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Eng Hock Chia
Australian National University

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THE BIOCENTRIC DESIGN MODEL: HOW FEATURES OF LIVING THINGS GO BEYOND IRREDUCIBLE COMPLEXITY AND SPECIFIED COMPLEXITY, AND HOW CREATION SCIENCE COULD FOMENT NEW DISCOVERIES IN BIOLOGY

Eng Hock Chia, Ph.D., Australian National University

KEYWORDS: irreducible complexity, specified complexity, epigenomics, metagenomics, systems biology, synthetic biology, Jackson-Messick model of creative cognition, insight-based design, metaphysics design, definition of life, abiogenesis

ABSTRACT

This paper highlights features of living organisms that go beyond that of machines on the one hand and computational devices on the other. These features exceed those of human crafted artifacts, as well as demonstrate insight and creativity in their creation. It will be demonstrated that they cannot arise from natural processes but are the result of mind and intelligence. It is hoped that the biocentric design attributes described here would augment irreducible complexity and specified complexity as evidence of design in living organisms. The issues addressed are of particular relevance in the light of recent discoveries in epigenomics and metagenomics, as well as developments in the new disciplines of systems biology and synthetic biology. Just as these disciplines focuses on designing biological systems, so too biology is no less than the science of how living organisms are designed. This paradigm shift could lead to the discovery of universal laws and scientific explanations of how living organisms are designed, superseding historical narratives in evolutionary biology.

INTRODUCTION

Life is not only intelligently designed; it evinces insight and creativity, and also displays features not shared with human-designed non-living objects, such as machines and computers. This is of far ranging significance for creation science.

The questions whether the attributes of living organisms, and the origin and diversity of life can be explained by natural causes are empirical and scientific. Furthermore, a theory of abiogenesis and common descent, to be scientific, must allow for an alternative hypothesis as well as a test of statistical significance. In short, are living things designed?

Empirical data from the experimental sciences, as well as common sense and our intuitions show that living organisms are created by God, and His Word affirms of the same (Rom. 1:21).

OVERVIEW, CONTEXT AND BACKGROUND: UNDERSTANDING DESIGN BEYOND ANTHROPOMORPHISM

Metaphors and mental models play an overarching role more important than we realize, whether it be in science or in everyday life (Lakoff and Johnson, 1980). The metaphor of design in modern times is understandably influenced by the prevailing culture of industrialism and increasingly, information technology.

The achievement of late twenty-century biology is that not since Darwin do we so clearly understand that life is built on code and information, and at the same time, the discovery of molecular machines shows how finely crafted the machinery of life is. It is interesting to note too that machinery and code parallels the two milestones in human history, which are the industrial and information technology revolutions respectively.

In addition and astoundingly, for the first time in human history, with the exponential increase in knowledge (Dan. 12:4), we now have the mathematical tools to also reveal unequivocally that life is intelligently designed, and not the result of chance and necessity (Dembski, 2007). Even more interestingly, in 2011, two articles respectively, show clearly that neither is mutation random (Talbot, 2011) nor is selection natural (Gulizzza, 2011), revealing the two sacred cows in Darwinian pasture for what they are.

Nevertheless, the debate over origins have hitherto centered on design related to machinery, industrial engineering, and information technology. Life is altogether too wonderfully created such that the concepts of design ought to go beyond human centism and reflect features of living organisms that transcends machinery and even mere information coding.

Irreducible complexity and specified complexity are two specific concepts proposed recently to augment the design argument for creation (Behe, 2006; Dembski, 2007).

While both concepts are relevant to living organisms as well as machines and information appliances, they do not specifically address design features of living organisms above and beyond that of machines and computational devices.

The purpose of this article is threefold:

- To show in what ways living organisms go beyond artifact and industrial design. This is termed the Biocentric Design Model (BDM) of Creation
- To explain how this can be related to the Jackson-Messick model of creative cognition (Jackson and Messick, 1965)
- The implications and applications for creation science

As this involves a shift of paradigm and a radical change of worldview in biology, the author would like to provide further background information in the next two sections.

It must also be emphasized that as this is a challenging topic that attempts to break important new ground, what is presented is to be considered a first approximation, with the singular aim

of encouraging further research. The author is fully aware that due especially to its multidisciplinary nature, from biology to the cognitive sciences to philosophy, shortcomings are inevitable. Nevertheless, it is hoped that the central thrust of this communication is clear, cogent and useful.

BIOLOGY AT THE INFLECTION POINT: TOWARDS THE FUNDAMENTAL LAWS OF BIOLOGY

In the bioeconomy of the twenty first century, we are beginning to discover anew how living organisms are complex, going beyond code and machinery. As Sverdlov (2006, p. 339) observed, "many biologists ... consider that modern molecular biology has traits of a scientific revolution. It has become obvious that the reductionist approach ... is limited.... The body of knowledge has reached a critical level when it is necessary to revise the philosophical basis of attempts to understand the molecular organization of living systems."

There is perhaps no better illustration at this time than the Fundamental Laws of Biology (FunBio) program ([http://www.darpa.mil/Our_Work/DSO/Programs/Fundamental_Laws_of_Biology_\(FUNBIO\).aspx](http://www.darpa.mil/Our_Work/DSO/Programs/Fundamental_Laws_of_Biology_(FUNBIO).aspx)) ambitiously launched by the US Defense Advanced Research Projects Agency (DARPA) with the following aims:

- "Bring new mathematical perspectives to biology
- Use the stimulus of those challenges to create new mathematics that will reveal unanticipated structures in large complex systems
- Explain biological organization at multiple scales
- Discover fundamental laws of biology that span all biological scales"

In the realm of creation biology, the Institute for Creation Research (ICR), recognizing the tremendous strides in molecular biology, and a whole new set of empirical data, has started a new program called Bio-Origins Research.

A NEW DIRECTION FOR CREATION SCIENCE AND THE ADVANCEMENT OF BIOLOGY

Why do we need to recognize life as going beyond machinery and code?

Not only do Darwin and Paley could not formulate their argument taking into account the discoveries of modern genomic science and molecular machines, but also neither does both have access to the current knowledge of how life functions at the molecular scale.

A key goal of modeling in Creation Science is faithfulness to both written revelation and physical observation.

In the area of empirical observations, perhaps no one has done better than what Stephen Talbott has achieved in a series of four essays (2010a, 2010b, 2011a, 2011b). On the basis of recent advances in molecular biology and genomic science, he shows why the more we find out about living organisms at the molecular level, the more it appears that information coding

and mere machinery are totally insufficient and inadequate representations of life and its processes. More information regarding his seminal work will be discussed later in the article. At this juncture, it is important to underscore that while his work is controversial, it should not detract from some of the legitimate issues raised concerning mainstream biology.

Secondly, turning to Biblical grounds, life does appear to be distinct from non-life and the Bible alludes to the mysteries of creation (Deut. 29:29, Psa. 139:14, Prov. 25:2). Again, Talbott summarizes it beautifully thus: “And yet today, after several decades of stunning progress in molecular research, it is no more possible than it was two hundred years ago to construct a single paragraph of properly biological description that does not draw on a meaningful language of living agency considered improper in chemistry or physics” (Talbott, 2010b, p. 47).

Understanding and acknowledging that life comes from creation alone and nowhere else is a giant step for the advancement of biology in the twenty-first century. It was Bergman (2011) who insightfully that observed “the controversy [over origins] is, by their [the evolutionists’] admission, not actually over the question of whether life was designed but rather on the identity of the designer—mutations and natural selection or by an intelligent, omnipotent Designer, whose identity is vastly important.”

BIOCENTRIC DESIGN: FEATURES OF LIFE BEYOND MACHINERY AND COMPUTATION

Two specific features of biocentric design are addressed in this paper: Insight-based Design (IBD) and Metaphysics Design (MD). In both features, we clearly see that nature reflects not just a Greater Mind, but also an Infinitely Wise God beyond human ken (Psalm 139:6). Both concepts will be explained in detail below.

While these two features are especially clear in the light of recent advances in molecular biology, genomic science, epigenetics and metagenomics, they apply to the entire unity that is life, at every level from ecosystems to body plans to molecular machines, and to every aspect of organisms, be it anatomy, physiology or biochemistry.

We will next explain these two features in detail.

MORE THAN A WATCHMAKER: INSIGHT-BASED DESIGN (IBD) AS APPLIED TO TRANSITION LIFE FORMS AND THE ICONS OF CREATION

The design of devices such as a watch mechanism shows that logic, thought and intelligence of a mind is at work. But frequently, human enterprise in the arts, sciences, and engineering also involves leaps of creativity and innovation, as well as elegance and beauty. More so than mere design, these elements do not come about through random processes but are the results of mind, imagination and insight.

Although many machines and information devices are works of beauty and creativity, living organism are the ultimate forms of inspiration and innovation. It is interesting for example

that the Biodesign Institute at Arizona State University states that it “seeks to harness the blueprints found throughout the Earth’s 3.8 billion year old patterns of life into bio-inspired innovation” (Arizona State University, Jan 12, 2013)

Creativity and innovation that is so apparent in nature and living organisms are the result of a Divine Mind (John 1:3; Romans 3:20). Many specific animals such as the platypus, often regarded as transition fossils and life form, on closer scrutiny, actually turns out to be exhibits of creativity and innovation in the creation of life.

Across all phyla and at every taxon, life is not an accumulation of evolutionary history from the simple to the complex, but manifestations of myriad creativity and innovation.

In the study of creativity and innovation, a classic model widely cited in the field is that proposed by Jackson-Messick (1965). This model lists four criteria of a creative work or artifact:

- Unusualness, relative to norms
- Appropriateness, judged with respect to context
This is more than the artifact being merely useful, but according to the authors, evokes the feeling of that the creation is not merely right, but ‘just right’!
- Transformation or Transcendence of Constraint
This is not so obvious as the earlier two criteria. Here, the product or solution overcomes constraints normally thought impossible or difficult to break, e.g., the invention of the airplane. It certainly bears repeating that in the realm of living organisms, there is no dearth of example satisfying this criterion, such as cetaceans or anadromous fishes like the salmon. This property is so astounding that according to the authors, it stimulates the observer to change his worldview. For example, it is not a usual expectation at all that air-breathing mammals would live entirely in the oceans
- Condensation, judged with respect to summary power
It is this quality that bestows upon a creative artifact the quality of endurance and greatness beyond novelty. “They have about them an intensity and a concentration of meaning requiring continued contemplation” (Jackson-Messick, p. 320). A truly creative solution is a paradoxical place where complexity and simplicity meet. It is apparently simple and elegant, but behind this parsimony, in Jackson and Messick's terms, it hides, summarizes or *condenses* the essences of complexity.

Although Jackson and Messick (1956) confined themselves to the creative works of the humans, the fourth quality of condensation is particularly relevant in evaluating living organisms as artifacts of special creation.

Jackson and Messick (1965) summed up this quality with the phrase "difficult to make judgments of" (p. 321). This is indeed most appropriate when we think again of the confounding qualities of transitional organisms and fossils, as well as astounding qualities of

some unique creatures that have been held as icons of creation, as well as mistaken for icons of evolution.

This author would like to draw the parallel between the concept of condensation with that of the Japanese idea of *kinobi*, that function (*kino*) and beauty (*bi*) are two sides of the same coin, that creativity embodies both usefulness and elegance. It is the universal principle of 'form follows function'. It is important to note that this is of course anathema to evolutionists.

Perhaps, this feature of Insight-based Design (IBD) might be summarized by a story. When the author was little, he would spend days on end devoted to playing with Lego blocks, and his favorite contraption was making moving or rotating parts out of only rectangular or square blocks. Now, one would not at first thought surmise that such construction would arise from only rectangular or square blocks.

INSIGHT-BASED DESIGN OR RANDOM-BASED DESIGN? THE ABSENCE OF EVOLUTION SUCCINCTLY EXPOSED

There is an all-important issue regarding insight-based design. If design were insight-based, we would expect that living organisms would serve as fantastic emulation models for engineering design, and indeed this has been the case with the rise of biomimetic engineering, which also extends to other fields relating to design such as architecture.

And this is the key point. If indeed, all the marvels of design revealed in living organisms come through evolution involving random processes, and if evolution is truly a scientific theory where the processes and facts are known such as gravitation laws, and not merely narratives, then we would be able to put them to good use in every design discipline. Rather than merely *emulating* or reverse engineering nature, the *actual* processes of evolution could be used, or more precisely, *simulated* to find optimum design solutions. Evolution theory would then be the most valuable scientific breakthrough and astounding discovery!

The National Museum of Natural History in Washington, D.C., part of the Smithsonian Institution, states in one of its exhibits that “the mind-boggling complexity of living things today came about step by step, through trial and error, over thousands of millions of years” (quotation retrieved during a visit on August 6th, 2012).

With today’s powerful computers, both deep time and random processes could quite easily be simulated. By way of comparison, stochastic processes have been used profitably in weather and climate prediction, as well as forecasting and decision-making in financial markets. As my doctoral research, and my more recent investigations in a separate field of computational finance, entails substantial use of computer simulation of stochastic processes, I am much aware of its usefulness and applications.

The history of science is replete with examples of major theories and discoveries leading to historic inventions and technological innovations, *specific and direct*, such as the Special Theory of Relativity and television, quantum mechanics and computers. No such thing could be cited for evolution theory.

The design of living organisms requires input of new information, insight and creativity. If indeed evolutionary processes could generate such input, these processes could through computer simulation be of mighty use in all design endeavors. It would lead to a true revolution, directly transforming whole technologies, giving rise to many engineering marvels and perhaps even leading to new medicinal drugs for previously incurable diseases. Alas, just as evolution theory is virtually not falsifiable, neither can its mechanism be simulated, unlike other scientific laws.

METAPHYSICS DESIGN (MD): THE FINEST EVIDENCE OF CREATION

At the most fundamental level, and especially with the hindsight afforded by genomics, what makes biology more than physics and chemistry is information:

Biology = Physics + Chemistry + Information

For example, considering the astounding diversity of life, a most legitimate and scientific question concerning the transition of life forms, such as body plans across phyla, is simply: Where is the information coming from? Whether it is wings or fins, where is the information coming from?

Even more than this, even as important as information is a fundamental property of living entities, there is more to it than just the addition of information, as the many examples below will make clear. Living organisms are not merely living computational machines, though they can be studied as such in bioinformatics, and systems and synthetic biology, and used as such in biotechnology.

As any hint of teleology and vitalism is so far removed from contemporary biology, and looked askance as mysticism, it is fortuitous that Talbott (2010a, 2010b, 2011a, 2011b) surveyed the advances in genomic science and the new field of epigenetics, and furnished evidence why living organisms are not machines at all, and not even computational machines. As his papers appear to be the only ones in both their comprehensiveness and in calling for a paradigm shift, I am quoting them at some length in this section.

As the following paragraph explains, life can be far better understood in the meta-context of God's creation and His revealed Word.

“The central truth arising from genetic research today is that the hope of finding an adequate explanation of life in terms of inanimate, molecular-level machinery was misconceived. Just as we witness the distinctive character of life when we observe the organism as a whole, so, too, we encounter that same living character when we analyze the organism down to the level of molecules and genes. One by one every seemingly reliable and predictable ‘molecular mechanism’ has been caught deviating from its ‘program’ and submitting instead to the fluid life of its larger context.”
(Talbott, 2010, p. 6)

Example after example, Talbott went on to buttress his argument that “the one decisive lesson I think we can draw from the work in molecular genetics over the past couple of decades is that life does not progressively contract into a code or any kind of reduced “building block” as we probe its more minute dimensions” (Talbott, 2010, p. 24). So then, life could be best described as the metaphysics (and metachemistry and metainformatics too):

Life = Physics + Chemistry + Information + Transcendence + Condensation

Fortuitously, the terms ‘transcendence’ and ‘condensation’ are borrowed from the Jackson-Messick model, and indeed comes to the author’s rescue, so to speak. They are used in their technical sense explained in the last section.

In short, the laws of physics and chemistry in this fine-tuned universe are necessary but not sufficient for the laws of biology. The latter do not follow or arise out of necessity from the former. Instead, the laws of biology transcend them to achieve a goal of its own. And that goal is life itself. More than code and machinery, Metaphysics Design is the finest evidence of agency and creation.

Another insight is given by Dhār and Giuliani (2010, p. 12): “The construction of matter from atoms and molecules can be described with the help of Physics and Chemistry. The layer of atomic structure is described by Physics. The layer of atomic interaction is described by chemistry. The question is: ‘where does the real biology begin’? In our opinion, the real biology is composed of space that exists between interaction and function i.e., biology must operate at levels higher than that of atoms and molecules. In other words, the real biology exists in the purpose and not just plain physical interactions.”

Van Regenmortel (2004, p. 1016) used a most apt metaphor to explain the futility of biological systems built solely on physics and chemistry: “Their situation is similar to that of an art student asking about the significance of Michelangelo’s David and being told that it is just a piece of marble hewn into a statue in 1504. This is certainly true, but it evades pertinent questions about the anatomy of the statue, its creation at the beginning of the Florentine Renaissance, its significance in European art history, or even the scars on its left arm that were plastered after it was broken in three places during the anti-Medici revolt of 1527.”

Returning to the equation above, living organisms exhibit more than transcendence and includes the property of condensation, particularly in the sense of “difficult to make judgments of”, as was pointed out earlier. One needs only to think of “junk” DNA so mislabeled precisely because condensation is the confounding factor for the human mind trying to make sense out of complex phenomena, not to mention the conditioning imposed by evolutionary thinking.

Another example may be found with respect to protein function, and here Talbott expounds the idea of livingness and dynamism as evident at all levels down to molecular machines and why “fluid, ‘living’ molecules do not lend themselves to the analogy with mechanisms, which may explain why the mistaken idea of precisely articulated, folded parts was so

persistent, and why the recognition of unstructured proteins has been so late coming” (Talbot, 2010b, p. 34).

Life is beyond physics and chemistry for precisely the reasons they are beyond code and beyond mechanism. Again, Talbot explicates this beautifully: “Here is the heart of the matter: The parts of a clock are put together in a certain way; the parts of an organism grow within an integral unity from the very start. They do not add themselves together to form a whole, but rather progressively differentiate themselves out of the prior wholeness of seed or germ. They are growing even as they begin functioning, and their functioning is a contribution toward their growing. The parts never were and never are completely separate, never are assembled.... The structures performing this work, such as they are, are themselves being formed out of the work. Does any of this sound remotely like a machine?” (Talbot, 2010b, p. 38)

Lastly, it cannot be emphasized that the reasons why life at every level down from ecosystems to organisms down to the molecular transcends physical laws is because of teleology, functionality and goal-seeking behavior, a most important aspect of creation, to the honor and praise of the Creator alone.

This truth stands in stark contrasts to ‘natural selection’, which ascribes to and confers on inanimate environments a role that is performed by living organisms. The term is truly an oxymoron at best and plagiarism at worst. It gives credit to the environment whereas it is addressing an innate ability given to all organisms by the Creator. Guliuzza (2011) calls ‘natural selection’ Darwin’s imposter and explains this succinctly:

“A distinctive of living things is their goal-directed operation—one of which is filling ecological niches. This is in obedience to God telling ‘them’ to be ‘fruitful,’ ‘multiply,’ and ‘fill’ the earth (Genesis 1:22, 28; 8:17; 9:1, 7.) An organism-based paradigm is biblical. The Lord enables creatures via reproduction of variable, heritable traits to fulfill His purpose. Organisms are programmed with this power. They are the active party at the organism-environment interface to either succeed or fail. Environments are problems or opportunities that organisms are programmed to try to deal with so they can fill them. Organisms generating traits suitable to an environment fill, pioneer, or move into that environment—they are not ‘selected for.’” (p. 15)

The hyper-reductionism of biology to physics and chemistry is the foundation of the notion that life can bootstrap itself (Trevors and Abel, 2004). At the heart of Metaphysics Design and the equation of life is the central question concerning origins: Can life create itself?

Even with human intervention and intelligence, it is telling that precisely because life is more than physics and chemistry, life has never been synthesized in the laboratory.

THE MEDIUM IS THE MESSAGE: COMPUTATION AND INFORMATION CODING IN CELLULAR SPACE

There is another aspect of Metaphysics Design, relating to computation and information.

When automobiles were first invented, they were called horseless carriages. Interestingly, in biotechnology, living organisms become wetware. While the discovery of DNA and the idea of information encoding and processing are important in understanding new aspects of design in living organisms, they are far more than living computers.

Research in biomimetic engineering has demonstrated that when biomolecules are used as data structures in metabolic pathways in living organisms, molecular shape plays a pivotal role in information encoding, the double helix of DNA being a prime example. This is also illustrated in protein folding where “a protein solves its large global optimization problem as a series of smaller local optimization problems, growing and assembling the native structure from peptide fragments, local structures first” (Dill *et al.*, 2008). In other words, geometry in three-dimensional space is fully utilized as an intrinsic property for efficient bioinformation processing and the all-important protein-protein interactions.

Secondly, the whole new field of epigenomics illustrates so clearly Information is not merely confined to the genome and DNA is more than a programming language. The central dogma that “DNA makes RNA makes protein” is now truly a grand oversimplification, with hindsight. Woodward and Gills (2011) is probably the only book length treatment that dealt with the subject from the creation framework.

Third, there is also another extension to the genome, information wise, that is essential to supporting living organisms: the metagenome. Gillen (2008) discusses the place of microbes in the creation framework as organosubstrate, a term first used by Francis (2003), meaning, they “were created as a link between macroorganisms and a chemically rich but inert physical environment, providing a surface (i.e., substrate) upon which multicellular creatures can thrive and persist in intricately designed ecosystems” (p. 7). The microbiome is increasingly garnering research attention, witness for example the Human Microbiome Project (HMP) and The International Human Microbiome Consortium (IHMC). Other microbiomes of immense importance include the coral holobiont, and the rhizosphere microbiome in plant roots. The field of metagenomics delivers the tools needed to analyze the genomes of as-yet-uncultured microorganisms.

When we examine all these facets of information encoding in living organisms, they are infinitely marvelous in comparison to computers designed by the human mind. Most significantly, these signatures in the cell, these hallmarks of creation, transcend the laws of physics or chemistry, and cannot arise through natural processes, random or otherwise (see also, Abel, 2011).

THE CONSEQUENCES OF IDEAS: IMPLICATIONS OF THE BIOCENTRIC DESIGN MODEL FOR CREATION SCIENCE

Ideas have consequences, in science as in the world. Think of classic communism and the widespread poverty and untold suffering that it brought to a large swath of humanity in the last century. Or how Darwinism is applied to the social arena with the most tragic of consequences.

While visiting The Harvard Museum of Natural History in the summer of 2012, I noticed that one of its exhibits states that “evolution, like the theory of gravitation, is an essential truth supported by overwhelming scientific evidence.”

To the contrary of being essential, the demands of Darwinism to fit all data to its ideology, could very well be impeding the progress of biology. A recent example comes to mind, that of the discovery of soft tissues in dinosaurs (San Antonio *et al.*, 2011). A key concern is that, unlike for example communism where there is basis for comparison, we can never know how biology would have progressed, perhaps even stupendously, without its evolutionism baggage.

Genomic science in general and the sequencing of the human genome specifically has not lived up to its promise. Referring to this development, Sverdlov (2006, p. 339) noted, "it becomes increasingly obvious that this knowledge will not solve the most important and fundamental problems of biology and, above all, will not answer the question that has been agitating many generations of researchers, which I will further on call question no. 1 in biology, *What is life?* [italics in original]".

The larger consequence of evolutionism is its implicit reductionism (Rosenberg, 2006). Van Regenmortel (2004, p. 1020) made the urgent call that “given our failures in developing drugs and vaccines against a wide range of debilitating diseases, this move away from the reductionist viewpoint and toolset is a high priority for both biological and biomedical research.”

Conversely, creation scientists truly informed by God’s Word concerning the physical world, could interpret empirical observations more accurately. Just as the Declaration of Independence which “hold these truths to be self-evident, that all men are created equal” leads to true liberation, so too creation science holds as self-evident the primacy of revelation, and Scripture affirms of the same:

- Job 32:8 But there is a spirit in man: and the inspiration of the Almighty giveth them understanding.
- Psa. 119:99 I have more understanding than all my teachers: for thy testimonies *are* my meditation.
- Psa. 119:100 I understand more than the ancients, because I keep thy precepts.

FOMENTING NEW DISCOVERIES IN BIOLOGY AND NEW APPLICATIONS IN BIOLOGICAL ENGINEERING

Creation science is the study of the creation model of origins with the Biblical mandate for apologetics (1 Pet. 3:15), evangelism (Matt. 28:16-20) and service to the household of faith (Gal. 6:10). Nevertheless, in view that prediction is one of the key values of the sciences, a fortuitous side effect could be that of fomenting new discoveries in biology and new applications. More importantly, it would be an important witness and testimony to the unbelieving world (Acts 17:6).

Indeed, one of the well-told truths is that those who are most concerned for eternity made the greatest impact on the here and now in society. Rodney Stark, a long time sociologist at the University of Washington, documented the positive impacts of Christianity on society (Stark, 2003).

It is acknowledged that the Biocentric Design Model is only a useful beginning for deriving predictions from creation science. More specific models in different subfields are of course required. Creation astronomy gives us an instructive example. Developing his theory of creation cosmology, Humphreys (2007) was able to explain the disparity in the actual and calculated positions of the Voyager spacecraft as they leave the solar system.

Incidentally, this example shows while man's salvation is the chief end of God's Word, where Scripture touches on the physical universe, it must not be dismissed as myth or figurative language but contains exciting clues that helps us make sense of the latest scientific data. Perhaps, in the future it would be possible for creation biology to come up with similar breakthrough insights that make better sense of the latest data from epigenetics, metagenomics and molecular biology.

As an example of application of creation biology, this author is currently working on biological engineering of a bioactive substrate for hydroponics. This goes against conventional thinking since the method was used in modern times almost a century ago. The author recalled conversations with two biologists, respected in their own fields of expertise, both of whom clearly hold a reductionist understanding of living organisms. In the first instance, a question was posed why there should be differences for plants growing in soil or in hydroponics since in the latter method all nutrients are supplied. In the second, the discussion centered as to why there should be differences between organic and non-organic agriculture, pesticides and other toxic chemicals aside, since eventually the plants take up the same nutrients from the soil. The creation science mindset especially impresses this author on the need for using microbial organisms to create a beneficial environment for growing plants in the light of the concept of organosubstrate discussed earlier.

Possibly, a most important spinoff of creation science research, directed at the features of created organisms, would be answers to the all important question: What is life?

If biologists reject understanding of the Creator, how can they come to a fuller understanding of the created?

THE BIOCENTRIC DESIGN MODEL: STRATEGIES FOR CREATION SCIENCE RESEARCH

The Biocentric Design Model (BDM) specifically directs research to look for features of living organisms that go beyond mechanism and code. These are the very attributes that will confound any evolutionary explanation, yet deliver fresh insights for discovering the processes in living organisms.

Creation scientists have for a large part and out of good necessity play the defensive role of re-interpreting data presented by evolutionists. As the discipline matures, the emphasis should shift to model building and experiments as it already has. As deep time is at the heart of evolution theory, it must by necessity be an historical science. In contrast, young earth creationism lends itself far better to experimentation and it is hoped that creation science will become as much an experimental science.

The Biocentric Design Model predicts that through complexity and nonlinearity, small differences and changes can lead to hugely different outcomes. Hence, the similarity in the genomes of chimpanzees and humans should come as no big surprise.

The model should also alert us to unexpected features not necessarily associated with mere functioning and survival of organisms. For example, with respect to steganography in the information structures of living organisms, Dembski (2002, p. 15) asked: "What if organisms instantiate designs that have no functional significance but that nonetheless give biological investigators insight into functional aspects of organisms. Such second-order designs would serve essentially as an "operating manual," of no use to the organism as such but of use to scientists investigating the organism. Granted, this is a speculative possibility, but there are some preliminary results from the bioinformatics literature that bear it out in relation to the protein-folding problem (such second-order designs appear to be embedded not in a single genome but in a database of homologous genomes from related organisms)."

Lastly, and most importantly, more than presenting evidence against evolution, the Biocentric Design Model alerts the creation scientist to look for signatures of creation and the Creator, which are evident in living organisms.

ELEGANT DESIGNS OR TRIAL-AND-ERROR EVOLUTION? THE KEY INSIGHT NEEDED FOR DISCOVERING THE LAWS OF BIOLOGY

Above all, the central strategy of creation science should be no less than to foment a paradigm shift, to replace evolution as the central dogma of biology and reinstate design as the key characteristic of living organisms. Biology is no less than the science concerned with the design of life, in as much as engineering focuses on the design of human artifacts.

Far from being classified as a religious question, creation and design is a key scientific worldview that leads a scientist to ask the right research questions in biology. It submitted that evolution is a red herring and blind alley that leads researchers to seek for evolutionary clues where there are none. This is perhaps the key reason why there are so few laws in

biology because if organisms are products of creation, then the laws must surely pertain to the principles of design. Just as there are principles governing the design of human artifacts (see for example, Norman, 2002), so it should not be surprising too that there must be laws applicable to design in living organisms, across the diversity of life.

Just as biotechnology is the science of redesigning living things, so too biology is no less than the science of how living organisms are designed. Creation biologists have the fresh choice of discovering universal laws and scientific explanations of how living organisms are designed. This would supersede strained historical narratives in evolutionary biology, as well as leading to new applications in biological engineering.

A LAST WORD: THE STONES AND CREATURES CRY OUT

The Jackson-Messick model describes features of artifacts that are the products of the human imagination and creative insight, as well as our responses to such artifacts. Would it then not be ironic that when it is pointed out to evolutionists that the same features are found in living organisms, they predictably kick up such a ruckus and insist that these same features cannot and must not be ascribed to agency and creation? It would sadly be a testimony to the abdication of the human intellect, as well as good scholarship and academic rigor.

It is nothing short of astounding that a theory of creative cognition should so fittingly explain attributes of living organisms as well, *though this must be furthest from the minds of the authors*. It is all the more remarkable that the latest advances in the fields of epigenetics, metagenomics and molecular biology unequivocally show that living organisms are not only intricately designed, but also creatively created. Truly, we “are without excuse” (Rom 1:20).

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