree of complexity, opportunity and material abundance on a massive scale but it is all based on the adversarial³³ relationship installed by the mental genes in our mental emotional programme. This elaborate adversarial relationship in everything an individual undertakes soaks up his emotional potential, sensitivities and motivation and in fact distorts his emotional process. The exponential growth in idea based desires, situation based desires and wish based desires, which basically operate in a competitive environment seriously destabilize the emotional process and create all kinds of perversions in it.

Another factor which has contributed to this destabilization is that man's response system as a result of the heavy modifications in the last three centuries in his mental processes and the external environment has become overloaded. He has to respond to every aspect of the changing reality, so enormous amount of processing has to be carried out. This has created a completely new mental and emotional culture. Man has started insulating himself and artificially narrowing down the application of his mental processes to the micro dimension of life, and is avoiding extending their application to those phenomena which are logically connected to the micro area that he is focusing on. This is the general human personality that one sees in contemporary times.

³³ By adversarial we mean that which creates more conflicts and contradictions instead of harmony. We can see this within an individual, amongst individuals and even in social institutions where people are collectively working towards certain goals.

In this time of material abundance and potential abundance due to the increased growth of his intelligence process and its applications leading to extremely sophisticated technological developments, survival is no longer an issue. It has been replaced with satisfaction and more recently with instant gratification, which is product of our modified genetic mental processes and therefore not an intelligent or rational category. Today we are not actually threatened by survival but our installed adversarial emotional makeup because it has become irrational and illogical. While we are continuously blaming everything else (environment, terrorism, populations, poverty, and so on) except that. So at this stage one sees an odd mixture of the highest level of intelligence at the most fundamental level of irrationality.

A very important consequence of this interactive overdevelopment of the emotional and intellectual processes was, as mentioned above, an accidental spillover or a leakage occurring in the subordination of intelligence to the mental emotional process³⁴. So that it started functioning beyond the parameters of mental genes and their software (as mentioned earlier). This led to the emergence of intellect as another category of intelligence. The extent to which intelligence gets disconnected from the programmed emotional process and its trigger becomes objective inquiry and not the dictates of this emotional process then to that extent it becomes the intellect. So now we see a new mature phenomenon beginning to take shape--- the human intellect.

With the evolution of the intellect we see a new form of uneven capabilities emerging between the genetic mental processes and the intellectual process. Perhaps the aggregate capability of genetic mental processes for handling complexity is greater than that of the intellect but the analytical capability of the intellect or its ability to go deeper into complexity is much greater than that of the genetic mental processes. Actually the genetic mental processes as we know occupy a greater part of our mind and are older and deep-rooted and they have experience of handling a different level and kind of complexity which is more quantitative in nature and has a larger share of nonverbal processes than verbal processes. This complexity requires a relatively

³⁴ We know that intelligence evolved as a tool for the emotional process and its original purpose was to ensure the survival and a more efficient functioning of the biological life-form. So its capabilities of reasoning and problem solving were not supposed to exceed or go beyond the requirements and parameters of the genetically programmed mental emotional process. But a study of human history reveals that this did not remain so.

mechanical kind of capability to handle it and the genetic mental processes with their programmes are therefore appropriate for the task. But when the complexity within and outside acquires another dimension and quality then the genetic mental processes become incapable of coping with it. Then it is only the intellect which has the capability and the discipline to handle it by going deeper into it.

The core crisis or issue of our time is that our genetically programmed mental processes are pushing us in one direction, which is of physical and mental destruction via the increasing distortions and instability in the emotional processes and their increasing inability to cope with internal and external complexity. On the other hand our developing intelligence and intellect which is discovering more truths and getting closer to reality and its logic and interconnections is trying to emancipate us from our current state of existence so that we can move onto a higher state of existence. So a huge functional disparity has arisen between the two and the conflicts and tensions between the two processes have grown to such an extent that this whole situation has today acquired the proportion of malfunctioning of our entire mental complex.

A pressure is silently building up within us to move on towards harmony in all that we are doing whereas we are persisting like never before with adversarial processes which are at the peak of contradiction. This is where we are standing today. To sum up we are living in a period of great unevenness between the intellect and the genetic mind. Both are experiencing growing disorder. Although both of them have been working separately but they have also been interacting and the genetic mind has been indirectly influencing and constraining the existing working and the increased potential of the intellect, via the quantitatively overgrown and perverted emotional processes, which has resulted in producing more confusion and irrationalities. We are totally entangled in our overgrown unintelligent subjectivity which uses intelligence for its own agendas. Almost ninety percent of our knowledge, ideas, and thinking are poisoned by our unintelligent genetic mental processes, in a way that we think we are becoming intelligent and honest with ourselves while at the core level we are unintelligent because we are ignorant of the subtle and covert ways in which the genetic mental processes hijack our intellectual processes and use them for their own agendas.

We find quite a number of examples in human history in which the products of our intellectual processes have been used to promote the adversarial agendas of our genetic mental processes. Nuclear and biological weapons are one such example. A more subtle and internal example would be of a cutting edge scientist whose intellectual processes are working at the optimum level in the field of say particle physics and he is coming up with extremely important insights and knowledge in his field. But among the numerous motivations which drive him in his work a dominant motivation could be of getting the Nobel prize for his work or to come up with those novel insights or knowledge which none of his colleagues are able to. So there his desire or wish based genetic emotional process, whose fundamental character is adversarial or vis-a-vis other individuals takes over and might also affect his intellectual work. He might give in to the tendency of coming quickly to conclusions in his work and not going through all the steps that intellectual labor requires. This tendency at the intellectual level is a translation of the urge for instant gratification in his genetic emotional processes. Now this is one simple example but in reality this process of intervention would be happening at various levels within an individual and in relation to numerous things, situations, interactions within him and outside of him and would be in terms of numerous shades, colors and layers.

Contemporary man is therefore experiencing a vicious circle of growing disorder in human behavior, a product of the misuse of the individual's growing intellectual processes, thoughts, ideas, feelings and actions, which is also leading to growing physical genetic disorders in the form of various genetic diseases and also growing mental disorders which are not intellectual but genetic. This in turn is impacting on his social life and creating new perversities in it which are again feeding back into the individual's mind.

The above situation requires an intelligent collaboration between the genetic mind and the intellect for a gradual replacement of the existing unintelligent genetic mental programme which presently makes and controls our mental processes to an intelligence based composite mental programme for the making of our mental processes which also incorporates within it the genetic mental programme as a subsidiary which has to operate in accordance with the agenda of the intelligent composite mental programme.

7. Transition from the genetic mind to the intelligent mind

The term 'transition' that we are using in this part of the paper is clearly indicating that any solution to address the above explained crisis within contemporary man and in the external environment that he has created will have to be a process made up of steps and stages and not a one-time act. Most importantly these steps and stages will not just consist of more 'knowing'³⁵ but also concrete 'doing' that man will have to undertake within his mind.

There will be two main steps of doing that he will have to undertake within his mind. One, he will have to install a many-layered monitoring system within his mind to observe the various layers of his mental processes and to track down his ideas and feelings to the roots from which they are sprouting, i.e., genetic or intellectual. This process of monitoring will enable him to separate and see in detail the layers of his genetic mental processes and the new advanced mental processes; how they have been interacting and influencing each other and also clashing with each other. Only then he will be able to selectively dismantle the irrational, adversarial and destructive genetic mental patterns and promote a quantitative and qualitative development of intelligent mental patterns. Two, his intellectual (advanced knowing) processes will have to step by step develop and install a complex and intelligent process of communication with mental genes via the gene based emotional and other mental processes for the actual making of the new intelligent composite software. It is in the process of going through these steps and their sub-steps that the transition from the genetic mind (produced by the unintelligent genetic mental programme) to the intelligent mind (produced by the intelligence based composite mental programme) will become a tangible reality for the individual himself who is undertaking the transition and also for others who are observing and interacting with him.

³⁵ Theoretical knowledge of the numerous factors, details, aspects and levels of the relationship between the genes, body, mental genes, brain and mental processes.

Developing a monitoring system within the mind

According to Daniel Dennett ‘... In most of the species that have ever lived, “mental” causation has no need for, and hence does not evolve, any elaborate capacity for self-monitoring...’ (Dennett, 2003, pp. 246-247). It is only in human beings that we find the emergence of this awareness of one’s own ideas, thoughts, feelings, and other mental functions. Although that awareness is now increasingly being viewed as the tip of the ice berg. Today there is a growing consensus that consciousness is an exception that emerges out of a vast pool of unconscious processes which are the rule. One can estimate the dominance of unconscious processes from the information that the human cognitive capacity processes a total of 11million bits per second out of which only 40 to 60 bits of information per second are processed consciously (Cohen & Farley, 2008). The fact that the bulk of our brain and mind function at an unconscious level was a discovery made during a century of ‘psychological theorizing and experimentation’. (Dennett, 2003, p. 246).

Over a period of time researchers and experimenters inquiring into the working of the conscious and unconscious mental processes have come up with various psychological techniques, concepts and methods to unravel their working. Among these a very important tool and method has been of ‘introspection’. So when we talk of monitoring our mental patterns or processes one can get the impression that we are referring to this known and used process of ‘introspection’ for this purpose. But actually we are not! We are not undermining or rejecting the usefulness of this psychological tool which has provided us with ample data on how we become aware of our existing unconscious and conscious thoughts, ideas, feelings, habits, etc, and their generation or activation by different environmental stimuli but that is not what we are proposing. The reason is that our current monitoring or awareness of our mental processes through introspection is not based upon a deep and systematic cognition or perception of our mental processes. And that is because our perceptual and cognitive abilities evolved for interaction with the outside world and for the specific purpose of our biological survival and consequently did not need to develop specialized perception of mental phenomena.

In this view of the matter when we try to perceive, observe, monitor or think about our mental processes, our genetic mental processes with their in-built assumptions

and paradigms about perception and cognition take over and determine what we can perceive and cognize and what we cannot and therefore what we can think about and what we cannot think about. We can only think in terms of abstractions derived from what we have perceived and observed. So the utmost we can do is to observe at a behavioral level our thoughts and feelings and reach some conclusions about them or pass value judgments on them which is nothing other than hearkening back to some other genetic patterns which pre-exist within us. It therefore becomes a reflexive monitoring of which genetic patterns are presently functioning and which other genetic patterns we would like to replace them with. So when we try to apply the results of our monitoring to improve or upgrade the functioning of some of our mental functions then in reality we are only trying to become genetically a better person.

As opposed to this the monitoring that we are proposing will be based on a developed process of non-sensory (read mental) perception and cognition of our mental processes in all their layers of complexity. We already have a non-sensory process of perception, observation and functioning within the mind through which we perceived strings, quantum states, or the big bang and solved complex problems of mathematics, physics, etc. It's only that we now have to focus this process on the mental processes; to abstract their various facets, aspects, behavior and start all kinds of experimenting³⁶ which would enhance one's observation of them. This is how we will develop a specialized perceptual process within the mind which will only cater to perceiving the mental processes. Once that becomes operational within the mind then the processing of those perceptions and their execution will also follow suite in becoming specialized functions which together will provide us with specialized knowledge about our minds.

³⁶ We are not referring to empirical experiments set up in controlled conditions to observe certain mental functions and correlate them with specific brain areas and alter their functioning either through drugs or direct tinkering with some brain processes. These experiments have to be set up by the individual within himself through using tools of his advanced intellect and developed sensitivities to perceive in detail his mental processes; their source, interconnections, influences on each other, mechanics and energy processes. The conclusions and results of these experiments have to be applied to minimize the conflicts and contradictions within the mind and to integrate its functioning and remove obstacles in the way of its upgraded functioning. And the verification of this process has to be obtained both at the mental level and at the level of the body. At the mental level one will experience the freedom from the excessive domination of one's mental processes by the programmes and hence a diminishing feeling of insidious hopelessness and depression and the emotional climate within oneself will begin to change. As regards the body, the various bodily disorders associated with the conflicting and disintegrated functioning of our mental processes will begin to diminish and one will be able to experience good bodily health.

The first task which this monitoring will enable us to perform is to track down the roots of our existing thoughts, ideas, imagination, etc; whether they are genetic or intelligent. We will be able to specifically see to what extent and at what level is some particular thought or idea of ours colored and dominated by our genetic mental programmes and by the same token which ones are not in the control of these programmed processes by virtue of having purely intellectual roots. This process of practical classification will enable us to reject and stop the intervention of those ideas, motivations and feelings which are emanating from our genetic mental programmes and consequently free our intelligent mental processes to play the dominant role in our existing decision making. And simultaneously proceed unhampered in making the new composite mental software for the making of our mental processes.

This process as an on-going exercise will gradually weaken the intervention of the genetic mental programmes and their adversarial logic, which means that we will no longer remain prisoners of our short-term genetic reality. A fallout of this will be that we will acquire relative freedom and autonomy to strengthen our advanced mental processes and their capabilities for a further qualitative growth of our mental processes. It is this process of intelligent monitoring and its results and conclusions which will then become the basis for the next step of communication with mental genes for constructing the new intelligent mental software and transitional programme for the making of our mental processes.

Intelligent communication with mental genes for creating mental processes

The communication process with mental genes will entail a modification in the existing mechanics of the construction of our mental processes wherein the mental genes dominate this process. And this modification need not manifest in our next generation but can also take place in the lifetime of an individual. The exact nature of this modification is that the best (unadulterated by the existing mental programmes) part of our knowing (a product of our advanced intellectual process) will need to communicate with our mental genes via the mental emotional process that they should stop giving their existing guidelines to the brain cells to produce mental processes according to the programme and instead coordinate with and work under the instructions of the new higher order mental processes to construct a new

intelligent software for our mental processes. The issue we are confronting is that the control of the process of the mind must not remain in the hands of the mental genes but comes into the hands of our advanced mental processes (intellect and intelligent emotional process or developed sensitivities). Which means that the formation of the new composite intelligent mental software for the making of our mental processes should no longer be controlled by the mental genes. Under the influence of the advanced or higher order mental processes it would be a software whose paradigms and data access processes are made in real time and are dynamic and not rigid and keep modifying and changing under their guidance.

The advanced mental processes here will play the same function that the mental gene does. Except that their design criterion will be different from the mental genes criterion, which was of survival and efficiency according to which they evolved their programmes through trial and error. This time the criterion will be a combination of the knowledge of how our emotional, intellectual and sensitivity processes are in reality a part of the progression of macro Nature and its logic and quality of life. In the case of our existing mental processes the design criterion in the mental genes is a micro criterion of the evolution of our particular species. While the new criterion for the making of mental processes is a macro criterion of the evolution of Nature itself which will encompass the micro criterion of the evolution of our species within it.

If the mental emotional process and our Will (which represents the whole of our response capability for all its layers) buy this new criterion through understanding that failure to adopt this criterion and persist with the old one will disintegrate the human biological and mental complex, then they will communicate this first to the top layer of the mental gene. Which will then join hands with the survival layer and turn against the middle layer which encodes our temperament, habits and Will patterns, etc, which are for reinforcing and perpetuating the existing mental programmes and processes. That is how the existing template of mental genes which instructs brain cells to make mental processes in accordance with its individual centric criteria will get modified or reprogrammed and will now instruct the brain cells to construct the new composite intelligent mental software or program under the guidance of the higher order or advanced mental processes and their criteria.

The products of this new software, that is, our intelligent mental processes by virtue of being disconnected from the mental genes, will be able to explore and develop further the non-molecular (higher order) mental mechanics and will develop a new mental tool-kit made up of weak quantum energy particles and states. The dynamic of these tools will be far greater than that of molecules and their requirements will also be more complex and much more. Most importantly, their applications will be of another dimension in the sense that they will produce advanced capabilities of cognition, processing, execution and handling new kinds of complexity.

Some broad characteristics of this transition

Some broad but indispensable characteristics of this transition are:

- a. It will not be a mechanical change of tracks but an organic and real life process. So it won't be a black and white situation but will involve shades of grey, since the composite intelligence based software and its products are in the future and have to be built bit by bit.
- b. The transition from the gene-based mental processes to composite intelligent mental processes does not mean that one has to completely get rid of them but they need to be sorted out on the basis of the new happiness criteria of the advanced mental processes and not the criteria of our gene-based mental processes, which make one pursue gratification and survival in the course of contradiction, conflict and aggression. While happiness is found in harmony, cooperation and bilateral intelligence.
- c. Due to the uneven development between the genetic mind and the intelligent mind, and the many-sided resistance which the former will put up the shift has to be in terms of growing circles of consensus within a hostile environment with varying degrees of hostility. One will need to develop an intelligent game plan for practically coping and dealing with the hostile environment (primarily internal but also external) from place to place and situation to situation.
- d. One will need to dismantle one's overgrown and perverted emotional response system which has today become like a dinosaur and reduce it to countable intelligent elements of happiness. And then evolve a new emotional structure of human happiness for the period of this transition.

- e. One will need to strictly and consistently monitor the quality of one's intellectual machinery which has been adversely affected by one's emotional processes. Two such effects are: one, a heavy empirical commitment that prevents one from inquiring beyond the micro, which has resulted in a strong intellectual bias against thinking on a larger dimension. Two, a constant urge for gratification which intellectually translates into a strong tendency to come to conclusions quickly or to respond quickly. While actually the criterion for intellectual labor on the intelligent plane should be approximation to logic and not time-based. So it requires a change of intellectual temperament.

Obstacles in this transition

The main obstacle in this process of intelligent modification or reprogramming of mental genes will not be the mental genes themselves. The reason being that on their own they are actually passive devices made up of energy building blocks arranged and organized in a certain way over a period of time. Any reprogramming or modification will only amount to a realigning of their building blocks, which will not resist change. The main resistance will come from the pre-existing strong (due to factors like time-span and repetitiveness) and many-sided relationship between our existing mental operating system, spearheaded by the Will process³⁷ and the mental genes.

There will be resistance at the idea level also but that will be superficial and can be overcome. At the idea level we can relegate the existing genetic programme and the

³⁷ The Will occupies a critical and a leading role in the whole gamut of our mental processes and is the means by which we express our emotional and other mental programmes. It is the intermediary between the mental and the biological. Its origin is mental but its functioning is at a biological level in the sense that it has become a reflex or automatic process, i.e., a kind of habit.

biological process to a secondary position and acknowledge intelligent mental processes as primary but that is only a mental trick. In reality we associate our identity with the existing genetically programmed mental processes and our intelligent or advanced mental processes are a part of that; an appendix of that. So the main resistance will come from the 'mental gene-Will' complex which, in total disregard of the conflicts and contradictions that we experience and comprehend, wants to preserve the status quo in our mental processes because that is what is and has been operating.

Today the problem of rewriting or reprogramming of mental genes is not due to the absence of the capability in mental processes to do so.

Mental processes have been rewriting genetic programmes and making new mental genes at an unconscious level. The problem lies in the opposition to it by our existing Will which today has acquired a very complex form and its relationship with the mental genes has also become very intricate and is like a spider's web in which man is entangled today.

So what the 'mental gene-Will' complex does is that it creates both direct and indirect obstructions in the way of intelligent rewriting of genetic mental software. An example of indirect obstruction is that we might want to do it intellectually and emotionally but the emotional drive or desire disappears very quickly or is neutralized by the operation of other dominant drives and we are unable to pinpoint the exact cause or reason for it. A direct obstruction just ties us to existing crystallized emotional priorities which simply prevent us from moving in a contrary manner or direction.

Another problem we confront when we try to employ the highest level of our mental processes (our knowing and intellectual process) for intelligent reprogramming of our mental genes is our existing pattern of intellectual processing which is presently targeted and agenda oriented due to being infected at subtle levels by the individual centric emotional processes. The intellectual process due to being tied up in its own agendas and priorities is unable to focus on or give time to this issue. So it considers it a non-issue which does not require any inquiry or investigation into it. Our intellect needs to first get rid of this pattern and then move on to another quality of functioning (which is not shackled or fettered by the older, more entrenched and dominant lower

order mental mechanics and the prices it is paying for the immaturity of its own new mechanics) so that it can play its required role in this process of intelligent reprogramming of mental genes for creating the new intelligent composite program for the making of mental processes.

Implications of this transition

Once the process of transition begins within an individual he will be set on the path of becoming a different human being. Because we know from our observation of human history that the process of change in the human personality is primarily an internal process. It can be stimulated by something external or channelized by external factors but the process itself is internal or we can say mental, to be more precise. If man is able to concretely take the above mentioned steps within himself then he will in fact be opening the doors of qualitative changes (in terms of his intellectual and emotional capabilities and capabilities of executing his developing understanding) in him as a human being. It would be something similar to what must have happened when language emerged and unleashed a qualitatively new and different process and capabilities of another order within his mind.

Another implication will be that now man will be able to become rational about the whole of himself and not just one or two dimensions or aspects. This transition will encompass all the dimensions and layers of his existence; his individual self, his social interactions at all levels and most importantly his relationship with the process of Nature as a whole, from which he will derive the criteria for his rationality at the other two levels. And that is how it has to logically be considering the level of functioning his mind has reached both in the macro dimension and the micro dimension. He has to now revive afresh at a more informed and rational level the integral relationship between the micro and the macro. There is no question of either or because he has had experience of that and he has seen what has come out of it; both in positive and negative terms. Today it has to be a more intelligent and rational integration of both the levels and not like the earlier attempts at integration that we have been making during the period of civilization.

Once a group of individuals are able to implement the above changes within them then the process will become repeatable. More human beings will be able to come

into the fold of this systemic rationality and so the social life of man will begin to change. He will discover the methods and means of how to collectively apply his new capabilities in the social arena. So his individual centric emotional and intellectual agenda will also start evolving at an intelligent plane towards a nature centric agenda, which will include his individual and social agenda.

The most important implication of the inception of this process within man is that he will be able to move beyond the stage of limiting his understanding of mental processes to inferences. He will be able to observe them now, not through the perceptual tools that he has so far been employing, but through his new mental tools of perception. Then he will seriously enter the world of science and engineering in relation to his mental processes. Proceeding with that he will finally be able to see the center of gravity within the phenomenon known as man shift from the biological to the mental. His mental life form will in the concrete become the center of gravity and the physical life form will stay connected to it but will orbit around that center. This means that his biological functions and mechanics and their mental and emotional appendages will now be organized on a more rational basis so that they do not only become a tool but also the raw material for the further evolution of his new higher order intellectual and pleasure processes.

Keeping in view these implications man can now put the negative implications of being dominated by his genetic programmes and the positive implications and potential of making the shift to an intelligent composite mental process side by side and then come back to the living individual and focus on the question of his Will and choices. We know that man's Will has been changing albeit on an unconscious plane but nevertheless it has changed when confronted with an emotional crisis and new knowledge. This time we need to change it intelligently through disconnecting it from its existing foundations and connecting it to the intelligent mental process, which is actually the next stage of Nature's own journey. The intelligent mental process of man is the third stage of Nature's own journey, the first two being the random and programmed processes.

8. Concluding comments

The conclusions, hypotheses, and explanations discussed in this paper are preliminary findings which are in the process of being developed and crystallized. The ideas explored and discussed in this paper are based on unpublished transcripts, which are the raw material for our work on what we term 'Evolutionary Mentology' which is being developed and written in the Philosophy department of Sanjannagar Institute of Philosophy and Arts. (website: www.sanjannagar.wordpress.com, email: sanjannagar@gmail.com).

They do not claim to provide any quick fix solutions to address the dilemmas and conflicts of contemporary man. They are just identifying a direction and some steps which an individual can take within him or herself and judge through his own experience both at the mental and physical levels if they work or not.

We are fully aware that this paper does not encompass all the layers of complexity which are associated with this inquiry and is probably only touching the tip of the iceberg but it is at least an attempt to go into deep waters and it should be viewed as such.

If some individuals decide to look into these ideas and concepts and develop them through a process of rigorous critique and disciplined intellectual and emotional inputs then in our humble opinion it will open up further areas of knowledge and inquiry both in philosophy and the sciences (natural and social).

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