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The molecular biology of the elites is replaced by an environmentally interactive biology of social equality

Christos D. Georgiou

What is life, and ultimately human nature and its biology? The answer to these questions requires a close examination of the scientific validity of the widespread gene-centred notion of human nature's blind dependence on 'selfish genes'. This perception has been imposed on biological science and eventually on the public by the economic elites since the 1920s, with the creation of Molecular Biology in order to scientifically justify their economic-political power as inherently (genetically) predetermined. However, new scientific developments in biology have questioned this perception, and redefine human nature as the result of biochemical interactions, feedback and modulation mechanisms between life's different levels of organization (cells, organs, organism) with the environment, physical and social. DNA is acting as a passive library of stored genetic information provided on demand by the organisms, and man, in response of their adaptive requirements to their intra-/inter-organisms' environment, and also to the external (physical, social) environment, which life itself modifies in response. The present study expands the scientific arguments of a previous critique of Marx and Marxism on its acceptance of genetic inequality among humans, for the main reason that this unscientific notion and centrepiece of the ideology of the economic elites pervades and the core of the ideology of the communist, left and anarchist fragmentations of Marxism.[1] *The new scientific evidence clearly shows that the biology of man necessitates that for his survival as species he should organize socio-political structures comprised of individuals unconditionally recognized as biologically and intellectually equivalent from birth. The new science of Biology is presented here extensively and in layman's terms with the wish to be considered by scientific study groups formulated in each and every political fragmentation of the left to help converge into a new unifying ideology of unconditional equality among men. Such ideology should be fully depleted from any*

[1] C.D. Georgiou, 'Unconditional Communist Equality Among Individuals - Beyond the Marxist Equality Limited to the Abolition Of Classes', *Critique – Journal of Socialist Theory*, 44:1–2 (2016), pp. 129–160.

elements of the gene-centred ideology of the capitalist elites as to be clearly recognized and contrasted by the masses, in order to help them realize that they are viewed by the elites as genetically inferior and degenerate disposables, with the aim to give them a clearer purpose to react against them.

Keywords: Social equality; biology; Marxism; communist ideology; left

> «In nature, there is no 'above' or 'below', and there are no hierarchies. There only networks nesting within other networks»[2]

Whenever the question arises as to where mental differences arise among individuals, the overwhelming majority of respondents point to genes (DNA; DeoxyriboNucleic Acid). This can be also seen in the political ideologies as they are all infiltrated by the same perception.[3]

People are being pushed, directed, trained from birth to familiarize with two main alternative explanations of their biological and behavioural diversity. The first, unscientific, attributes the differences to 'gifts' given by a God-creator (creationism and monotheistic religions). The second and more scientific, that of Neo-Darwinism, attributes the differences to hereditary DNA mutations that are random and independent of the environment. By ignoring and downgrading many past and current scientific facts, Neo-Darwinism arbitrarily extends Darwin's 'natural selection of the fittest' to genes as the origin of smart and talented individuals -and also of superior nations etc.

DNA is advertised by the (extreme right and centric) ideology-producing power networks of elites (political parties, economic institutions, news media, etc.) as 'law of nature' for the scientific validation of their claimed genetic[4] superiority to rightfully govern the world (today by neo-liberal global capitalism). Thus, genetically graded (superior / inferior) gene-centric individualism is projected constantly by the main stream media (MSM), the arts, etc., and is systematically implanted in the minds of the new generations through schooling and higher education.

As will be shown, life is self-organized without DNA's commands. It uses DNA as a passive library of genetic information, modifies it selectively (rearranging, reassembling, truncating it for new reconnections), and controls it after birth (i.e. by modifying it 'epigenetically'). There are even cases that life does not use DNA not even as a carrier of heredity. And all this life does by stimuli-controls through interaction with the various aspects of the environment (intra/inter cellular, natural, social, etc.).

We will see that new scientific data dethrone DNA from the epicentre of today biology, while they gradually evolve it to a socio-centric science which uncovers the biologically equal/equivalent, social nature of all people.

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[2] F. Capra and P. Luisi, *The Systems View of Life: A Unifying Vision* (Cambridge University Press, 2014).

[3] Georgiou, 'Unconditional Communist Equality Among Individuals', op. cit.

[4] The term 'genetic' used here means genes and DNA (not genital).

Scientific overblowing of DNA's role in life

The aforementioned elites' economic and political networks propagate the scientific falsification of the actual role of DNA, by taking advantage of the arbitrary extensions few prominent biologists are making of their DNA-connected past research to other unrelated areas. For example, the Nobel laureate (1993) Kary Mullis in his autobiography characterizes DNA as the 'The King of molecules',[5] although he only contributed to the artificial reproduction of DNA's copies.[6] He may have been possibly influenced by the over-promoted and advertised book (*DNA: The Secret of Life*) by James Watson, a Nobel Prize winner (1962) as well, which portrays DNA as the molecule that 'holds the key to the very nature of living things',[7] although Watson only contributed to the discovery of its chemical structure.

Other ardent supporters of Watson's admiration for DNA are Eric Lander (pioneer in modern human genetics, and head of the MIT's *Broad Institute* of molecular biology: https://www.broadinstitute.org/), who also finds the 'secret of life' in DNA, as well as Mary-Claire King (professor of genetics at the University of Washington). The latter, goes even further to legitimize in DNA (i.e. as a law of nature) the corrupt unequal social organization of man throughout ages: 'This is the story of DNA and therefore the story of life, history, sex, money, drugs, and still-to-be-revealed secrets'.[8]

Since human nature is individualistic and gene-centred according to experts such as Watson, DNA's perceived, by the western societies, dominant role as the central molecule of life is not surprising. This deterministic notion of human nature is propagated by elite-controlled MSM via regularly exposing the public to these famous scientists and their supporters. More crucially, this unscientific notion is propagated in biology and medicine by the constant cloning of new scientists through funding gene-centric research programmes.[9]

So, the key scientific question that should be addressed, due to its enormous consequences for man and its societies, is whether DNA is indeed the centre of control of man's biological, individualist and social makeup. The short answer, to be scientifically substantiated in the following chapters, is that DNA does not have any of the roles ascribed by Watson, Lander, and Collins. Nor is the *Language of God*, much more of modern biology. The scientific framework for this answer is set mainly from an emerging life science that explains the biological and social characteristics of man with new, experimentally verifiable ways of scientific analysis. Something that the current gene-centric deterministic molecular biology cannot do, because, as

[5] K. Mullis, *Dancing Naked in the Mind Field*, (Vintage Books, 1998).

[6] Known as the *polymerase chain reaction*.

[7] J.D. Watson, *DNA: The Secret of Life*. (Alfred A. Knopf, 2003).

[8] http://www.penguinrandomhouse.com/books/187337/dna-by-james-watson/9780307521484, last access 20-12-2017.

[9] By institutional scientific agencies, having directors that admire Watson's perceptions on DNA. Such is Francis Collins of the *National Institutes of Health*, USA, who vividly promotes Watson's ideas through his books *The Language of Life*, and *The Language of God*.

we shall see (in the end section of the present study), it was created by specific economic and political interests in the 1920s to serve their consolidation, and not on pure scientific merits.

Living organisms constitute integrated biological systems

Proof that DNA is not the central controller of human nature (biological, social, individualistic) stems from the fact that organisms are complex biological systems. The scientific analysis of any complex system (e.g. the climate) never starts by searching and focusing on a predominant element of it. Obviously, each complex system consists of subsystems necessary for the operation of the whole. Each subsystem may have a specific location in the set, but no subsystem has a prime causal relationship with the rest. The same applies to man and all living organisms. The physiology of each organism does not attribute a specific causal role to its individual subsystems (such as the organs heart, liver, skin, brain, etc.), because the organism depends on all its subsystems as a whole. Subsets exist within the organ-subsystems in the form of separate cell types (there are over 200 different cell types in man), which are self-controlled for their function and repair. At the cellular level, organelles (e.g. mitochondria) and other molecular structures constitute interacting and independent subsections of the whole. For Neo-Darwinist molecular biologists, the organization of life in systems stops at the level of macromolecules. For their gospel, the *Central Dogma* of biology, DNA is the starting point, the vector of genetic information passed on to RNA (RiboNucleic Acid) for translation into proteins,[10] and, by unscientific extension, DNA directs the history of life.

The first error of the *Central Dogma* derives from DNA's characterization as 'central' biological entity, with the genes (certain segments of DNA) it carries playing the role of the main hereditary reproductive elements of life. However, since organisms are integrated biological systems they do not have a molecular centre, nor do they assign any hierarchical importance to one or some of their individual components. In fact, cells are the main inherited reproducers of life and not genes - and the whole genome for that matter. This is because DNA can only be reproduced through auto-replicated cell reproduction. Even the 'immortality' of the 'selfish genes', an invention by the neo-Darwinist socio-biologist Richard Dawkins,[11] is determined by the repair mechanism of DNA that cells (not DNA) possess and control. That is, not only DNA cannot do anything on its own, but there are DNA-lacking cells, the red cells in blood, that can function smoothly for about 100 days.

Besides all these, there are examples of segments in the (thought of) 'junk' DNA (because it does not contain genes; it is 95% of our total DNA) which, when transformed (i.e. transcribed) into corresponding parts of RNA, these can be inherited

[10] F. Crick, 'Central Dogma of Molecular Biology', *Nature*, 227 (1970), pp. 56–63.
[11] R. Dawkins, *The Selfish Gene* (Oxford: Oxford University Press, 1976).

independently of DNA.[12] In addition, there are other RNA segments that control DNA expression[13] in a similar way that certain proteins control it (and they are called transcription factors). That is, even RNA exerts on the DNA the same action as certain proteins. The consequence of this is that we are unable to determine what actually a gene is, since it is no longer defined simply as that integral part of DNA that contains all the information that is needed for the synthesis of a protein. The concept of the gene becomes even more obscure by the additional fact that different or even identical segments of a region in DNA can be used (as corresponding RNA segments stitched together) to encode same corresponding segments of completely different proteins. That is, different and same segments in one or more DNA regions (and chromosomes) can be combined in order to generate more than one protein-coding genes; much more, when it is known that the same genes in our DNA are associated with (participate in) more than one biological function. Moreover, given that the same genes that control the development of organs (e.g. our hands or feet) can exist in organisms that do not even possess such organs, the notion of function the term 'gene' now carries is understood on the level of phenotype and not on genotype. All of these reasons, and many others that will be discussed below, ridicule Dawkins's 'selfish' notion of the gene. Therefore, no biological function can be determined and controlled by individual genes, and the often-used expressions of 'intelligence', 'entrepreneurship', 'talent', 'gift', 'homosexuality' genes, etc. completely lack any scientific basis whatsoever.

The second scientific error of the *Central Dogma* lies on the presumed existence of a linear pathway of transporting the information from DNA encoded to RNA, and from that to protein synthesis. In fact, this course is not linear but a sequence of interconnected and feedback loops of information, as DNA does not come to existence from nowhere. To create each DNA molecule, the creation of proteins via RNA[14] comes first. That is, the synthesis of DNA (like any RNA or protein) cannot be done outside a functional cell, which, in turn, needs an entire organism in order to exist. However, not even this information path is enough, because its completion for man needs the intervention of a complete bio-ecosystem, including a particular intestinal microbial population that is combined with a steady supply of food. Therefore, the feedback loops for transmitting the genetic information in DNA are necessarily integrated into a complex organismic matrix.

Nonetheless, the *Central Dogma*, presented simplistically by the deterministic molecular biology of today as an ideal linear path originating from distinct places-genes in the DNA, misinforms in two main ways the millions of students who are taught it each year. Firstly, by not placing the management of DNA's genetic information within

[12] D. Noble, *Dance to the Tune of Life: Biological Relativity* (Cambridge University Press, 2017), p. 89.

[13] The process by which information from a gene (a segment in DNA carrying genetic information) is used in the synthesis of a functional gene product, which is a protein.

[14] The information of the genes contained on RNA (being passed on to it from DNA) is decoded to protein synthesis by special cell organelles called *ribosomes*.

revolving cycles of feedback synthesis, multiplication, expression and control by the living organism as a whole. Secondly, by placing DNA as a generating and hereditary vector of all biological functions, abilities, behaviour and social organization of the members of human societies. Thus, the *Central Dogma* is not a biological law but a constructed non-scientific simplistic intellectual transfer of the evolution of life into conceived biological limits.

The old guard of Neo-Darwinist geneticists and other more contemporary biologists project the presumed linear function of DNA as reasonable theory without pointing to certain experimental verification studies. Ignoring contradictory results of their studies, they are content to use anthropocentric verbs in their references to DNA. They 'inform' us that DNA 'controls', 'governs' and 'regulates' cellular processes, and they use definitions, such as DNA 'expression,' which implicitly attribute to DNA supernatural functions. Such anthropocentric metaphors in rendering nodal functions to DNA, create implicitly and by extension uncritical circular arguments and conclusions such as that DNA controls everything in man, from foetal development or health to human nature, as a result of its genes' expression.

Nonetheless, the faithful to the *Dogma* New-Darwinist biologists do not provide any scientific evidence that DNA indeed plays the predominant role their favourite expression imply. In fact, the opposite conclusions are drawn by the new findings. As pointed out in a recent study in the prestigious scientific journal *Nature*, 'An emerging consensus [arises] that much of the protein constituent of the cell is buffered against transcriptional variation'.[15] That is, the protein make up of cells is unaffected by the transcription of DNA's information into RNA. In other words, DNA is isolated from direct genetic quantitative effects on it. Such cellular DNA isolation has been clearly demonstrated in many experiments. Indicatively, the circadian rhythm (i.e. any endogenous periodic change over a 24-hour period) of a bacterium can be reproduced (in a test tube) in the absence of its DNA and in the presence of only three specific proteins, and may be maintained for three days even when the temperature changes.[16]

Obviously, every linguistic description of DNA's functions is inevitably metaphorical and of limited precision. However, words such as 'governs' and 'controls' literally attribute features to DNA that does not have.[17] A much more accurate mapping of the role of DNA would compare it with a library, since cells use it primarily as a storage of information. That is, any reference to DNA should be made with more neutral verbs, such as 'use', to give the correct conclusion that 'cells use DNA to create proteins'.

[15] J.M. Chick, et al., 'Defining the Consequences of Genetic Variation on a Proteome-Wide Scale', *Nature*, 534 (2016), pp. 500–505.

[16] M. Nakajima, et al., 'Reconstitution of Circadian Oscillation of Cyanobacterial KaiC Phosphorylation *In Vitro*', *Science*, 308 (2005), pp. 414–415.

[17] D. Noble, *The Music of Life. Biology Beyond Genes* (Oxford University Press, 2003).

If the extreme inaccurate metaphors of the *Central Dogma* regarding DNA's functionality were rejected, a more accurate way of perceiving biology would arise. If we accept, as it stands, that each biomolecule and each subsystem in a living organism (regardless of the organizational scale to which the subsystem belongs) sets limits and is synonymized with the other parts of the organism, there is no place for a single molecule or system to function as a central controller. Then, DNA ceases to be the central model of biology and is replaced by a relational model of complex interaction of feedback systems and emerging properties, whose DNA information library is only one of the components. In this model, RNA is simply one of the inputs required to produce proteins, and DNA is just one of the inputs required to produce RNA and so on. Unlike the *Central Dogma*, such an understanding is in line with the existing and new experimental data of biology.

Therefore, the core essence of the *Central Dogma* that is unscientifically transmitted to the biology textbooks all over the world is at least a scientific illusion, and a classic example, according to the microbiologist C. Woese, of 'reductive fundamentalism'.[18] That is, an ideological choice for a simplistic explanation of a phenomenon that circumvents a mandatory analysis based on evidence - on the contrary, reductionism is a valid scientific method. In the case of the *Central Dogma*, reductive fundamentalism attributes supernatural powers to DNA to explain observable biological functions, while a more scientific explanation would have acknowledged that many biochemical phenomena have multiple and interacting causes. Such a scientific fallacy, according to Oxford University Physiology Professor Denis Noble, is what has attributed to DNA a 'privileged causal role'.[19]

Can there exist central molecules of life?

Many phytopathogenic viruses lack DNA, their life cycle is based on proteins, and they use RNA as their hereditary material. Other phytopathogens, the viroids, lack DNA and genes, and thus proteins, and consist exclusively of non-coded RNA (having no genetic information). That is, there are life forms without DNA or proteins, but there is no life form without RNA. Therefore, the common biomolecule for all organisms is RNA and not DNA, and there are many reasons for this.

RNA and DNA are structurally very similar molecules, but their properties are very different and attributed to their small chemical differences. RNA is structurally very flexible, unstable and chemically vulnerable, while DNA is extremely rigid and relatively inert. A basic difference between them lies in the number of chemical modifications the cells can exert to their different four chemical components (called 'bases'; they are the nucleotides marked with the letters A, C, G and T for DNA, and with U instead of T for RNA). Only two modifications are possible for DNA,

[18] C. R. Woese, 'A New Biology for a New Century', *Microbiology and Molecular Biology Reviews*, 68 (2004), pp. 173–186.

[19] Noble, op. cit.

called *methylation* and *acetylation*. These can alter the properties of the DNA bases and form the backbone of the modern science of *Epigenetics*. Instead, cells can, and do, generate over a hundred chemical modifications to the four different bases of RNA, with functional roles remaining a mystery but probably helping RNA perform its numerous cellular functions.

RNA is highly underestimated by most biologists because, due to their entrapment in the *Central Dogma*, they consider RNA to function only as an intermediate carrier of genetic information between DNA and proteins. However, only less than 1% of the RNA in a typical human cell produces proteins, while the remaining 99% exhibits a variety of structural, regulatory and enzymatic functions. Only recently did RNA emerge out of the shadow of DNA. This was mainly demonstrated by the knowledge that 80% of our previously considered 'junk' DNA is transcribed into RNA molecules,[20] many of which control DNA expression and some others are inherited independently from DNA.[21]

The main reason for the chemical differences between DNA and RNA results from the possible emergence of RNA before that of DNA in the early cells, which probably evolved by a combination of RNA with primitive precursor forms of proteins, also called peptides. The most important evidence of the origin of life from a combination of RNA-peptides[22] is based on the existence in cells of an enzyme (called *aminoacyl-tRNA synthetase*), which combines a certain species of RNA (called *transfer RNA* or tRNA) with the synthesis of proteins,[23] and thus connects the world of RNA with the world of proteins. This enzyme appears in organisms in two basic forms (Class I and II), but their evolutionary origin seems strangely incompatible. Although they perform virtually identical functions, their base structure is different (mostly consisting of different amino acids), except for an extremely important region with a special role, their active catalytic centre.[24] However, although this centre is expected to consist of the same conserved amino acids for both enzyme classes, nonetheless, the amino acid sequences in each of their own centres indicates that they have been encoded by two chains (strands) of the same small molecule RNA but running in the opposite base sequence.[25] That is, the critical active centre of the two classes (I and II) of enzymes that allows RNA to produce all of our proteins (and through which all our metabolism) appears to be derived from the opposite strands of one and the same primitive small molecule of RNA.

[20] The ENCODE Consortium, 'The Encode Project', *Science*, 306 (2004), pp. 636–640.

[21] Noble, op. cit., p. 89.

[22] C. Carter, 'An Alternative to the RNA World', *Natural History*, Dec 2016/Jan 2017 (2016), pp. 28–33.

[23] Different tRNAs function as vectors of each of our 20 different amino acids, from the various combinations of which all of our cell proteins are made.

[24] The specific region of each enzyme that catalyzes the cleavage or synthesis of the biological molecules in the cells.

[25] Carter, op. cit.

An important consequence of this impressive discovery is the close link between metabolism and proliferation at a very early stage of life, with RNA in the role of the assembler of primitive proteins as catalysts for driving and enhancing metabolism. That is, life most likely began as a process of primitive metabolism, with RNA appearing later to enhance it. Therefore, *metabolism and not DNA (and genes) has assumed evolutionarily the first role in generating and controlling all various functions and actions in all living organisms*.

However, despite its universality, RNA (as also DNA) does not have any role of a central molecule-controller of life. However, it is more difficult to study RNA than DNA because it is integrated into the organisms' biological systems in a multitude of ways. Due to RNA's extraordinary importance for cell function and survival, we cannot selectively remove or modify it (as we do with DNA) from cells in order to study its many roles in boosting metabolism. In addition, RNA, like most biomolecules and proteins, is a highly reactive molecule with continuous transient functional roles, and is present in thousands of copies in each cell, making it much more difficult to isolate and study. Indicatively, each human cell contains 820,000 molecules of RNA (and only 1 pair of DNA molecules, i.e. the whole of the genome), mixed with 3 million proteins, 20 million fats, 1 million lipopolysaccharides (saccharides with bound fats), and 4,000 glycogens.[26]

DNA besides its small number is a far more achievable practical goal of experimental intervention in biology because it is stable and durable. It can be easily isolated and made in many copies even by a high school student with just one hour training. With a little more practice, DNA can be artificially modified and replaced or introduced in simple microorganisms such as bacteria. It is therefore the most easily accessible molecule in living organisms, and this is the main reason why our understanding of the regulatory networks of genes outweighs that of other branches of biology. Although it has been evident that our lives are based on 25 million different macromolecules, Neo-Darwinism recognizes a central role in only a pair of DNA molecules. Hence the recurring cliché phrase 'it is in your DNA'.

Therefore, in order to understand the evolution and the metabolic and other functions of man (and all organisms), we must essentially reverse the gene-centred research and teaching of current biology, and dethrone DNA from its prominent position. We should present it, as it really is, as a sophisticated, specialized form of RNA, with greater structural and chemical stability that allows it to take on the role (from the primitive RNA) of the trusted librarian,[27] in the safe storage of hereditary information for just protein manufacturing. Proteins have been superior accelerators (catalysts) of biochemical reactions than RNA. However, RNA does not cease to be one of the

[26] R. Milo and R. Phillips, *Cell Biology by the Numbers* (Garland Science, CRC Press Taylor & Francis, 2015), p. 169 (see also in 'What is the macromolecular composition of the cell? at http://book.bionumbers.org/what-is-the-macromolecular-composition-of-the-cell/).

[27] The term librarian for DNA was coined by Colin Tudge [C. Tudge, *Why Genes are not Selfish and People are Nice* (Floris Books, 2013)].

possible universal building blocks of life in the universe, along with fatty acids[28] and certain catalytic groups in certain amino acids.[29]

DNA has no saying not even in the evolution of life

Molecular biology attaches to DNA pivotal roles in Darwin's theory of evolution by 'natural selection of the fittest'. In fact, it misinterprets the theory by exaggerating its importance, and also by inventing roles for DNA that does not play.

The first misconception made is the presentation of Darwin's evolutionary theory as an explanation of life. Life, however, began well before Darwinian evolution, while some of its fundamental parameters (cells, proteins, production of chemical energy for metabolism) emerged, as far as we can tell, long before DNA came to be the molecule of heredity.[30] Moreover, the appearance of protocells and metabolism as complex systems were based on their emerging and self-organizing properties.[31] The appearance of DNA in these systems not only did not eliminate these properties, but also interacted with them and contributed to the creation of new ones, thereby accelerating the emerging Darwinian evolution of the organisms. Self-organization is the first stage of life's emergence, during which 'the emergence of organisation is a necessary requirement for natural selection to occur. Without organisation, behaviours which can be selected upon, are statically so unlikely that the process cannot even start', thus 'self-organization constrains [natural] selection'. In a second stage, 'natural selection provides a form of constraints on self-organisation', which in a third stage makes them 'complementary aspects of a single process'.[32] Therefore, there exist alternative potential evolutionary pathways, opposing the deterministic classical gene-centred evolutionary theory.

A typical example of emerging biological properties is the three-dimensional folding of the amino acid chains (or peptides) that constitute the proteins as entities. Genes in DNA encode only for the linear sequence of amino acids in the protein chains. However, each protein eventually acquires a complex three-dimensional shape, which ultimately determines its functionality, electrical charge and solubility in the water of cells.[33] The non-scientific neo-Darwinian view, however, which is emphatically reverberated, is that it is only the DNA that carries all the necessary information for the final shape of a protein. And this despite it has been well proven that this also

[28] C.D. Georgiou and D.W. Deamer, 'Lipids as Universal Biomarkers of Extraterrestrial Life', *Astrobiology*, 14:6 (2014), pp. 541–549. D.W. Deamer and C.D. Georgiou, 'Hydrothermal Conditions and the Origin of Cellular Life', *Astrobiology*, 15 (2015), pp. 1091–1095.

[29] C.D. Georgiou, 'Functional Properties of Amino Acid Side Chains as Biomarkers of Extraterrestrial Life', *Astrobiology*, 18:11 (2018), pp. 1479–1496.

[30] Carter, op. cit.

[31] S. Kaufman, *The Origins of Order* (Oxford University Press, 1993). Carter, op. cit.

[32] D.Batten, et al., 'Visions of Evolution: Self-organization Proposes What Natural Selection Disposes', *Biological Theory*, 3 (2008), pp. 17–29.

[33] M. Munson, et al., 'What Makes a Protein a Protein? Hydrophobic Core Designs that Specify Stability and Structural Properties', *Protein Science*, 5 (1996), pp. 1584–1593.

depends on integrating multiple sources of cell information. Such are temperature, other chemical molecules of the cell (water, inorganic ions), acidity and alkalinity (i.e. pH) within the cell, chemical molecules storages of energy (such as ATP), helper proteins (called *chaperons*) for protein chains folding, etc.

Moreover, proteins such as channels and ion pumps incorporated in (and crossing) membranes acquire functionality only at higher levels of structure (when finalizing their positioning inside or on the surface of cell membranes, near other proteins etc.) and organization (e.g. located in particular organs). There are organ systems that function rhythmically (e.g. the heart) without the intervention of a biomolecular 'oscillator' being under the control of DNA. This is because rhythm is an emerging property and a common activity of biological systems,[34] and the result of interactions among many proteins (e.g. channels and pumps in the membranes of heart cells). Therefore, the structure of proteins and their functions are determined by DNA to a very limited extent.

Emerging properties are equally important in other areas of biology, such as the vascular system of plant organisms. Through this, trees can carry water to several tens of metres above ground with the help of transpiration. Such operation does not require an influx of biological energy, and takes advantage of the natural properties of the tree's xylem (a quite hydrophilic duct system) and of water itself passing through it. Without transpiration, the plants would neither be able to raise not even few centimetres off the ground, nor to survive drought.[35] Another example is the arches in man's foot. They are longitudinal and transverse structures consisting of bones and connective tissue, whose emerging property is both to diffuse the forces exerted on impact and to act as springs to transfer energy from impact to forward movement. Arches reduce the energy required for walking and running.

In the field of biochemistry, a recent development is the proposed existence of *metabolons*. They are three-dimensional systems of spatially positioned neighbouring enzymes, that is to say, temporary structural-functional complexes of successively coordinated enzymes in a metabolic pathway (they are held together by non-permanent interactions and through cellular elements such as membrane proteins and the cytoskeleton). Metabolons illustrate how a seemingly secondary metabolic pathway can account for 30% of the weight of a seedling (young plant) in order to be used for repelling its parasites.[36] A more conventional category of self-organizing properties are the homeostatic biochemical feedback loops for controlling the activity of enzymes (called 'allosteric') that are crucial for the metabolism of organisms. These are largely independent of genes, and have crucial roles in the development of the activities and properties of organisms. The foregoing reference (in section 'Living organisms

[34] Noble, op. cit., p. 60.

[35] T.D. Wheeler and A. Stroock, 'The Transpiration of Water at Negative Pressures in a Synthetic Tree', *Nature*, 455 (2008). (2008), pp. 208–212.

[36] T. Laursen, et al., 'Characterization of a Dynamic Metabolon Producing the Defence Compound Dhurrin in Sorghum', *Science*, 354 (2017), pp. 890–895.

constitute integrated biological systems') to the regeneration of a bacterial circadian rhythm by only three proteins is one of the most striking examples of an emerging property.[37]

Ignorance or concealment of all these non-genetically-defined emerging properties of life, and the attribution to DNA of all functional parameters in a protein, of a metabolic process and ultimately to an organism as a whole, constitutes a highly unscientific, over-simplistic and ultra deterministic view of biology. Such superpowers attributed to DNA make emerging properties irrelevant to the biological essence of life. Emerging biological properties clearly illustrate why the relationship between DNA and, for example, evolution is much weaker than it is usually presented by the followers of Neo-Darwinism. Patrick Bateson (of Cambridge University), whose scientific studies related to animal behaviour rather than to emerging properties, explains the evolution more clearly: 'Whole organisms survive and reproduce differentially, and the winners drag their genotypes with them. This is the engine of Darwinian evolution'.[38] Thus, we can understand why Darwin discovered his theory of evolution without even knowing the existence of DNA and genes. It is simply because DNA does not play a crucial role even for evolution. Nonetheless, it is still being taught and researched as the most important biomolecule in the evolution of organisms.

Unfulfilled expectations for DNA in curing and predicting diseases

Beneath the seemingly calm surface of human skin there exist continuously functioning biological systems such as circulatory, digestive, and lymphatic, and also electrical pulses, biomolecular reaction networks and so on. These systems put every part of our organism in constant motion, contraction, expansion, folding, vibration, tension and development, which essentially identify the dynamic biological nature of man. And this is what we look for when we want to verify somebody's death. We do not measure DNA but measure heartbeat or brain function. The living properties of organisms to be preserved require the vitalizing of molecular components such as RNA and proteins.

Despite all this, most biologists remain questionably focused on DNA for the scientific understanding of life, that is, on a biomolecule that is the least representative of life's dynamic nature. This is the main reason that the simplistically limited by the *Central Dogma* molecular biology of DNA has come under intense questioning by some of the leading scientists in the field, with their critiques published in prestigious scientific journals such *as Science* and *Nature*,[39] along with others lesser-known. All of

[37] Nakajima, op. cit.

[38] P. Bateson, 'P. (2005). The Return of the Whole Organism',. *Journal of. Biosciences.* , 30 (2005), pp. 31–39.

[39] Kaufman, op. cit. R.C. Strohman, 'The Coming Kuhnian Revolution in Biology', *Nature Biotechnology*, 15 (1997), pp. 194–200. S. Rose, *Lifelines: Biology beyond Determinism* (Oxford University Press, 1997). Woese, op. cit. A. Annila and K. Baverstock, 'Genes Without Prominence: A Reappraisal of the Foundations of Biology',

them point to the absence of new medical scientific discoveries and breakthroughs following the genome sequencing of man (it was completed in 2003) and also the detailed analysis of some of the tiny pieces of 'junk' DNA.[40] Some, such as Carl Woese (perhaps the most famous microbiologist after Pasteur), have concluded that genetic determinism is at a dead end, and that its unrealistic approaches in biology are 'spent'.[41]

Scientific fields focused on advancing artificial tissue engineering and disease therapies such as cancer, offer perhaps the most representative examples of failed clinical applications of the gene-centric research. Artificial tissue scientists claim they have made 'incredible' progress in constructing whole human organs for transplantation and other medical uses, even though these completely lack functionality. They lack blood vessels, immune systems or neural networks, and simply consist of human cells spread out on an e.g. artificial ear- or hand-shaped scaffold. In addition to many other shortcomings, these tissues are short-lived because they lack regenerative potential.[42] Nor, however, the sequencing of the human genome can predict the appearance of diseases based on damaged/lacking genes claimed as their cause.[43] In contrast, predictions on the occurrence of human diseases are better achieved simply on the basis of family history and lifestyles. The most striking improvements in the treatment/prevention of diseases such as cancer are made by lifestyle changes (e.g. quitting smoking). The same applies to longevity where the contribution of heredity is only about 15% (from same egg twin studies), with the other 85% being attributed to lifestyles.[44]

The need for biological scientific approaches that contrast those of New-Darwinian determinism is clearly articulated by Craig Venter, a geneticist pioneer in the sequencing of the human genome, and later a 'guru' of 'neoliberal biotechnology': 'Human biology is actually far more complicated than we imagine. Everybody talks about the genes that they received from their mother and father, for this trait or the other. But in reality, those genes have very little impact on life outcomes. Our biology is way too complicated for that and deals with hundreds of thousands of independent factors. *Genes are absolutely not our fate*. They can give us useful information about the increased risk of a disease, but, in most cases, they will not determine the actual cause of the disease, or the actual incidence of somebody getting it. *Most biology will come from the complex interaction of all the proteins and cells working with environmental factors, not driven directly by the genetic code*'.[45] Despite this, Venter

Journal of the Royal Society Interface, 19 (2014). DOI:10.1098/rsif.2013.1017. K. Friston, 'The Free-energy Principle: A Unified Brain Theory?', *Nature Reviews Neuroscience*, 1 (2010), pp. 127–138.

[40] J.P. Ioannidis, 'Non-replication and inconsistency in the genome-wide association setting', *Human Heredity*, 64:4 (2007), pp. 203–213. E.T. Dermitzakis and A.G. Clark, 'Life after GWA Studies', *Science*, 326 (2009), pp. 239–240. T. Manolio, et al., 'Finding the missing heritability of complex diseases', *Nature*, 461 (2009), pp. 747–753.

[41] Woese, op. cit.

[42] S. Badylak, 'Work with, not against, biology', *Nature*, 540 (2016), p. S55. DOI:10.1038/540S55a.

[43] Noble, op. cit., p. 251. M. Joyner, 'Has Neo-Darwinism failed clinical medicine: does systems biology have to?', *Progress in Biophysics and Molecular Biology*, 117 (2015), pp. 107–112.

[44] C. E. Finch and T. Kirkwood, *Chance, Development and Aging* (Oxford: Oxford University Press, 2000) (also in a videotaped lecture by Kirkwood at https://www.youtube.com/watch?v=hRUSkIMMhro).

made the claim that our DNA could be used to predict what our face will look like (face shape, eye, hair colour, and the sound of our voice, e.g. for forensic identification purposes). His study[46] was quickly challenged after been tested on his DNA and failed to predict his face.[47]

Why the Neo-Darwinian gene-centric biology is scientifically unfounded?

Many biologists, let alone the public, still ignore that DNA (the genome of man and all organisms) exhibits chemical instability that is directly induced by the environment. They also ignore that genomes are constantly modified (merged, shrunk, developed, joined with new DNA segments, and their structures are changed) through scientifically proven cellular and biochemical processes.

Changes in DNA can be induced by the environment, external (physical and social) and within the organism itself (within and among cells). These microenvironments, in turn, depend on the activities of preceded organisms, as organisms rearrange their genomes during evolution in response to such environmental influences.[48] Such environmentally induced changes in the genome of organisms can be inherited. The following indicative examples illustrate the amazing ways by which the environment can induce hereditary changes in the genome of experimental organisms: Bacteria have been shown to increase their genome's targeted reorganization by 100,000-fold in response to a stressful lack of food,[49] while others show surprising possibilities of genetic evolution and adaptation upon exposure to antibiotics.[50] Other bacteria restore the flagella they lost (after deletion of the relevant sequence in their DNA) within four days of exposure to a stressful environment, by evolving regulatory networks needed to restore their mobility.[51] Organisms also possess metabolic pathways that sense environmental nutrients and control changes in those regions of the genome associated with the construction of ribosomes (the cellular organelles for protein production). These indicative examples demonstrate that changes in DNA do not happen randomly, and that cells possess specific mechanisms for optimizing their genome in response to the environment.[52]

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[45] P. Anand, et al., 'Cancer is a Preventable Disease that Requires Major Lifestyle Changes', *Pharmaceutical Research*, 25 (2008), pp. 2097–2116.

[46] C. Lippert, et al., 'Identification of Individuals by Trait Prediction Using Whole-Genome Sequencing Data', *PNAS*, 114:38 (2017), pp. 10166–10171.

[47] A. Regalado, 'Does Your Genome Predict Your Face? Not Quite Yet', MIT(-associated) Technology Review, Sept. 7, 2017, https://www.technologyreview.com/s/608813/does-your-genome-predict-your-face-not-quite-yet/, last access on August 15, 2018.

[48] Noble, op. cit., p. 250.

[49] Noble, op. cit., p. 196.

[50] J. Bos, et al., 'Emergence of Antibiotic Resistance from Multinucleated Bacterial Filaments', *PNAS*, 112 (2015), pp. 178–183.

[51] T.B. Taylor, et al., 'Evolutionary Resurrection of Flagellar Motility via Rewiring of the Nitrogen Regulation System', *Science*, 347 (2015), pp.1014–1017.

[52] C. V. Jack, et al., 'Regulation of Ribosomal DNA Amplification by the TOR Pathway', *PNAS*, 112:31 (2015), pp. 9674–9679.

Instead, Neo-Darwinian molecular biology overrides, minimizes, and underrates the scientific significance of environmentally-induced basic processes of genome's modification, because they disprove the *Central Dogma* of environmentally isolated, randomly caused variations in our genomes. Simply described, the main processes are as follows:

Symbiogenesis: It is the movement of whole genomes between different symbiotic organisms. A characteristic example of symbiogenesis is the mitochondria (cell organelles for chemical energy production), which are remnants of symbiotic bacteria that have retained part of bacterial DNA. The rest of the bacterial DNA was integrated into the DNA of the eukaryotic cell nucleus through several steps of natural genetic engineering.[53] The cell nucleus can be also viewed as a cell within a cell.[54]

Genome reorganization: It occurs by inserting whole DNA domains into new places of the genome, e.g. by moving them via *mobile genetic elements*.[55] Because of this mechanism, whatever the differences between the worm, the fly, the mouse and the man are, they are not derived by the creation of completely new parts in their DNA but from the wholesale reorganization of their genome.[56]

Horizontal DNA transfer: It takes place between different species and across different kingdoms of organisms. It can be activated in organism's response to, e.g. an arid environment.[57]

External DNA transfer inside cells: For example, sperm cells can acquire DNA fragments from sources in their external environment, and then pass (and inherit) them to their offspring.[58]

Differential phenotypic expression of the same genome: Examples include (a) the transformation of the crawling caterpillar into the spectacularly coloured butterfly,[59] (b) the existence of over 200 different types of human cells,[60] and, most remarkable, (c) the environmentally induced different phenotypes in genetically identical (monozygotic) human twins.[61]

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[53] G. Hamilton, 'The Mitochondria Mystery', *Nature*, 525 (2015), pp. 444–446.

[54] Noble, op. cit., p. 106.

[55] They are a kind of genetic materials that are able to move around within a genome, or that can be transferred from one species or replicon to another. B. McClintock, 'The Significance of Responses of the Genome to Challenge', *Science*, 226 (1984), pp. 792–801.

[56] Noble, op. cit., p. 203.

[57] R. Acuna, et al., 'Adaptive Horizontal Transfer of a Bacterial Gene to an Invasive Insect Pest of Coffee', *PNAS*, 109 (2012), pp. 4197–4202. B. Hespeels, et al., 'Against All Odds: Trehalose-6-phosphate synthase and Trehalase Genes in the Bdelloid Rotifer *Adineta vaga* were Acquired by Horizontal Gene Transfer and are Upregulated During Desiccation', *PLoS ONE*, 10:7 (2015), p. eo131413. J. A. Schwartz, et al., 'FISH Labelling Reveals a Horizontally Transferred Algal (*Vaucheria litorea*) Nuclear Gene on a Sea Slug (*Elysia chlorotica*) Chromosome', *Biological Bulletin* 227 (2014), pp. 300–312.

[58] C. R. Pittoggi, et al., 'Generation of Biologically Active Retro-genes Upon Insertion of Mouse Spermatozoa with Exogenous DNA', *Molecular Reproduction and Development*, 73 (2006), pp. 1239–1246.

[59] Noble, op. cit., p. 87.

[60] Noble, op. cit., p. 52.

[61] J. Keul, et al., 'Effect of Static and Dynamic Exercise on Heart Volume, Contractility and Left Ventricular Dimensions', *Circulation Research*, 48:suppl 1 (1981), pp. 163–170.

Epigenetic modifications in DNA: An environmentally-induced biological phenomenon by which the organisms' DNA (genome) is modified environmentally, and the new features thus acquired can be inherited. Epigenetics and its basic mechanisms are presented in the following section with more scientific evidence, because they are among the strongest arguments against the Neo-Darwinist genetic determinism of molecular biology.

Epigenetics

Epigenetics is a modern scientific area of biology that studies potentially inherited changes in the expression of genes (they activate or deactivate them) that occur in the human embryo's genome (DNA) right after the fertilization of the ovum by the sperm. The ability of environmental factors to affect our health by causing diseases is manifested through epigenetic mechanisms that mediate interactions between our genes and the environment. Epigenetic regulation of the genes involves acquired hereditary changes in their expression, i.e. those that occur without changes in the DNA's sequence of bases.[62] More simply put, epigenetics adds to the genome additional information by chemically making (adding chemical labels) it on some of DNA's bases (A, C, G, and T, which are joined together to form the long chains called chromosomes). If we were to compare a DNA sequence to the score of a musical piece, an epigenetic modification of it would be the change of tones in different parts of the musical piece by another musician without notifying the musician who wrote it, in order to fool him into playing it with different melodies.

More specifically, the known epigenetic mechanisms are the following: (1) The refolding of *chromatin*[63] and its attachment to the nuclear matrix.[64] (2) Packaging of DNA around *nucleosomes*[65] by *histones.*[66] (3) Chemical (covalent) modifications (markings) of histone tails (such as acetylation, methylation and phosphorylation). (4) Methylation of certain bases of DNA.[67] In addition, the action of small portions of RNA and micro-RNA[68] in gene transcription is increasingly recognized as a basic mechanism of epigenetic gene regulation.

Epigenetic DNA markings guide cell proteins to process specific parts of the cell in defined ways. For example, DNA can be labelled with microscopic molecules, called methyl groups, by attaching them to some of its bases with the letter C. Already mentioned are the chemical labels (or tags) that can be added to the histones, the proteins

[62] D. C. Dolinoy, 'The Agouti Mouse Model: An Epigenetic Biosensor for Nutritional and Environmental Alterations on the Fetal Epigenome', *Nutrition Reviews*, 66:Suppl 1 (2008), pp. S7–S11.

[63] Complexes of DNA with proteins that form the chromosomes in the nucleus of eukaryotic cells.

[64] A network of protein fibres within the cell nucleus; something like the cytoskeleton of the cell.

[65] Consisting of a segment of DNA wound in sequence around eight histone protein cores.

[66] Proteins in the nuclei of eukaryotic cells that act as spools around which DNA is wrapped, and also play a role in gene regulation.

[67] Dolinoy, op cit.

[68] Non-coding RNA fragments of about 22 bases in length. They silence RNA, and regulate gene expression.

closely associated with the DNA. There are other proteins that seek out for binding methylated regions of DNA, and act as obstacles that block the activation of genes in these regions. These methyl groups (and other types of small molecular markers-labels) can attach to different positions in the histones, with each one having a different effect. Some labels in some locations on the histones loosen their attachment to certain areas of DNA, making them more accessible to the proteins responsible for activating the genes in the DNA attachment regions. Other labels in other histone sites do the opposite, or attract other proteins with other specific functions. There are epigenetic chemical labels that cluster in narrow or wide areas near the start points of the genes. There are also epigenetic modifications of RNA. Thus, although every cell begins its life with almost the same DNA, it ends up in different cell types (e.g. hepatic, brain cells) by acquiring different combinations of epigenetic markings. Undoubtedly, there are many other epigenetic chemical labels that we do not know as of yet.

The most important findings of the science of Epigenetics are that (a) its DNA chemical markings are not fixed (such as is our genome's sequence of bases), (b) they are environmentally induced, and (c) they could be inherited. In fact, they can change throughout our lifetime in response to external/internal environmental influences. Any external stimulus - physical (climate, exercise), chemical (food, pollution) or social (education, child abuse, unemployment etc.) - that can be detected by our body, can potentially cause epigenetic chemical modifications to our DNA. More importantly, these modifications can be inherited as Lamarck has predicted. In some cases, epigenetic markings have been found to remain in DNA for generations, and that epigenetic inheritance may sometimes be as strong as classical genetic inheritance.[69]

The exact degree of the impact of environmental stimuli on epigenetic DNA markings is still not clear, nor are the exact mechanisms involved and the downstream effects. However, there are several quite well characterized examples of environmentally-induced epigenetic markings that can be inherited. Indicatively, the following are worth mentioning:

(A) Related to environmental chemical and lifestyle factors

In reference to chemical factors:

(1) The first proof, and an example of epigenetic outcome, that a new feature is acquired and inherited as a result of an environmental change was the development of *bithorax* (double thorax) in the fruit fly.[70]
(2) The tiny worm *C. elegans* responds to an environmental stimulus, e.g. a virus infection, by synthesizing an RNA molecule (from a homologous part of its

[69] V. R. Nelson, et al., 'Transgenerational Epigenetic Effects of Apobec1 Cytidine Deaminase Deficiency on Testicular Germ Cell Tumor Susceptibility and Embryonic Viability', *PNAS*, 109 (2012), pp. E2766–E2773.

[70] C. H. Waddington, 'The Genetic Assimilation of the Bithorax Phenotype', *Evolution*, 10 (1956), pp. 1–13.

DNA) that inhibits the action of the virus. Yet, those worms lacking the analogous segment in their DNA that could generate the protective RNA shield, acquire resistance to the virus by passing small amounts of the RNA that silences the virus via the worm's male germ line. Subsequently, in each generation this RNA is multiplied by a specific enzyme (the *RNA polymerase*), and is, thus, passed through at least 100 generations.[71] This example further proves that (a) RNA fragments can be transmitted via germ lines, and (b) DNA is not the only hereditary molecule.

(3) Particularly stable inheritance of an epigenetic characteristic over many generations has been also demonstrated by a family of proteins in the mouse, which can insert mutations in DNA and RNA.[72]

(4) Epigenetic labelling of chromosomal proteins is also inherited.[73]

In reference to lifestyles:

(5) Inheritable transmission of epigenetic markings on DNA has been shown to play a role in the heredity of obesity in man.[74]

(6) RNA transmitted to mouse sperm mediates the hereditary transmission of obesity.[75]

(7) Some environmental factors experienced by adult mice can be passed on to their offspring through epigenetic mechanisms. A more typical example is a gene named *agouti*, which is epigenetically labelled (methylated) in normal brown mice. However, mice with an unlabelled (unmethylated) *agouti* gene are yellow and obese, although they are genetically identical to their lean brown relatives. Yet, changing the diet of the pregnant mother after adding to it certain chemicals (folic acid or bisphenol A; BPA), the ratio of brown to yellow offspring will also change. For example, with folic acid, more brown pups are born, while with BPA more yellow pups are born. Note that BPA is a toxic chemical and endocrine disrupter used in the manufacture of polycarbonate plastics and epoxy resins, and is present in commonly used plastic packaging containers (food, beverages, baby bottles), dental implants, etc.[76]

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[71] O. Rechavi, et al., 'Transgenerational Inheritance of an Acquired Small RNA-based Antiviral Response in *C. elegans*', *Cell*, 147 (2011), pp. 1248–1256.

[72] Nelson, op. cit.

[73] J. R. McCarrey, 'The Epigenome: A Family Affair', *Science*, 350 (2015), pp. 634–635. K. Siklenka, et al., 'Disruption of Histone Methylation in Developing Sperm Impairs Offspring Health Transgenerationally', *Science*, 350:6261 (2015), p. aab2006.

[74] I. Donkin, et al., 'Obesity and Bariatric Surgery Drive Epigenetic Variation of Spermatozoa in Humans', *Cell Metabolism*, 23:2 (2016), pp. 369–378.

[75] Q. Chen, et al., 'Sperm tsRNAs Contribute to Intergenerational Inheritance of an Acquired Metabolic Disorder', *Science*, 351:6271 (2016), pp. 397–400. U. Sharma, et al., 'Biogenesis and Function of tRNA Fragments During Sperm Maturation and Fertilization In Mammals', *Science*, 351:6271 (2016), pp. 391–396.

[76] Dolinoy, op. cit.

(B) Related to social environmental factors

(1) Epigenetic mechanisms can inherit memories of unpleasant experiences to the offspring of mice trained to fear a particular chemical odour through its association with an electric shock.[77]

(2) Inheritance of epigenetic marks has been shown to occur in rodents through maternal behaviour. Rodents, like many other mammals, groom their babies by licking, petting, and stroking them, which enhances the health and longevity of the offspring. These also affect epigenetic marking in the brain region called *hippocampus*, which among other roles is involved in emotional behaviour. Thus, epigenetic effects predispose offspring to exhibit the same behaviour towards their offspring, without requiring hereditary transmission, through the germ line, of a hypothetical 'behavioural' gene.[78]

(3) Studies in humans whose ancestors survived starvation in Sweden[79] and the Netherlands[80] show that the effects of famine on epigenetic DNA modification (and health) can be inherited through at least three generations. In particular, food deprivation at an ancestor seems to prime the offspring's body for diabetes and cardiovascular problems, a response that may have evolved to mitigate the effects of future famines in the same geographic area.

The aforementioned experiments overturn the Neo-Darwinist *Dogma* that environmentally isolated small random mutations in DNA are the main source of new and useful biological variations in organisms. Blind randomness in DNA mutations actually contributes little to the evolutionary diversity of organisms. Genome (DNA) is actually very resistant to blind mutations. This is proven by the fact that in the whole genome of, e.g. the yeast (i.e. its 6,000 genes), 80% of the experimentally-induced knock-out mutations (deleting whole genes) are silent (i.e. with no biological consequences).[81] Therefore, the evolution of organisms does not even require mutations in individual genes, but changes on the level of genes' expression patterns in response to the various forms of environments.[82]

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[77] B.G. Dias and K.J. Ressler, 'Parental Olfactory Experience Influences Behavior and Neural Structure in Subsequent Generations', *Nature Neuroscience*, 17(2014), pp. 89–96. B.G. Dias and K.J. Ressler, 'Experimental Evidence Needed to Demonstrate Inter- and Trans-generational Effects of Ancestral Experiences in Mammals', *Bioassays*, 36 (2014), pp. 919–923.

[78] I.C.G. Weaver, 'Life at the Interface Between a Dynamic Environment and a Fixed Genome' in D. Janigro (ed) *Mammalian Brain* (New York, NY: Humana Press, Springer, 2009), pp. 17–40.

[79] L.O. Bygone, et al., 'Change in Paternal Grandmothers' Early Food Supply Influenced Cardiovascular Mortality of the Female Grandchildren', *BMC Genetics*, 15 (2014), p. 12. DOI:10.1186/1471-2156-15-12.

[80] B.T. Heijmans, et al., 'Persistent Epigenetic Differences Associated with Prenatal Exposure to Famine in Humans', *PNAS*, 105:44 (2008), pp. 17046–170469.

[81] M.E. Hillenmeyer, et al., 'The Chemical Genomic Portrait of Yeast: Uncovering a Phenotype for All Genes', *Science*, 320:5874 (2008), pp. 362–365.

[82] Noble, op. cit., p. 232.

Physical and social environment and biological and social human nature

The aforementioned examples of environmentally dependent epigenetic DNA modifications of organisms clearly reveal that the various processes of this phenomenon on their genome and metabolic functions involve optimally regulated cell actions on the DNA in response to the environment. These processes can be collectively defined as 'evolvability' (i.e. potential for evolution), which enables organisms to accelerate their genetic diversity in response to environmental stimuli.[83]

Interactions take place between the environment and all the scales of structure and function in organisms (cells, organelles, organs). Starting with the scale of biomolecules, they are confined within the cells and controlled by the cellular environment. Cells, in turn, are constrained by the physiological properties of tissues, organs and systems (in multicellular organisms), which are also confined and controlled by their wider environment. This includes interactions with other organisms, meaning that social factors are bio-effective as well.[84] For example, on the cellular scale the surrounding outer membrane contains various proteins, carriers and transporters, which the cell uses to filter out chemical substances from the changing, variable external environment in order to maintain a protected and nearly constant internal chemical environment, where all the biochemical actions and processes take place orderly.[85] This environment is also maintained by a circularly displayed causality, from the level of the cell down to its molecules (downward causation) as to influence their biochemical behaviour, as well as an upward causation from the molecules inside the cell.[86] Typical examples of such constant circular biological processes are the daily rhythm (circadian) under which all cells in the body are synchronized to oscillate, as well as the heartbeat (approx. once per second) via adaptation of the organism to the existing environment by processes of interactions with the various metabolic networks of the organism.[87]

Organisms that are motivated by purpose and set goals, such as man, act with reasoning and not just by uncontrolled or instinctively automated causes. Naturally, neural, muscular, hormonal and other bodily causative functions are underlining factors for our actions. However, all these are necessarily intertwined with, and influenced by, processes that occur in the environment. In contrast, our actions are far from being accidental within the context of social relations, due to the interaction of each person's goals with those of others, with the overall social behaviour of the population being not accidental as it is shaped by and subjected to rules. Interactions with the environment and with other persons (organisms) enable each person to display rule-driven choices and behaviours,[88] and to develop skills ('inclinations', 'talents',

[83] Noble, op. cit., p. 234.
[84] Noble, op. cit., p. 172.
[85] Noble, op. cit., p. 99.
[86] Noble, op. cit., pp. 163–164.
[87] Noble, op. cit., p. 7.
[88] Noble, op. cit., pp. 256–257.

'intelligence') and behaviours (homosexuality preferences etc.). And these are materialized not because they originate from analogous genetic predispositions (i.e. 'genes for') but they are developed to the degree every person's life interacts holistically, combinatorically and for how long with the numerous and ever changing parameters of the social environment (education, culture, financial security, creativity etc.), as well as with its aberrations from established behavioural norms. Therefore, our DNA is not 'sealed off from the outside world', nor is it what 'created us body and mind', as claimed by the New-Darwinist guru of sociobiology Richard Dawkins.[89]

Human brain development and the detrimentally degenerative impact of the digital environment[90]

For the *Homo erectus* to be able to cope with the powers of nature, he underwent a selective pressure about two million years ago to expand his brain capacities. Increasing learning activity required an increase in brain volume and prolonging childhood of the new-borns, for developing learning abilities, flexible thinking, planning and creativity. Therefore, evolutionary environmental pressure was exerted on a new emerging brain structure, the frontal lobe, allowing spatio-temporal thinking into historical categories to appear, and also the opening of new cognitive horizons through creative ideas. These abilities had, and still need today, to be redesigned from the outset in every new-born human. This is because the spatio-temporal mental capabilities of the frontal lobe do not originate from a genetic programme imprinted in our DNA, but are created by the restructuring of the nervous system available from birth. And this is happening during the childhood and youth developmental phases, which have been extended in time for the human species and are ready for this. This fact alone obliges societies to provide each child with all the cognitive potentials and possibilities for developing and strengthening its frontal lobe, and, thus, its space–time-related intellectual capabilities. That is, to develop curiosity, courage, will, decision-making, anticipation and predictability potentials, and mostly social behaviour, for succeeding in the next day's planning.

Exposure to digital media (computers, smart phones, tablets, television, electronic game consoles etc.) is a typical example of a negative environmental impact on the optimal development of a child's brain, and also on the multifaceted functioning of the adult's brain. Human brain has been prepared to digitize information for at least three thousand years, that is, since the appearance of the Phoenician alphabet (which led to Greek, Hebrew, Aramaic, Roman, Arabic and modern alphabets).

[89] Dawkins, *The Selfish Gene,* op. cit.

[90] This chapter was mostly based on an interview by Gertraud Teuchert-Noodt, professor of neuro-cerebral physiology at the Universität Bielefeld, Germany [G. Teuchert-Noodt, 'Cyberattacke auf die nervennetze des gehirns – Wohin führt die digitale revolution? (Cyberattack on the nervous system of the brain - Where does the digital revolution lead-children?)' Interview in umwelt-medizin-gesellschaft, |30|3, 2017, pp. 28–32, https://www.ksta.de/ratgeber/finanzen/karriere/gehirnforscherin-warnt-digitale-medien-am-arbeitsplatz-machen-uns-abhaengig-und-dumm-24345186].

However, it was the last three centuries that compulsory schooling of the child, writing, reading and counting became a cultural and technological success story for the human species.

Sensory-motorized bark fields (i.e. the cortex) of the child's brain are best utilized only when fully mature at the defined childhood and youth developmental phases. Only the fully mature primary and secondary neuronal networks of these cortex fields will allow the adulthood brain to be creative in abstract patterns of thinking, and also to interact with the digital media in a reasonable way, or even to develop computer programmes and algorithms.

For the first time in mankind's history, this neuronal foundation, which is absolutely necessary for thought processes, is ignored and/or unscientifically challenged by the digitization of information and leisure time. It is a dangerous fallacy the widespread (by the digital-elite-controlled MSM) perception that the modern child can take over the handling of digital media from adults due to the required minimal technical effort. According to brain research studies, the child's brain will not be prepared to deal with the digital media not even in the next thousand years. This is because cognitive mental performance depends on the quite prolonged maturation of the primary and secondary neuronal networks in the child's cerebral cortex, in order to acquire, later in time, combinatory thought skills. It should be stressed out that at this point in time digital media act as *irreparably addictive* factors extremely accelerating the abnormal maturation of the cortex functional systems.

The over advertised, as progress, digital education in schools will automatically prevent the maturation of these essential vital mental qualities in the child's brain. In essence, digital media unleash an insidious attack on the very need of the frontal lobe to acquire these abilities during early and childhood life, thereby cancelling the normal development of the child's brain. Therefore, traditionally learned cognition during schooling cannot, and should not be replaced by digitized 'cognitive informatics'.

Parents are trapped by cliché digital propaganda of the kind, 'children are maturing fast on the internet'. Because the opposite is the fact, parents would better protect their children by forbidding the use of digital aid of any kind. They should also demand from their states the withdrawal of all digital media from kindergartens, primary and secondary schools. Encouraging is that such measures have been announced by the French state.[91] Additional scientific facts from brain research on the degenerative impact of digitation on child' brain are as follows:

The child's brain needs physical body movements to programme the developing experiences in space. These are mediated by the vestibular equilibrium maturation system,[92] as well as by the muscle and tendon spindles that determine the brain's

[91] The Telegraph, Dec. 11, 2017; http://www.telegraph.co.uk/news/2017/12/11/france-impose-total-ban-mobile-phones-schools.

[92] It includes the sensory receptors of the inner ear, the cerebral stem and cerebellar acquisition systems, and the effect of these systems within the brain.

control of body movement. At the same time, the three spatial lobes in the cerebellum are programmed during our lifetime in handling the corresponding actions of running, climbing, twisting and balancing, without which the cerebellum does not develop normally. The more numerous are the activities of movement that enrich childhood years, the more effectively and optimally will these affect maturation of the mental functions.

Smooth and normal development of child's brain is hampered by the addiction caused by the exposure of its limbic system to digitized media, and this is not different from drug addiction, nor is it less harmless in the long run. Both addictions activate the same areas of the limbic system to overproduce their own opiates, which destabilize the normal physiology of a self-reinforcing closed circuit that acts as a 'reward system'. The rewarding of this circuit is not re-established by chemical drugs (cocaine, amphetamines) nor by the unconscious brain stimulant digital messages (tablet, smartphones). In addition to the opioid receptor system, this self-amplifying circuit includes the highly active hippocampus as a bypass system. In addition, all emotional experiences are introduced into the amygdala. Children, however, do not possess the ability of self-control, and only from adolescence onwards the frontal lobe can - through its progressing maturation - cooperate with the limbic circuit in orderly ways to be able to manage the digitized media.

The addictive effect of digital media has been corroborated by *World Health Organization* in its *International Classification of Diseases 11th Edition* (18 June 2018) report, where it has officially recognized as a disorder the addiction of digitized gaming, as follows: 'Gaming disorder' is 'a pattern of gaming behaviour ('digital-gaming' or 'video-gaming') characterized by impaired control over gaming, increasing priority given to gaming over other activities to the extent that gaming takes precedence over other interests and daily activities, and continuation or escalation of gaming despite the occurrence of negative consequences'.[93]

If we allow this course to continue, the brain function of a whole generation of digitized children will return to the Stone Age. Digital media do not motivate the child to absorb the basic knowledge the teacher is trying to install in its brain's cortex. In children and young people that grow in lack of any societal or historical knowledge, their brain's cortex cannot acquire skills via correlation with a variety of experiences, which they rather perceive surrounded with clouds of ambiguity. Anxiety, aggression, and many other mental deficits are intensified in the digitally exposed schoolchild because the necessary process of slow mental and emotional disconnection from mother's care is interrupted, and because the child's development takes place under mental destabilization instead of self-employment.

It has been already apparent that even the adult brain has not expanded its mental capacities in the technologically equipped today world, because the biological and psycho-cognitive functions are still under the control of spatio-temporal functioning

[93] http://www.who.int/features/qa/gaming-disorder/en/.

of the nervous system. Without the permanent spatio-temporal grounding of the frontal lobe, the digital media freak gives up self-control and can't help but to enter to a 'learned helplessness' state, that is, a sense of feeling helpless to manage negative situations. This cognitive self-constraint is also responsible for the 'burnout' syndrome of modern man; a psychosomatic disorder, non-existent in the pre-digital age, caused due to overwhelming of the medial frontal lobe (critical for keeping conscious memory of events and facts) by unbearable digitized information. A typical consequence is the disorganization of the working memory, since every conscious information occupies the functional locations of time and space in the frontal lobe's neural networks. Information delivered through the spatial pre-processing of the hippocampus is divided into 3–5 s time units, in order to reconcile the events with past, present and future. That is, logical thinking is unable to monitor the very fast timing of exposure to digital information. Adult brain digital degeneration will not stop with 'digital detox' movements such as those developed even in the heart of Silicon Valley.[94]

Digital information acceleration causes cognitive disability because it prevents functional neuronal sequencing and neurochemical communication between brain's cell groups that serve to transmit excitatory motifs to distant neuronal networks. We need the complete use of the frontal lobe also for our social survival because the necessary social framework of equality to be established and maintained requires free, unimpeded functioning of our brain to develop high self-determination, self-responsibility and judgment. However, this is incompatible with the hidden goals of the digital business elite, i.e. the profiting and political control over the new generations. Through acquisition and use of digital media (smart tablets/phones), these elites impose a short of a non-invasive lobotomy on the frontal lobe of the young generation, directing them towards a voluntary intellectual incapacitation. For example, one of them, Elon Musk,[95] develops implantable brain cortex-computer interfaces (Neuralink) for the transformation of individuals into world-linked human-symbiotes of human artificial intelligence.

Towards a new socio-centric biology of biologically equivalent man cross-interacting with the environment

The Helmholtz machine is a sensory device (something like an artificial neural network[96]) that can make a prediction, confirms it against the real world and calculates the difference between prediction and confirmation, as does also the Bayesian statistical method.[97] A new theory of neurobiology, that of the Bayesian brain, proposes that

[94] https://www.voanews.com/a/reu-san-francisco-techies-unplug-digital-detox-camp/1954058.html, EPT3-https://www.youtube.com/watch?v=_rfPpMpeeVA.

[95] Owner of the corporations *SpaceX*, *Tesla*, *Paypal*, *SolarCity*, *Hyperloop*, *Boring Company*, https://www.youtube.com/watch?time_continue=852&v=tnBQmEqBCY0, https://www.neuralink.com.

[96] https://en.wikipedia.org/wiki/Helmholtz_machine.

[97] https://en.wikipedia.org/wiki/Bayesian_statistics.

the brain works in approximate simulation with the Helmholtz machine and Bayesian statistics.[98] And this because our brain makes predictions and weighs out expectations with mismatches, which it then transmits to higher levels of neuronal circuits that repeat the process. If there are still mismatches, they are transferred to even higher mental levels.

The Bayesian brain theory explains many structural and functional aspects of our brain. For example, how the brain manages and deals with diametrically different stimuli (visual, sensory, taste, acoustic etc.), and combines action and perception using essentially the same neuronal mechanisms and structures. The theory also offers a meaningful explanation for the learning functions of our brain, i.e. the updating process of the predictive model. It may also explain how the brain evolved higher levels of consciousness by adding new levels of prediction. A particular advantage of this theory is that it mimics the actual spatial organization of neurons in the primary cortex of our brain; there where the ranks of 'predictive' and 'sensory' neurons send signals in opposite directions, allowing for annulment between them except for mismatches.

The structurally dependent predictive learning system of the Bayesian brain theory is extremely important because it relegates and marginalizes detailed explanations, by Neo-Darwinist sociobiologists, that are based on genes for many biological phenomena such as consciousness.[99] As already explained, genes and proteins can complement the functional processes of the brain, but many of its key functional elements (learning, action, perception) derive mainly from its structure; that is, they are emerging organizational properties.[100]

Many biologists are at least critical on some aspects of similar deterministic examples, but they rarely question the gene-centric biology as a whole. At present, there is no organized scientific direction towards the relativistic systems biology, nor is there any state scientific institution challenging the scientific validity of the dogmatic neo-Darwinian reductionist basis of the gene-centric biology. Notable official recognition of the obvious fact that organisms are complex systems is the funding of a limited number of studies (especially in the US) in the direction of 'systems biology', but the vast majority of the involved scientists use these resources to broaden their gene-centric reductionism. Encouraging is the leaning towards Systems Biology of the *European Molecular Biology Organisation* (EMBO), by organizing in 2018 of a workshop in 'Integrating Systems Biology: From Networks to Mechanisms to Models'[101]; EMBO is one of the two key neo-Darwinian scientific organizations (the other centre is MIT's *Broad Institute*) that promote Molecular Biology worldwide. Moreover, prestigious scientific journals such as *Antioxidants &*

[98] A. Clark, 'Whatever Next? Predictive Brains, Situated Agents, and the Future of Cognitive Science', *Behavioural and Brain Sciences*, 36:3 (2013), pp. 181–204.

[99] Friston, op. cit.

[100] As is, e.g. the folding of proteins and other aforementioned examples in the chapter *DNA has no saying not even in the evolution of life*.

[101] https://www.embl.de/training/events/2018/ISB18-01.

Redox Signaling publish forums of original research in *Systems Biology*,[102] which is indicative of the scientific deadlocks and wastage of funding coming out of projects in reductionist biology research.

This scientific void is replenished by numbered scientists with promising and revolutionary theoretical and experimental findings (some of which have been already mentioned in the present study), which explain biological phenomena in ways that go beyond the established gene-centric approaches. New unifying theories have emerged for cells and metabolism, in order to interpret the most elemental and universal levels of life's organization. Undoubtedly inspirational to all these theories was the mathematician-biologist Nicolas Rashevsky (a professor at the University of Chicago), whose ideas survive through his students Robert Rosen and Aloisius Louie. Other scientists with similar perceptions include the Nobel laureate physicist Erwin Schrödinger (author of the *What is Life?*), Stuart Kauffman (*The Origins of Order*), Steven Rose (*Lifelines: Biology beyond Determinism*), Enrico Coen (*The Art of Genes*), Denis Noble (*The Music of Life*, and *Dance to the Tune of Life: Biological Relativity*).

Some theories relate life with the fundamental laws of nature. For example, Annila and Baverstock (2014)[103] and Karl Friston (2015)[104] support the idea that life is based on the second law of thermodynamics. That is, life is a system with localized energy, low disorder, and production capacity. Life is, in its elemental components, a space-limited (capsular), and self-assembled, -corrected (thus, imperfect), and -multiplied water-based organic system with spatially localized energy, whose organic molecular components are ordered in structure (are deposits of energy, having high order, low entropy) and capacity for producing work. Life absorbs external and temporarily ordered energy either radiated from a star (being under increasing disorder and energetically depleted), or of geothermal (from an energy-decreasing magma, or by plate tectonics) and chemical (by consuming e.g. hydrogen etc.) origin. The system of life tends to die when its components are transformed into a high disorder state and its spatially ordered energy becomes chaotic. That is, what breaks down when life is dwindling is not the quantity but the quality (order) of its energy, which from spatially-ordered becomes chaotic and dispersed in a disorderly ascending universe.

These and many other thinkers have largely composed and collected the necessary scientific material (its main parts are mentioned in the present study) for a revolution in biology far beyond the functional framework of regulatory gene networks. The most fundamental elements of these theories will form a coherent theory of life's origin and preservation once they unify by focusing on the metabolism of each organism viewed as a bio-system interactively responding to a constantly changing environment

[102] https://www.liebertpub.com/toc/ars/29/10.

[103] Annila and Baverstock, op. cit.

[104] K. Friston, et al., 'Knowing One's Place: A Free-Energy Approach to Pattern Regulation', *Journal of the Royal Society Interface*, 2015. DOI: 10.1098/rsif.2014.1383.

(chemical, physical and social). Such new biology is much needed and can definitively dethrone genetic reductionism as the explanation of life and human nature.

The economic elites made molecular biology the eugenic core of their ideology

The origins of political poisoning of all aspects of modern societies with the Neo Darwinian genetic determinism - its endurance against the scientifically sound anti-gene-centric new ideas in biology especially of man and their silencing by the MSM, the education and the research funding institutions - can be found, for the most part, in the dependence of sciences on politics and economics.

The foundations of the gene-centric molecular biology of today were set by the *Rockefeller Institute of Biochemistry* (now *Rockefeller University*), founded by the well-known US economic dynasty,[105] where the chemical structure of DNA was first resolved (in the 1920s). The Rockefeller Foundation formulated even the name of the DNA by adding its initials, *rib*, in the chemical name (DeoxyriboNucleic Acid) - it was named after modifying the correct Greek term *Deoxy riboso Nucleic Acid* (the correct segment *riboso* was replaced in DNA by *rib*).

The Rockefeller Foundation was interested with DNA from the 1920s because its trustees were afraid of a Bolshevik-style revolution from the public uprisings in 1911 that led to the break-up of the Rockefellers' company *Standard Oil*. The Foundation was looking for ways to effectively manage the indignant and jealous mobs by applying two separate but complementary strategies to control human behaviour. The first was at the level of social structures (family, work, public emotions etc.) under the term 'psychobiology', and the second at the level of chemical biomolecules. The double-focused programme 'science of man' of the Foundation, described by its director Max Mason (in 1929), is 'directed to the general problem of human behaviour, with the aim of control through understanding. The social sciences, for example, will concern themselves with the rationalization of social control; the medical and natural sciences propose a closely coordinated study of the sciences, which underlie personal understanding and personal control'.[106] According to Warren Weaver, director of the Foundation's natural sciences project in 1932, the 'recasting of prevailing ideas of human nature and conduct' should be in harmony with the 'managerial needs' of the capitalistic industrialization of personal characters for social traits such as timelessness and obedience.

Regarding the second strategic objective of the Foundation specifically, it was the scientific rationalization of the then widespread perceptions of eugenics, which for the Foundation's trustees meant that human features such as courtesy, intelligence and obedience are controlled by some hidden mechanisms and biomolecules, which should be scientifically detectable reasonably, and once identified could be used to

[105] Historian of the Foundation. L. E. Kay, *The Molecular Vision of Life: Caltech, the Rockefeller Foundation, and the Rise of the New Biology* (Oxford University Press, 1993).

[106] Ibid.

control behaviour. This required a new reductionist and deterministic 'science of the very small', focused to discover the nature eventually of the gene (then considered to be proteins), which the Foundation termed 'molecular biology'. After trying out other approaches to biology with scientists and institutions, the Foundation by 1933 had developed a fully elaborated strategy to reinvent biology in the molecular level of DNA, by the funding of carefully selected and isolated scientific teams in a few elite institutions such as *Caltech* (*California Institute of Technology*) and the *University of Chicago*. Hundreds of scientists were trained by these institutions in the discovery of the 'master molecules', ending up with DNA; the origin of upward causation mechanisms responsible of the bodily functions and the behaviour of man (and all organisms for that matter). These would then allow the Foundation to scientifically validate Rockefeller's ideology of eugenics.

The Foundation's strategy in funding studies on DNA was proven extremely successful by the fact alone that only 1 out of the 18 Nobel prizes awarded for genetics after 1953, was given to a scientist who had not been funded by the Rockefeller Foundation.[107] By 1989, molecular biology had become the predominant scientific approach in all branches of biological sciences (medicine, developmental biology, neurobiology, genetically modified agriculture), mainly thanks to the Foundation's ties to the economic and political elites and their institutions. Molecular biology's successes eventually gave rise to the, purposefully kept apolitical in the public eye, transformation of biological determinism into its more modern forms. But always with the aim of genetically justifying moral rules and social behaviours for the masses, in order to scientifically legitimize the governing of the masses by the economic elites on grounds of gene superiority. The influence these disguised forms of modern eugenics have had in Western societies was so profound especially in the 1980s, that brought about the fierce wrath of prominent scientists such as Steven Rose, Richard Lewontin and Leon Kamin against biological determinism: 'Now it is I.Q. and race, now criminal genes, now the biological inferiority of women, now the genetic fixity of human nature'.[108]

From Thomas Huxley and Herbert Spencer to E. O. Wilson, Richard Dawkins and Steven Pinker (after the 1970s), the magical properties of DNA formed the basis of its many deterministic social implications. Wilson's sociobiology with his book *The New Synthesis*,[109] and Dawkins's *The Selfish Gene* (1976) and *The Extended Phenotype*[110] expanded biology far beyond the previously accepted studies on the organic functions of human body, to now deal and with social structures, and individual's human desires, 'abnormal' behaviour, morality etc. In the mid 1970s, it was Richard Dawkins who gave gene-centric basis to the notion 'greed' is 'good'[111] for legitimizing

[107] Kay, op. cit.

[108] S. Rose, R.C. Lewontin, and L.J. Kamin, *Not in Our Genes: Biology, Ideology and Human Nature* (London: Pantheon Books, 1984), p. 265.

[109] E.O. Wilson, *Sociobiology: The New Synthesis* (Harvard University Press, 1975).

[110] R. Dawkins, *The Extended Phenotype* (Oxford University Press, 1982).

[111] Dawkins, *The Selfish Gene,* op. cit.

the neo-conservative elites of the New Right, as they emerged to globalize by assimilation the inflexible, less profiting ethic industrial capitalisms of the western societies under an Orwellian New World Order. Pinker's book *The Language Instinct* (and others he wrote) combined behavioural genetics and evolutionary psychology with cognition.[112] He is still an academic celebrity although his book's main claim that grammar is an innate feature in man and is based on genes, has been challenged by many prominent linguists.[113]

The sociobiological doctrine behind all these forms of eugenics that supports the existence of innate differences among individuals and races has been extensively presented by the author in past studies.[114] Biological determinism continuous today to rely on very weak statistical associations between genomic markers (in DNA) and human characteristics to keep claiming that there is genetic dependence, to a significant degree, for numerous human traits; such as oral and written expression, sexism and sexual preferences, religious orientation, wars, political ideologies, female inferiority, entrepreneurship, crime, violence, and even sleepwalking.[115] These claims, propagated by the MSM on a daily basis, have entrenched in politics and public opinion the eugenic notion that genes play strong deterministic roles in human behaviour on the individual's and societal base. The only concession made by the Neo-Darwinian molecular biology was the acceptance of a minor degree of indirect environmental involvement in the genetic engineering of human nature.

Consequently, Neo-Darwinian genetic determinism is undoubtedly the central element of the ideology of the elites - starting with the Rockefellers - of all forms of capitalism and up to the present, and provides scientific justification for the well camouflaged eugenic core principle of their ideology.

What about the ideology of the left?

The core principle of the ideology of the elites, the inherent (genetic) inequality (in capabilities and intellect) among individuals, was also believed by Marx and was part of the communist ideology he formulated.[116] Nonetheless, this belief was expectable with the biology being in its infancy, and with Darwin's ideas about the 'fittest' at their heyday in Marx's time. With the notable exception of Antonio Gramsci and

[112] S. Pinker, *The Language Instinct: The New Science of Language and Mind* (New York: William Morrow and Company, 1994).

[113] G. Sampson, *Educating Eve: The 'Language Instinct' Debate* (London: Continuum International Publishing Group, 1997, 2005).

[114] C.D. Georgiou, 'Analogies between Aristotle's Ontology and Biological Ideologies on Human Nature', *Nature Society & Thought*, 17 (2004), pp. 47–65. C.D. Georgiou, 'Evolutionary Psychology: The Modern Version of Sociobiology [in Greek]', *Utopia*, 69 (2006), pp. 75–90. C.D. Georgiou, 'Biological Reductionism and Religious Vitalism in The Firing Squad: Dialectics, Biological Equality and the Left [in Greek]', *Utopia*, 92 (2010), pp. 67–98. Georgiou, 'Unconditional Communist Equality Among Individuals', op. cit.

[115] A. Kales, et al., 'Hereditary Factors in Sleepwalking and Night Terrors', *The British Journal of Psychiatry*, 137 (1980), pp. 111–118.

[116] Georgiou, 'Unconditional Communist Equality Among Individuals', op. cit.

Cornelius Castoriadis, this genetically deterministic notion has not been questioned by the theorists of Marxism, communism, socialism and anarchism, even today despite of being challenged by the new advances of modern biology.[117]

The left has bitten the bait of biological determinism's concession to allow for the environmental factors to be placed in the trunk of the car of human evolution. In ideological terms, the neo-liberal/-conservative right, socialist and social democracy believe that the percentage of the environmental factors that contribute in shaping human nature is near 0–20%, and this is varied as to keep hidden their eugenics core. On the other hand, the orthodox communist and anarchist ideologies are infiltrated by the elites' ideology with the 50/50% 'nature vs nurture' logic, since it fits very well with their Marxist origins. However, this logic neutralizes ideologically the left to challenge the well-hidden eugenics agenda of the elites' ideology; and despite the fact that even this logic is essentially been crushed and becomes 100% 'nature' in the individual's everyday life by the neo-liberal Clashing Rocks of perfectionism and meritocracy.[118]

By not understanding the transformation of the gene-centred deterministic biology into a major ideological-political tool by the elites, the left in any shade is unable to confront the elites once it accepts the genetic core of their deterministic ideology. How, for example, the left in Greece can confront ideologically - and with radically distinct political programmes – the Neo-Darwinian basis of the thinking of one of the key political representatives of the Greek elites, when he openly endorses social inequalities as a law of nature: 'I do not have delusions for a society without inequalities. This is contrary to human nature'?[119]

The abstractly defined inequality by Marx was sufficient for Lenin to persuade the masses to revolt because the socioeconomic differences at that time were enormous and therefore obvious to everybody. After all, the Russian Revolution was the natural outcome of the extreme social inequalities imposed by the totalitarian tsarist regime and its institutionalized slavery. So were obvious the social inequalities that lead to the Cuban revolution, to say the least.

Without revealing, by the left, to the masses how the elites really see them, as genetically inferior and deplorable forms of low life, without the left confronting the elites by non-hierarchically organized and run parties, which are empowered by a unifying ideology that embraces all individuals with a scientifically defined unconditional equality (thus, anti-diametrical to the eugenic ideology of the elites), the masses will perceive the political propositions by the left at best as utopian programmes of socio-economic philanthropy, and they will keep ignoring the left and because of its political fragmentation.

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[117] Georgiou, 'Unconditional Communist Equality Among Individuals', op. cit.

[118] https://www.yahoo.com/lifestyle/irrational-desire-driving-millennials-gen-z-depression-222357005.html?.tsrc=daily_mail&uh_test=2_01.

[119] From a political speech of Kyriakos Mitsotakis (President of the New Democracy Party) delivered at the Thessaloniki International Fair on Sept. 16, 2017, https://www.youtube.com/watch?v=q7bbEPxvGMY, to justify the endless economic stagnation imposed by the Eurozone on Greece and its people.

One of the main reasons for this fragmentation has been suggested to be the lack of such a unifying scientific definition of equality. Also, the inability of the left to fill this vacuum is one of the reasons that Marxism is in a course of ideological decline and scientific stagnation because of not being rejuvenated the findings of the natural sciences and especially biology.[120] As long as the existing many scientific arguments against all forms of biological determinism are not taken into account by the left, the development of a unifying scientific definition of equality based solely on historical, social, political and economic parameters is an impossible task. Besides, an ideology of the left which integrates the unconditional and unlimited acceptance of an intellectual equivalence (not identity) among all individuals (clinically physiological or not), automatically leads to the abolition of social classes. In contrast, it is certain that the latter without the first ideological prerequisite will create and perpetuate social inequalities, as has been evidenced in former and present regimes of 'existing socialism'.

The realization by the individuals that they are the twenty-first century serfs of the elites, is a crucial first step in breaking the vicious cycle of their mentally debilitating perceptions for 'self' in the Orwellian world the elites have created for them. People in a society believe in vague perceptions and impressions for every of its aspects: identity and etiquette, language and ethnicity, social roles and hierarchies, rules and laws, science, economics and jobs, politics and government, ideology and religion, etc. These are all implanted mental constructs which swirl inside out our brain continuously and mostly unconsciously. We regain an essence of their existence by mental chattering; otherwise being passed unnoticeable for they do not contribute to our actual everyday experience. Such a perception is also the conceptual identity construct we call 'self'. Without mental perceptions, the only self we experience are visual, auditory and touch impressions with unclear shape or limits. However, with mental chattering we give names to them through language, and classify them in our memory. We pay attention to them only when we feel they put at risk or satisfy the various aspects (desires, goals) of our 'self'. They dominate our lives by consuming almost all of our mental energy. Because of this, we can be easily controlled by whoever can create, modify and manipulate the narratives of our perceptions as long as they fall in the wider pool of perceptions believed and subscribed to by the majority of the society. The key controllers and generators of our perceptions and their narratives are the financial elites. They teach us in school and with the brain function-degenerating info they portray in the screens of their digital social media, to believe that we live in sovereign and democratic nations, where we freely elect our governments after being well informed by a voting process that ensures equal access of all candidates to unfixed debates of free exchange of ideas. They make us also believe that we live in an economy and commerce whose laws are solely determined by the supply and demand of consumers. In reality, all these and our governments are fully controlled

[120] Georgiou, 'Unconditional Communist Equality Among Individuals', op. cit.

by the elites, who also happen to own the MSM which broadcast the picture of the world they want us to have. We all have been imprisoned in perceptions programmed in our brain into social consciousness by the elites. Not just during our adulthood, but by the time our parents taught us our first words, and tried to put in some order our thinking in concert with that of their also distorted view of the world. And not just the modern world, but through education and religion back to belief systems of societal structures and religions that power-served the elites (kings and so on) of these times.

On top of and in addition to all these, the elites control and divide societies by a gene-centric, hierarchically graduated, social racism (the white collar is genetically superior to the blue collar, who is superior to the jobless, who is superior to the homeless, and so on), and by promoting a cognitively cloudy and impersonalized gene-centric individualism on the social level; and lately in gender identity (abolition of differences, even on the level of genital organ terminology[121]). The elites make people believe that they have freedom of choice, while they allow them to exercise it only within culturally homogeneous (cosmopolitan, multicultural) ways of life styles, which, however, depersonalize the essence of a socially and ethnically non-offensive and non-racist creative individualism. Thus, they manipulate them to use blurry self-assurance criteria, turning them into politically harmless individualistic insignificances. However, individuals can balance biologically, psychologically and mentally only when they derive self-affirmation and respect from social objectives and actions which they pose and realize jointly with equally recognizable members by their societies.

Besides the above, the mental and cognitive diversity in individuals is the result of exposure and interaction with micro (within family) and more extended (natural, societal) environmental stimuli. These may be of accidental origin (being born in unchosen family microenvironments, and unchosen countries and within geographical locations), or imposed (by education, political system), or even self-pursued (consciously to the extent the individual has a detailed picture of the, manipulated by the elites, makings of the society as a whole). Moreover, environmental stimuli can be random for each individual when viewed in the context of cultural, economic, biological and technological constraints. Especially the latter two make economic globalization unfeasible on the level of the individual's way of life. Such constrains are bipedalism, the technologically unfeasible instantaneous going/coming (by portable flying machines at super speeds) among countries for transient business/work residence; let alone biological adaptation. To these constrains should be included the self-preserving biological tendency-instinct of the individual to form groups (tribes, countries, nations) of complementary interests, traditions, religions within limited geographical areas.

The emerging new biology offers the necessary scientific arguments for the ideological and scientific foundation of the future societies on the unconditional equality of

[121] By using the word 'parts' for male and female genitals; e.g. 'front hole' or 'internal genital' instead of 'vagina', https://www.healthline.com/health/lgbtqia-safe-sex-guide.

individuals. It puts DNA and its genes in the lifeless piano keyboard, to be activated by the social individual, the pianist, in response to an ever-endless interplay with the environment and its infinite graduations (intra and intercellular, organismic, dietary, physical, social etc.). The biological nature of man and his survival as a species impose the need for an intellectually and in social value equal coexistence among individuals, under socioeconomic conditions that generate and affirm equal respect and high level of culture and education. Only in this context of biological and intellectual equivalency will man be able to work out political systems and structures of effective and sustainable social self-management.

The many arguments that challenge biological determinism discussed in the present study in layman's terms are intended to be considered by scientific study groups of the left as to converge into a new unifying ideology of unconditional equality among men. Such ideology should be fully depleted from any elements of the gene-centred ideology of the capitalist elites as to be clearly recognized and contrasted by the people, so they can take into their own hands the construction and self-management of their future societies.

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