

“the way of the tree of life”, of the promises to the fathers, of the call of Israel and the Hope of Israel, which we are privileged to share. We watch and wait patiently for that imminent day of the Lord’s return, and look for the Kingdom

age, when all men and women will be brought to understand their true position before God, to worship the Creator in truth, and to appreciate that this book is true from its beginning, and is the foundation stone of faith.

Atoms, molecules and evolution

John Morris

EVOLUTION—as most people understand the term—is a theory put forward to account for the origin of living creatures on planet earth. It is a theory that contradicts the account of Creation in Genesis, and effectively denies the existence of God, or at the very least diminishes His power.

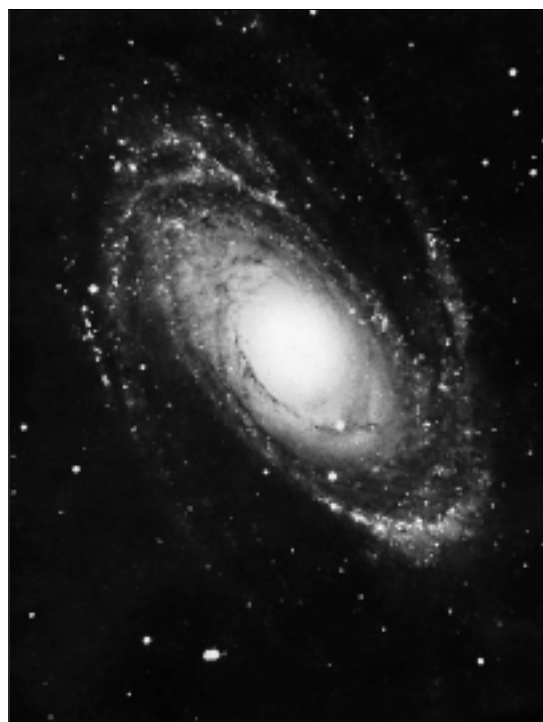
When Charles Darwin first published his book *The Origin of Species* in 1859, he saw “no good reason why the views given in this volume should shock the religious feelings of anyone”. He did not deny the existence of God, and in fact assumed the presence in the very beginning of a few primitive created organisms—from which all others developed. Since his time, however, the theory of evolution has become much more elaborate and far more dogmatic, finally doing away (in very many people’s minds) with the need for belief in God, and taking for granted that not just the origin of species but the origin of life itself can be explained by evolutionary ideas.

An all-embracing dogma

‘Evolution’, in fact, has become a shorthand word for all the processes by which the universe as we know it came about. Darwin occupied himself with orchids and finches, and his theory of natural selection was concerned with biology—with birds, plants, fish and animals. He gave little thought to galaxies and stars, or to atoms and molecules. Today, evolutionary thinking pervades most branches of science.

Cosmologists, for example, regularly use the word ‘evolution’ to describe the way stars and galaxies might have formed and developed in the course of time. They explain the origin of the heavenly bodies as the result of the laws of physics acting upon the remnants of a ‘big bang’ at the dawn of the universe. Now, the theories of astronomy may not offend a disciple’s faith in quite the same way as the idea that man arose by natural selection; ‘big bang’ theory does not im-

mediately appear to contradict what the Bible says. On the other hand, could we ever be content with the idea that the stupendous beauty and order of outer space was the result of mere chance? It is hard to imagine how anyone who has seen recent photographs taken through the Hubble telescope, breathtaking in their beauty, could fail to acknowledge the work of an Almighty hand.



Spiral Nebula in Ursa Major

Uniformitarianism

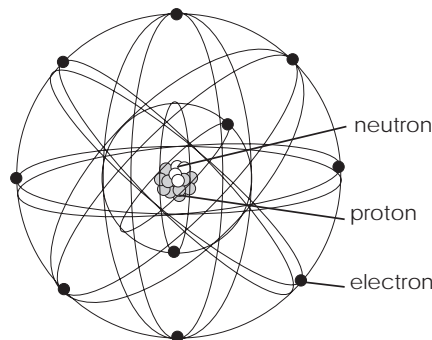
Geophysicists, too, use evolutionary language; they speak of the way they believe the surface of the globe has ‘evolved’ as a result of continental drift. Again, this may not seem to have implications for the believer; after all, does it matter whether or not the continental ‘plates’ came into

their present positions by slow uniformitarian processes over long periods of time? Leaving aside the question of time, and overlooking objections which creationists have made to ideas of continental drift, one is bound to ask if the One Who “laid the foundations of the earth” (Job 38:4) left it to mere processes of chance. Surely, when God on the third day created dry land, He placed it where He wished it to be, deliberately setting “the bounds of [man’s] habitation” (Gen. 1:9; Acts 17:26).

It is important to realise what scientists are saying: they are asking us to believe that everything, from tiny subatomic particles to colossal galaxies, life in all its varied forms, the amazing powers of the mind—all this, they say, arose by unguided processes of chance.

The infinite and the infinitesimal

This article is mostly about molecules; but before we can discuss molecules we ought just to say something about atoms—molecules being made up of combinations of atoms. Because they are so small, we cannot admire atoms in the same way as we can marvel at flowers or butterflies or tropical fish. Yet, as at every other level of creation, there is something to astonish us in the variety of what we sometimes call the ‘simple’ chemical elements—substances as different as oxygen and iron, or carbon and copper. Looking even closer, we marvel further at what has been uncovered within the atom: mysterious subatomic particles such as leptons, bosons and quarks—but in combinations, and with qualities and ‘colours’, which defy the imagination. Atoms are amazing; scientists simply take them for



Representation of an atom: a nucleus with orbiting electrons

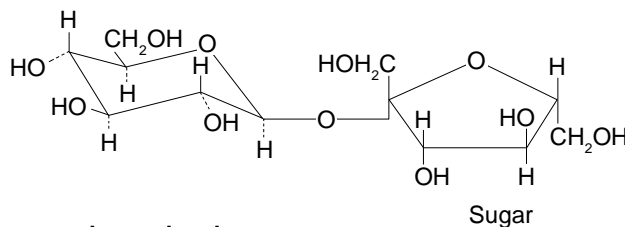
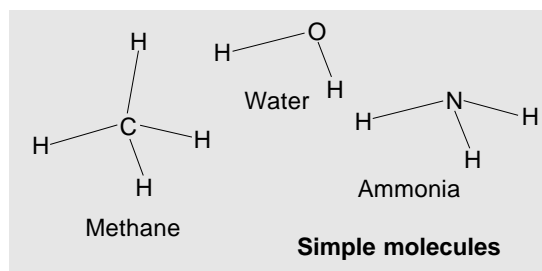
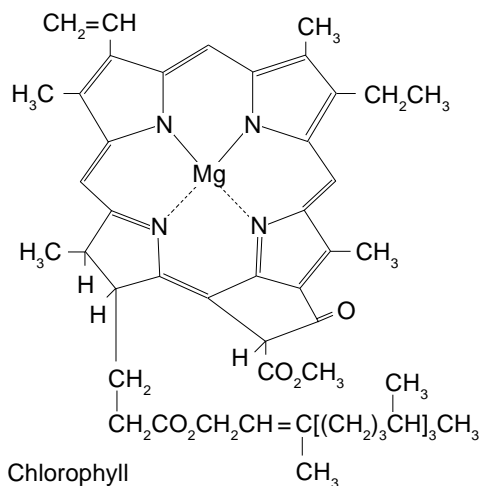
granted, but we can learn to wonder at them. In the infinite and also in the infinitesimal, the Creator’s mighty hand has been at work.

And so to molecules. Here, too, the myriad forms, the range of shape and size, from the ‘simple’ hydrogen molecule to the exquisite complexity of, for example, a molecule of chlorophyll, with the vital magnesium atom nestling at its centre—this is beauty and variety just as awe-inspiring as that of insects or birds.

The building materials of life

Now we are getting closer to the main subject of this article. For it is when we come to consider the molecules associated with life that evolutionary thinking ceases to be remotely credible.

For the believer in a Divine Creator, there is no problem; just as God made atoms, He also created ‘ordinary’ molecules such as water and methane, and also—from the very beginning—complex molecules like chlorophyll, and giant molecules such as the protein fibres in muscle or



the long helical filaments of nucleic acid that are found in genes and chromosomes. All these are molecules designed by the Creator to work together and fulfil specific functions.

The evolutionist, on the other hand, does have a problem: without a Creator he cannot assume the existence, on the earth of long ago, of anything more complicated than the gases and minerals that one might find on a 'dead' planet. Long before he has to worry about the origin and diversity of species, the evolutionist has to worry about where the materials for life came from.

He theorises that, in certain favourable conditions which once existed on earth, simple molecules came together to form more complex molecules—amino acids, for example—and, in due course, self-replicating molecules such as nucleic acids. Once these existed, it is not difficult (so he says) to envisage the formation of a cell from an envelope of phospholipid, and inside it a genome of nucleic acid. In this way he claims to account for the basic components of every cell in every known organism. And having thus 'explained' the cell, the evolutionist then goes on to 'explain' the emergence of life in all its varied forms.

But 'to assert is not to prove'. The evolutionary scientist has to be challenged on the credibility of every one of these processes—from atoms to molecules, from molecules to the cell, from complex molecules to the living being—and then, of course, on the origin and diversity of species.

Extrapolation

As with many arguments against the evolutionist, our criticism is best directed against his tendency to extrapolate—that is, his habit of reasoning from small, observable effects to much larger processes of change that no one can observe. Take, for example, the idea, regularly put forward, that life began as a result of chemical reactions in a warm rock pool. Scientists, attempting to simulate chemical reactions that might have led to the production of 'life', have reported that ammonia, methane, carbon monoxide and water, under certain laboratory conditions, assisted by an electric discharge, combine to form one of the twenty amino acids (the basic building blocks of all proteins). This could well be true. But the evolutionist, on the strength of this one small discovery, is presumptuous enough to claim that he has the explanation for the origin of proteins and the secret of life.

One flash of lightning in one rock pool, say in the South Pacific, may well fuse together some basic chemicals, but it requires the continued and concerted action of many transformations, in the same chemical 'soup'—not over millions of years but in a brief period of time—to form a larger molecule which might be a step towards a primitive protein. And it requires all the circumstances to work favourably on that primitive protein (presumably in the same rock pool!) if, in the end, a viable protein is somehow to come into being. The odds against any such idea are enormous.

And one needs not just one, but thousands of different, specialised, proteins. Moreover, the proteins one is looking for—enzymes, for example—are immensely complex and highly unstable (which is why they need the delicately balanced environment of the cell to function in). In the highly unlikely event of one such molecule being formed, it would soon be broken down again. And having said all this about proteins, one has to repeat the process for nucleic acids, lipids and carbohydrates, and many other materials—all of which must be present together.

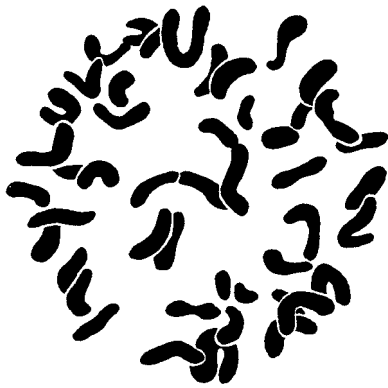
In other words, our disbelief concerns not so much the possibility of one or two small chemical changes, but the idea that a succession of such changes could produce life. This is far more unlikely and improbable even than the chances of a primitive quadruped evolving into the dog or horse we know today.

The blueprint of life

How the first 'primitive' cell might have come about presents an insuperable obstacle to evolutionists. Darwin did not have to face that challenge because the unravelling of the structure of the cell and its contents had barely begun. Darwin was aware of what he called "organs of extreme perfection and complication", for example the eye, but he had little idea of the next level of sub-microscopic complexity—the inner workings of the cell—and he could have no idea at all of the molecules that drive those inner workings. The subject of molecular biology, even now barely fifty years old, describes and analyses the hidden biochemical processes that go on constantly within the cell.

Much has been made in the news media recently of 'the genome', and it is here that we can conveniently start in attempting a brief survey of what is called 'molecular biology'. The 'genome' (of whatever species) is the total sum

of its genes—long molecular filaments of deoxyribonucleic acid (DNA) which define all the characteristics of that individual. In higher animals these genes are packed into chromosomes (twenty-three pairs in man), which are to be found in the nucleus, a self-contained body within the cell.



Human chromosome under the microscope

At this stage, for the sake of brevity, we have to make some enormous simplifications, but essentially one can say that DNA—the blueprint of the organism—directs and controls the cell (and organises its own replacement) through another nucleic acid, RNA, which is then translated into protein.¹ Such a statement, however, obscures

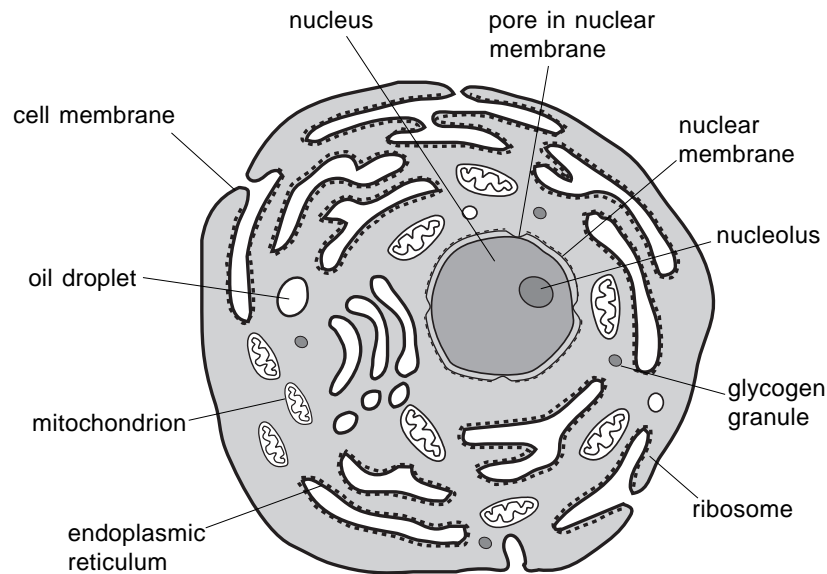
the fact that there are (in man) possibly thirty thousand genes, producing tens of thousands of proteins to fulfil all the thousands of functions of each cell—and there are 100 million million cells in a human body! Many of those proteins are enzymes, essential for the cell's metabolism (the turnover of vital chemicals and removal of waste).

The powerhouse within the cell

Perhaps the nearest analogy one can find for the cell is that of a chemical factory—or complex of factories—of the more old-fashioned sort, where wagons carried raw materials, men turned taps and oiled machines, steam belched forth from valves . . . and where, perhaps in the middle of each production hall, there would be a cabin in which managers pored over papers and charts.

The cell is not a blob of inert jelly, but a microscopic factory where thousands of biochemical processes are being performed unceasingly throughout its life. It has at its centre a nucleus containing the blueprint which determines all that goes on; and it has compartments, pathways and channels by which materials are processed and waste is disposed of. To believe that such a cell could come together by chance is like

1. See ["Order and chaos"](#), by Simon Collard, on p. 181 of this Special Issue for a more detailed description.



Diagrammatic representation of a cell

believing that a chemical factory (or rather dozens of chemical factories) could arise overnight by spontaneous reactions in heaps of raw materials.

The challenge to the evolutionist

One can now begin to see what the evolutionist has to answer. Any explanation for the marvel of life has to be able to account for:

- 1 the formation of large molecules from which a 'primitive' cell might be made (there is, incidentally, no such thing as a 'primitive' cell; the humblest bacterium is almost as sophisticated as the human cell);
- 2 the organisation of the cell, where countless millions of large and small molecules, all in the right proportions, keep the cell going (and provide for a replacement when the cell dies);
- 3 the mechanisms by which cells are 'turned on' to fulfil specialised functions in different parts of the body—liver, brain, heart, etc.;
- 4 the mechanisms which lead to the unique differences between individuals within a species (the factor which explains why we have blood typing and why grafts can be rejected), and to the differences between the cells of different species.

What Darwin never knew

How can such vastly complex processes have evolved? And remember, this entire 'infrastructure' has to be in place before one can speak about a living being, capable of sustaining and reproducing itself. The evolutionist takes for granted that there were once simple organisms in which all this infrastructure was present; and on this assumption he then builds his theory of how 'higher' creatures evolved from simple ancestors. The absurdity of his assumption has now been exposed by biochemical advances.

In a recent book, *Darwin's Black Box: The Biochemical Challenge to Evolution* by Michael Behe,² the author writes:

"It was once expected that the basis of life would be exceedingly simple. That expectation has been smashed. Vision, motion, and other biological functions have proven to be no less sophisticated than television cameras and automobiles [cells are actually far more sophisticated than cameras or cars, and are capable of replicating themselves!—J.H.M.]. Science has made enormous progress in understanding how the chemistry of life works, but the elegance and complexity of biological

systems at the molecular level have paralyzed science's attempt to explain their origins . . . There are compelling reasons—based on the structure of the systems themselves—to think that a Darwinian explanation for the mechanisms of life will forever prove elusive".

Behe then proceeds to give detailed examples of the wonder of the body's biochemical mechanisms: the chain of molecular events triggered by light arriving at the eye, which registers an image in the brain; the cascade of proteins called into action in the delicate process of blood clotting;³ the amazing recognition mechanisms which alert the body to invasion and lead to immunity. These, and other examples, are used to prove the general principle that the marvellous mechanisms of the human body (and equally all other forms of life) have to come fully formed, and can never have arisen by some process of gradual development, that is, evolution.

What does the Bible say?

Confronted by the wonders of chemistry within the cell, the Bible believer is bound to enquire whether the Scriptures describe or allude to this sphere of creation. The ancients had no microscopes, yet is there a hint in Job of a promise that one day the wonders of the infinitesimal will be revealed? God says, "Hast thou entered into the treasures of the snow? or hast thou seen the treasures of the hail, which I have reserved against the time of trouble . . . ?" (38:22,23). Some students, moreover, have quoted Psalm 139 as possibly describing the still hidden secrets of the genetic code and the workings of the cell: "I will praise Thee; for I am fearfully and wonderfully made: marvellous are Thy works . . . My substance was not hid from Thee, when I was made in secret, and curiously wrought in the lowest parts of the earth. Thine eyes did see my substance, yet being unperfect; and in Thy book all my members were written" (vv. 14-16).

One cannot be dogmatic that these passages really anticipate modern science; yet we must recognise that God from the beginning did know all the intricacies of life—for He created it. "He

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2. Reviewed in *The Testimony*, Feb. 2000, p. 93. The author of this book (first published in 1996), whilst not a creationist, documents what he sees as the evolutionist's inability to account for the exquisite machinery of the living cell.
 3. See "[The life is in the blood](#)", by Mark Allfree, on p. 221 of this Special Issue.

That planted the ear, shall He not hear? He That formed the eye, shall He not see?" (Ps. 94:9). The great Creator of heaven and earth knows more than man will ever discover of the atoms, molecules and cells that constitute life: "He giveth to all life, and breath, and all things; and hath made of one blood all nations of men . . . in Him we live, and move, and have our being" (Acts 17:25-28). He formulated the DNA sequences—the genomes—that determine the form and function of every living thing.

Man playing God

We have already referred to the announcement of what has been hailed as molecular biology's greatest triumph, the deciphering of the human genome. There is no denying that this was a prodigious achievement—the analysis of a message which is three billion characters long (the equivalent of more than 700 Bibles). Yet though this was a spectacular achievement, it falls far short of man being able to claim that he now knows—let alone controls—man's genetic make-up. Knowing the genome sequence does not yet tell us how all the genes are organised. In fact, as someone has wryly commented, "It is like discovering a directory of all telephone numbers, but with only some of the names and addresses!".

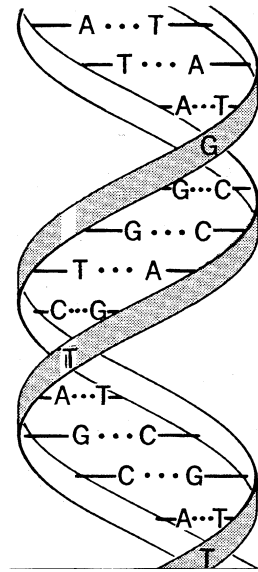
Certainly, mankind is closer to describing his own and other species; he may one day be able to use his new-found knowledge to cure a few diseases by genetic intervention (though most of this is still wishful thinking). But an explanation of how the cell and its molecular workings might have evolved is even further away. The recent

Sample of genome sequence
 . . . CGATTAACCCTGATACCAATAAAAATCCCTAAGC . . . etc.

breakthrough has actually magnified the wonders of nature; it reassures us that the hand of the Creator was at work in the beginning, and it adds considerably to the evidence that evolution is powerless to explain such marvels.

Alphabets and atoms

One feature of the genome above all others must be noted: it is written in a four-letter alphabet that is the same for virtually every living being—from bats to badgers, from the flu virus to bacteria that live in ocean deeps. If evolution occurred, then by laws of blind chance there is



Simple representation of DNA double helix; A, C, G, T are the four 'letters' of the genetic 'alphabet'

no reason why different 'alphabets' should not have arisen in different groups of species. Yet life has a common alphabet, shared by the DNAs of all the world's organisms.

A digression back to physics and chemistry is appropriate here. Is it not a marvel, attributable only to a Creator and not the result of chance, that we have a universal system of elements? Wherever one might be in the universe, hydrogen is hydrogen, calcium is calcium—with exactly the same properties as they have on earth.

Subatomic particles, too, are the same wherever they occur in the vast universe—electrons are electrons, and neutrinos are neutrinos.

In the same context, one should add that, as far as man has been

able to discover, the laws of physics—for example, laws to do with gravity, or the speed of light—are the same everywhere. Thus, in all the basic systems of the universe—the laws of physics, the 'alphabet' of atoms, and the language of the genetic code—there is uniformity. It is one universe, created by one Almighty hand. It did not have to be so; in fact this would not necessarily be the situation resulting from processes of blind chance.

Of course, the evolutionist tries to turn this argument around, insisting that evolution itself 'ensured' a single set of laws, a single alphabet

for the genetic code, and so on. He also frequently uses the molecular similarities between species, for example, a close correspondence in the structure of their haemoglobins, as proof of a common origin in the 'evolutionary tree'. For those who believe in Creation, this is no different from the old argument that similarities between the limb structures of reptiles and birds 'prove' their evolutionary connection; they prove no more than the Creator's use of similar design features throughout the animal world.

Many more avenues could be explored. Perhaps this will be sufficient, however, to encour-

age the believer, whether or not tutored in the science of our age, to keep faith in his Creator—the God Who made the world to be filled with His glory, and made man to have dominion over His creation.

"He hath made every thing beautiful in his time" (Eccl. 3:11).

Acknowledgement

The author is grateful to several who have commented on drafts of this article, especially Brethren David Brown and Phil Mallinder.

Interpreting the fossil record

Alan Fowler

"Speak to the earth, and it shall teach thee" (Job 12:8)

THERE CAN be no conflict between the Divine record of Creation in Genesis 1 and the fossil record of creation in the rocks. Conflicts can only arise if we misinterpret either or both of these records.

As we hope to show, the species-specific zoning of fossils in the succession of sedimentary rocks indicates that they could not have been deposited from a single flood, and must have been laid down over a very long period of time.

In Genesis 1 we have a six-day time frame in which God revealed the creative power of His Word. Apart from the creation of man, there is no indication when Creation began ("In the *beginning* God created . . ."), nor are we told how God created the plants and animals. We are simply told that God said, "Let the earth bring forth" or "Let the waters bring forth". By contrast, when God created man He declared, "Let us make man in our image". This is followed by details regarding the creation of Adam and Eve, and the genealogies indicate that they were created about 4,000 B.C.

So, although the Divine record of Creation excludes the possibility that Adam and Eve evolved, we are free to explore the fossil record for clues regarding the manner in which the plant and animal kingdoms came into being.

What do we find in the fossil record?

Until recently, the oldest fossil-bearing rocks were found in the Cambrian series. In these sedimen-

tary rocks we are introduced to a spectacular burst of life containing representatives of all the major categories of marine life. A dragnet in the Cambrian sea would have brought up porifera (for example, sponges); coelenterates (for example, jellyfish and sea anemones); echinoderms (for example, sea lilies and sea cucumbers); brachiopods (lamp shells); molluscs (for example, bivalves such as mussels, and single-shelled gastropods such as limpets); annelids (segmented worms); arthropods (for example, trilobites); and vertebrates (for example, jawless fish).

Over 500 different species have been found in the earliest Cambrian deposits, but more remarkable than the numbers is the complexity of many of these creatures. For example, Cambrian trilobites, which vary from a quarter of an inch to eighteen inches long, had well-developed limbs, antennae, a digestive system, a nervous system and compound eyes. Yet they, like their contemporaries, appear abruptly and without evidence of their ancestry.

Evolutionists often speculate on possible steps in the evolution of the eye. Such speculation is futile because the eyes of early trilobites have never been exceeded for complexity or acuity by later arthropods. They were perfect from their beginning, and their acuity was enhanced both by a doublet lens structure and by a sophisticated aspheric correcting interface.¹

This record of the sudden appearance of new forms of life is repeated again and again in the