

Design and Evolution: A Mechanic Looks at the Mechanistic World

By Ross Macmillan

Ross Macmillan is Senior Fellow in Agricultural Engineering, University of Melbourne and a Fellow of ISCAST. Ross has qualifications in mechanical and agricultural engineering and has taught the latter in Indonesia, New Zealand and Australia for over 40 years. His long-term interest in agricultural engineering education has resulted in online publication of curricula materials which are widely used in first and third world countries. In retirement he enjoys making mechanistic models in his workshop and watching green grass grow on the family farm on the northern outskirts of Melbourne.

Abstract

The world is often spoken of as being “mechanistic” and although many of its creatures and processes are biological they have characteristics of rationality, repeatability and functionality that we recognise in modern human-made machines and devices. It is widely claimed that this vast array of biological creatures shows evidence that they have evolved from simpler forms. Alternatively, others assert that the Scriptures state that the various species were separately “designed” and created in fixed forms. This paper argues that rather than these being alternative explanations, they are complementary because there is evidence of both design and evolution of creatures in the natural world as there is in the creatures of the modern human-made world.

Keywords

mechanistic, mechanism, design, evolution, earth, world, Creation, nature, natural, laws of Creation, creatures

“Rather is mechanism everywhere and is everywhere the servant of purpose.”¹

Introduction

The words in the Scriptures about the origins of our world, which were written for a general readership in a pre-scientific age, speak simply of it having been “created.” They emphasise its characteristics such as its divine origins, its enduring and fruitful nature, its giftedness to its creatures and the inherent glory that it, and the whole of Creation, gives to its creator—God.

On the other hand, in our modern understanding and description of the natural world, we often use the word “mechanistic.” We can do this because both its biological and non-biological creatures (broadly defined to include all natural things) have characteristics (described below)

¹ Rhodes, “Christianity in a Mechanistic Universe,” p. 34.

that we recognise and read back from our modern human-made mechanisms, machines, structures etc. In describing how it came into being, we also describe it as having had a beginning, of having been designed and of its having evolved.

However, as an engineer I am here interested in how we should understand these two views and how they relate to each other in ways that are consistent with both the faithful interpretation of the ancient Scriptures and with our modern scientific understandings.

A mechanistic world

Consider the modern engineering terms such as “mechanism,” “mechanistic,” and their derivatives, as commonly used to describe human-made devices and processes. These terms are read back into all of Creation (noun) and its creatures (broadly defined and not limited to animals), its materials and processes because, at the everyday or superficial level, they all have similar characteristics, viz:

- (i) universal—they operate on the basis of the general, descriptive and universal “laws of Creation.”
- (ii) rational—they can be studied, described and explained on the basis of human reason by reference to matter and those laws –“being understood from what has been made” (Romans 1:20 NIV).
- (iii) repeatable—their operation repeats exactly when the mechanism operates.
- (iv) functional—the mechanism operates to achieve a predetermined and often identifiable function and purpose.

The classic, human-made analogue of the Creation, which has the above mechanistic characteristics, is the clock. For the scientific lay-person, the mechanic and the engineer it is still a valuable, even if a simple and, for some purposes, inadequate analogue.



We live on a mechanistic world of which the clock is a useful, if limited, analogue.

As Russell observes, “There appears to be a general consensus that, far from undermining theology, mechanism actually represents a culmination of several centuries of Christian argument on the sovereignty of God.”²

² Russell, *Earth, Humanity and God*, p.15.

But to suggest or imply that Creation is nothing more than a “giant clock” is to abuse the analogy by pressing its elements beyond what is helpful. Its value is to model the mechanistic aspects as many folk see, experience and rely on them in their everyday lives.

For example, we can readily identify some natural mechanisms in Creation that, at an everyday level, are similar to human-made mechanisms and hence justify their being termed mechanistic. These include:

- the human arm and wrist as a set of relatively rigid pin-jointed members with several degrees of freedom (types of relative movement), the ability to transmit a force, and a feedback mechanism giving a dexterity controlled by the senses of both sight and touch,
- the drawing of water from the soil up over 100 m by the leaves of a tree as a hydrostatic suction pump,
- the generation of two billion+ electrical signals giving heart beats for a typical human life,
- the circulation of air, clouds, gases, etc., around the earth as a three-dimensional, dynamic, thermo–fluids system that drives our weather systems and helps to define our climate and climatic zones,
- and the dynamic equilibrium of a tiny blue planet rotating and circulating, while still receiving life-giving energy from a star after billions of years.

However, in spite of these examples, to identify the whole Creation as “mechanistic” is both a great generalisation and simplification. It is a generalisation because many of the constituent organic and inorganic components and processes bear little or no direct resemblance to the physical mechanisms and processes that gave rise to that term.

It is also a simplification because, while there are layers of complexity that are beyond our everyday vision and understanding, much of it conforms to the general characteristics of mechanisms given above and combine to give, in the short term at least, unchanging functional outcomes.

As Conway Morris writes, “To be sure we refer to motors, switches, transport mechanisms, fluid flow, pumps and electricity but the reality is that organisms have a subtlety and efficiency far beyond any machine we can build ... even in apparently straightforward functions there is an exactness to purpose which is eerily precise.”³

The modern words “design” and “evolve” are often used as alternatives with reference to the processes involved in this mechanistic Creation. However we need to explore what we mean by them because, to use them as alternatives, which many do, is a category mistake; they refer to complementary, rather than alternative, explanations.

Design in Creation

Although design is a modern term and not a biblical one, it is often loosely applied to biblical creatures. As a word, it implies forethought in the definition of purpose and function followed

³ Conway Morris, “Darwin’s Compass,” p. 10.

by decision and specification at various levels; it is a precursor to the actual creation or manufacture.

When we consider the Creation we have two sources of information from which we can draw conclusions. Firstly the biblical record, which is replete with references to the Creation and to God as the creator; for example, in the Old Testament “the Lord laid the earth’s foundations” (Proverbs 3:19 NIV) and in the New Testament “the Word was God ... through him all things were made” (John 1:1,3 NIV). Secondly, the creatures themselves, which include the laws of Creation and the properties that we can infer from the way the creatures react or behave in varied circumstances to which they are subject as a result of natural and human induced actions.

Those who reject the biblical account also reject the necessity for a creator and hence for a designer; they assert that the Creation and its laws occurred *ex nihilo*. However that hardly represents an explanation of characteristics that suggest “design,” such as its underlying unity, its functional utility and its inspirational beauty and “awe-fullness.” Those who accept the biblical account that God created the “heavens and the earth” would want to include the laws and properties as well as the physical creatures which we can see and touch. When we consider the question “was it designed?” how do we imagine such a design took place—in the heavenly drawing office or on the divine super-computer? To ask the question is to reveal the limits of our minds and the poverty of our spirits.

So we read back, on the basis of our modern experience of designed creatures, and conclude that, “in the beginning” it was designed and created, albeit by the simple word—“And God said, ‘Let there be ... and it was so.’” Before that, presumably, there was nothing; after that there was a universe of rational, repeatable, functional creatures in time and space all singing one song (uni-verse) of recognition and praise to the Creator.



And God said, “Let there be ... and it was so.”

When it comes to how and over what period the creation took place we are frequently offered two alternative understandings of the Biblical text. Those who interpret this as six-day creation conclude that it was by “fiat” and “instantaneous.” Alternatively, the text can be taken to reveal that the creative processes, which were created together “with time,” have continued over vast periods but were revealed and described in a six-day format.

Further, we might ask of the Genesis 1 text, what is encompassed in the words, “God created.” Many folk would understand, on the basis of those words, that this is limited to the visible, physical creatures that are noted in the Genesis account and others that may be inferred from it. But there is much more to the Creation than the visible creatures—the “hardware” as it were. The text could be understood to also include the “software”—the “laws of Creation” noted above, which are the basis for the design and operation of the various mechanisms, both natural and human, that characterise the earth and our life on it.

In Mackay's words, "to invoke 'natural processes' is not to escape from divine activity, but only to make hypotheses about each regularity."⁴

Hence, there appear to be at least three types of creature and levels of Creation:

(a) Firstly, there are the "laws of Creation"—the fundamental, invisible processes by which the Creation operates. Darwin described them as "laws impressed on matter by the Creator."⁵ These are presumably included in what is referred to as "things unseen" in Colossians 1:16 (NIV). As Hooykaas says, "God as a skilful engineer has put the laws of motion into matter and he maintains them by his continual co-operation ... Nature is not a 'separate' agent but a system of rules [laws]."⁶

In more specific terms these include the laws of physics, chemistry, biology and other basic sciences. In the physical sciences we can identify the laws in more specific terms such as those associated with energy, electro-magnetism, heat, light, fluids, inertial bodies, and physical and atomic structure. In the biological sciences we can identify laws associated with anatomy, physiology, microbiology, biochemistry, genetics, etc.

As Coulson explains, "Here we begin to see something about scientific law ... it is essentially a description of the results of observations. A scientific law does not control events, otherwise we could not alter it ourselves when we were dissatisfied with it. It is a means of correlating experiences."⁷

(b) Secondly, the manifestations of these laws are seen in what can be identified as "mechanisms" (again broadly defined) in the Creation. As Coulson again says, "scientific laws are practically meaningless to a [hu]man who has not experienced them in some particular instance; it is because I see this stone *fall* that I realise the meaning of the law of gravity."⁸

In particular the creatures in the animal and vegetable kingdoms have their own mechanisms that give them their peculiar "living" natures. While they were also created, they also appear to have evolved in various ways to allow them to live and reproduce in various climatic and ecological niches.

(c) Thirdly, given the number and the generality of fundamental laws of Creation it is perhaps not surprising that vast numbers of natural mechanisms, with their associated laws, have been embodied in natural creatures. Many scriptures, for example Deuteronomy 8, explicitly identify some of the uses to which these natural creatures (as materials) are put; other uses are implicit in the biblical story and in human history.

The embodiment of the laws of Creation

The laws of Creation are embodied in a vast array of natural and human-made creatures. For example, Genesis 1 gives:

⁴ MacKay, *Science and Christian Faith Today*, p. 55.

⁵ Darwin, *The Origin of Species*.

⁶ Hooykaas, *Religion and Rise of Modern Science*, p.18.

⁷ Coulson, *Science and Christian Belief*, p. 50.

⁸ Coulson, *Science and Christian Belief*, p.138.

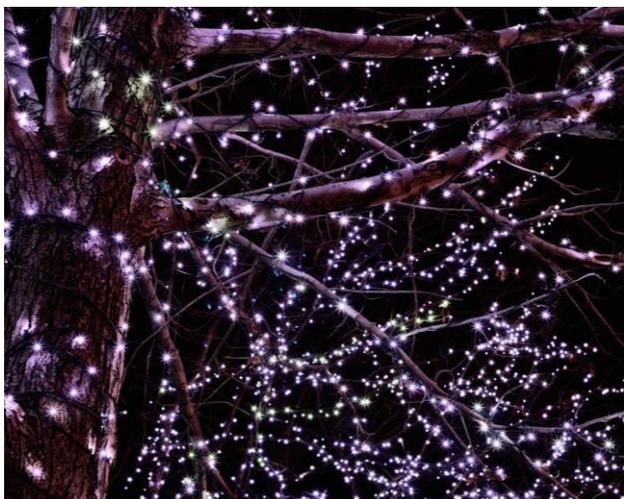
(a) the creation of light (1:3)—as a “process” with its own laws.

(b) the identification of the mechanisms involving light which we now know as nuclear fusion and optical reflection (1:14).

(c) the identification of the two physical creatures (1:16—“the lights”: the greater light and the lesser light), where these mechanisms are embodied in the creatures which we can see in the sky and know respectively as the sun and the moon.

(d) the major uses for the light creature are also identified here as providing light and darkness on the earth and to mark days and years for natural and sacred occasions. Although not identified here, light with its mechanisms also serves to grow green, seed-bearing crops to provide food for animal (including human) creatures and vast stores of hydrocarbon fuels.

There are many other natural creatures in which light is created, such as by bio-luminescence, (that may be used by the glow-worm to attract a mate by signalling or to mimic other species as prey) and by the controlled oxidation of hydrocarbon fuels in creatures such as a simple candle.



The glow worm and candle—natural and human-made creatures that embody a mechanism of light

Two natural embodiments of the laws of Creation are seen in the characteristics of water, as a fluid, and in its resultant effects on the earth’s geomorphology. The bipolar nature of water leads to the well-known property of its expansion when, in being cooled, it reaches 4C. When water, which has entered crevices in rocks freezes, it causes them to split; the resulting fractures in the rocks and soils promotes the erosion of the mountains and high land areas. Flowing water also embodies another law of Creation—that of the inverse relationship between velocity and pressure known as the “Bernoulli Principle” elucidated in the eighteenth century . This is embodied in the lifting and carrying of particles on the bed of flowing water—in a process known as saltation—and their ultimate deposition in slow-moving currents on the flood plains.

The creation and embodiment of these and many other laws have set in train processes that have contributed over eons of time and in universal, random ways, to what we might well call the non-biological evolution of the earth's crust. These are rather more mechanistic processes than those involved in biological evolution discussed below. However as Frederick Temple said "[God] did not make the things, we may say; no, but He made them make themselves" ⁹



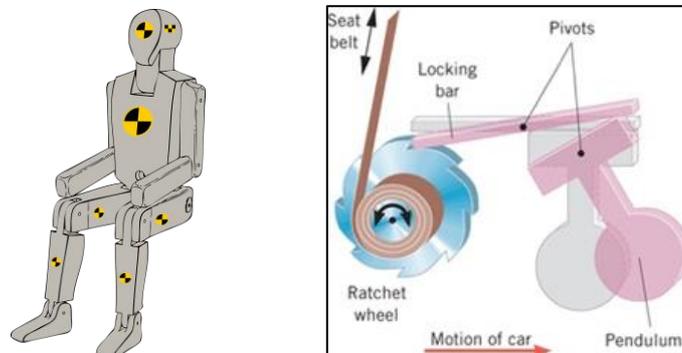
Water is one creature that embodies mechanisms that cause evolution of the earth's crust.

The design and evolution of animal limbs with various degrees of freedom are convergent forms of mechanism that have been embodied, for example, in various natural creatures and mimicked by human-made creatures such as walking robots. In many creatures, both natural and human, the limbs also involve sensitive feed-back systems; such creatures can do anything from unfolding the solar panels on a satellite to conducting a surgical operation.

Powered, position-sensitive mechanisms have been embodied in natural forms in the leaf-cutter ant and mimicked in the modern six-legged walking robot.

⁹ Hinchliff, *Fredrick Temple: A Life*, p. 185.

Or consider a modern, human-made creature based on the laws of inertia, laws which are “seen” and felt in the movement of our bodies and other masses in our everyday life. These laws are both the basis of the impact and head injuries in vehicle accidents and the inertial mechanism that is designed and embodied in our motor cars as the actuator to lock the seat belt and prevent impact damage to the head.



The law of Creation associated with inertia is both the cause of bodily impact in vehicle accidents and the basis of the safety belt locking mechanism to help to reduce such injuries.

More generally, evidence for design is purpose and function which may be seen or inferred, in the staged and ordered sequence outlined in Genesis 1: “his [God’s] design is implied in the way that things are organised.”¹⁰

The independent creatures—light, soil, water, etc. are created first; the more dependent then follow—plants, animals, humans. Thus each group of creatures, was created, to serve the creatures following it in the sequence and thereby create a functioning whole.

For example, the psalmist recognised the hand of the Creator in the functions of the rain—that fills the streams, forms the tilth of the soil and fills the growing seed (Psalm 65). Along with the psalmist, many of us, as we study the land, still rejoice to see the laws of Creation embodied in these functions and in the mechanisms on which they are based. Also, as we understand that many such mechanisms have evolved, so not unreasonably we also conclude, on the basis of their functionality, that they have been designed.

The Genesis text also suggests that the Creation has the characteristics of a design with mechanisms and creatures that are all seen as being “good.” In design terms, this means that they performed their function with “something like a dependable orderliness”¹¹ according to the laws of Creation and the design of the creator.

One characteristic of the mechanisms and their interactions which we need to recognise is the variable magnitude at which they may operate; for example, the variable and sometimes disastrous characteristics of climate. This is the result of the interaction of many mechanisms, and illustrates the fact that the “goodness” of the Creation may not always be seen, superficially at least, as conducive to life and enjoyment by its creatures. As explained below this variability in the climate has a significant influence on the evolution of plants and animals, and on their apparent design.

¹⁰ Barclay, “Design in Nature,” p. 52.

¹¹ Sherlock, “Creationism, Creation and Scripture,” p. 18.

Design and evolution

Limiting the discussion here to evolution in the biological world, this is characterised by vast numbers of species of plants and animals, the life, growth and reproduction of which are based on the biological laws of Creation and their associated mechanisms.

One of the features of the reproduction of such species is the random appearance of genetic variation in their offspring. This could be seen as an inbuilt “mechanism” (as for example in the modern random number generator) that provides some of the creatures with the opportunity to generate new varieties and species and to test their ability to breed, grow and live in an environment that is variable in both time and space. They must compete for food, water and the other inputs with their own and other creatures in their area at that time as well as the presence of pests, diseases and other ecological effects.

This “evolution,” often spoken of as “Godless,” is rejected by some Christians because it is asserted that a random variation, as a driver for the generation of new varieties and species, is not theologically acceptable in the understanding of the text, “and God said ... and it was so.”

The confusion partly turns on the understanding of the “randomness” in the appearance of the genetic variation; to some believers it suggests a lack of repeatability which we expect would be characteristic of mechanisms that, as we understand them, were designed to reproduce, “according to their kinds” (Genesis 1:12, 25 NIV) with a predetermined functional purpose.

But if randomness itself might be considered as a “law of Creation” then perhaps the randomness that is characteristic of the biological world is a mechanism that it was designed to exhibit and to drive the evolution processes. However, as Conway Morris¹² shows, events in Creation that appear to be random to the casual, short-term viewer, can be shown to have, in the long term, purposeful and convergent features. So, mechanisms which appear in different forms in different primitive creatures may converge (apparently “randomly”) to a single form in later creatures. Similarly Polkinghorne affirms “homologies between species ... can also be the consequence of an intrinsic tendency in nature for certain types of structure to be generated through natural processes.”¹³

Biological evolution appears as a driver that results in mechanisms and creatures that have the characteristics of adaptability to local conditions which we associate with the design of modern creatures like robots that have the ability to “learn”—albeit in a primitive way. It is therefore not clear why a fiat creation would require a designer but the evolution of the same creatures, based on the same laws of Creation and mechanisms would not.

Another confusion is introduced if “evolution” is expressed as the *cause* of creation or as an alternative to design. Evolution is but a mechanism by which certain features of the biological world are created or modified; to confuse it with the primary cause of those features has led to the idea that the earth does not need to be designed or created and is self-perpetuating.

¹² Conway Morris, *Darwin's Compass*, p. 13.

¹³ Polkinghorne, “Rich Reality,” p. 32.

The alternative to a creator is often reflected in words like “nature has devised” or even “nature has constructed.” “Who” or “what” is this thing/person called “nature” that does the devising (designing) or the constructing (evolving)? One senses that there is pressure to avoid the use of the word “create” or its derivatives at all costs because that word is already associated with divine creation. In these circumstances we are left without a word that expresses the cause, the initiator or the originator. But then, just perhaps, there is no other word except “creator”!

Others still cannot quite break with the “old” creation paradigm and adopt a wholly naturalistic one. Rather, they adopt a fuzzy semi-deistic one where nature is deified as “Nature” or even as “Mother Nature.”

However, as Hooykaas says: “Even today a reference to Nature serves as the invocation of a deity for many members of the church scientific, while an appeal to what is “natural” still seems to have the force of divine command for some leading members of the church catholic. Deification of nature is still alive.”¹⁴

Also, “The Bible knows nothing of ‘Nature’ but knows only ‘creatures’ who are absolutely dependent for their origin and existence on the will of God.”¹⁵

One of the characteristics of the biological Creation is that, while there is a vast number of different species, they have many common mechanisms and hence can be divided into families on the basis of these; for example—those animals with backbones (vertebrates) and those without (invertebrates). Plants also have similar familial features, for example, in their stems. These range in size from trunks on large trees to stems on smaller plants, all having evolved with the stiffness and height necessary and appropriate to hold the energy gathering leaves above the surrounding species in the physical environmental conditions in which they are living and growing.

The factors such as weather, climate and competitors that determine food and water supply are also subject to variation, firstly at one place due to the short-term statistical characteristics of weather and the long-term changes in climate. Secondly, superimposed on this will be the variation in their locality. For animals this will arise from their mobile and migratory habits and for plants from the movement of seeds and other reproductive parts in the wind, water and animal activities.



Natural climatic mechanisms test the evolutionary capacity of plants and animals to live in new ecological regimes.

¹⁴ Hooykaas, *Religion and Rise Modern Science*, p. 18.

¹⁵ Hooykaas, *Religion and Rise Modern Science*, p. 8.

One can therefore imagine, for example, the evolution that will take place during the continual “testing” of the heritable traits of plant and animal species by their continual advance and retreat into new areas and/or the intensification and reduction in numbers in the existing areas due, for example, to variable climate. This might be seen as the equivalent to the trial and error/success that is characteristic of design and evolution in the modern technological world discussed below.

One of the interesting, modern combinations of the design and evolution of living species that is analogous to natural breeding is of human controlled plant and animal breeding. The “design” aspect involves the identification of varieties and specimens with desired characteristics chosen, after appropriate research, for example, to allow them to be grown in different environments, avoid diseases to which they are susceptible or produce food with desirable yield or taste characteristics.

The “evolution” aspect involves the selection of specimens with the desired characteristics as the seed or parent for the next generation or for the manual transfer of its genes from the donor to the recipient specimen. Plant and animal breeding, involving both design and evolution, have brought about enormous benefits in increasing yields, avoiding disease, etc., in crop and animal production. As Darwin noted, “The key is man’s power of accumulative selection: nature gives successive variations; man adds them up in certain directions useful to him. In this sense he may be said to make for himself useful breeds.”

An example of plant breeding to achieve a human objective of greater yield—a form of design and evolution—is associated with the breeding of canola with pods that have a greater shatter resistance. Varieties are screened to find those with good shatter resistance; the genes of these are then inserted, in a form of human driven-evolution, into local varieties that had other desirable agronomic characteristics; the “designed” result is a variety with shatter resistant pods and a resultant increase in harvestable yield.



The writer (left) (and his plant-breeder colleague) with the mechanical instrument which the former designed to measure shatter resistance of canola pods under impact.

Design and evolution in the human world

“Design” (verb) is a modern term that implies a purpose and literally means to “de-sign,” as in “de-cribe,” “de-note” or “de-fine” the mechanism or the creature. So design involves:

- the identification and definition of the function that it is required to perform.
- the selection of the mechanisms and processes that will be employed to achieve the desired functional performance.
- the calculation and choice of dimensions and shapes based on the materials and mechanisms and their disposition to achieve the function. Each mechanism should be appropriately designed relative to all the other mechanisms and so achieve an efficient

design. Other considerations may include control, safety, appearance, economics, life, etc.

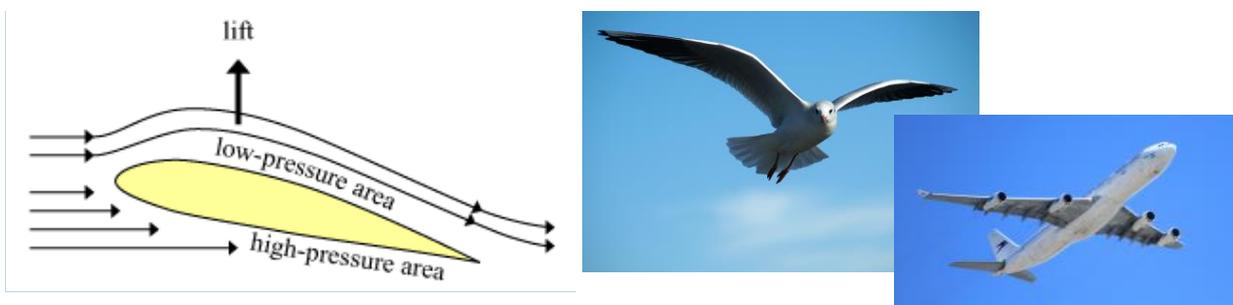
- the construction of the various individual mechanisms and their testing, often to destruction, in appropriate ways that simulate their operation in the complete creature.
- the construction of a “prototype” (first of its type) and an evaluation of it in terms of its operation, performance and desired function, again often to destruction.
- the redesign of any mechanisms to improve their functional performance and increase their life, efficiency, safety and other measures of performance.

This series of trials may be repeated wholly or partially many times before the functional requirements are satisfactorily met, the creature is completed and is finally available for sale and use. Large complex devices are usually monitored throughout their entire life and often upgraded to improve their function or eliminate faults that have only appeared, or on the basis of incipient failures, may be expected to appear, after much use.

These processes result in a kind of evolutionary development of human-made creatures that may start off by mimicking natural ones. Richard Dawkins writes, “Whenever humans have a good idea zoologists have grown accustomed to finding it anticipated in the animal [and plant?] kingdom ... examples include echo-ranging (bats), electro-location (duckbill), the dam (beaver), the parabolic reflector (limpets), the infra-red heat-seeking sensor (some snakes), the hypodermic syringe (wasps, snakes and scorpions), the harpoon (cnidarians) and jet propulsion (squids).”¹⁶

Thus modern designers in search of rational, optimum mechanisms to use in human-made creatures often find, at least, “in-principle” solutions to their search that have already been reached under natural evolution. It therefore seems entirely reasonable that the latter should be described as having been “designed” even if we cannot explain how that occurred or find a more relevant word to describe it.

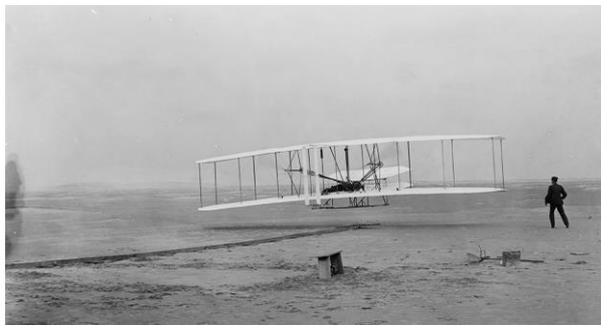
The bird wing is an example of a natural mechanism that has been mimicked in the modern aerofoil. Like the Wright brothers in USA and others around the world, Lawrence Hargraves in Australia was seeking to design a suitable wing mechanism for use in powered flight. At that stage they were unaware that the relevant law of Creation—the Bernoulli Principle, viz the inverse relationship between pressure and velocity could be implemented in the aerofoil to provide aerodynamic lift.



The aeroplane wing is an example of the embodiment of the law of Creation associated with the inverse relationship between pressure and velocity and an imitation of a bird's wing.

¹⁶ Dawkins, *The Ancestor's Tail*, p. 56.

As an illustration of this evolutionary development in human-made creatures we might compare the primitive wood and cotton cloth airplane weighing 274 kg that the Wright brothers managed to fly 260 m in 1903 to the latest A380 Airbus weighing some 575 tonnes as it hurtles down the runway and commences to fly half way around the world at 900 km/hr.



The Wright brothers' first flight and the A380 Airbus illustrate the design and evolution of aircraft over the twentieth century. The wingspan of the A380 is greater than that first flight!

All the primitive experimental and mature commercial aeroplanes since the Wright brothers have operated with each of its mechanisms designed to perform their inherent function—structural, thermodynamic, fluid-dynamic, electromagnetic—each at a level associated with the then current understanding of the relevant laws of Creation.

This general evolution of the aeroplane in the past century was, like evolution in the natural world, characterised by both successes and failures. These usually occurred because the mechanisms were pushed to operate in new, often extreme, untested conditions or over untested periods. New models are now based on millions of hours of design, thousands of experiments and hundreds of prototypes all seeking to maximise various chosen measures of performance such as size, aerodynamic lift, speed, fuel efficiency or manoeuvrability.

Today we have hundreds of types, sizes and models of aeroplane—from giant cargo and passenger planes weighing 100+ tonnes to small drones weighing a few grams. Each has been designed and each operates on the basis of the well-understood laws of Creation and a long evolutionary line of mechanisms each designed to meet the relevant functional requirements.

Like evolution in the natural world, the failure of many creatures in the scientific-technological-industrial world is a “costly” aspect of the design and evolution process. Notwithstanding the many modern computer based design techniques, failures, particularly of the aeroplane and many other modern vehicles, have cost thousands of lives. And while every failure is a personal and technological tragedy, society appears to be willing to pay the associated “price” for such developments while carrying on the unending search for a greater understanding of the mechanisms and a more successful embodiment of them in ever larger, faster, more efficient and luxurious models.

Conclusion

The world itself and its natural and human-made creatures are often spoken of as being “mechanistic” because they are described by universal laws of Creation and mechanisms which behave in rational and repeatable ways, characteristics that we recognise in modern human-made machines and devices.

When we consider how the biological world and its creatures came into being, the scientific understanding is that they evolved from simpler forms over many generations. Many Christians believe that this is consistent with the statement that “In the beginning God created the heavens and the earth.” Alternatively others assert that this statement means that the various species did not evolve but were separately “designed” and created in fixed forms.

It is argued above that the creatures in the natural world were created by God and

- operate within the universal laws of Creation,
- follow long-running evolutionary processes,
- embody mechanisms which are often convergent forms of simpler, earlier mechanisms.

We describe this world as having been “created.”

It is also argued that the creatures in the human-made world, which function within the natural world, also

- operate within the universal laws of Creation,
- embody many mechanisms which are analogous to those in the natural world,
- often embody mechanisms which are variations of earlier mechanisms,
- often follow relatively long-running evolutionary processes.

We also describe this same world, in more specific but complementary terms as having been “designed” and as having “evolved.”

Thus we rightly use the modern terms “design” and “evolution” to describe aspects of both the divine and human-made processes by which the world’s creatures came into being. Therefore it is reasonable to suggest that these are not mutually exclusive terms, but rather complementary ones, which together describe what we understand about the words and works of both God and humans .

However, the elucidation of the laws of Creation and the design of the vast array of useful human-made creatures has often been marked by a certain secular hubris. The divine creator of the laws and mechanisms on which they are based, and the wonder of the creatures in which they are embodied, goes unacknowledged by many. This is based on the view that the Creation is assumed to be “uncaused” and so no divine role is needed.

In a short step from having adopted this secular, humanistic stance, many in society also commit the sin against which the Hebrews were warned when they prepared to enter their new, resource-rich land: “You may say to yourself, ‘My power and the strength of my hands have produced this wealth for me.’ But remember the Lord your God, for it is he who gives you the ability to produce wealth” (Deuteronomy 8:18 NIV).

In the present context we ought to remember that we have not only been created by God—through design and evolution—and to bear the image of God but, with all the other creatures, to inherit the Creation with all its glory and awe-fullness, its complexity and fecundity, its power and usefulness.

Given the mechanistic and rationalistic characteristics of the Creation, we have, on the basis of our understanding of its laws and mechanisms, been able to create, by design and evolution, the vast array of good creatures and a few bad ones; perhaps one of our greatest sins is wilfulness in even using some of the good creatures in bad ways.

It ought to be conceded that, while the mechanistic model of the Creation is a useful one for many purposes and people, there are many aspects of Creation that are better described by other words, modelled by other images and revealed by more nuanced visions; for example, in the quantum world. Also underlying and imbuing all that we understand, and that which we don't, are the spiritual dimensions that inform our minds and affirm the relationships which we have by faith with the Creator, our heavenly Father.

So, notwithstanding our successful creations, there is no justification for any hubris. Indeed, we ought to remember that, like the Hebrews, it is the Lord our God who not only created our earthly home but “who richly provides us with everything for our enjoyment” (1 Timothy 6:17 NIV). Further having been given the ability to produce creatures in all their forms we are commanded to be good stewards of Creation and of all its creatures.

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The comments by the Rev. Dr Chris Mulherin and Dr Helen Joynt on an earlier version of this paper are gratefully acknowledged.