

SCIENCE IN THE GLORIOUS QUR'AN



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The Glorious Qur'an is the Divine Book of Muslims, who constitute nearly one-fourth of the human race. Muslims purely believe in One God and obey and submit to Him.

The Glorious Qur'an was revealed to the Prophet Muhammad (peace be upon him), in the seventh century through Angel Gabriel. Since its revelation, Muslims have been keen to record and memorised the Qur'an by heart. Therefore, it is well preserved as it was revealed.

The Glorious Qur'an was revealed as a divine remedy for our souls and hearts. It is God's prescription for mankind to lead a peaceful and happy life in this world and the world to come.

Because the Qur'an is the final revelation of God, which contains His Straight Path or Islam, He put precise scientific facts as evidence for its divinity. Surprisingly these facts have been fairly recently discovered; a fact which obviously raises the question:

How would a man brought up in an illiterate Society in the seventh century have known all these amazing facts unless he was inspired by God?

"We shall certainly show them Our signs in the Universe and in their own selves, till it will be very obvious to them that this (Qur'an) is the Truth" (Qur'an, 41:53).

In this book, we have reviewed more than 75 modern scientific facts mentioned in the Glorious Qur'an. These facts precisely cover topics in biology, embryology, cosmology, and geology.

"O people! A proof has come to you from your Lord, and We sent down to you a clear light" (Qur'an, 4:174).

"O people, now there has come to you an admonition from your Lord, and a healing for what is in the breasts, and guidance, and a mercy to the believers" (Qur'an, 10:57).

BACK OF THE COVER

SCIENCE IN THE GLORIOUS QUR'AN

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May God accept this humble effort and reward all those who contributed in writing, revising, amending, translating and printing this book (Ameen).

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

IN THE NAME OF GOD, THE MOST GRACIOUS, THE MOST MERCIFUL

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1. INTRODUCTION

1.1. The Qur'an

The Glorious Qur'an is the Divine Book of Muslims, who constitute nearly one-fourth of the human race. Muslims believe purely in One God and obey and submit to Him. The Glorious Qur'an was revealed through Angel Gabriel to the Prophet Muhammad (peace be upon him, PBUH), who lived in an illiterate Society in the 7th century.

Since its revelation, Muslims have been keen to record and memorise the Qur'an by heart. Therefore, it is not surprising today to find millions or hundreds of thousands of the 1.6 billion Muslims around the world memorising the entire Qur'an by heart, from its beginning to its end, regardless of their race, nationalities or native languages. This has kept the Qur'an free from any human manipulations and contradictions which might be found within previous holy scripts.

"إِنَّا نَحْنُ نَزَّلْنَا الذِّكْرَ وَإِنَّا لَهُ لَحَافِظُونَ" (الحجر:9).

"It is We Who revealed the reminder (the Qur'an) and it is We Who will preserve it" (Qur'an, 15:9).

"وَلَقَدْ يَسَّرْنَا الْقُرْآنَ لِلذِّكْرِ فَهَلْ مِنْ مُدَكِّرٍ" (القمر:22).

"We made the Quran easy to remember, is there any that will remember" (Qur'an, 54:22).

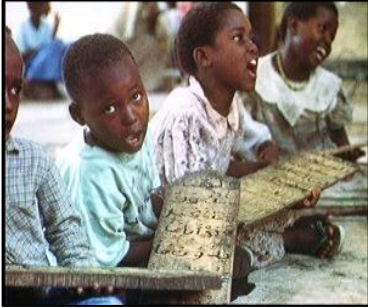
"لَا يَأْتِيهِ الْبَاطِلُ مِنْ بَيْنِ يَدَيْهِ وَلَا مِنْ خَلْفِهِ تَنْزِيلٌ مِّنْ حَكِيمٍ حَمِيدٍ (فصلت:42).

"Falsehood cannot approach it, from before it or behind it. It is a revelation from One Wise and Praiseworthy" (Qur'an, 41:42).

The Qur'an is a comprehensive Book of Wisdom and Guidance which confirms the previous Holy Books revealed to the Prophets of God, such as Abraham, David, Moses and Jesus (PBUT). It encompasses a complete way of life with laws, commands, conduct, duties, rights and all that humanity requires for peaceful coexistence.

"مَا يُقَالُ لَكَ إِلَّا مَا قَدْ قِيلَ لِلرُّسُلِ مِنْ قَبْلِكَ" (فصلت:43).

"Nothing is said to you but was said to the Messengers before you" (Qur'an, 41:43).



Muslims are keen to teach their children how to recite and memorise the Qur'an in their childhood.



The Qur'an touches, opens and moves true hearts. It stirs souls and eases anxiety. It guides people to the truth regardless of their age, knowledge or cultural background.

"وَنُنَزِّلُ مِنَ الْقُرْآنِ مَا هُوَ شِفَاءٌ وَرَحْمَةٌ لِّلْمُؤْمِنِينَ ۖ وَلَا يَزِيدُ الظَّالِمِينَ إِلَّا خَسَارًا " (الإسراء: 82).

“And We send down from the Qur'an that which is a healing and a mercy to those who believe” (Qur'an, 17:82).

The Noble Qur'an was revealed in the Arabic language. This language has an elaborate system of grammar and a rich vocabulary. In addition, the Arabic words possess various meanings and numerous synonyms. Therefore, the Arabic language provides immense scopes for expressing thoughts in different ways. This has allowed people, at different times, to comprehend the meanings of the Qur'anic verses in a way which is enriched as their knowledge increases.

1.2. The Qur'an and the Science

The first word in the first verse revealed in the Qur'an to the Prophet Muhammad was read. This means that God encourages us to be knowledgeable. This is because the more we are knowledgeable, the more we would appreciate the Omnipotence and the Magnificence of God's creation.

"اقْرَأْ بِاسْمِ رَبِّكَ الَّذِي خَلَقَ: (العلق).

“Read: In the Name of your Lord” (Qur'an, 96:1).

The Glorious Qur'an encourages us to look around, use our minds and contemplate His creation. God knows that if our minds are impartial and unprejudiced by ideas and thoughts propagated around us, we will reach the reality that there must be a creator behind this mighty and great creation.

"إِنَّ فِي خَلْقِ السَّمَاوَاتِ وَالْأَرْضِ وَالْخْتَلَافِ اللَّيْلِ وَالنَّهَارِ لآيَاتٍ لِّأُولِي الْأَلْبَابِ" (ال- عمران: 190-191).

“In the creation of the heavens and the earth, and in the alternation of night and day, are signs for people of understanding (Qur'an, 4:82).

"أَمْ خُلِقُوا مِنْ غَيْرِ شَيْءٍ أَمْ هُمْ الْخَالِقُونَ. أَمْ خُلِقُوا السَّمَاوَاتِ وَالْأَرْضَ بَلْ لَا يُوقِنُونَ" (الطور:35).

***Or were they created out of nothing? Or are they the creators?
(Qur'an, 52:35).***

God throughout the Qur'an makes it clear that the rule in His creation is perfection and integration. Everything in the universe, starting from the tiniest electron in an atom to a huge galaxy, follows the Laws of God. Would chance create these defined sets of intricate laws? On the other hand, would chance lead to perfection and integration of all the complex forms of life, which keep everything in harmony and order?

"صُنِعَ اللَّهُ الَّذِي أَنْتَقَنَ كُلَّ شَيْءٍ إِنَّهُ خَبِيرٌ بِمَا تَفْعَلُونَ" (النمل:88).

“The making of God; Who has perfected everything” (Qur'an, 27:88).

"مَا تَرَى فِي خَلْقِ الرَّحْمَنِ مِنْ تَفَاوُتٍ" (الملك:3).

“You see no fault in the creation of the Beneficent” (Qur'an, 27:88).



Who is behind the integration of the diverse creatures and their fine balance in the diverse ecosystems? The interference of humans in this balance always leads to environmental disasters.



"إِنَّا كُلَّ شَيْءٍ خَلَقْنَاهُ بِقَدَرٍ" (القمر: 49).

“Everything We created is precisely measured” (Qur’an, 54:49).

"أَلَمْ تَرَ أَنَّ اللَّهَ يَسْجُدُ لَهُ مَنْ فِي السَّمَاوَاتِ وَمَنْ فِي الْأَرْضِ" (الحج : 18).

“Do you not realize that to God prostrates (submits to His Law) whatever in the heavens and everyone on earth” (Qur’an, 22:8).

God in the Glorious Qur’an draws our attention to the fact that He planned everything to support life on the Earth. Accordingly, He organized and finely tuned everything starting from the tiniest atom to the whole vast universe to

make this life possible and enable it to flourish in an orchestrated balanced and integrated form.

"هُوَ الَّذِي خَلَقَ لَكُمْ مَا فِي الْأَرْضِ جَمِيعًا ثُمَّ اسْتَوَىٰ إِلَى السَّمَاءِ فَسَوَّاهُنَّ سَبْعَ سَمَاوَاتٍ ۗ وَهُوَ بِكُلِّ شَيْءٍ عَلِيمٌ" (البقرة: 29).

“It is He who planned to create everything for you on earth, then turned to the heaven, and made them seven heavens. And He is aware of all things” (Qur’an, 2:29).

"وَسَخَّرَ لَكُمْ الشَّمْسَ وَالْقَمَرَ دَانِيَيْنِ" (ابراهيم: 33).

“And He committed the sun and the moon to your service, both continuously pursuing their courses” (Qur’an, 14:33).

1.3. The Qur’an is the living miracle of the Prophet Muhammad

In addition to being the Book of Guidance, which leads humanity to the Straight path of God, the Glorious Qur’an is the living miracle of the prophet Muhammad (PBUH). The Glorious Qur’an addresses all aspects of life and deals with historical, religious, moral, social, and financial issues.

"مَا فَرَّطْنَا فِي الْكِتَابِ مِنْ شَيْءٍ" (الأنعام: 38).

“We have neglected nothing in the Book” (Qur’an, 6:38).

Surprisingly, the Glorious Qur’an mentions some scientific facts which have been discovered fairly recently. These scientific facts deal with diverse issues covering different aspects of biology, human embryology, cosmology, and geology.

Is it possible for an unlettered man like the Prophet Muhammad (PBUH), who was born in an unlettered Society in the Arabian Desert in the 7th century, to have been so knowledgeable unless his immense knowledge was revealed to him by God?

"إِنَّهُوَ إِلَّا وَحْيٌ يُوحَىٰ عَلَّمَهُ شَدِيدُ الْقُوَىٰ" (النجم: 5).

“It is no less than inspiration sent down to him: He (Muhammad) was taught by one mighty in Power (Qur’an, 53:4-5).

"سَنُرِيهِمْ آيَاتِنَا فِي الْأَفَاقِ وَفِي أَنْفُسِهِمْ حَتَّىٰ يَتَبَيَّنَ لَهُمْ أَنَّهُ الْحَقُّ " (فصلت: 53).

We shall certainly show them Our signs in the Universe and in their own selves, till it will be very obvious to them that this (Qur'an) is the Truth" (Qur'an, 41:53).

In this book, we have briefly reviewed more than seventy-five scientific facts mentioned in the Qur'an. We did our best to make these diverse scientific facts discussed in a simple way. For more details, you may return to the references at the end of the book (1-6).

We should keep in mind that the main purpose of the revelation of the Qur'an, as the Divine Book of God, is to guide mankind to the Straight Path of God to believe, worship and submit to Him alone without partners and to lead a happy life in this world and the life to come.

" يَا أَيُّهَا النَّاسُ قَدْ جَاءَكُمْ مَوْعِظَةٌ مِّن رَّبِّكُمْ وَشِفَاءٌ لِّمَا فِي الصُّدُورِ وَهُدًى وَرَحْمَةٌ لِّلْمُؤْمِنِينَ " (يونس: 5).

"O men, now there has come to you an admonition from your Lord, and a healing for what is in the breasts, and guidance, and a mercy to the believers" (Qur'an, 10:57).

2. BIOLOGY

Before the advent of Islam, Arabia was culturally isolated and economically underdeveloped region. Most of the land was and still arid and desert; rainfall was scarce; vegetation scant and very little of the land was suitable for agriculture .

The Prophet (PBUH) was born approximately in 570 CE. He was raised in Makah, where the greatest intellectual accomplishment of the Arabs and their greatest pride was their poetry. Science then was not of any interest to them. When The Prophet (PBUH) was a boy he worked as a shepherd, like most prophets and when he was a youth he was a merchant. He did not attend schools and, therefore, he was illiterate. At the age of 40, the Qur'an was revealed to him bit by bit over two decades, during which he had to migrate to Medina; another city in the Arabian desert .

Biological sciences were not addressed until the 18th and 19th centuries. Botany and zoology became professional scientific disciplines and the unknown world of microorganisms was discovered after the invention of the microscope. Therefore, the use of experimentation and careful observation in physiology, and the classification and the behaviour of organisms and the interaction between organisms and their environment, were not known until after the 8th century. Consequently, by no means the Prophet Muhammad (PBUH) had any access to the biological sciences touched by the Glorious Qur'an through his society or the nearby Roman or Persian civilizations.

On the other hand, **there is no way for the Qur'an to have been copied from the Bible as some people claim**. This is simply because unlike the Qur'an, the Bible, we have today, contradicts with the scientific biological facts. For instance, the Bible classifies bats which are mammals as fowls. It claims that flying insects walk on four legs, and rabbits are regurgitating animals, all of which is obviously scientifically incorrect.

"وَهَذِهِ تَكْرَهُونَهَا مِنَ الطَّيُورِ. لَا تُؤْكَلُ...النَّسْرُ وَالْأَنْوَقُ وَالْعُقَابُ... وَالْخَفَاشُ" (سفر اللاويين 20:11).

"You shall detest among the birds... the eagle and the vulture ... and the bat" (Leviticus, 13-19).

وَلَا تَأْكُلُوا الْحَشْرَاتِ الْمُجْتَنَّةَ الَّتِي تَمْشِي عَلَى أَرْبَعٍ، فَهِيَ رُجْسٌ لَكُمْ، مَا عَدَا الَّتِي لَهَا رِجْلَانِ أَطْوَلُ مِنْ يَدَيْهَا تَقْفَرُ بِهِمَا عَلَى الْأَرْضِ" (اللاويين 11: 21).

“Yet among the winged insects that go on all fours, you may eat those that have jointed legs above their feet, with which to hop on the ground” (Leviticus 11:21).

“والأرنب لأنه يجتر” (اللاويين 6:11)

“And the hare, because it chews the cud” (Leviticus 11:6).

On the other hand, dragons are described as fire breathing animals which are biologically impossible. Therefore, in some recent translations, there have been trials to substitute them with real animals like serpents and crocodiles.

“ لهيب يخرج من فمه ، شرار نار يتطاير منه . دخان يخرج من أنفه ، كأنه من قدر تغلي على نار حامية . نفاخة منه تشعل جمرا ، ومن فمه ينطلق لهيب ” (أيوب- 41 : 19-21).

“Flames stream from its mouth; sparks of fire shoot out. Smoke pours from its nostrils as from a boiling pot over burning reeds. Its breath sets coals ablaze, and flames dart from its mouth” (Job, 41:21).

In this chapter, we will discover that the Qur’an, revealed to the prophet Muhammad (PBUH) more than fourteen centuries ago, covers wide and diverse biological subjects related to plants, animals, and humans, which were not known, addressed or discovered until the 18th century. Interestingly some of these biological subjects like animal behaviour and plant ecology are teaching subjects in day’s Universities.

We will read about diverse biological subjects, which deal with the perfection of God’s creation and hence, negates the possibility for life to emerge from nothing or through chemical evolution. We will also review scientific facts about the diversity of living organisms; plant ecology, seed germination, grains’ anatomy and animal behaviour.

You will find that the numerous accurate and diverse scientific biological facts mentioned in the Qur’an are evidence for the revelation of the Glorious Qur’an from God.

“وقل الحمد لله سيريكم آياته فتعرفونها وما ربك بغافل عما تعملون” (النمل:93).

And say, “Praise belongs to God; He will show you His signs, and you will recognize them. Your Lord is not heedless of what you do.” (Qur’an, 27: 93).

2.1. Chemical Evolution or Divine Creation?

"أَمْ خُلِقُوا مِنْ غَيْرِ شَيْءٍ أَمْ هُمْ الْخَالِقُونَ" (الطور: 35).

*Were they created by nothing, or were they themselves the creators?
(Qur'an, 52:35).*

The hereditary material of humans and all living creature is mad of DNA. It contains the complete construction plan of the human bodies, regarding their physical and structural characteristics from their birth to death. DNA is found in the form of chromosomes in the nucleus of each of the 100 trillion cells of the human body. The genetic make-up of humans is almost 99.9% identical. The remaining 0.1% variation in DNA is responsible for differences in individual traits of people .

The building unit of DNA is nucleotides which are four types named by the initial letters of their bases; A, T, G, and C. The number of nucleotides in the human DNA is about 3.5 billion .

The data pertaining to DNA is recorded in the form of “genes,” which are estimated to be between 20,000 and 25,000. The genes are translated into proteins which are made of amino acids. Each three nucleotides of a gene code for one amino acid. An error in the sequence of just one of the nucleotides of a gene could cause a mutation in an amino acid that renders the protein completely useless. For example, one nucleotide error could lead to monogenic diabetes (7).

You may ask wouldn't the situation become less sophisticated in a unicellular creature like bacteria? Well, still the chromosome of bacteria consists of about 4.6 million nucleotides coding for about 4,400 genes .

*Is it possible for a chance to accurately arrange millions of nucleotides in the right sequence to produce functional genes and proteins which are required for the life of even a single bacteria cell to start? **Certainly, not.***

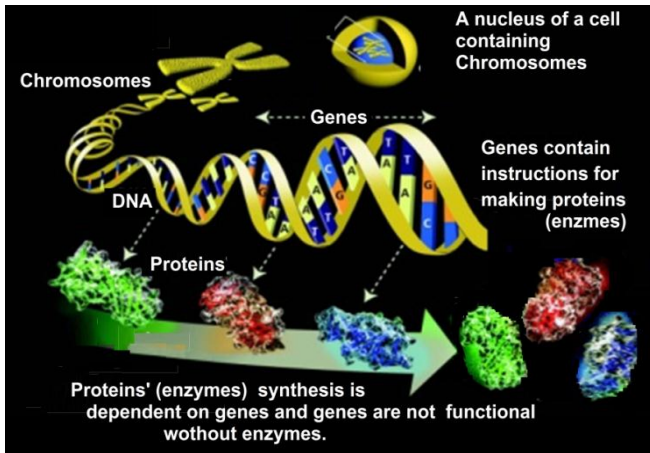
Suppose for the sake of argument this happened, would life start? No, because DNA alone is useless and does not function without several enzymes which replicate and read it. Ironically, these enzymes need to be synthesized from the recorded information on the DNA itself. In other words, both the DNA and the enzymes have to coexist at the same time otherwise, neither of them is enough to start life.

Can chance create both functional DNA and enzymes simultaneously for life to start ?

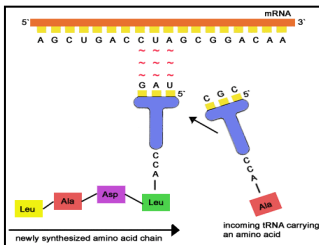
It may, therefore, be concluded that there is no chance for the chemical evolution of life to take place. In fact, naturalists are just substituting God with nature? Life started by the Will of God, Who created in each single cell properly arranged nucleotides coding for functional genes and enzymes, all working in concert with one another in order for life to start and continue (8).

"مَا خَلَقْتُمْ وَلَا بَعَثْنَا إِلَّا نَفْسًا وَاحِدَةً" (لقمان: 28).

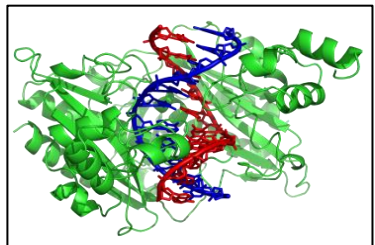
“Your creation and your resurrection are only as a single soul” (Qur’an, 31:28).



A functional protein needs to have the correct amino acid sequence which is dependent on the correct DNA sequence of the coding gene.



Each amino acid has a codon of three nucleotides.



A mistake in one amino may lead to incorrect protein folding and non-functional protein.

2.2. Perfection is the Rule

"صَنَّعَ اللَّهُ الَّذِي أَنْفَعَنَ كُلَّ شَيْءٍ" (النمل: 88).

"The making of God, who perfected all things" (Qur'an, 27:88).

"مَا تَرَى فِي خَلْقِ الرَّحْمَنِ مِنْ تَفَاوُتٍ" (الملك: 3).

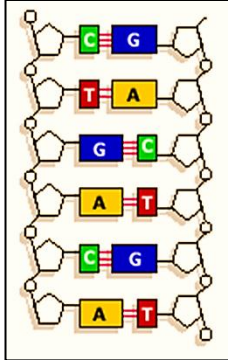
"You see no fault in the creation of the Compassionate" (67:3)

"الَّذِي أَحْسَنَ كُلَّ شَيْءٍ خَلَقَهُ" (السجدة: 7).

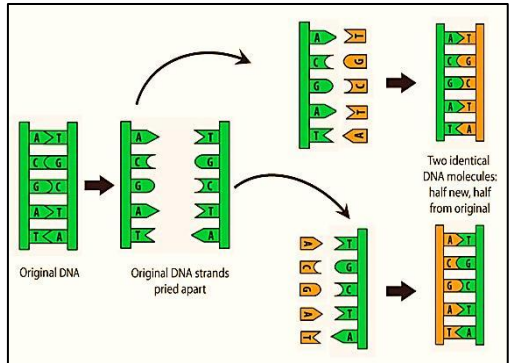
He who perfected everything He created" (32:7)

Perfection is the feature of all God's creation. Here, we will just go briefly through the example of the fidelity of the synthesis of the double-stranded DNA, which is the hereditary material of all living creatures. The DNA is double-stranded and it is built up of four types of nucleotides, called A, C, G, T. During replication only one mistake takes place every one thousand million copied nucleotides [$1/10^9$] (8). So how does this precision or perfection happen?

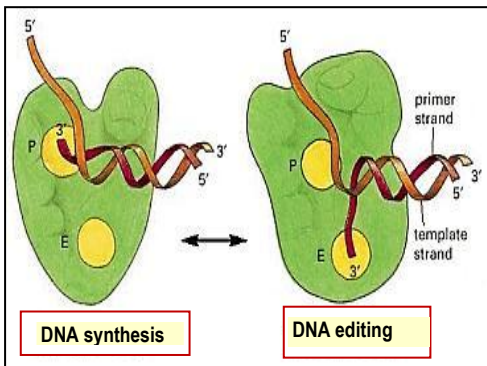
- 1- **Complementary base-pairing:** Base A has the ability to pair with base T and base C has the ability to pair with base G., This holds the two strands in a double-stranded structure. During replication, two new strands are stepwise copied complementary to the original parent strands. **The guided insertion of complementary nucleotides (A for T, and G for C)** by the synthesizing enzyme reduces possible errors (please see the figure on the top of next page).
- 2- **Double-checks:** In rare instances, a mistake may occur during synthesis. However, the synthesizing enzyme (polymerase enzyme) has the ability to **"check" the base-pair geometry** before it catalyses the binding process of the newly coming nucleotide.
- 3- **Proofreading:** The synthesizing polymerase enzyme is also capable of **proofreading** what it did. In rare instances, if a wrong base is bound, the polymerase enzyme can **excise the wrong base and add the correct one**.
- 4- **Mismatch proofreading:** Mismatch proofreading: If yet still a mistake happens, there is a **mismatch repair enzyme**, which checks the DNA strands after completion of synthesis, and can correct any errors in them.



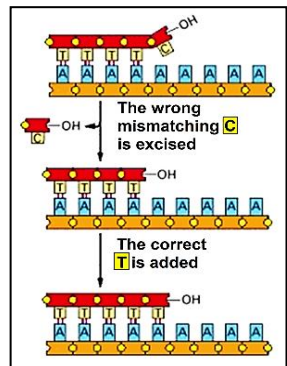
Double strands of DNA bound together by bonding between A=T and C=G.



Complementary base-pairing guides the insertion of the nucleotide by the synthesizing enzyme and reduces possible errors.



The polymerase enzyme, can both synthesize the DNA (left) and edit mismatches (right).



During proofreading, the polymerase corrects the wrong nucleotides.

2.3. Diversity of Living Things

The phenotype of a living creature is based on its characteristic traits, which are inherited through genes. The role of genes was discovered by Mendel between 1856 and 1863. On the other hand, the environment plays a much lesser effect on traits, like for instance the effect of the sun on the colour of humans. Wilhelm Johannsen, in 1911, concluded the effect of environmental factors on phenotypic variations and coined together the terms ‘genotype’ and ‘phenotype’ (9).

It was in 1735 when Carl Linnaeus set up the biological classification or what is called taxonomy in his ‘Systema Naturae’ and subsequent works (9).

Interestingly, the Glorious Qur’an revealed more than 14 centuries ago, has referred to the presence of floral diversity and referred to distinct faunal classes as **Omam**.

2.3.1. Faunal Diversity: “Omam”

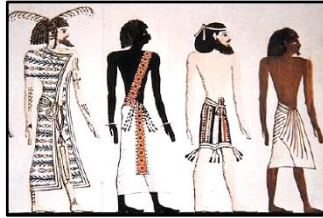
"وَمَا مِنْ دَابَّةٍ فِي الْأَرْضِ وَلَا طَائِرٍ يَطِيرُ بِجَنَاحَيْهِ إِلَّا أُمَّمٌ مُمْتَلِكُمْ ۗ مَا فَرَطْنَا فِي الْكِتَابِ مِنْ شَيْءٍ ۗ ثُمَّ إِلَىٰ رَبِّهِمْ يُحْشَرُونَ" (الأنعام: 38).

“There is not a moving (living) creature on earth, nor a bird that flies with its two wings but are communities (Omam) like you. We have neglected nothing in the Book” (Qur’an, 6:38).

In humans, there are genes responsible for each character like for instance the colour of the skin. The degree of pigmentation of the skin is decided by a set of genes. Nonetheless, the environment, like the exposure to sunlight affects the intensity of the skin colour (phenotype).

According to the above verse of the Qur’an, people are classified according to their phenotypic features or traits into ‘**Omam**’ and, so are all other moving or flying creatures.

Differences in genotypes and phenotypes of humans were realized thousands of years ago. Therefore, the apparent variations of humans (Omam) were recorded on the walls of the temples of the Egyptian pharaoh, Ramses III. However, the observation of variations in the traits of the same Genus or species of animals (like insects, reptiles, birds, jaguar, etc.), which is referred to as Omam, in the verse above, was not realized by scientists until late the 18th and early the 20th centuries (9).



Differences in human's traits (Omam) were depicted as early as the time of the Pharaoh, Ramses III, in Egypt

"And of His signs is the creation of the heavens and the earth, as well as the difference of your languages and colour" (Qur'an, 630:22).



Zonotrichia albicollis with black-and-white-striped morph.



Zonotrichia albicollis with brown-and-tan-striped morph.



Light-morph jaguar.



Dark-morph jaguar.

Genotypic and phenotypic variations result in the formation of different features in the species, which leads to their classification into **Omam** as shown in the pictures above.



Different frog species of the genus *Micrixalus*.

2.3.2. Floral Diversity

There are several verses in The Glorious Qur'an referring to the floral diversity. Interestingly, the Qur'an mentions about 22 plants belonging to 17 plant families. Let's have a look at the following verses.

"وَفِي الْأَرْضِ قِطْعٌ مُتجاوِرَاتٌ وَجَنَاتٌ مِّنْ أَعْنَابٍ وَزَرْعٌ وَنَخِيلٌ صِنَوَانٌ وَعِزْرٌ صِنَوَانٌ يُسْقَى بِمَاءٍ وَاحِدٍ وَنُفْضِلٌ بَعْضُهَا عَلَى بَعْضٍ فِي الْأَكْلِ إِنَّ فِي ذَلِكَ لآيَاتٍ لِّقَوْمٍ يَعْقِلُونَ" (الرعد:4).

"On earth are adjacent terrains, and gardens of vines, and crops, and date-palms, from the same stem root or from distinct roots, irrigated with the same water. We make some taste better than others. In that are proofs for people who reason" (Qur'an, 13:4).

"وَأَنْزَلَ مِنَ السَّمَاءِ مَاءً فَأَخْرَجْنَا بِهِ أَزْوَاجًا مِّنْ نَّبَاتٍ شَتَّى" (الرعد:53).

"And (God) has sent down water (rain) from the sky. And We have brought forth with it various kinds of vegetation" (Qur'an, 20:53).

"وَهُوَ الَّذِي أَنْزَلَ مِنَ السَّمَاءِ مَاءً فَأَخْرَجْنَا بِهِ نَبَاتٍ كُلِّ شَيْءٍ فَأَخْرَجْنَا مِنْهُ خَضِرًا نُّخْرِجُ مِنْهُ حَبًّا مَّتْرَاكِبًا وَمِنَ النَّخْلِ مِنْ طَلْعِهَا قِنْوَانٌ دَانِيَةٌ وَجَنَاتٍ مِّنْ أَعْنَابٍ وَالرَّيثُونَ وَالرَّحْمَانَ مُشْتَبِهًا وَغَيْرَ مُتَشَابِهٍ^١ انظُرُوا إِلَى ثَمَرِهِ إِذَا أَثْمَرَ وَيَنْعِهِ^٢ إِنَّ فِي ذَلِكَ لآيَاتٍ لِّقَوْمٍ يُؤْمِنُونَ" (الأنعام:99).

"And it is He who sends down water from the sky. With it We produce vegetation of all kinds, from which We bring greenery, from which We produce grains in clusters. And palm-trees with hanging clusters, and gardens of grapes, olives and pomegranates, each similar yet different (in variety and taste). Look at their fruits when they begin to bear, and the ripeness thereof. Surely in this are signs for people who believe" (Qur'an, 6:99).

In the above verses God draws our attention to the following:

- The diversity of vegetation after rainfall is a sign from God .
- Plants are diverse though they are irrigated with the same water.
- There are diversities of the same type of plants like grapes, olives and pomegranates (6:99).
- In addition to the diversity of plants, God draws our attention to the fact that the enjoyment of the beauty of His creation and the availability of water are blessings amongst countless blessings that God favours us with.

However, notice here that the term **Omam** used for faunal diversity was not also used, by the Qur'an, to describe floral diversity. Perhaps this is because unlike animals, plants are not moving creatures (Qur'an, 6:38).

Interestingly, microorganisms like bacteria have been found to be both motile and to communicate together through chemical signals (Quorum sensing), therefore, by the definition of the Qur'an (6:38) classifies as **Omam**.

It may be concluded that God has referred to the diversity of both the flora and fauna in the Glorious Qur'an revealed more than 14 centuries ago, though, we have not been attentive to this phenomenal fact before the eighteen century.



The diversity of vegetation after rainfall in a desert.



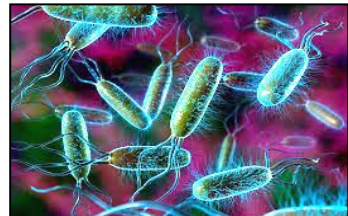
One root-one stem (left) or one root - several trees (right).



The diversity of colours and tastes of grapes.



Pomegranate fruits and seeds of different colours.



Bacteria can communicate through chemical signals.

2.4. Pairs

There are three types of plant flowers: 1) Male flower, 2) female flower and 3) the most common hermaphrodite flower which have both male and female parts. The fact of the presence of the male parts (stamens) and the female parts (pistils) of flowers were discovered around 1790, by Konrad Sprengel, though this was not given any attention during his lifetime (10).

However, the Qur'an revealed to the Prophet Muhammad, more than 1400 years ago mentions that there are pairs of plants and of creatures which we do not know (see also Qur'an, 26: 7 and 50: 7).

"سُبْحَانَ الَّذِي خَلَقَ الْأَزْوَاجَ كُلَّهَا مِمَّا تُنْبِتُ الْأَرْضُ وَمِنْ أَنْفُسِهِمْ وَمِمَّا لَا يَعْلَمُونَ" (يس:36).

"Glory to Him, Who created all pairs, of what the earth produces, of themselves (humans), and of others unknown to them" (Qur'an, 36: 36).

"وَأَنْزَلْنَا مِنَ السَّمَاءِ مَاءً فَأَخْرَجْنَا بِهِ أَزْوَاجًا مِّنْ نَّبَاتٍ شَتَّىٰ" (طه:53).

"... and (God) has sent down water from the sky. With it, We have produced diverse pairs of plants (Qur'an, 20: 53).

"وَأَنْزَلْنَا مِنَ السَّمَاءِ مَاءً فَأَنْبَتْنَا فِيهَا مِنْ كُلِّ زَوْجٍ كَرِيمٍ" (لقمان:10).

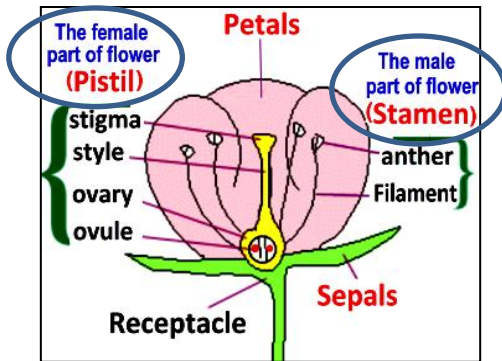
"We send down water from the sky, (in order that) We cause goodly pairs to grow out of it (of the Earth)" (Qur'an, 31: 10).

"وَتَرَى الْأَرْضَ هَامِدَةً فَإِذَا أَنْزَلْنَا عَلَيْهَا الْمَاءَ اهْتَزَّتْ وَرَبَّتْ وَأَنْبَتَتْ مِنْ كُلِّ زَوْجٍ بَهِيجٍ" (الحج:5).

"And you see the earth still; but when We send down water on it, it vibrates, and swells, and grows all kinds of delightful pairs (Qur'an, 22:5).

In the first verse above (36: 36), God draws our attention to the existence of other creatures, which were not known to people at the time of the revelation of the Glorious Qur'an. Examples of these organisms are bacteria and fungi, which were not characterised before the invention of the microscope.

In 1946 it was discovered that bacteria can mate as pairs and exchange their genetic materials (74). On the other hand, sexual reproduction in fungi was discovered in 1951 (74). Both bacteria and fungi may be considered among the unknown creatures that exist in pairs and referred to in the Qur'an revealed in the 7th century.



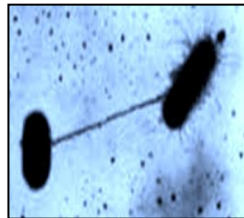
Pistils and stamens are the female and male parts of the flower.



Male flowers of palm date tree.



Female flowers of palm date tree.



Bacterial conjugation was discovered in 1946.

The Qur'an revealed more than 14 centuries ago referred to the presence of unknown creature like bacteria which exist in pairs (36:36).

2.5. STILLNESS AT NIGHT

"فَالِقُ الْإِصْبَاحِ وَجَعَلَ اللَّيْلَ سَكَنًا وَالشَّمْسَ وَالْقَمَرَ حُسْبَانًا ذَلِكَ تَقْدِيرُ الْعَزِيزِ الْعَلِيمِ" (الأنعام:96).

He splits the dawn and appoints the night as a time of stillness and the Sun and Moon as a means of reckoning (Qur'an, 6:96)

The night is the time for rest not only of humans but also for other organisms. Many mammals, (such as chimpanzees, gorillas, elephants and squirrels), birds (like sparrows and pigeons), reptiles (like lizards), insects (like butterflies and honeybees), are active during daytime and rest at night.

In humans and mammals, the hormone melatonin is secreted to prepare the body for sleep and the heartbeat and respiration rhythms slow down and blood pressure falls. If humans fail to sleep, their immune system weakens and they become more susceptible to sickness. In addition, their concentration decreases and they may fail to think logically and hallucinate (11).

Plants also conserve energy for the daytime. The chloroplasts responsible for photosynthesis are highly dynamic at daytime and become still at night. At daytime, the chloroplasts move around in the plant cells to capture solar energy and convert it into stored energy molecules (11).

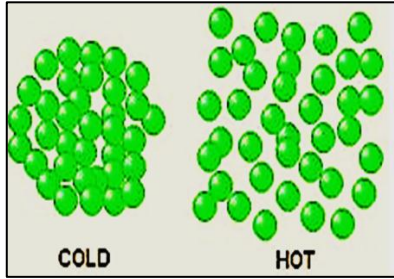
On the other hand, the pores of the stomata of the leaves of plants which regulate the flow of gas and water vapour between the leaf and its environment are closed at night. In addition, some plants fold up or drop down their leaves and close their flowers at night.

If we go down to the atomic level, we find that during daytime sun heat and radiation, increase vibration and movement of the molecules of water, which, therefore, are faster during daytime compared to night.

However, It should be mentioned that God also refers to other organisms which are active at night like bats and owls in the following verse.

"وَلَهُ مَا سَكَنَ فِي اللَّيْلِ وَالنَّهَارِ ۗ وَهُوَ السَّمِيعُ الْعَلِيمُ" (6:13).

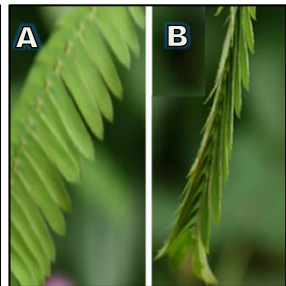
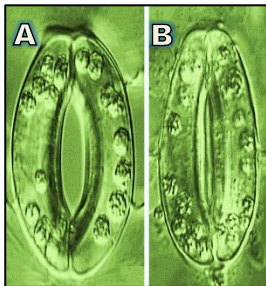
"To Him belongs whatever rests in the night and the day. He is the Hearing, the Knowing" (Qur'an, 6:13).



At night things become still and rest. Even molecules of water in the absence of sun radiation and heat are less energetic and are closer (right).



Humans and many mammals, birds, reptiles rest at night



At night in plants, chloroplasts become still (left); Stomatal pores close (middle, B) and some plants fold their leaves (right, B).

2.6. Bees

"وَأَوْحَىٰ رَبُّكَ إِلَى النَّحْلِ أَنِ اتَّخِذِي مِنَ الْجِبَالِ بُيُوتًا وَمِنَ الشَّجَرِ وَمِمَّا يَعْرِشُونَ . ثُمَّ كُلِي مِن كُلِّ الثَّمَرَاتِ فَاسْلُكِي سُبُلَ رَبِّكِ ذُلُلًا ۚ يَخْرُجُ مِنْ بُطُونِهَا شَرَابٌ مُّخْتَلِفٌ أَلْوَانُهُ فِيهِ شِفَاءٌ لِّلنَّاسِ ۗ إِنَّ فِي ذَٰلِكَ لَآيَةً لِّقَوْمٍ يَتَفَكَّرُونَ " (النحل: 68-69).

“And your Lord inspired the bee: “Set up hives in the mountains, and in the trees, and in what they construct.” Then eat of all the fruits, and go along the pathways of your Lord, made easy (for you). From their bellies emerges a fluid of diverse colors, containing healing for the people. Surely in this is a sign for people who reflect” (Qur’an, 16:68-69).

2.6.1. The Female Worker Produces Honey

Honey bees use caves, rock cavities, and hollow trees as natural nesting sites, in addition to the Man-made structures which are typically referred to as "beehives".

The female queen determines which sex is required at the time each individual egg is laid. A fertilized egg produces a female offspring and an unfertilized egg produces male. A worker bee is a female which lacks the reproductive capacity of the queen bee.

It was estimated that bees fly over 48,000 miles to gather the nectar needed to produce a litre of honey (*travel the paths of your Lord*). The nectar is mixed with enzymes in the stomach and carried and stored in wax cells (*There comes forth from their bellies a drink*). A part of honey, a worker bee produces beeswax, royal jelly, and a resin (propolis). Unlike the female worker bee, the only role of the male bees is to inseminate a fertile queen (12).

In the Arabic grammar, the verb tells whether the subject is a female or a male. The verbs used for the bees in the above verses (coloured blue) are in the format which indicates that the worker bees are females. Therefore, the Qur’an predicted the sex of the worker bee more than 14 centuries ago. Interestingly the light microscope which was used to dissect insects to predict their gender was only in use at the late 1600s (12).



Bees taking a rock cavity and a hollow of a tree as natural nesting sites.



The queen and worker bees.



Bees fly over 48,000 miles to gather the nectar required for the production of a litre of honey.

2.6.2. The Super Navigation

فَاسْأَلِكِ سُبُلَ رَبِّكِ ذُلُلًا" (النحل: 96).

“Go along the pathways of your Lord, made easy” (Qur’an, 16: 69).

The worker honeybees may travel up to 10 km far from their hive and visit about 2,000 flowers for pollen and nectar each day and yet they do not get lost. The above verse states that God has made it easy for bees to navigate around and find their way back to hives. How that is accomplished has been unclear, until recently, different researchers have found some clues, which are summarized in the following (12):

- A honeybee has her solar **compass**: This allows her to remember where things are in relation to the sun. The bee's ability to see polarized light allows her to determine where the sun is even if this is obscured by clouds.
- A honeybee has **an internal clock**: This lets her determine how much the sun moves during her journey so that she can tell other bees exactly where the food is in relation to the current position of the sun. She even learns about how the sun's path across the sky changes during different seasons of the year and at different latitudes.
- A honeybee has cognitive **mental maps**: Even if the position of the sun was confused, the bees can use their mental maps of landmarks of locations.
- A honeybee can **smell flowers** from kilometres away and can recognize the colour of flowers.
- A honeybee can sense **distance using optic flow**: Nearby things produce more optic flow than distant objects, therefore, while sitting in a moving vehicle they move faster away. From the rate that an image appears to a moving bee, it can predict the position of the observed site.
- A honeybee can sense **the electric fields of flowers**: While, bees have a positive charge, flowers tend to have a negative charge. Therefore, when a bee arrives at the flower, pollen jumps from the flower to the bee and the charge of the flower is changed. This change in an electric field can tell the bee whether a flower has been recently visited, and hence short of nectar.

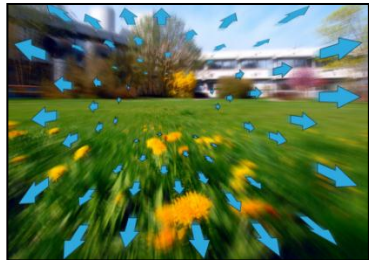
This is just what we have so far learned about how *God has made the travelling paths of bees “easy to find”* as stated in the verse of the Glorious Qur’an above.



A honeybee has a solar compass. The honeybee has cognitive mental maps.



A honeybee can smell flowers from kilometres away.



A honeybee can sense distance using optic flow.



Minute tags attached to bees help to study their navigations.



Negatively charged pollens jumped and covered the positively charged bee.

2.6.3. The Healing Effect of Honey

"يَخْرُجُ مِنْ بُطُونِهَا شَرَابٌ مُخْتَلِفٌ أَلْوَانُهُ فِيهِ شِفَاءٌ لِلنَّاسِ" (النحل: 96).

“There comes forth from their bellies (honey bees), a drink of varying colour wherein is healing for men” (Qur’an, 16: 69).

Nectar is collected by honeybees from flowers. It undergoes ripening by partial enzymatic digestion in the honey stomach and then matured by moisture reduction. It contains sugars, proteins, vitamins, phytochemicals from plants and enzymes

Honey has been utilized by humans since prehistoric times, both for nutritional and medicinal purposes (apitherapy) (13). Honey possesses antimicrobial and antioxidant capacities. Externally, it has been used as a remedy for burns, cataracts, wounds, skin ulcers, eczema and lip sores. Raw honey possesses memory-enhancing effects, as well as neuropharmacological activities, such as anxiolytic, anticonvulsant, and antidepressant activities. The oral ingestion of raw honey has been also indicated for stomach and intestinal ulcers, constipation, osteoporosis, and laryngitis (13).

In addition, bees also produce royal jelly from their stomachs which is used to feed the queen. Royal jelly has been used as a skin tonic and hair growth stimulant. Royal jelly has also been used as antibiotic and antitumor. It has insulin-like action, lowers blood pressure, lowers cholesterol, regulates the immune system and improves female hormonal activity.

The above verses of the Glorious Qur’an ascertain the curing effect of honey and royal jelly produced by bees.



Honey of different colours.



Royal jelly is widely used for skin care.

2.7. Animal Behaviour: The Fly

”يَا أَيُّهَا النَّاسُ ضَرْبٌ مِّثْلَ مَا فَاسْتَمَعُوا لَهُ إِنْ الدِّينَ تَدْعُونَ مِنْ دُونِ اللَّهِ لَنْ يَخْلُقُوا ذُبَابًا وَلَوْ اجْتَمَعُوا لَهُ وَإِنْ يَسئَلُهُمُ الذُّبَابُ شَيْئًا لَا يَسْتَنْقِذُوهُ مِنْهُ ضَعُفَ الطَّالِبِ وَالْمَطْلُوبِ”
(الحج: 73).

“O people! A parable is presented, so listen to it: Those you invoke besides God will never create a fly, even if they banded together for that purpose. And if the fly steals anything from them, they cannot recover it from it. Weak are the pursuer and the pursued” (Qur’an, 22:73).

Only liquids can be taken in by the housefly and not solid food. When a fly settles on food the proboscis is extended to the surface of the food. Saliva is secreted by salivary glands and runs down onto the food to digest and liquefy it. The proboscis pumps up the semi-digested liquid to the ‘stomach’ or midgut of the fly. On the other hand, sometimes the fly vomits on the food and this enables the fly to mix more digestive enzymes from the gut with it (14).

Therefore, God made the parable about the impossibility of bringing back the food particles that the fly took away as the food would have already been digested. How did the prophet Muhammad know this notion of fly nutritional behaviour, unless the Qur’an is the revelation of God?



The fly cannot eat solid food. It secretes its saliva first to the food and pumps back the digested food.



The fly may vomit on the food.

2.8. Animal Behaviour: Communication of Ants

"حَتَّىٰ إِذَا أَتَوْا عَلَىٰ وَادِ النَّمْلِ قَالَتْ نَمْلَةٌ يَا أَيُّهَا النَّمْلُ ادْخُلُوا مَسَاكِنَكُمْ لَا يَحْطِمَنَّكُمْ سُلَيْمَانُ وَجُنُودُهُ وَهُمْ لَا يَشْعُرُونَ" (النمل:18).

"Then, when they (Solomon and his soldiers) reached the Valley of the Ants, an ant said: "Ants! Enter your dwellings, so that Solomon and his troops do not crush you unwittingly" (Qur'an, 27: 18).

Colonies of ants consist of populations of hundreds of thousands (sometimes millions). Therefore, they should have a social structure based on mutual exchange of information (14).

An ant carries multiple sensory organs to pick up the chemical, visual and sound signals. The brain of an ant contains half a million nerve cells; the eyes are compound; the antennae act as nose and fingertips; the projections below the mouth sense taste; hairs respond to touch.

Chemical communication: Ants can communicate by chemicals (pheromones) produced by glands, which could be perceived by smelling and touching each other with antennae. Ten to twenty different pheromones discovered so far, each represents a 'chemical word' that the entire colony understands. These include the attacking of prey, the defending of the colony, the location of a food source, the relocation of the colony, etc.

Body communication: Ants can communicate visually by tilting their heads and antennae sideway and physically by touching bodies.

Sound communication: Using miniaturized microphones and speakers inserted into nests, researchers discovered that ants can communicate using sounds. Most ants have a natural washboard and plectrum built into their abdomens, that they can rub together to produce sounds. Sounds produced were found to provoke different reactions.

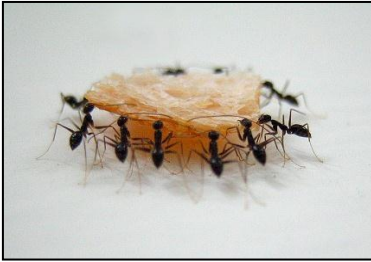
We may conclude that science has proved recently the communication of ants. This communicate was indicated in the above verse, of the Quran, more than 14 centuries ago.



Ants may communicate visually by tilting their heads and antennae sideways.



A worker (left) and a queen (right) ants communicating through touch and pheromones.



A swarm of ants communicating to coordinate their movements to move food to their nest.



Hairs covering the body of ants respond to touch and used as body language.



Rebel's large blue butterfly was found to have learned to imitate the sounds and chemical signals of ants. The butterfly's caterpillars are carried by ants into their nest where they are fed by the workers (left photo). When a colony is disturbed the ants will rescue the caterpillars before their own breeds.



2.9. Animal Behaviour: Locusts

"خُشِعَا أَبْصَارُهُمْ يَخْرُجُونَ مِنَ الْأَجْدَاثِ كَأَنَّهُمْ جَرَادٌ مُنْتَشِرٌ" (القمر: 7).

They will emerge from their graves with downcast eyes, like swarming locusts. (Qur'an, 54:7)

God in the above verse mentions that the emerging of humans at the Day of Judgment is like a swarm of locusts. Therefore, the question raised is why were locusts chosen by God as a similitude?

Locusts deposit their eggs in sandy soils like seeds in 10-15 cm-long tunnels in the ground. Each female locust lays 95-158 eggs at once for three times and up to 1,000 egg pods could be found in one square metre. The larvae remain underground for 10-65 days, depending on the temperature, and they all emerge together at the same time. A single locust swarm is large enough to cover 1,200 square kilometres (460 square miles) and contains between 40 and 80 million locusts per a single square kilometre (14).

The underground existence and the sudden emergence of locusts on the surface of the earth in a vast number (almost 100 billion locusts) at the same time resemble the resurrection of human beings at the Day of Judgment.



A, a swarm of locusts; B, a locust laying eggs, C and D, locusts hatching and emerging from the earth.



2.10. Animal Behaviour: Spiders

"مَثَلُ الَّذِينَ اتَّخَذُوا مِنَ اللَّهِ أَوْلِيَاءَ كَمَثَلِ الْعَنْكَبُوتِ اتَّخَذَتْ بَيْتًا وَإِنَّ أَوْهَنَ الْبُيُوتِ لَبَيْتُ الْعَنْكَبُوتِ لَوْ كَانُوا يَعْلَمُونَ" (العنكبوت:41).

"The likeness of those who take to themselves protectors other than God is that of the spider. It builds a house. But the most fragile of houses is the spider's house." (Qur'an, 29:41).

In the above verse, God named the spider in Arabic as **"Al-Ankaboot,"** which is a **singular feminine name**. God in His knowledge knows the behaviour of female spider which has a solitary life. The female and not the male have the glands for the secretion of the silk used to weave the web. The female kills the male after mating and keeps the eggs temporarily until hatching. Therefore, metaphorically it is a weak house in the sense that there are no family or community ties during the life the spiders compared for example to ants and bees. These facts of animal behaviour have been discovered only in the last few decades (14).

On the other hand, the spider's house is the weakest house because it is made out of a number of very delicate silk threads. Although as such the thread of the web is strong compared to its thickness, yet, generally, the web or house is fragile because the threads are interwoven, leaving large separating spaces and the web does not protect the spider from the heat of the sun, or the cold weather. It does not provide adequate shade, nor protect the female spider from the rain, storming winds, or dangers of attackers.



The female weaves the web and lives a solitary life.



After mating the male is killed by the female.

2.11. Animal Behaviour: The Hoopoe, the Messenger of Solomon

"وَتَفَقَّدَ الطَّيْرَ فَقَالَ مَا لِيَ لَا أَرَى الْهُدُودَ أَمْ كَانَتْ مِنَ الْغَائِبِينَ. لِأَعَذِّبَنَّهُ عَذَابًا شَدِيدًا أَوْ لِأَدَّبَحَتُهُ أَوْ لِيَأْتَنِي بِسُلْطَانٍ مُّبِينٍ. فَمَكَثَ غَيْرَ بَعِيدٍ فَقَالَ أَحَطْتُ بِمَا لَمْ حَطَّ بِهِ وَجِئْتُكَ مِنْ سَبَإٍ بِنَبَأٍ يَقِينٍ. إِنِّي وَجَدْتُ امْرَأَةً تَمْلِكُهُمْ وَأُوتِيَتْ مِنْ كُلِّ شَيْءٍ... وَجَدْتُهَا وَقَوْمَهَا يَسْجُدُونَ لِلشَّمْسِ مِنْ دُونِ اللَّهِ... قَالَ سَتُنظرُ أَصَدَقْتَ أَمْ كُنتَ مِنَ الْكَاذِبِينَ. اذْهَبْ بِكِتَابِي هَذَا فَأَلْقِهْ إِلَيْهِمْ ثُمَّ تَوَلَّ عَنْهُمْ فَانظُرْ مَاذَا يَرْجِعُونَ" (النمل: 20-27).

"Then he inspected the birds, and said, "Why do I not see the hoopoe? Or is he among the absentees? I will punish him most severely, or slay him unless he gives me a valid excuse. But he did not stay for long. He said, 'I have learnt something you did not know. I have come to you from Sheba, with reliable information. I found a woman ruling over them, and she was given of everything' ... I found her and her people worshiping the sun, instead of God'... He said, 'We will see, whether you have spoken the truth, or whether you are a liar. Go with this letter of mine, and deliver it to them; then withdraw from them'" (Qur'an, 27:20-24).

Solomon was a prophet of God, who was given the ability to recruit different animals and birds for his service. The above verses tell the story of Solomon with the hoopoe who went to Shaba and returned back to Solomon with some news. **Why did God choose hoopoes, as stated in the Holy Qur'an to travel between Yemen and Jerusalem providing that the distance between them is about 2,300 Km?**

Hoopoes are remarkable bird species, with distinctive crowns of feathers. They are widespread in Europe, Asia, and North Africa, Sub-Saharan Africa, and Madagascar. **Hoopoes are migrant birds.** Therefore, God created it in such a way that it can travel for long distances (15). **Therefore, physically hoopoes are capable of travelling between Yemen and Jerusalem.**

The reaction of people to hoopoe is controversial. Though the hoopoe was considered a sacred bird in Ancient Egypt, and a symbol of virtue in Persia, it is one of the detestable animals in the Torah (Leviticus, 11:13–19). It was also related to underworld across Europe and was believed to be a harbinger of war and death. Therefore, because Solomon did not know how would Queen Shaba reaction to the hoopoe he asked him just to deliver his letter and withdraw.



Hoopoes are characterized by their feather crowns.



They feed on insects and they nest in holes in trees or walls.



Hoopoes are migrant birds. Therefore, they can fly for long distances. They are low fliers with an erratic flight pattern and irregular wing beats, however, if being preyed they fly very high to escape.

2.12. Animal Behaviour: The Intelligence of the Crow

" فَبَعَثَ اللَّهُ غُرَابًا يَبْحَثُ فِي الْأَرْضِ لِيُرِيَهُ كَيْفَ يُورِثُ سَوْءَةَ أَخِيهِ " (المائدة:31).

"Then God sent a crow searching in the ground to show him how to hide the disgrace of his brother" (Qur'an, 5:31).

Crows and ravens are highly intelligent birds. Recent studies suggest that the cognitive abilities of crows match those of primates such as chimpanzees and gorillas. Crows can learn, gain experience, and they can manufacture and use tools (16).

Crows have a family life and a sophisticated social behaviour. They have been found to entertain themselves in social activities like sports.

Crows have the habit of hiding and storing food across seasons. They **may dig the earth searching for nuts, earthworms, seeds, etc.** It is that digging behaviour of such a remarkable creative animal that inspired the son of Adam to bury his brother after killing him.



Crows are highly social birds.



A crow digging the earth to extract earthworms and seeds.



A crow using a twig as a tool to dig a trunk for grubs.



A thirsty crow dropping stones to raise the water level to drink.

2.13. Animal Behaviour: The Lion and the Prey

"كَانَّهُمْ حُمْرٌ مُسْتَنْفِرَةٌ. فَرَّتْ مِنْ قَسْوَرَةٍ" (المدثر: 50-51).

“As if they were frightened (wild) donkeys, fleeing from a lion, (Qur’an, 74:50-51).

The above verse refers to two scientifically well-known behaviours of two wild animals. Wild donkeys live in communities of tens or hundreds in order to give them a community protection from attacks by wild animals. On the other hand, lions consider wild donkeys as one of their best preys (17).

Interestingly the Qur’an mentions the behaviour of both animals though neither of them was commonly found in the Arabian Desert around Makah or Medina, where the Prophet Muhammad (PBUH) lived and was raised up. Who taught the Prophet Muhammad the behaviour of these two animals?



A herd of zebras (a type of wild donkeys) scattered as they are fleeing from a lion.

2.14. Animal Behaviour: Body Language of Dogs

2.13.1. Panting

"فَمَثَلُهُ كَمَثَلِ الْكَلْبِ إِنْ تَحْمِلَ عَلَيْهِ يَلْهَثُ أَوْ تَتْرَكْهُ يَلْهَثُ. ذَلِكَ مَثَلُ الْقَوْمِ الَّذِينَ كَذَّبُوا بِآيَاتِنَا (الأعراف: 176)."

"His metaphor is that of a dog: if you chase it, it pants; and if you leave it alone, it pants. Such is the metaphor of the people who deny Our signs" (Qur'an, 7:176).

Because dogs don't sweat the way humans do, panting is their way of cooling down their bodies. Therefore, it is normal for dogs to pant under different circumstances; when they are hot, in pain, excited, energetic, lazy, sad or happy. This behaviour of a dog is like that of a person who took a stand and would not see the signs of God or respond, whatever you do to draw his attention (18).

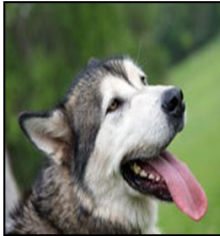
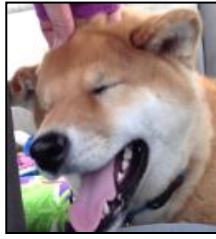
2.13.2. Stretching the forelegs

"وَتَحْسَبُهُمْ أَيْقَاظًا وَهُمْ رُقُودٌ ۚ وَنَقَلْبُهُمْ شَآءَ الْيَمِينِ وَشَآءَ الشَّمَالِ ۚ وَكَلْبُهُمْ بَاسِطٌ ذِرَاعَيْهِ بِالْوَصِيدِ ۚ لَوِ اطَّلَعْتَ عَلَيْهِمْ لَوَلَّيْتَ مِنْهُمْ فِرَارًا وَلَأَمَلْنَا مِنْهُمْ رُعْبًا" (الكهف: 18).

"And you would think them awake while they were asleep. And We turned them to the right and to the left while their dog stretched his forelegs at the entrance. If you had looked at them, you would have turned from them in flight and been filled by them with terror" (Qur'an, 18:18).

During the reign of a pagan Roman Emperor, some youths refused to associate the sun with God and decided to take a shelter in a cave away from their community.

They took with them their dog and slept by the will of God for about 300 years. In the above verse, God mentions that **the dog took an attentive position by sitting with his forelegs stretched to give the impression that it would jump up at the slightest perceived threat** (18). The body language of attentive stretched forelegs of dogs is mentioned in the verse above.



Dogs pant whatever their circumstance.



Dogs may have different positions during their sleeping; attentive on their stomach and with stretched forelegs (left pictures) and relaxed/ non-attentive as shown in the right pictures.

2.15. Animal Behaviour: Beaching of Whales

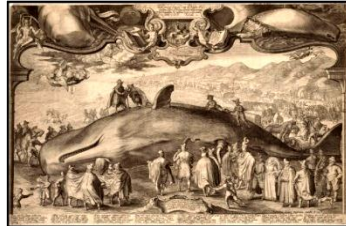
"وَإِنَّ يُونُسَ لَمِنَ الْمُرْسَلِينَ. إِذْ أَبَقَ إِلَى الْفُلِّكَ الْمَشْحُونِ. فَسَاهَمَ فَكَانَ مِنَ الْمُدْحَضِينَ. فَالْتَقَمَهُ الْخُوْتُ وَهُوَ مُلِيمٌ. فَلَوْلَا أَنَّهُ كَانَ مِنَ الْمُسَبِّحِينَ. لَلَبِثَ فِي بَطْنِهِ إِلَى يَوْمِ يُبْعَثُونَ. فَتَبَدَّنَاهُ بِالْعَرَاءِ وَهُوَ سَقِيمٌ" (الصفات: 139-146).

“And, verily, Jonah was one of the Messengers. When he ran to the laden ship, He (agreed to) cast lots, and he was among the losers. Then a fish (whale) swallowed him and he had done an act worthy of blame. Had he not been of them who glorify God, He would have indeed remained inside its belly till the Day of Resurrection. But We cast him forth on the naked shore while he was sick” (Quran, 37:139-146).

It is a documented common behaviour for whales to strand to a beach when they are sick. The beaching phenomenon today is more common because of ships striking, diseases, pollution with poisonous chemicals and possibly military sonar (19).

Whales eat a variety small crustaceans, squids, and small schooling fishes (19). As mentioned in the above verse, when the whale swallowed the Prophet Jonah (PBUH), it was natural to feel sick and hence to beach on the sea shore. This beaching animal behaviour is mentioned in the Qur’an revealed from God who is acquainted with everything related to His creation.

Under the natural circumstances, a person swallowed by a whale would die because of the lack of oxygen and the digestive secretions of the animal’s stomach. Here lies the miracle of the Prophet Jonah, who by the Will of God survived these harsh conditions.



A photo of a beached whale at Long Island (left) and an engraving of a beaching whale at Beverwijk, Netherlands, by Jan Saenredam, 1602.

2.16. The Physiology of Cattle's Milk

"وَإِنَّ لَكُمْ فِي الْأَنْعَامِ لَعِبْرَةً ۚ نُسْقِيكُمْ مِمَّا فِي بُطُونِهِ مِن بَيْنِ فَرْثٍ وَدَمٍ لَبَنًا خَالِصًا سَائِبًا
لِّلشَّارِبِينَ" (النحل : 66).

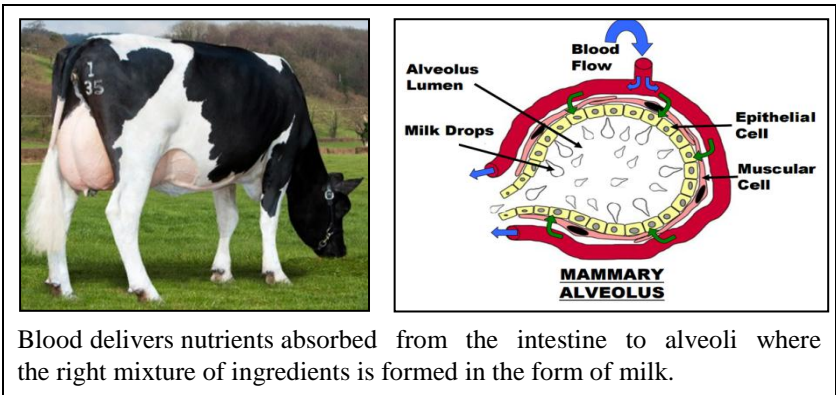
“And there is a lesson for you in cattle: We give you a drink from their bellies, from between FARTH and blood, pure milk, palatable to the drinkers“ (Qur’an, 16:66).

The word “Farth” is the food inside the stomach or intestines:

How is milk produced? (20)

- Cows eat grass which contains nutrients (FARTH). After digestion, nutrients are absorbed into the blood stream.
- Bloodstream delivers nutrients to alveolus epithelial cells
- Epithelial cells collect the right mixture of ingredients from the cows blood and turn it into milk.
- The produced milk is then released into the alveolus lumen of the mammary glands.
- During milking, oxytocin hormone is released into the blood stream and induces contraction of the muscular cells covering the alveoli leading to milk ejection.

One thousand years before the discovery of the blood circulatory system, and before it was determined that the internal organs were nourished by nutrients from the process of digestion, the Qur’an describes the source of the constituents of milk, in conformity with scientific facts.



Blood delivers nutrients absorbed from the intestine to alveoli where the right mixture of ingredients is formed in the form of milk.

2.17. The Camel: Ship of the Desert

"أَفَلَا يَنْظُرُونَ إِلَى الْإِبِلِ كَيْفَ خُلِقَتْ" الغاشية: (17).

“Do they not look at the camels, how they are created?” (Qur’an, 88:17).

God draws our attention to camels as they have unique features and, therefore, are witnesses for His Magnificent Creation. Camels are unique animals. They provide us with milk, meat, hair for textiles and leather. They bear loads for human and are used for his transportation. Camels can endure the drastic conditions of the desert because they are characterized by unique anatomical and physiological features (21) as summarized below.

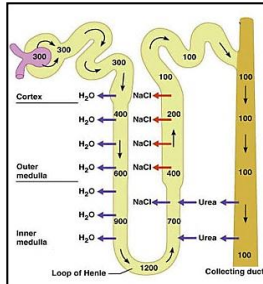
- They have a unique wide pad of connective tissue on the base of the feet which provides a support on the soft sandy soils.
- Camels are ruminating animals (regurgitate and re-chew their food), yet their stomach is only three-chambered and not four-chambered like cattle.
- The upper lip is split into two finger-like projections which aid in the collection of tough forage. The mouth has a thick leathery lining to help to chew thorny desert plants.
- Unlike most animals, they have no gall bladder.
- They have unique oval red blood cells, which facilitates the flow of red blood cells during dehydration.
- The camels' thick coats insulate them from the intense heat of sands.
- Camels also have a flexible “thermostat” (34°C - 42°C), and they do not start sweating until their body temperature reaches 42°C.
- To avoid retaining heat, fats are localized, in the camel's hump.
- They are protected from the sands of the desert, by their long eyelashes, ear hairs, and the nostrils which can be closed.
- Camels' long legs keep his body away from the ground, which can heat up to 70 °C and enable them to eat from desert trees.
- Unlike other animals, which have light and heavy chains of antibodies they have additional unique antibodies made of only "heavy-chains".
- They can survive in the desert without water for 6 - 7 months during which they depend only on the water available in desert's vegetation.

- They can endure the loss of over 40% of their body weight water before becoming distressed and when water is available, whether fresh, brackish or salty; camels can drink up to 57 litres at a time.

Features to store and conserve water (67):

- When the camels exhale, water vapour is trapped in their nostrils and is reabsorbed to conserve water.
- The kidneys and intestines of a camel are very efficient at the reabsorbing of water to produce highly concentrated urine and almost dry faeces.
- Nephrons of the kidney have longer loops of Henle in the medulla to allow for the re-absorption of most water before excretion of urine.
- Camel can store water in its blood stream and the three chambers of the stomachs act as reservoirs for water.

These combined adaptations allow a camel to survive for 1 week in a desert environment without any source of water compared to 24 hours for a human. That is why God in the above verse draws our attention to the uniqueness of camel’s creation.



The longer loops of Henle medulla of the kidney of camels helps to absorb water and concentrate their urine.

.God created camels with unique features to live in the desert.



2.18. God Ordains and Guides

"مَا مِنْ دَابَّةٍ إِلَّا هُوَ آخِذٌ بِنَاصِيَتِهَا" (سورة هود: 56).

“There is no creature but He holds it by the forelock” (Qur’an, 11:56).

"وَالَّذِي قَدَّرَ فَهَدَى" (الأعلى: 3).

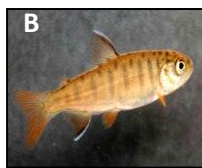
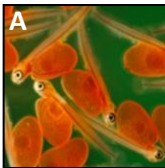
“Who has ordained and then guided” (Qur’an, 87:3).

2.18.1. Salmon fish migration

Migration is not a peculiar behaviour of only birds. There are other migratory species on land, sea and even in our bodies.

Female Salmon lay eggs in the river which hatch and the small fishes grow for several weeks before they start to advance down the river towards the ocean. After spending two to four years there in the, and becoming mature enough to spawn, they swim back to the freshwater streams where they were born. They may travel for months a distance of about 1,500 km (930 miles) (22). Scientists use the word instinct to define this inborn behaviour. **How was this instinctive behaviour developed and passed to later generations?**

Scientists suggest that the fish remembers its way back by using a magnetic map, the sun as a compass, or by tracking waves on the beach through infrasound and smell. As mentioned in the above verse it is God, Who has ordained that salmon fish should go through this interesting journey and therefore, He has **guided** it.

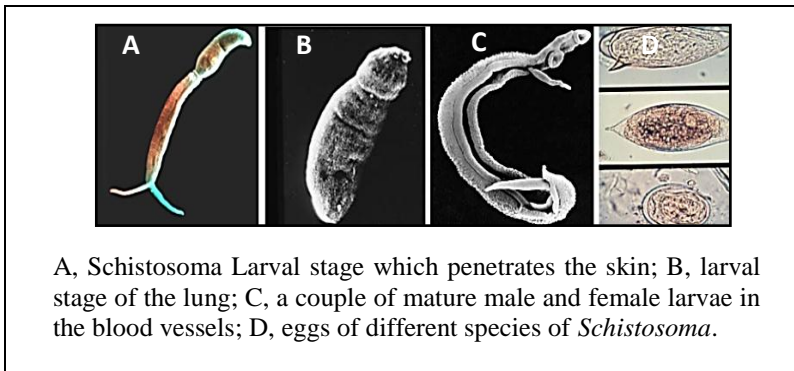


Sockeye salmon after hatching (A); in fresh water for two weeks (B); in the ocean for 2-4 years (C); spawning salmon migrating against the flow of the fresh water stream on its way to the spawning where it was hatched (D).

2.18.2. A Tour of a Parasite in Human Body

Schistosoma is a parasite which has a complex life cycle in both snails and humans. The worm starts its life as an egg in freshwater where it hatches into a larva and finds and infects a host snail. There it passes through several stages to turn into another larva (cercaria) which leaves the snail and returns to water, to infect man (swimmer or a farmer). It burrows into human's bare skin, enters the bloodstream and hides in the lung for a few days to acquire resistance to the immune system. It returns to the blood and migrates to the veinules of the intestine or the urinary bladder, depending on the species of the parasite. Female worms lay eggs which penetrate the blood vessels to be passed out with faeces or urine of the infected persons and hence go back to a freshwater source to begin another life cycle (23).

Who taught the larva to be attracted to the skin of man? Who taught the larva to hide in the lung from the immune system of humans? Who taught the worm to find its way to the blood vessels of the intestine or bladder? Who guided the worm that they should lay their eggs in the blood vessels of the intestine or bladder as they are their only way to get back to the fresh water again? Who guides this larva where to go in its tour in the human body without any previous experience and without eyes or access to a sun map or a magnetic field map? It is God Who ordains and guides.



2.20.3. When Mice Lose Their Fear of Cat Predators

While most mice that smell a cat would run away, those infected with the parasite *Toxoplasma gondii*, do not fear the cat!

This single-celled parasite infects most warm-blooded animals, like mice and may infect humans causing a disease called toxoplasmosis. However, this parasite cannot reproduce sexually, unless it infects a feline animal like cats (24).

One way for the parasite to reach its cat host is to infect a rodent. When rodent's brain is infected by the parasite, **it removes the rat's innate fear of cats**, so that instead of running away when they smell a cat, they are not disturbed by the risk of being eaten by their predator. The removal of innate fear of cats after infection is a way to make sure that the parasite would complete its sexual life cycle in the cat after being eaten. Is it cleverness of the single-celled parasite that removed the innate fear of mice or is it, God, Who has ordains and guides?



Mice fear cats and once they smell them they run away for fear of being eaten as shown on the left. However, after infection with toxoplasma, they lose their innate fear as shown on the left.

2.19.4. When Snails become Keen to Attract their Bird Predators

Leucochloridium paradoxum is a parasitic worm of various birds, which uses snails as an intermediate host in Europe and North America. If the snails get infected by the parasite after feeding on faeces of infected birds, the following happens (25):

- 1- The tentacles of their eyes take the appearance of colourful pulsating caterpillars that various birds prey on.
- 2- Instead of seeking dark areas to avoid predation, infected snails prefer to expose themselves to predators in the open areas to be eaten.

Is it the cleverness of the parasite that makes it change the appearance of the eye stalk of the snail to look like an attractive caterpillar and to change the behaviour of the snail to be keen to be exposed to birds to complete its life cycle or is it God Who ordains and guides?



A land snail infected with the parasite in one (left) and both eyestalks (right). The infected eyestalks appear like caterpillars to attract a bird predator to eat the snail and complete the life cycle of the parasite.

2.19. Plant Ecology: Effect of Height on Garden's Harvest

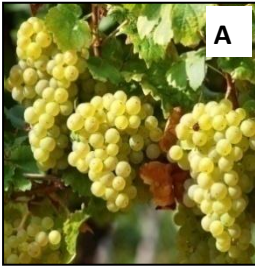
"وَمَثَلُ الَّذِينَ يُنْفِقُونَ أَمْوَالَهُمْ ابْتِغَاءَ مَرْضَاتِ اللَّهِ وَتَثْبِيتًا مِّنْ أَنفُسِهِمْ كَمَثَلِ جَنَّةٍ بِرَبْوَةٍ أَصَابَهَا وَابِلٌ فَآتَتْ أُكْلَهَا ضِعْفَيْنِ فَإِن لَّمْ يُصِبْهَا وَابِلٌ فَطُلٌّ وَاللَّهُ بِمَا تَعْمَلُونَ بَصِيرٌ" (البقرة: 265).

"And the likeness of those who spend their wealth seeking God's Pleasure while they in their own selves are sure and certain that God will reward them, is the likeness of a garden on a height; heavy rain falls on it and it doubles its yield of harvest. And if it does not receive heavy rain, light rain suffices it. And God is All-Seer of (knows well) what you do" (Qur'an, 2:265).

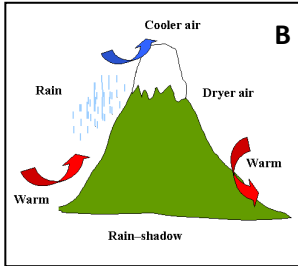
Heights have the following advantages for growing gardens (26):

- 1- They are more liable to have rains which usually suffice their cultivation (see fig figure B).
- 2- Rainwater is rich in nitrates. Nitrates are formed due to lightning which provides enough energy for their formation. Nitrates act as fertilizer for the plants on heights.
- 3- Heights have better drainage of excess water which is good for the root system of the cultivated plants (C).

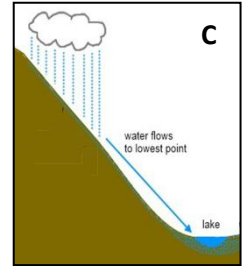
In the above verse, God specifies that the garden on a height enjoys a rainy weather and enjoys an abundant harvest.



Grapes of a vineyard on top of a mountain.



Heights usually have more rains and fogs (B), and better drainage of excess rain water (C).



2.20. Plant Ecology: The Location of Olive Tree

"اللَّهُ نُورُ السَّمَاوَاتِ وَالْأَرْضِ ۚ مَثَلُ نُورِهِ كَمِشْكَاةٍ فِيهَا مِصْبَاحٌ ۚ الْمِصْبَاحُ فِي زُجَاجَةٍ ۚ الزُّجَاجَةُ كَأَنَّهَا كَوْكَبٌ دُرِّيٌّ يُوقَدُ مِنْ شَجَرَةٍ مُبَارَكَةٍ زَيْتُونَةٍ لَا شَرْقِيَّةٍ وَلَا غَرْبِيَّةٍ يَكَادُ زَيْتُهَا يُضِيءُ وَلَوْ لَمْ تَمْسَسْهُ نَارٌ ۚ نُورٌ عَلَى نُورٍ ۗ يَهْدِي اللَّهُ لِنُورِهِ مَنْ يَشَاءُ ۗ وَيَضْرِبُ اللَّهُ الْأَمْثَالَ لِلنَّاسِ ۗ وَاللَّهُ بِكُلِّ شَيْءٍ عَلِيمٌ" (النور:35).

"God is the Light of the heavens and the earth. The parable of His Light is as (if there were) a niche and within it a lamp, the lamp is in glass, the glass as it were a glittering star kindled from a blessed tree, an olive, neither of the east nor of the west, whose oil would almost glow forth (of itself), though no fire touched it. Light upon Light! God guides to His Light whom He wills. And God sets forth parables for mankind, and God is All-Knower of everything" (Qur'an, 24:35).

Olive trees need a long, hot summer and a cool, not frigid winter. The tree is also affected by its micro-climate which includes the amount and duration of light, day and night temperature, winds, atmospheric moisture and the type and source of water (27).

The location of the olive tree affects its ecology and consequently affects the oil produced and its quality. The effect of the ecology of the olive tree on the quality of the oil produced is stated in the above verse of the Qur'an.



The olive tree is found in the Mediterranean Basin. However if required climate is provided, it may grow regardless of its place. Therefore, it has been naturalized in some places in China in the east and the USA in the west. However, the quality of the oil of the tree is affected by its microclimate. A notion made in the Qur'an more than 14 centuries ago.

2.21. Plant Ecology: Dormant Seeds Germination in the Desert

"وَتَرَى الْأَرْضَ هَامِدَةً فَإِذَا أَنْزَلْنَا عَلَيْهَا الْمَاءَ اهْتَزَّتْ وَرَبَتْ وَأَنْبَتَتْ مِنْ كُلِّ زَوْجٍ بَهِيجٍ" (الحج:5).

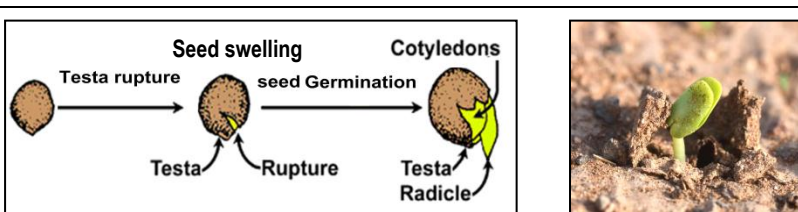
“And you see the earth still; but when We send down water on it, it vibrates (Ehtazat), and swells (Rabat), and grows all kinds of lovely pairs“(Qur’an, 22:5).

Dormancy of seeds in the soil of desert provides a strategy to start germination in time in order to reduce the risk of plant death and species extinction in an unfavourable environment (28).

When rain strikes the earth it causes the quivering and vibration of the particles of the soil (**Ehtazat** in Arabic). This causes mechanical abrasion of dormant seed coats (testa). The abraded seed coat becomes permeable to water, which is essential for seed germination. In addition, microbes growing in the wet soil produce enzymes which also damage the seed coat and help in water permeation and seed germination (28).

The upper layers of the soil contain humus and clay. Humus refers to a dark, amorphous, spongy, jelly-like organic matter, which arises by microbial degradation of dead organisms. Humus can hold the equivalent of 80–90% of its weight moisture. Also, clay is known to increase in size by hydration and shrink by drying. Therefore, both humus and clay would contribute to the swelling of the soil (**Rabat** in Arabic). On the other hand, the growth of microorganisms in the soil, the enlargement of the size of sprouting seeds and the growth of plant roots may also contribute to the elevation of the soil.

Is it not striking how the Qur’an describes the of quivering of soil particles, the swelling of soil and the growth of various plants after rain falls, which we could have never realised without today’s scientific knowledge?



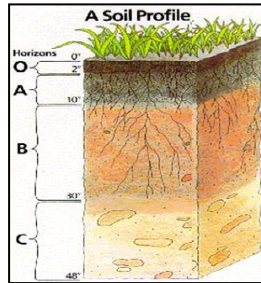
Abrasion of seed leads to water absorption, swelling and germinate.



The Namibian desert before (left) and after rain (right).



The swelling of the seed and the growth of the roots increase the size of the soil.



Humus and clay in layers O, A and B of the soil swell when they absorb water.

2.22. The Anatomy of Grains

"مَثَلُ الَّذِينَ يُنْفِقُونَ أَمْوَالَهُمْ فِي سَبِيلِ اللَّهِ كَمَثَلِ حَبَّةٍ أَنْبَتَتْ سَبْعَ سَنَابِلٍ فِي كُلِّ سَنَابِلَةٍ مِائَةٌ
حَبَّةٌ وَاللَّهُ يُضَاعِفُ لِمَنْ يَشَاءُ وَاللَّهُ وَاسِعٌ عَلِيمٌ" (البقرة: 261).

"The parable of those who spend their wealth in God's way is that of a grain (wheat, barley, oats, etc.) that produces seven spikes; in each spike is a hundred grains. God multiplies for whom He wills. God is Bounteous and Knowing" (Qur'an, 2:261).

The above verse tells us that the parable of those who spend their money for His sake is that of a grain which when it is grown produces a large number of grains. The question is, why does God choose the grain as a parable?

The grains of family Poaceae (Gramineae) are characterized by the following (29):

- 1- One grain produces multiple stems. It starts with the main shoot and then produces side shoots (tillers), which start from the initial seedling.
- 2- Each shoot produces a terminal spike which consists of spikelets.
- 3- Each spikelet can produce two to five grains.

Therefore, the total number of grains produced may be increased by:

- a- Increasing the number of tillers which will lead to an increased number of spikes.
- b- Increasing the number of grains produced by each spikelet of the spike.

"وَالْحَبُّ ذُو الْعَصْفِ وَالرَّيْحَانُ" (الرحمن: 12).

"And grains with chaff, and fragrant plants" (Qur'an, 55:12).

The verse refers to the dry, scaly protective casings of the seed of a grain which is called chaff. It consists of three casings; the glumes, the palea, and the lemma (see the figure on the opposite page).

Who taught the prophet Muhammad these accurate details about the characteristics of the anatomy of a grown grain? Was he a plant scientist specialized in grains or was it a revelation from God who created and knows the characteristics the grains? Needless to say, grains were not commonly cultivated in the Arabian Desert.



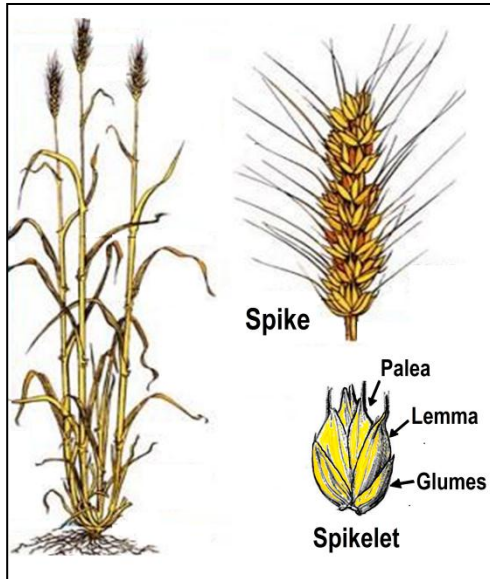
One grain
produces multiple
stems as told in the
verse



The main shoot and each
tiller ends with a spike
consisting of spikelets.



Each spikelet may
produce several grains.



The scaly protective casings of the grain are called chaff and consists of three layers named the glumes, the palea, and the lemma.
(العصيفة السفلى - Lemma -العصيفة العليا - Palea - القنابع - Glumes)

2.23. Intercropping

"وَاضْرِبْ لَهُم مَّثَلًا رَجُلَيْنِ جَعَلْنَا لِأَحَدِهِمَا جَنَّتَيْنِ مِنْ أَعْنَابٍ وَحَفَفْنَاهُمَا بِنَخْلٍ وَجَعَلْنَا بَيْنَهُمَا زَرْعًا . كِلْتَا الْجَنَّتَيْنِ آتَتْ أُكْلَهَا وَلَمْ تَظْلِمْ مِنْهُ شَيْئًا وَفَجَّرْنَا خِلَالَهُمَا نَهْرًا ... قَالَ مَا أَظُنُّ أَنْ تَبِيدَ هَذِهِ أَبَدًا قَالَ لَهُ صَاحِبُهُ وَهُوَ يُحَاوِرُهُ فَعَسَىٰ رَبِّي أَنْ يُؤْتِيَنَّ خَيْرًا مِّنْ جَنَّتِكَ وَيُرْسِلَ عَلَيْهَا حُسْبَانًا مِّنَ السَّمَاءِ فَتُصْبِحَ صَعِيدًا زَلَقًا . أَوْ يُصْبِحَ مَأْوَاهَا غَوْرًا فَلَنْ تَسْتَطِيعَ لَهُ طَلْبًا" (الكهف: 32-41).

“And cite for them the parable of two men. To one of them, We gave two gardens of a vine, and We surrounded them with palm-trees, and We placed between them crops. Both gardens produced their harvest in full and suffered no loss. And We made a river flow through them. ... He said, "I do not think this will ever perish.... His friend said to him, as he conversed with him ... “Perhaps my Lord will give me something better than your garden, and release upon it a catastrophe from the sky, so it becomes a barren waste. Or its water will sink into the ground, and you will be unable to draw it.” (Qur’an, 18:32-41).

The verses draw our attention to two distinguished gardens with a river flowing in between. The fertile soil of the gardens allowed its owner to grow at least three crops at the same time or what is called **intercropping** (30).

However, the owner of the garden was arrogant and ungrateful. He denied that the two gardens were rather a blessing and a bounty of God. His poor friend advised him to be thankful and reminded him that he might be punished for his ingratitude and his gardens could suffer from the unavailability of the water and a change in the properties of soil.

Now, there have been no flowing rivers in the Arabian Desert at the time of the Prophet Muhammad (PBUH) to allow for **intercropping**. This practice is nowadays found in some countries like India and Egypt. Who taught the prophet Muhammad about the **intercropping** system? Was Muhammad (PBUH) a Prophet or an expert in agriculture? Or is this parable is given in the Qur’an because it is a revelation to him from God?



Multilayer layer agriculture of two or more crops of trees and vegetables is now common in some countries, where the soil is fertile enough and water is available.



A multilayer of coconut and a flowering plant (left), and coconut, vine and a vegetable (right) in India.

2.24. The Pumpkin of Jonah

"فَنَبَذْنَاهُ بِالْعَرَاءِ وَهُوَ سَقِيمٌ . وَأَنْبَتْنَا عَلَيْهِ شَجَرَةً مِّنْ يَّفْطِينٍ" (يونس:139-146).

"But We cast him forth on the naked shore while he was sick, And We caused a pumpkin to grow over him" (Qur'an, 145-146).

Jonah was swollen by a whale, after which he was cast on a beach. God made a pumpkin plant to grow over him. Why did God choose pumpkin? Let's try to answer this question.

- Pumpkin can moderately tolerate the salinity of the soil near the seashore.
- Pumpkin is a fast growing plant which can create trellis in a short time and with its large leaves can provide good shade to protect Jonah from the burning sun.
- Pumpkin fruits would be available for Jonah without any effort.
- Pumpkins can be eaten raw without preparation, and together with its seeds, it provides a balanced source of proteins, minerals, and vitamin.
- Pumpkin has many known medicinal benefits, therefore (31):
 - ❖ It has a healing effect on the skin exposed to Whale's gastric juices.
 - ❖ It has an anti-inflammatory effect to relief his pain.
 - ❖ It can help him to sleep and relief the distress he went through.
 - ❖ It can boost his immune system to recover quickly.
 - ❖ It can benefit his bones, heart, and kidney.

Were the Prophet Muhammad and an expert in its anatomical, nutritional and medical properties of pumpkin or is it God, the All-Knowing, Who revealed the Glorious Qur'an?



Pumpkin with its large leaves provided a shaded trellis to shelter Jonah and provide him with food.

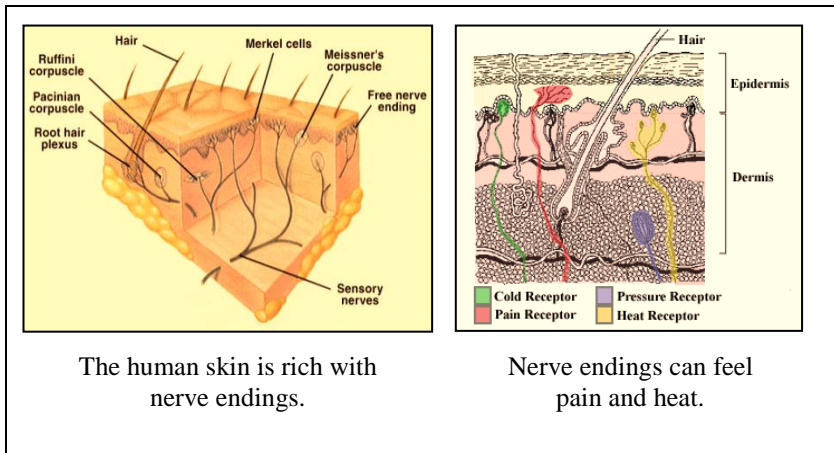
2.25. Human Skin Sensation

"إِنَّ الَّذِينَ كَفَرُوا بِآيَاتِنَا سَوْفَ نُصَلِّبُهُمْ نَارًا كَلَّمَآ نَضَجَتْ جُلُودُهُمْ بَدَلْنَاَهُمْ جُلُودًا غَيْرَهَا لِيَذُوقُوا الْعَذَابَ إِنَّ اللَّهَ كَانَ عَزِيزًا حَكِيمًا" (النساء:56).

“Indeed, those who disbelieve in Our signs - We shall burn them in Fire. As often as their skins are roasted through, We shall change them for other skins that they may taste the punishment. Indeed, God is ever Exalted in Might and Wise” (Qur’an, 4:56).

Before the age of scientific discovery, it was commonly believed that the whole human body could feel pain. It was not until the role of nerve endings in the skin were discovered, that people learned about the existence of certain nerve endings which transmit the feelings of pain to the brain (32).

Therefore, the skin exposed to burns suffers from great pain sensation. If a burn extends to beneath the skin tissues, the pain will naturally decrease because of the absence of nerve endings. The dependence of the sensation of pain on the skin and its replacement, when damaged to suffer the feeling of pain again, is described in the above verses of the Qur’an.



2.26. Human Fingerprint

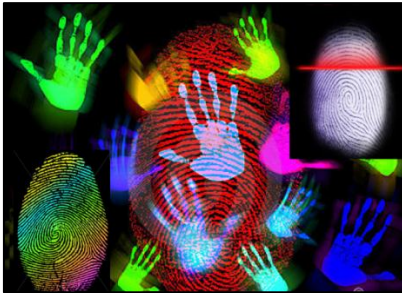
"أَيُخَسِبُ الْإِنْسَانُ أَنَّ نَجْمَعُ عِظَامَهُ. بَلَىٰ قَادِرِينَ عَلَىٰ أَنْ نَسُوِّيَ بَنَانَهُ" (القيامة: 3-4).

"Does man think that We will not assemble his bones? Yea, We are able to put together in perfect order the very tips of his fingers." (Qur'an, 75:3-4).

Fingerprints were discovered in the 19th century. They are based on the patterns of skin ridges on the pads of the fingers. Each person's fingerprint is unique and even in identical twins, who have the same DNA, have different fingerprints. Although the basic whorl, arch, and loop patterns may be similar, the details of the patterns are specific to each individual. That is why they have long been used as a way to identify individuals (33).

The ridges of fingerprints begin to develop during the third month of foetal development, and they are fully formed by the sixth month. Ridges remain the same throughout life. Studies suggest that multiple genes contribute to the patterns of ridges (33).

Who knew at the time of the Prophet Muhammad (PBUH) about fingerprint variations?



Although the patterns of fingerprints may be similar, the details of the patterns are specific to each individual.



Fingerprints' ridges are fully formed by the sixth month.

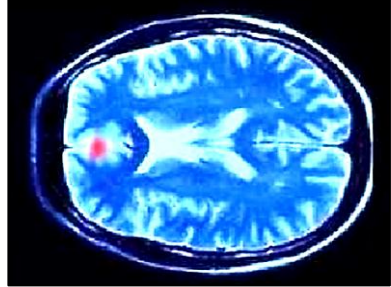
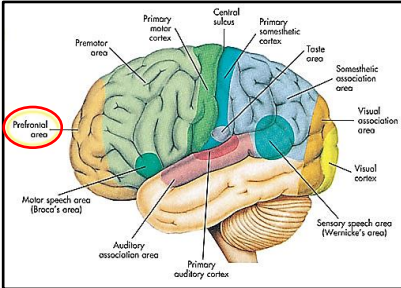
2.27. Human Forehead (Cerebrum)

كَلَّا لَئِن لَّمْ يَنْتَه لِنَسْفَعَا بِالنَّاصِيَةِ. نَاصِيَةٍ كَاذِبَةٍ خَاطِنَةٍ (العلق: 15-16).

“Let him beware! If he does not stop, We will drag him by the Naseyah (front of forehead), A lying, sinning Naseyah” (Qur’an, 96: 15-16).

The prefrontal area of the cerebrum is called the forehead (the frontal lobe of the brain). Modern science has demonstrated that frontal lobe of the brain is responsible for motivating and initiating good and sinful behaviours like telling lies (34).

The responsibility of the forehead for lying and sinful behaviour is described in the above verses of the Holy Qur’an.



Functional regions of the cerebral cortex. The prefrontal area is indicated by a red circle.

The red spot indicates activity of the prefrontal area while lying.

2.28. People of the Cave

"فَضَرَبْنَا عَلَىٰ آذَانِهِمْ فِي الْكَهْفِ سِنِينَ عَدَدًا" (الكهف:11).

Therefore, We covered up their (sense of) hearing in the Cave for a number of years (Qur'an, 18:11).

"وَتَرَى الشَّمْسَ إِذَا طَلَعَتْ تَزَاوَرُ عَنْ كَيْفِهِمْ ذَاتَ الْيَمِينِ وَإِذَا غَرَبَتْ تَقْرِضُهُمْ ذَاتَ الشَّمَالِ وَهُمْ فِي فَجْوَةٍ مِّنْهُ" (الكهف:17).

“And you might have seen the sun, when it rose, declining to the right from their Cave, and when it set, turning away from them to the left while they lay in a cavity of it” (Qur'an, 18:17).

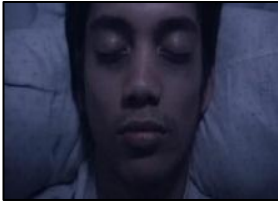
" وَنُقَلِّبُهُمْ ذَاتَ الْيَمِينِ وَذَاتَ الشَّمَالِ" (الكهف:18).

“And We turned them to the right and to the left” (Qur'an, 18:18)

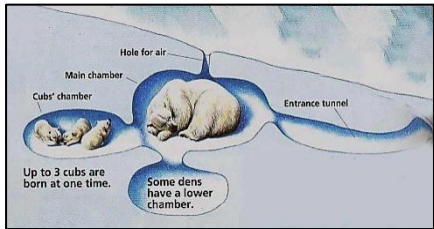
During the reign of a pagan Roman Emperor, some youths refused to associate the sun with God and decided to take a shelter in a cave away from their community.

God made them sleep for more than 300 years which, as such, is a miracle. God in the above verses describes how this long sleep was associated with the physical environmental conditions which aided the physiological requirements for the deep sleeping for a long time.

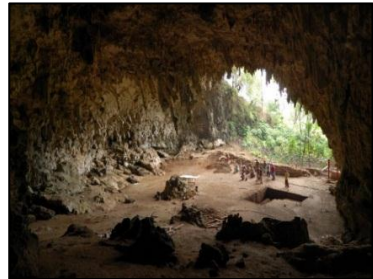
- 1) The sun did not enter the cave directly. In addition, it seems that the cave was large enough to have **several cavities** as mentioned in verse 17. Being in one cavity suggests that there was **enough darkness** in the cave.
- 2) Darkness is essential for the **release of melatonin**, which is a hormone secreted at night hours to get deep sleep. In hibernating animals, the circadian clock which coordinates the secretion of melatonin is arrested and the hormone is continuously released, which might have been the case for the people of the cave (35).
- 3) While sleeping, God made them **turn to the right and the left**. This is necessary to protect them from bedsores (pressure ulcers), which happen to bedridden individuals as localized injuries to the skin and/or underlying tissue (verse 18).
- 4) God stopped their **sense of hearing** (verse 11) because any loud sound may disturb their deep sleeping.



Darkness is a necessity for deep sleeping



In hibernating animals, melatonin is secreted continuously for 24 hours/day.



Large caves may have several cavities as indicated in verse 17. A gap in a large cave would ensure enough darkness and quietness.

2. HUMAN EMBRYOLOGY

The Qur'an revealed more than 14 centuries ago mentions in a number of verses precise information about the human embryo and its developmental stages as signs of the divine power of God. Therefore, the question automatically raised is: Was the science of embryology known at the time of the Prophet Muhammad, in his society or neighbour societies? Actually not and though the Bible was claimed to be the source of Qur'an compares embryo formation with cheese making.

"ألم تصبني كاللبن وخرتني كالجبين. كسوتني جلدًا ولحمًا فنسجتني بعظام وعصب"
(سفرأيوب 10:11-10)

***"Did you not pour me out like milk and curdle me like cheese, clothe me with skin and flesh and knit me together with bones and sinews?"
(Job, 10:10-11).***

Strikingly, nothing was known about embryology until 1651, when Harvey, to the first time, observed the embryo of a hen using a simple lens! Later, using a light microscope, human sperms were observed, in 1677, by Hamm and Leeuwenhoek. Interestingly, it was then presumed that a sperm contains a tiny human being who can grow in the womb of the mother like a seed. On the other hand, the female ovum was not observed until 1827, when it was first observed by von Baer in the ovary of a dog (36,38).

In 1839, Schleiden and Schwann realized that the human being is formed from living 'cells'. Although the idea of the union of a male sperm and a female ovum was later concluded by scientists, **little was known about the stages of growth of human embryos until the twentieth century** (36,38).

From where then did the Prophet Muhammad, who lived in an illiterate society, in the seventh century, get a precise description of the human embryo and its developmental stages, unless it was revealed to him from God? This question was the reason for Keith Moore the professor of anatomy (70), at the University of Toronto, Ontario, Canada to write about embryology in the Qur'an (37,69).

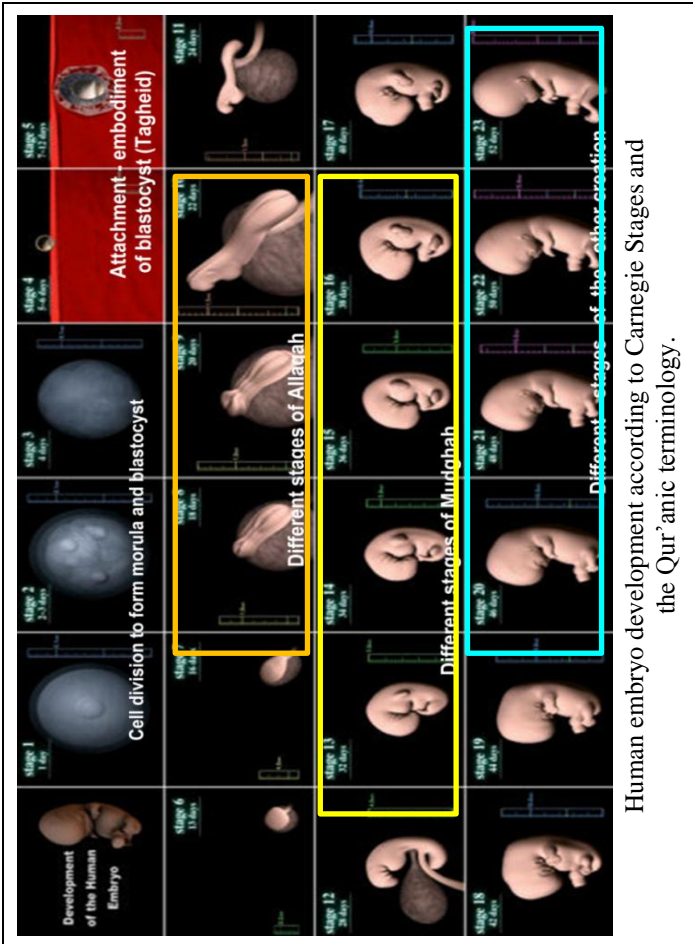
"وَلَقَدْ خَلَقْنَا الْإِنْسَانَ مِنْ سَلَالَةٍ مِّن طِينٍ. ثُمَّ جَعَلْنَاهُ نُطْفَةً فِي قَرَارٍ مَّكِينٍ. ثُمَّ خَلَقْنَا النُّطْفَةَ عَلَقَةً فَخَلَقْنَا الْعَلَقَةَ مُضْغَةً فَخَلَقْنَا الْمُضْغَةَ عِظَامًا فَكَسَوْنَا الْعِظَامَ لَحْمًا ثُمَّ أَنْشَأْنَاهُ خَلْقًا آخَرَ ۗ فَتَبَارَكَ اللَّهُ أَحْسَنُ الْخَالِقِينَ" (المؤمنون: 12-14).

"And indeed, We created Man (Adam) out of clay. Thereafter, We made him (his offspring) as Nutfah (mixed drops of male and female sexual

discharges) and lodged it in a safe lodging (the womb of a woman). We then made the Nufah into Alaqah (leech-like structure, suspended thing, and blood clot) and then We changed the Alaqah into Mudghah (chewed-like a lump), and then We made out of the Mudghah bones, then we clothed the bones with flesh (muscles). Then We developed out of it another creation. So blessed be God, the best to create” (Qur’an, 23:12-14).

”وَقَدْ خَلَقَكُمْ أَطْوَارًا” (نوح:14).

“He created you in stages” (Qur’an, 71:14).

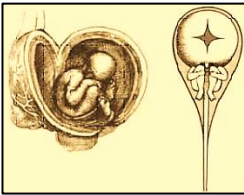


3.1. Male and female gametes

"إِنَّا خَلَقْنَا الْإِنْسَانَ مِنْ نُطْفَةٍ أَمْشَاجٍ نَبْتَلِيهِ فَجَعَلْنَاهُ سَمِيعًا بَصِيرًا" (الانسان: 2).

“Indeed, We created man from Nutfatin Amshajin (liquids of males and female) that We may try him; and We made him hearing and seeing” (Qur’an, 76:2).

The zygote results from intermixing of male and female gametes and fertilization of the ovum. The Qur’an uses the Arabic words ‘Nutfatin Amshajin’ which means, mingled liquids of males and female.



A minute human in a sperm as imagined in the 18th century.



Man produces millions of the sperms.



A sperm fertilizing an ovum.



Fertilized ovum.



Two-cell embryo.



Four-cell embryo.

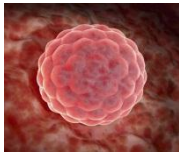
3.2. Embedding in the Uterus (Tagheid)

"اللَّهُ يَعْلَمُ مَا تَحْمِلُ كُلُّ أُنْثَىٰ وَمَا تَغِيصُ الْأَرْحَامُ" (الرعد: 8).

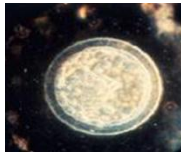
"God knows what every female bears, and what the uterus embed (Tagheid)" (Qur'an, 13:8).

Once fertilized, the embryo undergoes series of cell divisions to form morula and the blastocyst.

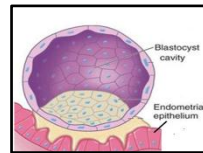
The blastocyst adheres to the endometrium of the uterus and then starts to **penetration of the uterine epithelium** until it becomes **completely embedded** in the stromal tissue and become covered by the regrown endometrium (**tagheid, in Arabic**).



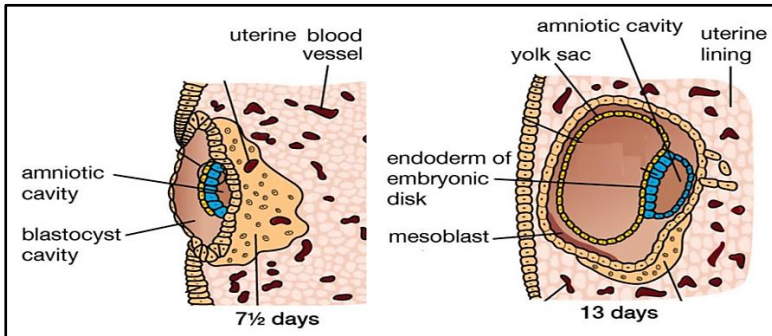
Morula (16 cells)



Blastocyst (70-100 cells).



Adherence of blastocyst to uterus endometrium



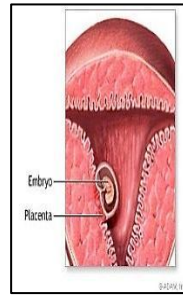
Penetration of the uterine epithelium by the blastocyst after 7 days of fertilization (left). The blastocyst becomes completely embedded in the stromal tissue (**Tagheid**) by the 13th day as shown on the right.

3.3. Alaqah

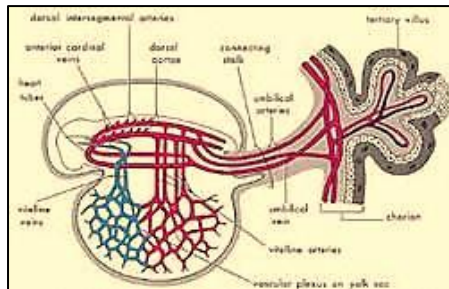
”ثُمَّ خَلَقْنَا النُّطْفَةَ عَلَقَةً” (المؤمنون:14).

“We then made the Nutfah into Alaqah (leech-like structure, suspended thing, and blood clot)” (Qur’an, 23:14).

Alaqah means literally, in Arabic, a suspended or clinging entity, blood clot, and leech. The embryo after 2-3 weeks is suspended on the uterine wall of the mother. It looks like a blood clot because of the presence of relatively large amounts of blood. After two weeks it looks like a leech feeding on the blood of the mother uterus.



Two-three weeks embryo looking like a leech.



The embryo looks like a blood clot because of its heavy vascularization.

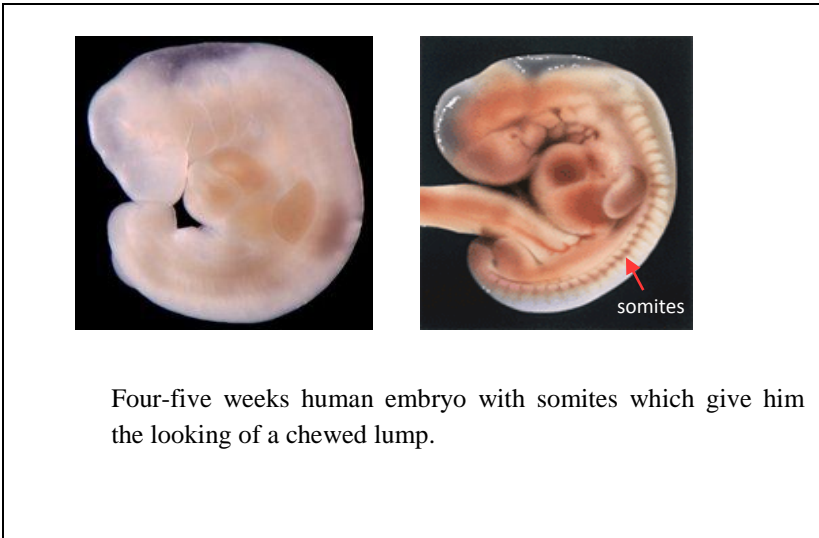
3.4. The Chewed Lump Stage

"فَخَلَقْنَا الْعَلَقَةَ مُضْغَةً" (المؤمنون:14).

*“And then We changed the Alaqah into Mudghah (chewed-like lump)”
(Qur’an, 23:14).*

After the fertilized ovum clings to the uterus, like a leech, then the somites develop. Somites are bilaterally paired blocks which give rise to multiple tissues, including the axial skeleton, skeletal and smooth muscles, ligaments, and cartilage.

The foetus with the somites at the age of 4-5 weeks appears as a chewed-like lump or what is called in the verse **Mudghah**.



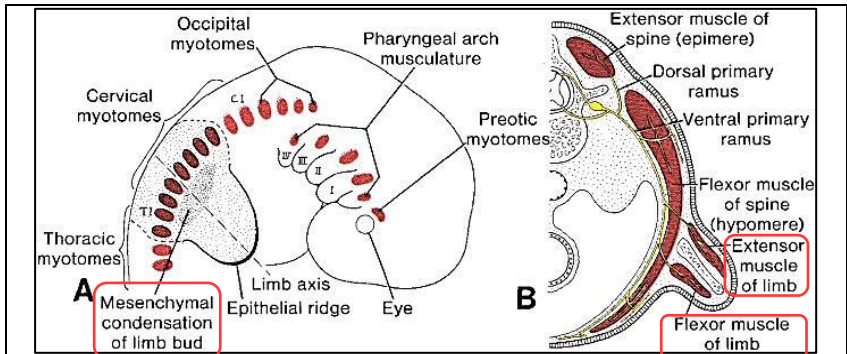
3.5. Bones then Muscles

“فَخَلَقْنَا الْمُضْغَةَ عِظَامًا فَكَسَوْنَا الْعِظَامَ لَحْمًا” (المؤمنون:14).

“And then We made out of the Mudghah bones, then we clothed the bones with flesh (muscles)” (Qur’an, 23:12-14).

Science has revealed that bone structures develop before muscles of the embryo.

- 1) Mesenchyme first forms cartilage tissues which ossify into bones (Fig. A).
- 2) Muscle cells then come together and wrap around the bones (Fig B).



A. The condensation of mesenchyme at the base of the limb bud.

B. The formation of the dorsal (extensor) and ventral (flexor) muscular components of the limb around the bone after its formation.



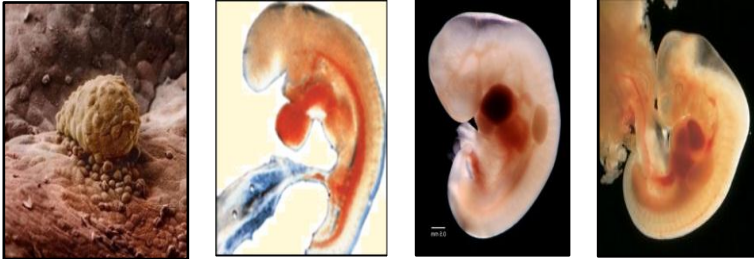
The cartilage tissues of the embryo are first formed and ossify. Then the muscle cells are wrapped around the bones.

3.6. Another Creation

"ثُمَّ أَنْشَأْنَاهُ خَلْقًا آخَرَ ۖ فَتَبَارَكَ اللَّهُ أَحْسَنُ الْخَالِقِينَ" (المؤمنون:14).

“Then We developed out of it another creation. So blessed be God, the best to create” (Qur’an, 23:14).

After the development of the cartilaginous skeleton and clothing it with muscles, the embryo changes its shape dramatically into a human shape and is called the foetus. This happens through an accelerated rate of growth, during which the limbs and external organs appear and fingers and external genitalia are distinguished.



Embryo early stages (Alaqah and Mudghah stages).



Embryo foetus-stages (another creation stages).

3.7. Development of Senses

"إِنَّا خَلَقْنَا الْإِنْسَانَ مِنْ نُطْفَةٍ أَمْشَاجٍ نَبْتَلِيهِ فَجَعَلْنَاهُ سَمِيعًا بَصِيرًا" (الانسان:2).

"Indeed, We created man from liquids of males and female that We may try him; and We made him hearing and seeing." (Qur'an, 76:2).

"وَجَعَلْ لَكُمْ السَّمْعَ وَالْأَبْصَارَ وَالْأَفْئِدَةَ قَلِيلًا مَّا تَشْكُرُونَ" (السجدة:9).

"And He gave you hearing, and sight, and understanding" (Qur'an, 32:9).

The first sense to develop in human embryo is hearing. The foetus can hear sounds after the 24th week. Subsequently, the sense of sight is developed by the 26th week, when the retina becomes sensitive to light. In the above Qur'anic verses the sense of hearing is mentioned before that of sight, which is uncovered with modern embryology.



24-week embryo

The Foetus can respond to sound from both inside and outside the uterus.



26-week embryo.

The eyes are partially opened and can perceive light.

3.8. Protection of Foetus

"يَخْلُقُكُمْ فِي بُطُونِ أُمَّهَاتِكُمْ خَلْقًا مِّن بَعْدِ خَلْقٍ فِي ظُلُمَاتٍ ثَلَاثٍ ۗ ذَلِكُمُ اللَّهُ رَبُّكُمْ لَهُ الْمُلْكُ ۗ لَا إِلَهَ إِلَّا هُوَ ۗ فَآَنَىٰ تُصْرَفُونَ" (الزمر:6).

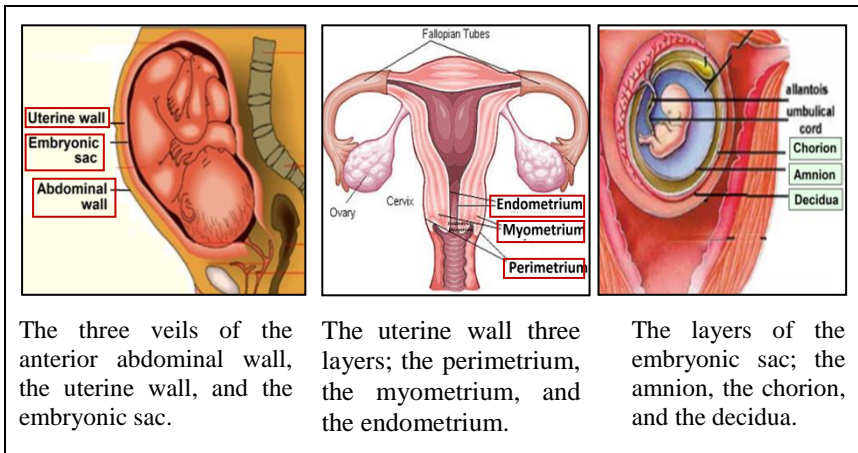
“God created you in the wombs of your mothers, one act of creation after another, in three veils of darkness” (Qur’an, 39:6).

The developing foetus is surrounded by three anatomical structures which are the abdominal wall, the uterine wall and the embryonic membranes in which the foetus is enclosed.

Interestingly enough, each layer is itself made up of three layers. The abdominal wall is made up of three muscle layers: The external oblique sheet, the internal oblique sheet, and the transverse muscle layers.

The uterine wall is made up of the perimetrium, the myometrium, and the endometrium.

The embryonic sac is made from three membranes; the amnion, the chorion, and the decidua. These three layers are described in the Holy Qur’an as three veils.



The three veils of the anterior abdominal wall, the uterine wall, and the embryonic sac.

The uterine wall three layers; the perimetrium, the myometrium, and the endometrium.

The layers of the embryonic sac; the amnion, the chorion, and the decidua.

3.9. Development of Ovaries and Testicles

"فَلْيَنْظُرِ الْإِنْسَانُ مِمَّ خُلِقَ . خُلِقَ مِنْ مَّاءٍ دَافِقٍ . يَخْرُجُ مِنْ بَيْنِ الصُّلْبِ وَالتَّرَائِبِ " (الطارق: 5-7).

“So let man observe from what he was created. He was created from a fluid, ejected, emerging from between the backbone and the ribs.”(Qur’an, 86: 5- 7).

In the embryonic stages, the reproductive organs of the male and female, i.e. the testicles and ovaries, begin their development near the kidney **between the spinal column and the eleventh and twelfth ribs**. Later, through the inguinal canal, the female gonads (ovaries) descend and stop in the pelvis and the male gonads (testicles) continue their descent before birth to reach the scrotum. The Holy Qur’an describes the site of development of sex organs in the above stated verse.

In Week 5: The genital ridges begin to form adjacent to the developing kidneys (Fig A).

In week 6: Primitive germ cells, migrate from the embryo's yolk sac to the genital ridge (green colour in Fig. B), where they are incorporated into the primary sex cords (Fig C).

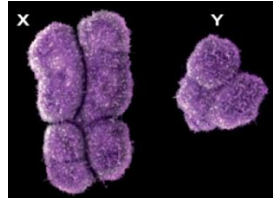
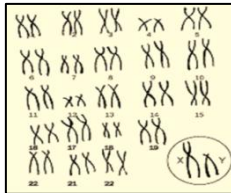
The gonadal ridges, in turn, develop into a gonad; a testis in the male and an ovary in the female. Through the inguinal canal, the ovaries descend and stop in the pelvis and the testicles continue their descent before birth to reach the scrotum.

3.10. The Gender of the Child

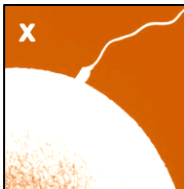
"وَأَنَّهُ خَلَقَ الزَّوْجَيْنَ الذَّكَرَ وَالْأُنثَىٰ (45) مِن تُفْئَةٍ إِذَا تُمْنَىٰ " (النجم:45-46).

“... And that He creates the two mates - the male and female- From semen when it is emitted” (Qur’an, 53:45-46).

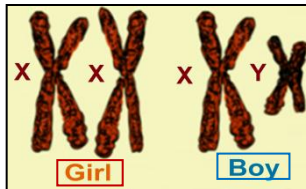
Until fairly recently it was thought that baby’s sex was determined by the mother’s cells, or at least by both male and female cells. However, it is now understood through genetics and molecular biology that the sex of the baby is determined by the sperm cells of the male. The Qur’an states that masculinity or femininity is determined by the ejected male sperms as explained below.



The mother’s ovum contains only the X chromosome while the sperms may carry either X or Y chromosomes. Therefore, the sex of the baby depends on whether the sperm fertilizing the ovum contains the X or Y chromosome.



Sperm with X chromosome produces a female embryo.



Gender is determined by chromosome 23 which is **XX** in females and **XY** in males.



A **sperm with Y** chromosome produces a male embryo.

3.11. Facilitated Labour, and Delivery

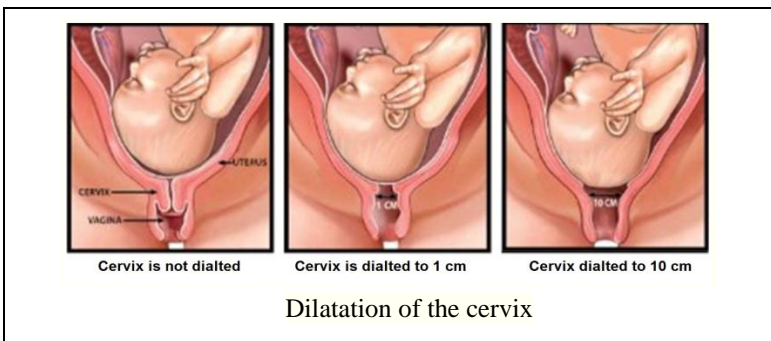
" ثُمَّ السَّيْلَ يَسَّرَهُ " (عيسى: 20).

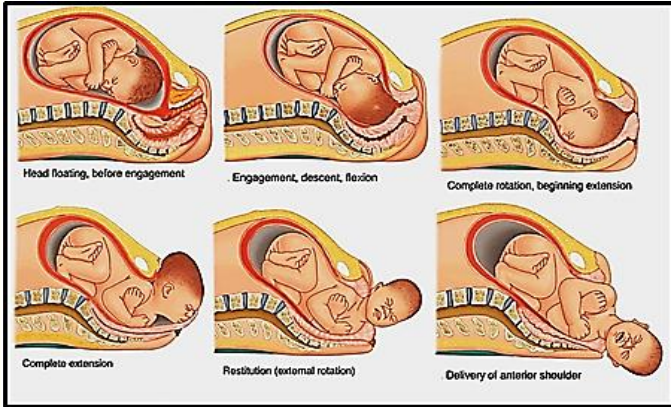
"Then He makes his path smooth for him." (Qur'an, 80: 20).

It is striking that a foetus with a head diameter that may exceed 12 cm can be delivered smoothly through an initially closed cervix, and a narrow vagina.

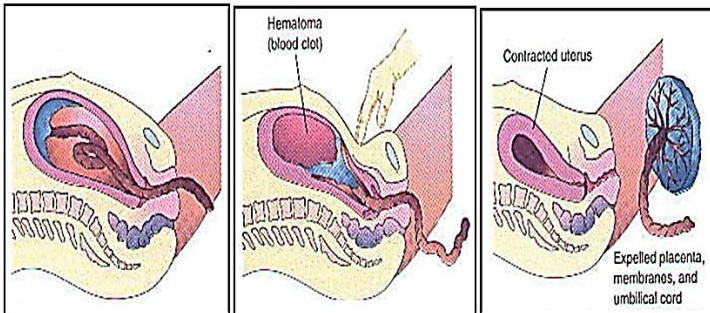
The delivery of the foetus is comprised of 4 stages:

- 1- The stage of dilatation of cervix and contraction of uterus muscle. This stage takes about 7-12 hours.
- 2- The stage of delivering the foetus. This stage takes about 30-50 minutes. After enough dilatation of the cervix and in the presence of consequent uterus contractions, the membrane ruptures, and foetus head starts to emerge first. It should be mentioned that the head of the foetus is normally triple the diameter of the vaginal canal.
- 3- The stage of placental emergence and the formation of a blood clot behind the placenta. This stage lasts about 15 minutes.
- 4- The stage of uterine contraction to alleviate the bleeding after the delivery process. This continues for about two hours.





Delivery of the foetus



The emergence of the placenta, formation of a blood clot behind the placenta and uterine contraction to alleviate the bleeding after delivery.

3.12. Breastfeeding

"وَالْوَالِدَاتُ يُرْضِعْنَ أَوْلَادَهُنَّ حَوْلَيْنِ كَامِلَيْنِ لِمَنْ أَرَادَ أَنْ يُتِمَّ الرَّضَاعَةَ " (البقرة:233).

“The mothers shall give suck to their infants for two whole years, for those who desire to complete the term of suckling” (Qur’an, 2:233).

The Glorious Qur’an emphasized on the importance of breastfeeding of infants. Recent studies demonstrated that breast milk is a unique nutritional source that cannot adequately be replaced by any other food, including infant formula (39).

Among the important health benefits of breastfeeding are:

- Breastfed children have better psychosocial and cognitive development than formula-fed children.
- A woman's ability to produce all of the nutrients that her child needs can provide her with a sense of confidence and provides most mothers with a powerful psychological experience.
- Breastfed children are more resistant to disease and infection in their early life than formula-fed children because breast milk contains many factors that help to support a baby’s immune system (e.g. antibodies, white blood cells). Antibodies (IgA) protect the mouth, stomach, intestines and lungs of the infant. Therefore, diarrheal disease is three to four times more likely to occur in infants fed formula than those fed breast milk (39).
- Researchers have observed a decrease in the probability of sudden infant death in breastfed infants.
- When breastfed babies are vaccinated, they produce higher levels of antibodies in response to some vaccinations compared to formula-fed babies.
- Breastfed babies have a larger thymus gland compared to those fed infant formulae. The thymus gland makes white blood cells that help to protect babies against infections.
- Breastfed children are less likely to contract a number of diseases later in life, including juvenile diabetes, multiple sclerosis, heart disease, and cancer before the age of 15.

- Mothers who breastfeed their babies are less likely to develop osteoporosis later in life.
- Mothers who breastfeed their babies are able to lose weight gained during pregnancy more easily.
- Mothers who breastfeed their babies have a lower risk of breast, uterine and ovarian cancer.
- Breast milk is cheaper and less liable to contamination than formula milk.



In addition to the unique composition of breastfeeding, bottle-fed babies do not emotionally bond with their mothers



Artificial Milk Increases risks for Rheumatoid Arthritis



Babies who are fed with artificial milk are more likely to get Childhood Diabetes (Type I)

4. COSMOLOGY

The Universe According to the Bible

Some people have claimed that the Qur'an was copied from the Bible. However, this is definitely impossible because unlike, the Qur'an, the Bible depicts the universe in a way which is far away from scientific facts as summarized below:

- ❖ The sky is like a tent:

" الذي ينشر السماوات كسرادق و يبسطها كخيمة للسكن " (سفر أشعيا 40:22).

"Who stretches out the heavens like a curtain, and spreads them like a tent to dwell in" (Isaiah, 40:22).

- ❖ During creation God made a vault (sky) which separates the water above the vault from the water below the vault on the earth below:

" فعمل الله الجلد، وفصل بين المياه التي تحت الجلد والمياه التي فوق الجلد " (سفر التكوين 1:7).

"So God made the vault and separated the water under the vault from the water above it" (Genesis, 1:7).

- ❖ The sky is spread over the earth like a hard a mirror of cast bronze:

" هل صفتت معه الجلد الممكن كالمرآة المسبوكة " (سفر أيوب 37:8).

"Can you join him in spreading out the skies, hard as a mirror of cast bronze?" (Job, 37:18).

- ❖ The heaven is held up by pillars:

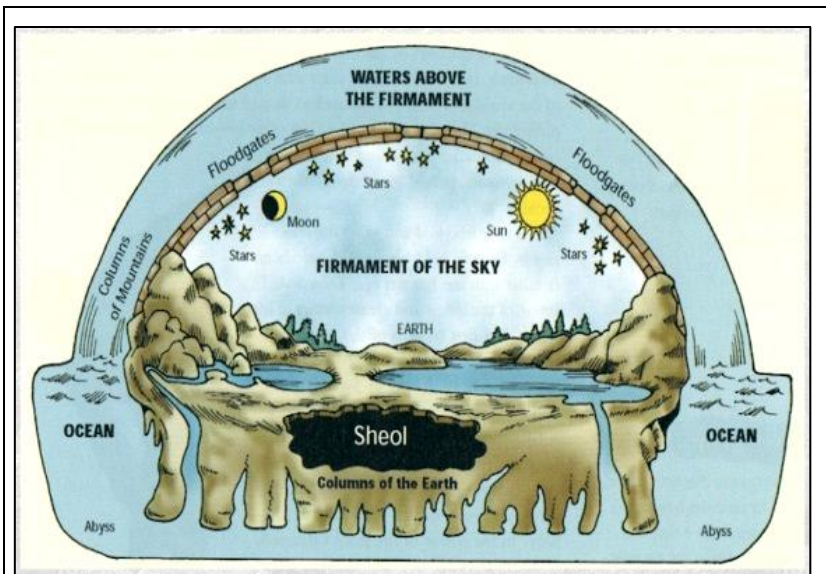
" أعمدة السماوات ترتعد وترتاع من زجره " (سفر أيوب 26:11).

"The pillars of the heavens quake, aghast at his rebuke" (Job, 26:11).

- ❖ The sun moves around the earth:

" من اقصى السماوات خروجها (الشمس) و مدارها الى اقصيها و لا شيء يختفي من حرها " (المزمور 19:6).

"It (the Sun) rises at one end of the heavens and makes its circuit to the other; nothing is deprived of its warmth" (Psalm, 19:6).



A diagram of the Universe as depicted in the Bible.



A diagram of the flat earth, depicted in the 12th-century, showing the T and O map of the inhabited world and on the right is a 15th century adaptation of a T and O map.

- ❖ The stars may fall to earth:

"كيف سقطت من السماء (النجمة) يا زهرة، بنت الصبح؟ كيف قطعت إلى الأرض يا قاهر الأمم" (سفر إشعياء 14: 12-13).

"How you have fallen from heaven, O star of the morning, son of the dawn! You have been cut down to the earth, You who have weakened the nations!" (Isaiah, 14:12-13).

- ❖ The whole world can be seen from a high mountain and a large tree can be seen from the ends of the Earth. Both verses imply a flat Earth.

"ثم أخذه أيضا إبليس إلى جبل عال جدا، وأراه جميع ممالك العالم ومجدها" (متى 4:8).

"Again, the devil took him to a very high mountain and showed him all the kingdoms of the world and their splendour" (Matthew, 4:8).

"فكبرت الشجرة وقويت، فبلغ علوها إلى السماء ومنظرها إلى أقصى كل الأرض" (دانيال: 4:11).

"The tree grew large and strong and its top touched the sky; it was visible to the ends of the earth" (Daniel, 4:11).

- ❖ God laid foundations for Earth which implies that it is fixed on the foundations and does not move.

"المؤسس الأرض على قواعدها فلا تتزعزع إلى الدهر والأبد" (مزمور 104:5).

"He set the earth on its foundations; it can never be moved" (Psalm, 104:5).

- ❖ When the windows of the vault of heaven are opened the rain it rains:

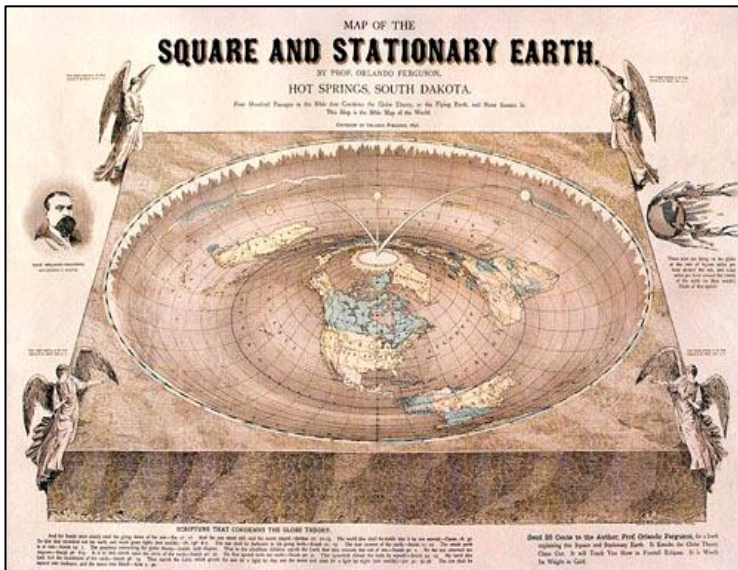
"انفجرت كل ينابيع الغمر العظيم، وانفتحت طاقات السماء" (سفر التكوين 7:11).

"The sky's windows were opened" (Genesis, 7:11).

"وانسدت ينابيع الغمر وطاقات السماء، فامتنع المطر من السماء" (سفر التكوين 8:2).

"The fountains also of the deep and the windows of heaven were stopped" (Genesis, 8:2).

It may be concluded that the depiction of the universe according to the Bible contradicts recent scientific discoveries. Any scientist propagating other ideas was persecuted by the Church. Therefore, ideas of the mathematicians, Copernicus (1543) and the astronomer, Galileo (1632), who placed the Sun rather than the Earth at the centre of the solar system, were faced with objections from the Church and were considered heretical.



The Flat Earth map as drawn by Orlando Ferguson in 1893. The map demonstrates the Biblical concept of the flat Earth in which:

- 1- It does not move (read Psalm, 104:5 in page 85).
- 2- It has four corners.

" فهكذا قال السيد الرب لأرض إسرائيل: نهاية قد جاءت النهاية على زوايا الأرض الأربع" (سفر حزقيال 7:2).

"This is what the Sovereign LORD says to the land of Israel: "'The end! The end has come upon the four corners of the land!" (Ezekiel 7:2).

- 3- Four angels are standing on the corners of the Earth.

"وبعد هذا رأيت أربعة ملائكة واقفين على أربع زوايا الأرض" (سفر رؤيا 7:2).

"After this I saw four angels standing at the four corners of the earth" (Rev, 7: 1).



Charles K. Johnson (1924 - 2001), the founder and president of the International Flat Earth Society.

The flat Earth was still a popular imagination in the 19th century, and the Flat Earth Society propagated this hypothesis until the Society declined in the 1990s.

The flat Earth was still a popular imagination in the 19th and 20th centuries. The Flat Earth Society was founded by Charles K. Johnson (1924 - 2001) in the United States and propagated the flat earth hypothesis until it was declined in the 1990s.

The Universe According to the Qur'an

The Qur'an encourages us to think and ponder over the creation of God.

"إِنَّ فِي خَلْقِ السَّمَاوَاتِ وَالْأَرْضِ وَاخْتِلَافِ اللَّيْلِ وَالنَّهَارِ لآيَاتٍ لِّأُولِي الْأَلْبَابِ"
(آل عمران:190).

"Indeed, in the creation of the heavens and the earth and the alternation of the night and the day are signs for those of understanding" (Qur'an, 3:190).

The Qur'an is not a book of science; therefore, it makes no extended effort to describe the cosmos. Yet, the facts about the universal creation, its purpose and fate, and some other aspects of cosmology are revealed as signs of God's creation.

While, as demonstrated previously, the Biblical hypothesis of the Earth and the Universe were primitive, obscure and contrast with recent scientific discoveries, the Qur'an amazingly refers in an accurate scientific way to different phenomena concerning the Universe. These phenomena include the creation of the universe, its expansion, the nature and orbits of heavenly bodies like the sun and the moon, the shape of the earth, etc. All these topics are going to be reviewed in this chapter.

The prophet Muhammad (PBUH), lived in the seventh century, in an illiterate Society. *How would these phenomena, which scientists have discovered fairly recently using complicated and advanced technological and scientific methods, have been known to him unless he was inspired by God?*

وَمَا كُنْتَ تَتْلُو مِنْ قَبْلِهِ مِنْ كِتَابٍ وَلَا تَخْطُهُ بِيَمِينِكَ إِذًا أَلَّا تَابَ الْمُبْطِلُونَ" (العنكبوت: 48).

"You did not read any scripture before this, nor did you write it down with your right hand; otherwise the falsifiers would have doubted"
(Qur'an, 29: 48).

On the other hand, is it possible that the Qur'an was copied from the Bible as some people have claimed?

"سَنُرِيهِمْ آيَاتِنَا فِي الْأَفَاقِ وَفِي أَنْفُسِهِمْ حَتَّىٰ يَتَبَيَّنَ لَهُمْ أَنَّهُ الْحَقُّ" (فصلت: 53).

We shall certainly show them Our signs in the Universe and in their own selves, till it will be very obvious to them that this (Qur'an) is the Truth"
(Qur'an, 41:53).

In this chapter, we are going to briefly review several subjects about cosmology, found in the Qur'an. For more details, you may return to other sources (3-5, 6, 38, and 40).

4.1. Creation of the Universe

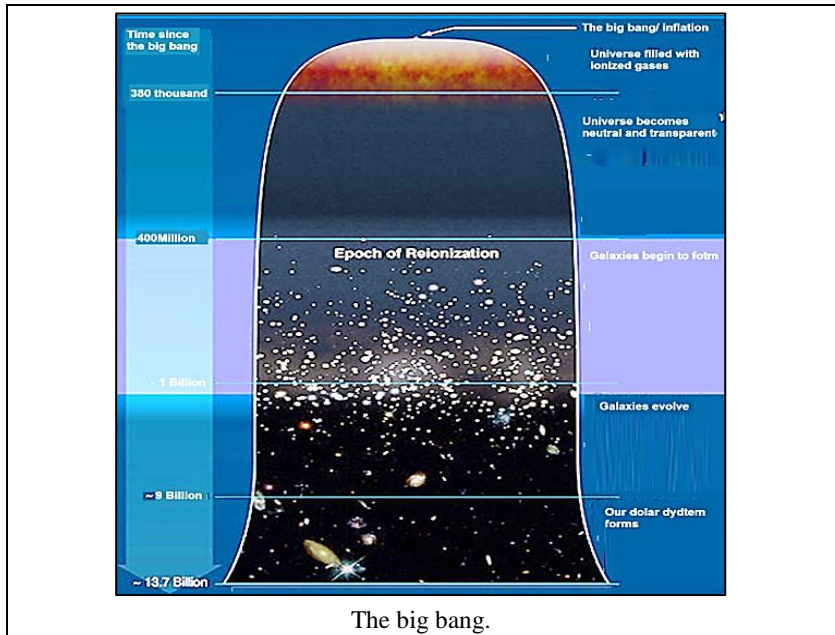
"ثُمَّ اسْتَوَىٰ إِلَى السَّمَاءِ وَهِيَ دُخَانٌ فَقَالَ لَهَا وَلِلْأَرْضِ ائْتِيَا طَوْعًا أَوْ كَرْهًا قَالَتَا أَتَيْنَا طَائِعِينَ" (فصلت: 11).

"Then He turned to the heaven when it was smoke..." (Qur'an, 41:11).

"أَوَلَمْ يَرَ الَّذِينَ كَفَرُوا أَنَّ السَّمَاوَاتِ وَالْأَرْضَ كَانَتَا رَتْقًا فَفَتَقْنَاهُمَا ۖ وَجَعَلْنَا مِنَ الْمَاءِ كُلَّ شَيْءٍ حَيًّا ۚ أَفَلَا يُؤْمِنُونَ" (الأنبياء: 30).

"Have those who disbelieved not considered that the heavens and the earth were a joined entity, and We separated them and made from water every living thing? Then will they not believe?" (Qur'an, 21: 30).

Modern science has proven that the universe was formed from a gaseous mass. This gaseous nature of the universe is described in the above verses of the Qur'an as smoke. The primary gaseous nebula subsequently split up into multiple fragments of huge masses, this process is usually referred to as the 'big bang' theory which is described in the second verse.

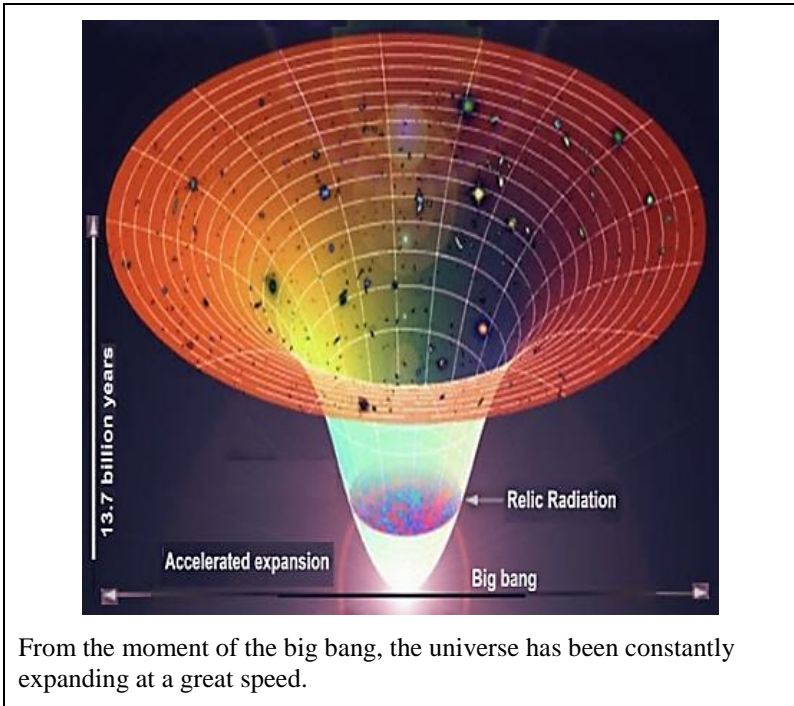


4.2. Expansion of the Universe

"وَالسَّمَاءَ بَنَيْنَاهَا بِأَيْدٍ وَإِنَّا لَمُوسِعُونَ" (الذاريات:47).

“And the heaven We constructed with strength, and indeed, We are [its] expander” (Qur’an, 51:47).

The Universe is not static but in a state of expansion. In the late 1920s, the American astronomer Edwin Hubble provided observational evidence that all galaxies are receding from one another, which implies that the universe is expanding. This expanding nature of the universe is described in the above verse of Holy Qur’an.



4.3. The Woven Cosmic Structure

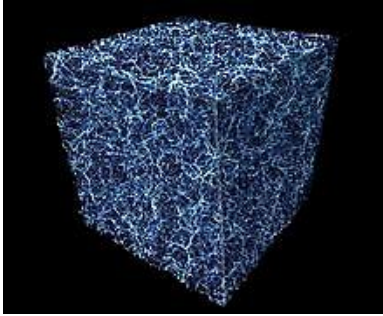
"وَالسَّمَاءِ ذَاتِ الْحُبُكِ" (الذاريات: 7).

“And by the heaven with its woven structure” (Qur’an, 51:7)

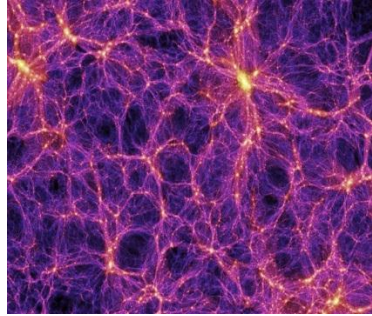
The universe extends to a distance of 380 million light-years from Earth (one light year = 9.4607 trillion Km). Our galaxy is one of more than million galaxies in the cosmos. The stars we can see are part of our Milky Way Galaxy, which contains more than 100 thousand stars like our sun.

When a giant supercomputer was used to simulate the structure of the cosmos, the outcome looked like a woven structure. Filaments of this structure are formed of galaxies. This woven structure is identical to the Qur’anic description.

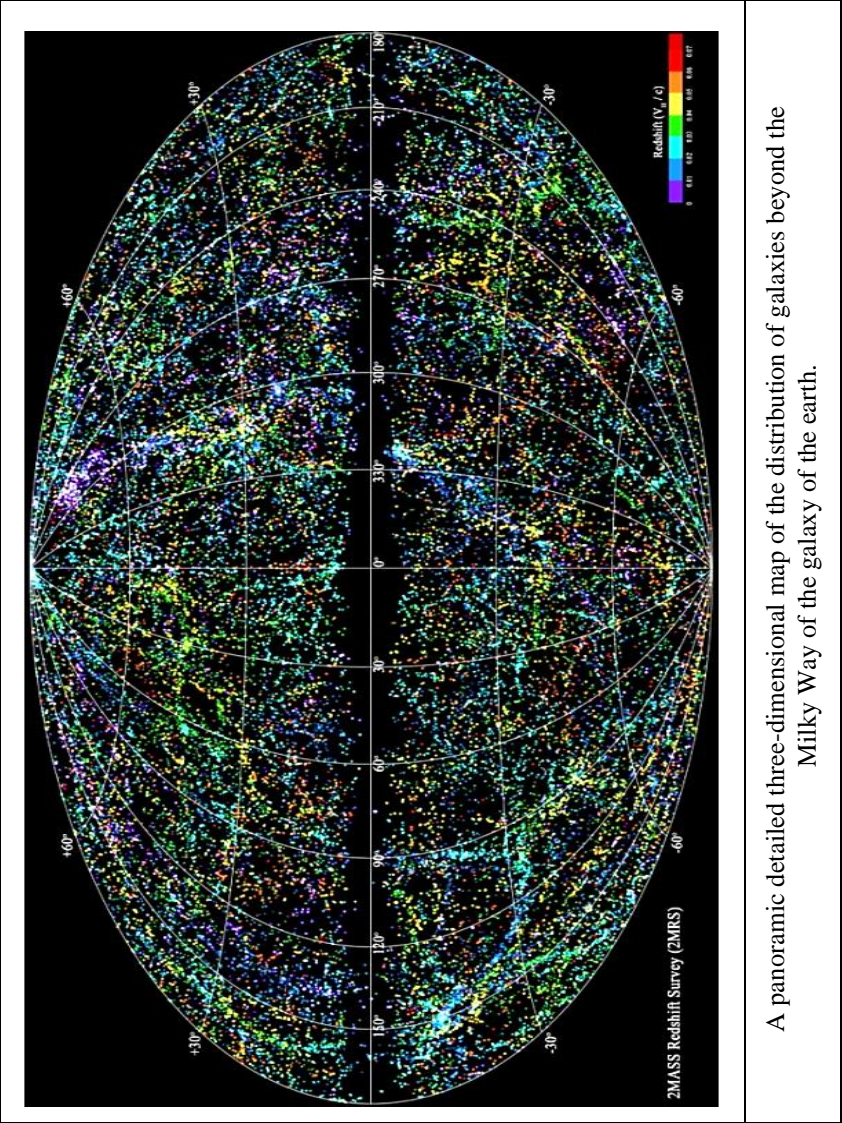
*“When He decrees a matter, He only says to it: "Be!"and it is”
(Qur’an,2:117).*



A cubic section of the Universe where the blue fibre structures represent the matter.



Our Milky Way galaxy is just a little dot in the woven structure of the universe.

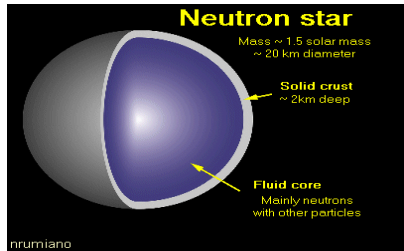
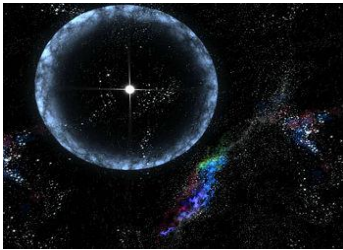


4.4. The Pulsar

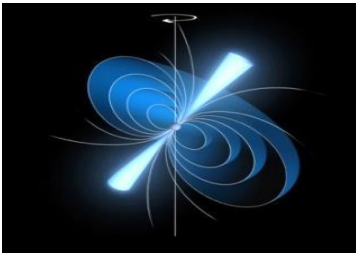
"وَالسَّمَاءِ وَالطَّارِقِ . وَمَا أَدْرَاكَ مَا الطَّارِقُ . النَّجْمُ الثَّاقِبُ" (الطارق:1-3).

“By the sky and the Tariq (knocker or pulsar) -And what will convey to you what is the Tariq is? It is the piercing star”! (Qur’an, 86: 1-3).

A knocker or what is scientifically called a pulsar results from a star explosion. Even though it is only 20 kilometres across, yet its material consists of neutrons and its mass is heavier than the mass of the sun. It spins more than 600 rotations per second and emits a beam of polarized radiation that can pierce anything. The beam repeatedly crosses the earth in regular pulses as if someone is knocking at a door.



A pulsar (Tariq, in Arabic) originates from the explosion of a massive star (left). It is a small and extremely dense ball of neutrons with a thin solid crust on its surface (right).



A neutron star (pulsar) spins very fast and produces glowing cones of radiation stemming from its magnetic poles.

4.5. The Black Holes

"فَلَا أُقْسِمُ بِالْخُنَّسِ. الْجَوَّارِ الْكُنَّسِ" (التكوير: 15-16).

“Verily, I swear, by the stars that are Khunnas (veiled), those which are Jawar (run their courses) and Kunnas (sweep whatever is in their path)” (Quran, 81:15-16).

It was previously thought that it is possible to see all the stars, until in 1969 stars which are not perceived were discovered and the term "black holes" was employed.

When a supermassive running star (**Jawar**, in the verse) consumes its fuel, it collapses resulting in a black hole with an enormous gravitational force that can sweep other heavenly bodies like a vacuum pump or cleaner (**Kunnas**, in the verse). Because the photons of light, which have a speed of 186,000 miles per second, do not escape the enormous gravitational force of the black hole, it appears black or veiled (**Khunnas**, in the verse).

Black holes are revealed indirectly, by the suction of heavenly bodies. In the above two verses, God swears by the stars of the black holes and summarizes their characteristics in three words of Jawar, Kunnas and Khunnas.



Red dwarf star is sucked into a giant black hole (NASA).



The closest black hole to earth is about 26,000 light years away (NASA).

4.6. Dying of the Sun

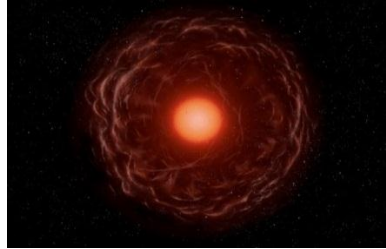
إِذَا الشَّمْسُ كُوِّرَتْ. وَإِذَا النُّجُومُ انْكَدَرَتْ" (التكوير: 2-1).

“When the sun is wrapped up [folded] and when the stars fall losing their lustre” (Qur’an, 81:1-2).

The light of the sun, like any star, is due to nuclear reactions within its core, which takes place for billions of years. However, when this process eventually comes to an end, the sun will be totally extinguished at the Day of Judgment as described in the Holy Qur’an.



The bright stable star: This star burns Hydrogen gas to helium in its core through nuclear fusion.



The red giant: As the star runs out of core fuel, it cools, begins to shrink and glows red.



The planetary nebula: The outer layers of the star are ejected as the core continues to shrink.



The remnant star: The low mass core continues shrinking to form a star without lustre.

4.7. Rose-Shaped Explosion of Stars

"فَإِذَا انشَقَّتِ السَّمَاءُ فَكَانَتْ وَرْدَةً كَالدِّهَانِ" (الرحمن:37).

*"And when the Heaven is split asunder and becomes rosy like oil"
(Qur'an, 55:37).*

The star shines through nuclear fusions in its core. As the star runs out of core fuel, the core shrinks and the outer layers of the star are ejected.

The observation of Cat's eye Nebula, which is 3000 light years away, by Hubble space telescope has suggested that masses from the star were ejected in a series of pulses at 1,500-year intervals. The ejected masses have created concentric layers of shells around the dying star. The view from Hubble is like seeing a painted flower as described in the Glorious Qur'an, which was revealed more than 14 centuries ago.



The Cat's Eye Nebula as revealed by NASA's Hubble Space Telescope (NASA. 1999). The dying star shows a pattern of layered concentric rings and appears like a flower as told by the Qur'an.

4.8. Location of Stars

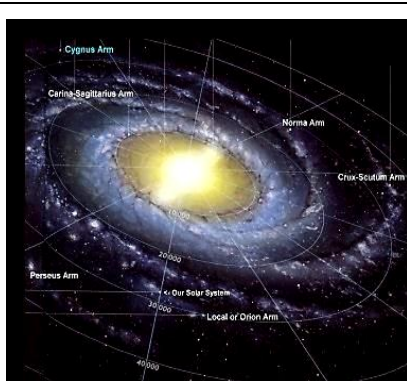
"لَا أَقْسِمُ بِمَوَاقِعِ النُّجُومِ . وَإِنَّهُ لَقَسَمٌ لَوْ تَعْلَمُونَ عَظِيمٌ" (الواقعة:75-76).

“I swear not by the location of the stars, and indeed, that is a great oath - if you could know” (Qur’an, 56: 75-76).

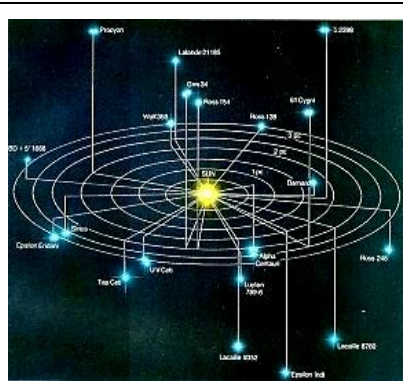
The number of stars in our “Milky Way” galaxy is about 200-400 billion stars, and our galaxy is about average in size with regards to the number of stars. Stars are on the constant move; for example, our own Sun is moving through space at about 30 km per second.

We see stars through the light which reaches our eyes. The light emitted from the second closest star to the Earth reaches us after more than 50 months; during which, it has definitely moved millions of kilometres.

Therefore, what we actually see is the location of the star and not the star itself. The above Qur’anic verse, speaks of the dynamic “positions” of stars rather than the static position.



There are thousands of light years between the sun and other stars.



Location of moving stars relative to the sun.

4.9. Radiating Sun and Inert Moon

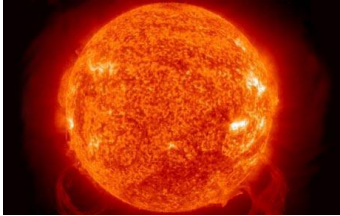
"هُوَ الَّذِي جَعَلَ الشَّمْسَ ضِيَاءً وَالْقَمَرَ نُورًا" (يونس:5).

*"It is He who made the sun a radiant lamp and the moon a light
Qur'an, 10:5).*

"تَبَارَكَ الَّذِي جَعَلَ فِي السَّمَاءِ بُرُوجًا وَجَعَلَ فِيهَا سِرَاجًا وَقَمَرًا مُنِيرًا" (الفرقان:61).

*"Blessed is He Who made constellations in the skies, and placed therein
a Lamp (the sun) and a Moon giving light" (Qur'an, 25:61).*

It is well known today that the moon is an inert body that does not give off light by itself and rather it reflects the light of the sun. Conversely, the sun is a bright burning star which generates intense heat and light by its internal nuclear fusion. The light reflecting moon and the radiating sun are described in the above two verses of the Holy Qur'an.



Nuclear reaction at the core of the sun releases vast amounts of energy in the form of light and heat.



Hot tubes of plasma (magnetic loops) extend thousands of miles above the sun.



The moon casts no light of its own. It only shines as it reflects the light of the sun.



4.10. Sun and Moon Orbits

"وَهُوَ الَّذِي خَلَقَ اللَّيْلَ وَالنَّهَارَ وَالشَّمْسَ وَالْقَمَرَ كُلٌّ فِي فَلَكٍ يَسْبَحُونَ" (الأنبياء:33).

"It is He, Who created the night and the day, and the sun and the moon, each swimming along in its rounded course" (Qur'an, 21:33).

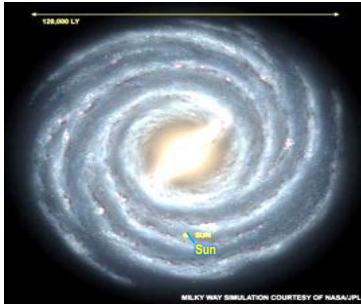
"لَا الشَّمْسُ يَنْبَغِي لَهَا أَنْ تُدْرِكَ الْقَمَرَ وَلَا اللَّيْلُ سَابِقُ النَّهَارِ ۚ وَكُلٌّ فِي فَلَكٍ يَسْبَحُونَ" (يس:40).

"It is not permitted for the sun to catch up to the moon, nor can the night outstrip the day, each swims along in its own orbit" (Qur'an, 36:40).

In 1609, the German scientist Yohannous Keppler discovered that the planets (like the earth with its moon) move in elliptical orbits around the sun and rotate around their axes, which explain the sequence of night and day.

The Moon takes 27.322 days to go around the Earth once and approximately 27 days for the moon to rotate once on its axis. Therefore it appears to observers from Earth to be keeping almost perfectly still.

On the other hand, the sun takes approximately 25 days to rotate around its axis and 200 million years to complete one revolution around the centre of our Milky Way Galaxy. The above verses of the Qur'an refer to the movements of the sun and the moon in orbits.



The sun path round the Galaxy takes about 200 million years.



The Earth and the moon rotate together around the sun.

4.11. Motion of the Earth

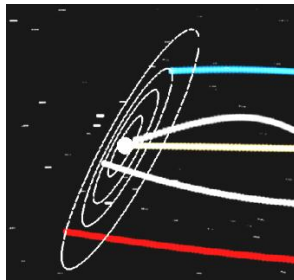
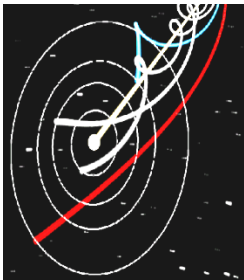
"أَلَمْ نَجْعَلِ الْأَرْضَ كِفَاتًا" (المرسلات: 25).

“Have We not made the earth KEFATAN” (Qur’an, 77:25).

In the Arabic language “KEFATAN” means fast, the helical gait of a flying bird and to collect and include things. These meanings collectively describe the motion of the earth.

The sun is in a fast motion around the galaxy (500,000 miles/hour) and the planets orbit around the sun. The planets orbit on ellipses which are tilted with respect to one another. This means that the planets are sometimes relatively or slightly ahead of the Sun, and they are sometimes relatively behind it. On the other hand, the gravitational force of the Earth is strong enough to keep things on the surface from flying off.

Both the heliocentric motion around the fast moving sun, which results in a helical gait, and the gravitational force of the earth that keeps things on its surface are described in the above verse as KEFATAN.



The planets and the Earth move around the fast moving sun in tilted orbits. Therefore, they have helical gait motion around the Sun (Kefatan).

Helical gait of a flying bird.

4.12. The Shape of the Earth

"أَلَمْ تَرَ أَنَّ اللَّهَ يُولِجُ اللَّيْلَ فِي النَّهَارِ وَيُولِجُ النَّهَارَ فِي اللَّيْلِ" (لقمان:29).

*"Do not you see that God merges night into day and day into night?"
(Qur'an, 31:29).*

"يُكَوِّرُ اللَّيْلَ عَلَى النَّهَارِ وَيُكَوِّرُ النَّهَارَ عَلَى اللَّيْلِ" (الزمر:5).

*"He wraps the night over the day and wraps the day over the night
(Kawwar)" (Qur'an, 39:5).*

"وَالْأَرْضَ بَعْدَ ذَلِكَ دَحَاهَا" (النازعات:30).

*"And the earth, moreover, He has extended (to a wide expanse)
[DHAHA]" (Qur'an, 79:30).*

A practical demonstration of the spherical shape of the Earth was demonstrated by Ferdinand Magellan and Juan Sebastián Elcanos in their expedition from 1519 to 1522, which, resulted in the first circumnavigation of the Earth.

Merging in the first verse above and wrapping (coiling or Kawwar in Arabic) in the second verse means a gradual change of night and day and vice versa, which can only take place if the earth is spherical. In the third verse, 'Dhaha', means the earth is extended (to a wide expanse) which would not take place unless the shape of the Earth is spherical.



The merging of the day and the night suggests a spherical shape for the Earth.

4.13. The Corned Ceiling

" وَجَعَلْنَا السَّمَاءَ سَقْفًا مَّحْفُوظًا ۗ وَهُمْ عَنْ آيَاتِهَا مُعْرِضُونَ " (الأنبياء: 32).

“And We made the sky (the atmosphere) a protected ceiling; yet they turn away from its wonders” (Qur’an, 21:32).

Although the atmosphere extends for several hundred kilometres it is a thin layer above the surface of the Earth. The atmosphere contains the oxygen, which is essential for life and carbon dioxide which keeps the moderate temperature suitable for life. On the other hand, it **protects** the Earth from **millions of meteoroids** which are burnt completely or reduced to a small size due to its friction with Earth’s atmosphere. The atmosphere also protects the Earth from dangerous and harmful **radiations** like ultraviolet and cosmic rays.

What keeps the atmosphere bound to Earth? It is the gravity that keeps the atmosphere anchored to Earth. If the Earth was less massive it would have lost most of its original atmosphere as has happened in Mars.

Isn’t this protecting ceiling of the atmosphere a great blessing of God the Almighty? Who told the Prophet (PBUH) about this corned ceiling?



The atmosphere contains oxygen, which is essential for life and keeps the moderate temperature for life to continue on the Earth.



The friction of meteoroids at a speed more than 40,000 km/hr with atmosphere burns them off completely or reduces them to small particles.

4.14. The Returning Sky

"وَالسَّمَاءِ ذَاتِ الرَّجْعِ" (الطارق: 11).

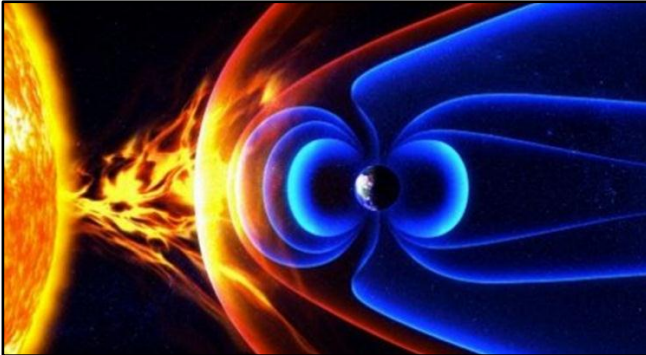
“And I swear by the Heaven which returns” (Qur’an, 86: 11).

The layers of the atmosphere surrounding the earth have the function of returning the materials or rays they are exposed to back into space or back down to the earth.

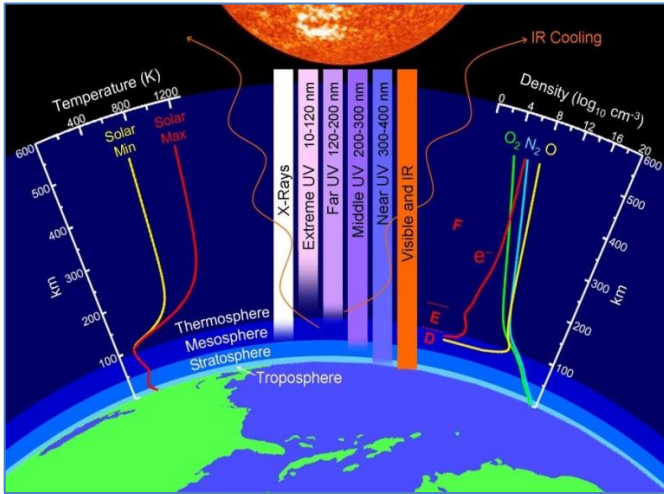
On the other hand, the molten core of the Earth generates a magnet which results in magnetosphere layers around the Earth. These magnetosphere layers are capable of keeping away the devastating solar winds away from the Earth.

Earth's magnetic field has been weakened by 15 per cent over the last 200 years. If the Earth's magnetic field collapses, the planet's north and south poles will flip and the sun will then rises from the West. **Interestingly, this was mentioned in a saying of the prophet Muhammad as a sign of the Hour.**

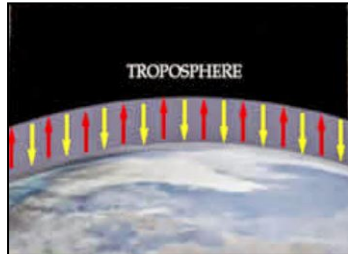
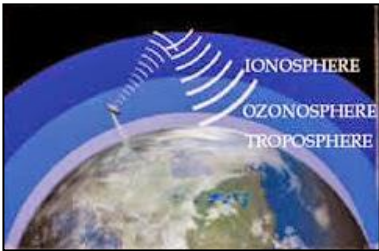
Who taught the Prophet Muhammad about the returning ability of the atmosphere?



The Earth's electromagnetic protective field extends thousands of miles into space and its magnetism affects everything from global communication to animal migration and weather patterns



The layers of the atmosphere reflect harmful radiations like the ultraviolet light and X rays coming from space.



The ionosphere reflects radio waves broadcast from the Earth back down to different parts of the world, and thus makes wireless communication possible over long distances. The troposphere enables water vapour rising from the surface of the Earth to be condensed and return back as rain.

4.15. The Moon at the Service of the Earth

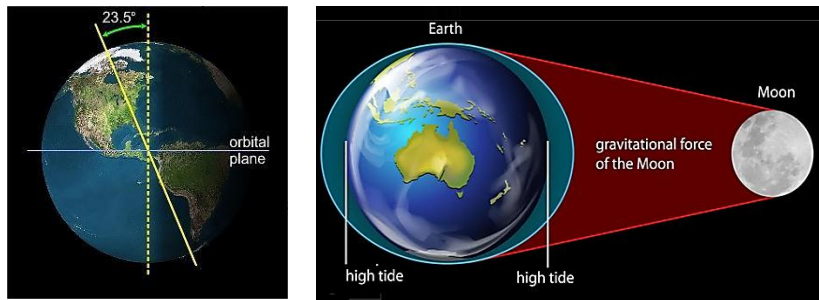
"وَسَخَّرَ لَكُمُ الشَّمْسَ وَالْقَمَرَ دَائِبَيْنِ" (ابراهيم:33).

"And He committed the sun and the moon to your service, both continuously pursuing their courses" (Qur'an, 14:33).

The moon exerts different effects on the Earth. The moon's gravitational effect maintains the degree of the rotational axis of the Earth, and this keeps stable the season's cycle as the Earth orbits the Sun. If the moon hadn't existed, the slope of our poles would be very different which could have devastating consequences for the climate and life on our planet.

Without the gravitational effect of the moon, the Earth would complete its rotation every 8 hours. With this high rotational speed, the temperature on Earth would substantially drop because there would be less time for the sun to heat up the Earth and the temperature variations would be too abrupt in the day and night. The winds would be more powerful and the Earth's magnetic field would be three times more intense. These together would have a major impact on food production and life on Earth.

On the other hand, the oceans' tidal flow helps to transport heat from the equator to the poles and influences the biology of species living near the coast that have adapted to the salt water conditions based on the ebb and flow of the tide.



The gravitational force of the moon causes axial tilting of the Earth and the high tide.

5. Geology

Geology is an earth science comprising the study of solid Earth, the rocks of which it is composed, and the processes by which they change.

Geology gives insight into the history of the Earth by providing the primary evidence for plate tectonics, the evolutionary history of life, and past climates. Geology is important for exploitation and evaluation of water resources and understanding of environmental problems.

There are several Qur'anic verses dealing with geological phenomena which have been known to us fairly recently, using sophisticated and advanced machines. These phenomena include the tectonic structure and the fissures of the earth, mountains, the internal waves in deep oceans and fire beds in their bottoms and the source of iron of the earth.

The verses of the Qur'an also deal also with fossils, water cycle and the formation of clouds, and the importance of water for life.

These different geological subjects will be briefly reviewed. You will notice how these phenomena are described accurately and in complete agreement with scientific discoveries.

As previously stated, the Glorious Qur'an was revealed in the seventh century to the Prophet Muhammad (PBUH), who lived in the Arabian Desert. He was illiterate and the scientific information found in the Qur'an was not known in his community or in the neighbour civilizations.

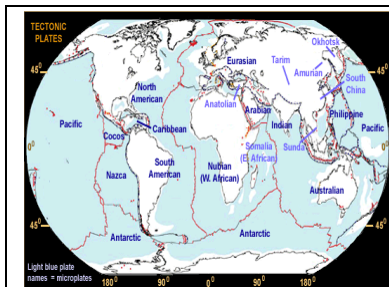
5.1. Fissured Structure of Earth

"وَالسَّمَاءِ ذَاتِ الرَّجْعِ . وَالْأَرْضِ ذَاتِ الصَّدْعِ" (الطارق:11-12).

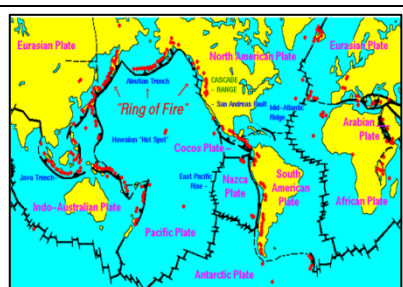
*"By the sky which returns and [by] the earth which cracks open"
(Qur'an, 86:11-12).*

The external surface of the earth is split by a large number of cracks (Faults), which divide the earth surface into a mosaic of moving plates. If Earth had been slightly smaller and less massive, it would not have plate tectonics. Plate tectonics are the forces that move continents and build mountains (41).

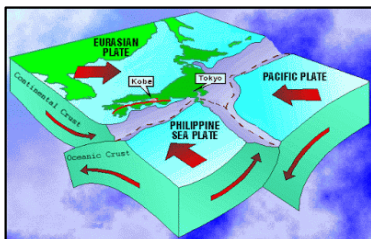
The geological fact plate tectonics was only realized in the middle of the last century and yet it is described in the Holy Qur'an revealed more than 14 centuries ago.



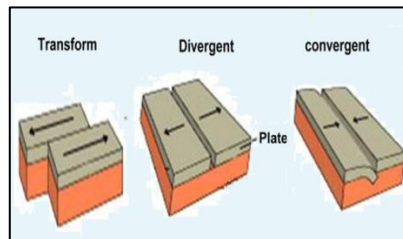
The mosaic of moving plates of Earth.



Cracks running from north to south and east to west.



The moving plates of the Earth.



5.2. Stone and Iron Human Fossils

"وَقَالُوا إِذَا كُنَّا عِظَامًا وَرُفَاتًا أَلَيْسَ لِمَنْ نُحْيِيهِمْ حُلُقًا جَدِيدًا. قُلْ كُونُوا حِجَارَةً أَوْ حَدِيدًا أَوْ خَلْقًا مِمَّا يَكْبُرُ فِي صُدُورِكُمْ. فَسَيَقُولُونَ مَنْ يُعِيدُنَا قُلِ الَّذِي فَطَرَكُمْ أَوَّلَ مَرَّةٍ" (الإسراء: 49-51).

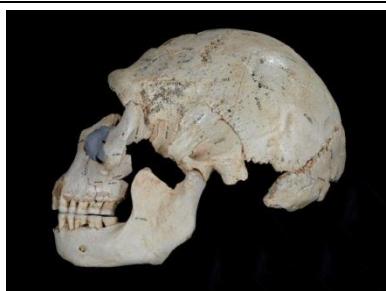
“And they say, ‘When we have become bones and dust, shall we really be resurrected as a new creation?’ Say, ‘Even if you become rocks or iron or some substance, which, in your minds, is even harder.’ Then they will say, ‘Who will restore us?’ Say, ‘The One who originated you the first time...’” (17:49-51).

In the above verse, the unbelievers denied resurrection and God ascertained it. After death, people may be buried, decay and leave their bones and mineral behind or alternatively, incinerated and turn to dust. However, could humans become rocks or iron as stated above?

Unlike soft tissues which decay soon after death, the hard parts, like teeth and bones, need several years before becoming dust. However, if bones and teeth become fossilised, they can stay for thousands and millions of years.

How bone fossils are formed? Under certain conditions of pH and oxygenation the original minerals of bones and teeth dissolve away and get replaced by minerals like silica or iron pyrite (iron disulphide); i.e. they turn into rocks. Therefore, the above verses refer to fossilised bones which have actually become rocks of silica or iron pyrite (42).

How could the Prophet Muhammad (PBUH), have known that bones could turn into rocks of silica or iron pyrite? Isn't that evidence that the Qur'an is the divine revelation of God?



Nearly 7,000 human fossils of the skulls unearthed in a Spanish cave.

5.3. Mountains

5.3.1. Mountains are like pegs

"وَأَلْقَى فِي الْأَرْضِ رَوَاسِيَ أَنْ تَمِيدَ بِكُمْ وَأَنْهَارًا وَسُبُلًا لَعَلَّكُمْ تَهْتَدُونَ" (النحل:15).

“And He has cast into the earth firmly set mountains, lest it shifts with you, and [made] rivers and roads, that you may be guided,” (Qur’an, 16:15).

“Have We not made the earth as a bed, and the mountains as pegs?” (Quran, 78:6-7).

Modern Earth Science has proved that mountains have deep roots beneath the surface of the earth, and these roots can reach several times their elevation above the surface of the earth. Therefore, schematic sections of the mountains resemble pegs. Likewise, the modern theory of plate tectonics holds that mountains work as stabilizers for the Earth and prevent the earth from shaking while it's rotating around its own axis (38, 71). Both phenomena are referred to in the verse of the Nobel Qur'an.

5.3.2. Motion of the mountains with the Earth

"وَتَرَى الْجِبَالَ تَحْسَبُهَا جَامِدَةً وَهِيَ تَمُرُّ مَرَّ السَّحَابِ" (الزمل: 88).

“And you see the mountains, and imagine them fixed, yet they pass, as the passing of the clouds” (Qur’an, 27:88).

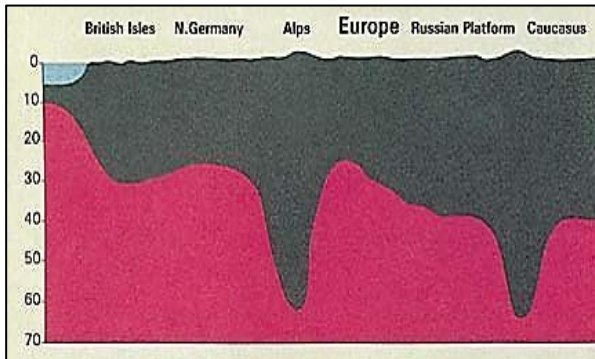
The Earth spins on its axis once in every 24-hour day. Its speed at the equator is about 1,600 Km/h. In spite this high speed, we don't feel the motion of the Earth. Why not? Because everything on earth, including oceans, mountains, and the atmosphere, are moving along with the Earth at the same constant speed.

In the above verse, God draws our attention to the motion of mountains, which we do not notice or even imagine, because it is dependent on the motion of the Earth. The illiterate Arabs who lived by the time of the revelation of the Glorious Qur'an would never know or imagine this fact as referred to in the above verse.

Why did God choose the motion of the clouds as a parable for mountains?

- Like mountains, the clouds don't actually move on their own. They are carried by winds and are moved by them.

- They move at high speed. The speed of motion of high cirrus clouds is around 160 Km/h for small high clouds and 30-80 Km/h for storm clouds.
- The mountains are naturally very heavy and rain clouds may carry more than 300,000 tons of water.



Mountains have deep roots like pegs which are several times their elevation above the surface of the ground.



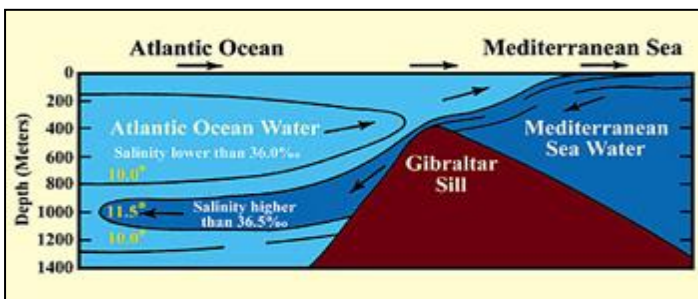
The Himalaya mountains as seen from space. They move along with the Earth, therefore, we cannot notice their motion

5.4. Barrier Between The Seas

"مَرَجَ الْبَحْرَيْنِ يَلْتَقِيَانِ. بَيْنَهُمَا بَرْزَخٌ لَا يَبْغِيَانِ" (الرحمن: 19-20).

"He released the two seas, meeting together [side by side]. Between them is a barrier, which they do not overrun." (Qur'an, 55:19-20).

Modern science has discovered that at the location where two different seas meet, there is a barrier between them. This barrier divides the two seas so that each sea has its own temperature, salinity, and density. This phenomenon occurs in several places, e.g., the divider between the Mediterranean Sea and the Atlantic Ocean at Gibraltar (38).



The barrier between the water of the Mediterranean Sea and the Atlantic Ocean. The former is warmer, denser and has a higher salinity.



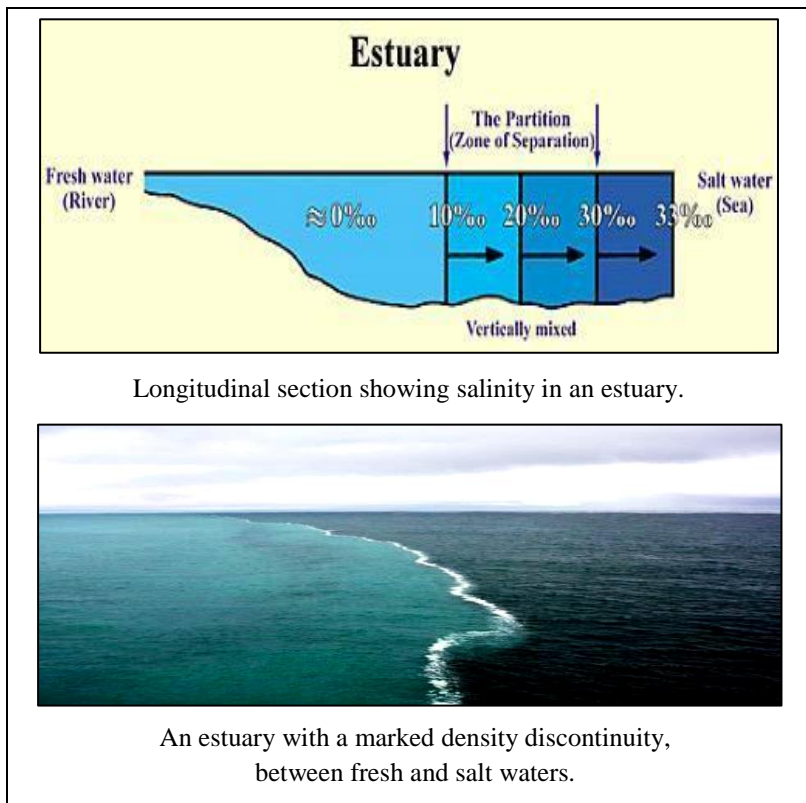
A satellite photo showing the barrier between the surface water of the Atlantic Ocean as it enters the Mediterranean sea, as illustrated in the above diagram.

5.5. Salt and Sweet Water Barrier

"وَهُوَ الَّذِي مَرَجَ الْبَحْرَيْنِ هَذَا عَذْبٌ فُرَاتٌ وَهَذَا مِلْحٌ أُجَاجٌ وَجَعَلَ بَيْنَهُمَا بَرْزَخًا وَحِجْرًا مَّخْجُورًا" (الفرقان: 53).

"And it is He who merged the two seas, one palatable and sweet and the other salty and bitter, and He placed between them a barrier, and an impassable boundary" (Qur'an, 25:53).

In estuaries, where fresh (sweet) water and saltwater meet, what distinguishes fresh water from salt water is a pycnocline zone with a marked density, separating the two streams. This zone has a different salinity from both fresh and saltwater (43). The Qur'an mentions this phenomenon in the above verses.



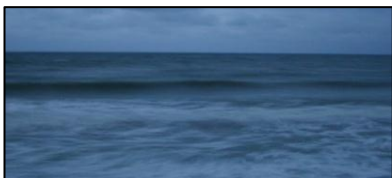
5.6. Darkness and Internal Waves

"أَوْ كَظُلُمَاتٍ فِي بَحْرٍ لُجِّيٍّ يَغْشَاهُ مَوْجٌ مِّنْ فَوْقِهِ مَوْجٌ مِّنْ فَوْقِهِ سَحَابٌ ظُلُمَاتٌ بَعْضُهَا فَوْقَ بَعْضٍ إِذَا أَخْرَجَ يَدَهُ لَمْ يَكَدْ يَرَاهَا وَمَن لَّمْ يَجْعَلِ اللَّهُ لَهُ نُورًا فَمَا لَهُ مِن نُّورٍ" (النور: 40).

“Or (the unbelievers’ state) is like the darkness in a vast deep sea, overwhelmed with waves, above which are waves, above which are clouds; darkness’, one above another. If a man stretches out his hand, he cannot see it” (Qur’an, 24:40).

Humans are unable to dive down unaided underwater to a depth of more than 20 to 30 metres. As one goes deeper and deeper with equipment or using a submarine, darkness increases due to the successive disappearance of visible colours of light. Of course, darkness under water increases many folds in the presence of clouds as stated in the above verse.

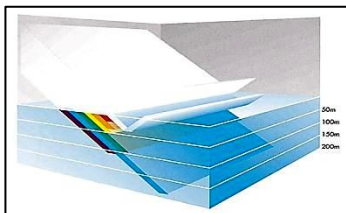
On the hand, scientists have recently discovered the presence of internal waves. These waves act like surface waves and can be detected by studying temperature or salinity changes at a given location in the deep water. They may also be observed from satellites due to surface roughness enhanced by sunlight backscatter (44, 66).



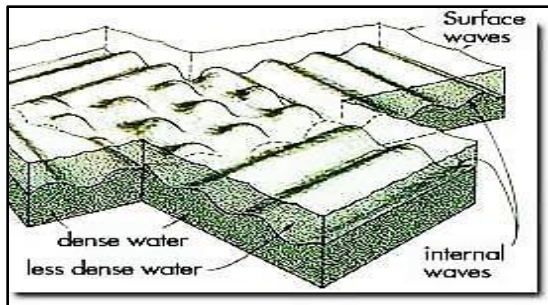
Heavy clouds increase the darkness of the sea many folds.



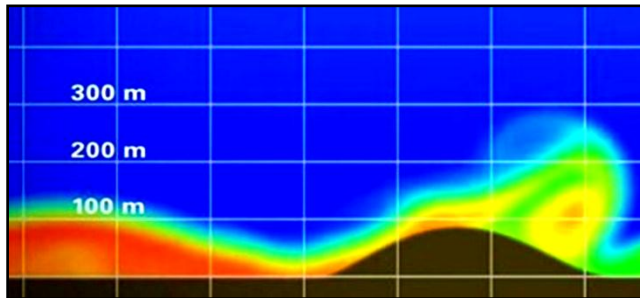
The sea surface reflects 3-30% of sunlight.



Almost all the seven colours of the light spectrum are absorbed one after another on the first 200 metres of ocean, except the blue light, which gradually decreases and completely disappears by the depth of 1000 metres.



Internal waves at the interface between two layers of water of different densities.



Waves of cold, saltier water (bottom layer) may rise up 300m above the floor of the ocean into the above warmer water.



Internal waves (marked with an arrow) made visible by sea surface roughness which enhances sunlight backscatter, Somalia, Africa.

5.7. Clouds

5.7.1. Rain clouds

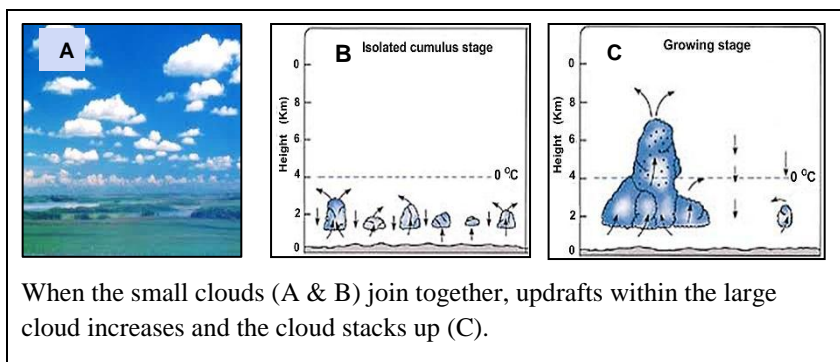
"أَلَمْ تَرَ أَنَّ اللَّهَ يَرْجِي سَحَابًا ثُمَّ يُؤَلِّفُ بَيْنَهُ ثُمَّ يَجْعَلُهُ رُكَامًا فَتَرَى الْوَدْقَ يَخْرُجُ مِنْ خِلَالِهِ وَيُنَزِّلُ مِنَ السَّمَاءِ مِنْ جِبَالٍ فِيهَا مِنْ بَرَدٍ فَيُصِيبُ بِهِ مَنْ يَشَاءُ وَيَصْرِفُهُ عَنِ مَنْ يَشَاءُ يَكَادُ سَنَا بَرْقِهِ يَذْهَبُ بِالْأَبْصَارِ" (التور: 43).

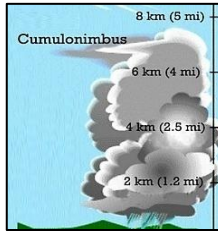
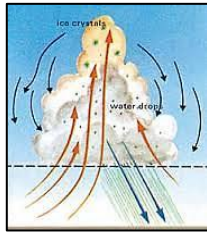
“Have you not seen how God makes the clouds move gently, then joins them together, then makes them into a stack, and then you see the rain comes out of it. And He sends down hail from mountains (clouds) in the sky, and He strikes with it whomever He wills and turns it from whomever He wills. The vivid flash of its lightning nearly blinds the sight” (Qur’an, 24:43).

Scientists have found that a cumulonimbus cloud goes through the following stages (75):

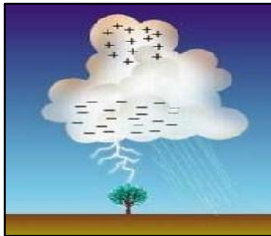
- Small pieces of cumulus clouds are pushed by the wind. The small clouds then join together forming a larger cloud.
- Updrafts within the large clouds cause their body to grow vertically (stack) and stretch into cooler regions where drops of water and hail formulate.
- The hail acquires a positive charge as it collides with ice crystals and falls towards the bottom of the cloud and becomes negatively charged.
- The negative charge is then discharged as lightning.

Aren't these stages precisely described in the above verse?





After the cumulonimbus cloud is stacked up, rain comes out of it.



The lighter positively charged crystal particles are carried to the upper part of the cloud. The warmer hailstone acquires a negative charge from the cooler ice crystals and they fall towards the bottom of the cloud before their charges get discharged as lightning.

5.7.2. Heavy clouds

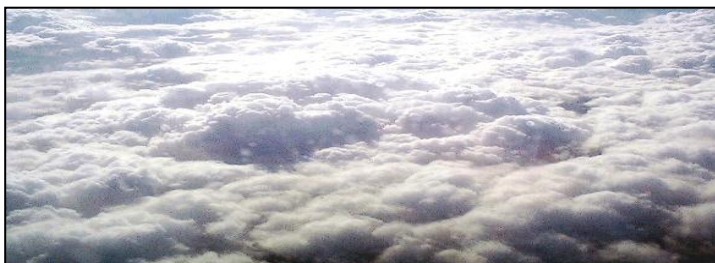
"هُوَ الَّذِي يُرِيكُمْ الْبَرْقَ خَوْفًا وَطَمَعًا وَيُنشِئُ السَّحَابَ الثَّقَالَ" (الرعد:12).

“It is He Who shows you the lightning, with fear and hope and He raises up the excessively heavy clouds” (Qur’an, 13:12).

According to modern science, a thunder-cloud may contain up to 300,000 tons of water (76). The heaviness of the clouds in the Qur’anic verse is referred to as ‘THEQAL’, which means excessively heavy. Was it possible when the Qur’an revealed to believe that clouds which are carried and moved by winds could be so heavy?



Vertical growth (stacking) of clouds makes them reach a height of 25,000 feet and therefore they look like mountains.



Clouds may carry as much as 300,000 tons of water.

5.8. Lava in the Sea Water

" وَالسَّقْفِ الْمَرْفُوعِ . وَالْبَحْرِ الْمَسْجُورِ " الذاريات: (5-6).

"By the elevated Heavens and the sea sitting on bed fire" (Qur'an, 52: 5-6).

Modern age geology discovered stretching faults within the Earth's crust at great depths beneath the sea. The cracks within the faults allow molten lava to gush through sea water. Lava may also gush from active volcanoes in deep-sea water (45) as described in the above verse.



Lava erupting from submarine cracks in the Earth's crust.



Molten lava gushes through sea water.

5.9. The lowest place on the Earth

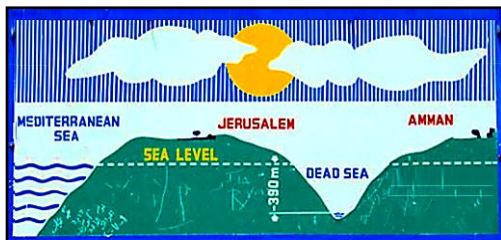
"غَلِبَتِ الرُّومُ . فِي أَدْنَى الْأَرْضِ وَهُمْ مَن بَعْدَ غَلِبِهِمْ سَيَغْلِبُونَ . فِي بضعِ سِنِينَ ۗ لِلَّهِ الْأَمْرُ مِن قَبْلُ وَمِن بَعْدُ ۗ وَيَوْمَئِذٍ يَفْرَحُ الْمُؤْمِنُونَ " (الروم: 1-4).

"The Romans have been defeated. In the lowest (ADNA) land, and they, after their defeat, will be victorious in a few years. The decision of the matter, before and after is only with God. On that day, the believers will rejoice" (Qur'an, 30: 2-4).

The above verses which were revealed around 620 AD refer to: 1) the defeat of the Romans by Persians, 2) the place where they were defeated, and 3) the prediction of the victory of the Romans after a few years.

Soon after the revelation of the above verses, in 622 AD, Heraclius gained a number of victories over the Persian. He was able to drive them out of Asia Minor and push them into their territory. The defeat of the Persians was decisively accomplished in 627 as predicted by the above verses of the Glorious Qur'an (a few years).

On the other hand, the above verses of the Qur'an used the word "ADNA" to indicate the location where the Romans were defeated by the Persians. The word **ADNA means the lowest**. Interestingly, geologists, in the modern era, have discovered that the latitude of the Dead Sea, where the Romans were defeated, is 420m below the level of the sea and therefore, it is considered the lowest altitude on the globe (46).



The dead see is 420m below the sea level and is considered the lowest altitude below sea level on the globe.

5.10. High altitude and Lack of Oxygen

"فَمَنْ يُرِدِ اللَّهُ أَنْ يَهْدِيَهُ يَشْرَحْ صَدْرَهُ لِلْإِسْلَامِ ۖ وَمَنْ يُرِدْ أَنْ يُضِلَّهُ يَجْعَلْ صَدْرَهُ ضَيِّقًا حَرَجًا كَأَنَّمَا يَصْعَدُ فِي السَّمَاءِ ۖ كَذَلِكَ يَجْعَلُ اللَّهُ الرِّجْسَ عَلَى الَّذِينَ لَا يُؤْمِنُونَ" (الأنعام:125).

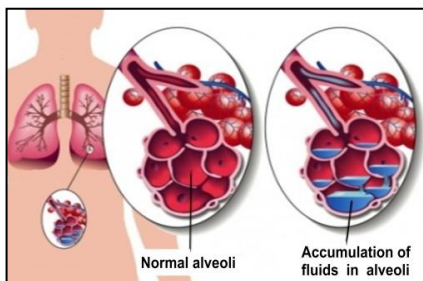
"When God desires to guide someone, He expands his breast to submission (Islam). When He desires to misguide someone, He makes his breast narrow and constricted as if he were climbing up into the sky. That is how God defiles those who have no faith" (Qur'an, 6:125).

There is a gradual decrease in both atmospheric pressure and the available amount of oxygen on ascension to higher altitudes.

The decrease in atmospheric pressure due to the ascension to higher altitudes, leads to an increased pulmonary capillary pressure, the development of pulmonary oedema and accumulation of fluids in alveoli, which together lead to a difficulty in breathing,

On the other hand the decrease in oxygen molecules per unit volume of air at higher altitudes leads to a lesser differential pressure between oxygen in the inspired air and its level in the blood and tissues. Consequently, it would become harder for the haemoglobin to pick up oxygen from air and transport it to tissues, a fact which leads to suffocation and an increased rate of breathing (47).

The above verse revealed more than 14 centuries ago, points out at the major symptoms of ascension to high altitudes.



Lower pressure at high altitudes causes pulmonary oedema, and the lower amount of oxygen causes rapid shallow breathing and rapid heart rate.

5.11. Aquatic origin of life

"وَجَعَلْنَا مِنَ الْمَاءِ كُلَّ شَيْءٍ حَيٍّ أَفَلَا يُؤْمِنُونَ" (الأنبياء:30).

“And We made from water every living thing. Then will they not believe?” (Qur’an, 21: 30).

The origin of water on Earth is not completely understood. Water has many unique physical and chemical properties that make it well suited to support the complex chemistry required for life.

- It can dissolve many substances.
- Expansion of water, when it freezes, keeps oceans and lakes on Earth from freezing solid.
- Water gives Earth its relatively moderate climate because it has a high heat capacity, which means it takes a lot of energy to cause water to change temperature.

Scientists believe that in order for life to exist on Earth, water must form and remain liquid. For this to happen, the Earth must be found in the right region, away from the sun and should have a unique right size (48).

Who made all these conditions collectively to happen? It is the Will of God, Who wanted to create water-dependent forms of life and therefore, He made all the right conditions for water to form and remain.



Water covers about 75% of the Earth.



Every living entity requires water for its existence.



5.12. Control of Wind Circulation

"وَتَصْرِيفِ الرِّيَّاحِ آيَاتٌ لِّقَوْمٍ يَعْقِلُونَ" (الجاثية:5).

“And in TASREEF (the control of circulation) of the winds, are signs for people who reason” (Q, 45:5).

The wind is an air in motion caused by natural factors like the uneven solar heating of the earth's surface, the rotation of the earth from west to east and the irregularities of the earth's surface.

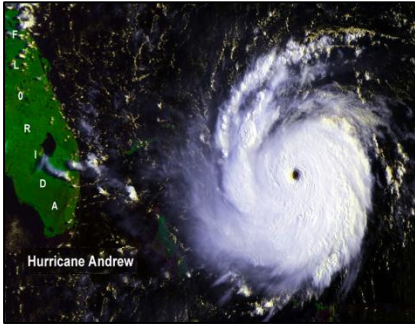
Winds may occur locally as a thunderstorm, coastal sea breeze/land cycles or globally due to the difference in absorption of solar energy at the equator and the poles. Winds are very important for us (49).

- Winds carry are responsible for the formation and carriage of rainy clouds.
- When winds become faster than 320 Km/hour, as in cases of hurricanes, tornados and cyclones, trees and man-made structures may be damaged or destroyed.
- Winds have a major role in shaping landforms and the formation and erosion of soil and movement of sand dunes.
- Winds spread wildfires, pollinate flowers, disperse seeds of various plants and enable the survival of flying insects.
- Winds are a power source for mechanical work, electricity generation, sailing ships, and hot air balloons.

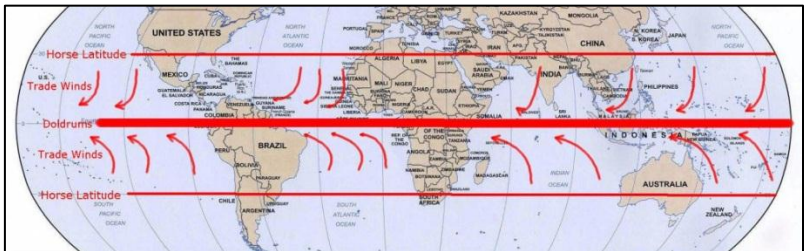
Winds are mentioned in the Qur'an 29 times. Their role in carrying particles (51:1), and the formation of rain clouds (30:48; 35:9) is indicated. They are classified according to their characteristics into several categories (Sakin, Asif, Qasef, Aqim and Sarsar). They have been also used for punishment of disbelieving people (3:117; 10:22; 17:69; 46:37; 69:6).

Though winds have detrimental effects on us, we cannot control them. We can perhaps predict their type and perhaps utilize them; however, we are helpless against their devastating effects.

Winds and their categories and beneficial or devastating effects are mentioned in the Glorious Qur'an to demonstrate that they are controlled by the Will of God and a sign of His Might, Mercy, and Punishment.



The total damage hurricane Andrew (1992) across the affected regions exceeded \$26 billion, and 65 people lost their lives.



NE Trade Winds



pollens are transported by wind



Wind dispersal of seeds

5.13. Fire Whirls

"أَيُّوَدُ أَحَدِكُمْ أَنْ تَكُونَ لَهُ جَنَّةٌ مِّن نَّخِيلٍ وَأَعْنَابٍ تَجْرِي مِن تَحْتِهَا الْأَنْهَارُ لَهُ فِيهَا مِن كُلِّ الثَّمَرَاتِ وَأَصَابَهُ الْكِبَرُ وَلَهُ ذُرِّيَّةٌ ضُعَفَاءُ فَأَصَابَهَا إِعْصَارٌ فِيهِ نَارٌ فَاحْتَرَقَتْ" كَذَلِكَ يَبَيِّنُ اللَّهُ لَكُمْ الْآيَاتِ لَعَلَّكُمْ تَتَفَكَّرُونَ " (البقرة: 266).

“Would anyone of you like to have a garden of palms and vines, under which rivers flow with all kinds of fruit in it for him, and old age has stricken him, and he has weak children then a whirl with fire batters it and it burns down? Thus, God makes clear the signs for you so that you may reflect” (Qur’an, 2:266).

Fire whirls or firenado are a rare phenomenon. They may occur when intense rising heat and turbulent wind conditions combine to form whirling eddies of air. These eddies could be contracted into a tornado-like structure that sucks in burning debris and combustible gasses. A fire whirl can reach up to 1,090 °C, which is hot enough to potentially reignite ashes sucked up from the ground. Rarely, however, do fire whirls grow to become actual tornadoes (50).

To keep the blessing of God, He would like us to be generous to the poor and give them of what we possess, because if not we may lose what we possess in a moment.

The rare phenomenon of fire whirl was documented by the Qur’an more than 14 centuries ago. Who told the Prophet Muhammad about it?



Kanto, Japan, 1923, after a fire tornado.



Canberra tornado, Australia, 2003.



Brazil, San Paolo, 2010.

5.14. Source of Iron

"وَأَنْزَلْنَا الْحَدِيدَ فِيهِ بَأْسٌ شَدِيدٌ وَمَنَافِعٌ لِلنَّاسِ وَلِيَعْلَمَ اللَّهُ مَن يَنْصُرُهُ وَرُسُلَهُ بِالْغَيْبِ ۗ إِنَّ اللَّهَ قَوِيٌّ عَزِيزٌ" (الحديد: 25).

"And We sent down iron in which there lies great force and which has many uses for mankind..." (Qur'an, 57:25).

Modern astronomical findings have disclosed that the iron we have on earth has come from giant stars in outer space. As a heavy metal iron is produced in the nuclei of big stars where the temperature required is higher than what we have in our solar system. When the amount of iron exceeds a certain level in a giant star, the star explodes and meteors containing iron are scattered around the universe until they get attracted by the gravitational force of a celestial body like the earth (51).

Therefore, the iron we have on the Earth was sent down from space as stated in the above verse of the Glorious Qur'an. How did the prophet know this scientific fact?



A meteoroid during its passage through the atmosphere into meteors.



The iron we have on earth has come from the space in the form of a meteoroid



6. Scientific Wisdom Behind Prohibitions

6.1. Extramarital Relations

"وَلَا تَقْرَبُوا الزِّنَا إِنَّهُ كَانَ فَاحِشَةً وَسَاءَ سَبِيلًا" (الإسراء:32).

"Nor come near to adultery, for it is a shameful deed and an evil road (to other evils)." (Qur'an, 17:32)

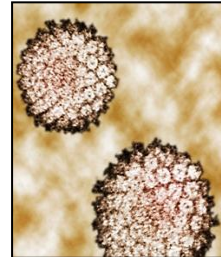
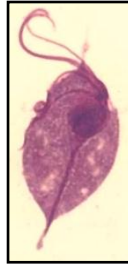
Each individual is responsible and accountable to God for maintaining a state of purity prior to matrimony. Virginity of male and female Muslims is emphasized and any, pre- and extra-marital relations are prohibited in Islam (Qur'an, 17:32, 24:26, 25:68). Extramarital relations are also prohibited in both Christianity and Judaism (see, for example, Exodus 20:14; Lev. 20:10; 20:10).

So what is the Divine wisdom behind forbidding adultery and fornication?

Negative social and psychological

Adultery or fornication has multiple negative social, psychological and physical consequences (52,53).

- A person after adultery would suffer from a feel of guilt and shame and he would need to seek God's forgiveness.
- The relationship between partners after infidelity would suffer from a deep scar of a break in trust, and lack of intimacy, both of which need a long and painful recovery.
- The husband might attempt to kill the adulterer and the marriage ends up with divorce.
- If pregnancy happens, the unwanted child might be aborted.
- Children suffer from a deep disappointment and bewildering.
- Recent studies suggest that the more sexual partners a woman has had before marriage, the less happy her future marriage would be.



From the left; pubic lice, trichomonas protozoa, and papilloma virus.



Babies may acquire certain sexually transmitted diseases like gonorrhoea (left) and herpes (right) during delivery.

The risk of acquiring infections

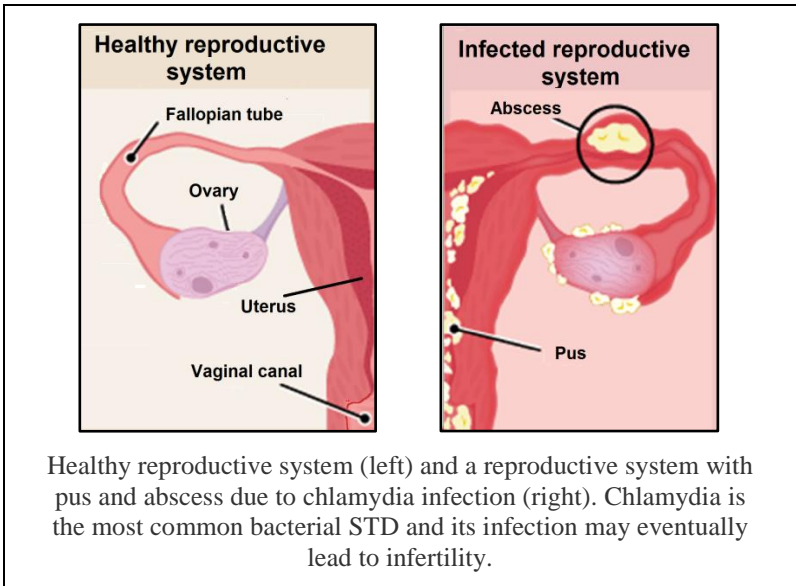
- There is a risk of acquiring **one of more than 30 different bacterial, viral, and parasitic sexually transmitted diseases (STDs)**.
- Most STDs are initially asymptomatic which further increases the risk of their transmission.
- Examples of bacterial infections are chlamydia, gonorrhoea, and syphilis; examples of viral infections are genital HPV (herpes), HIV (AIDS), HBV (hepatitis B) and HPV (human papilloma virus); and examples of fungal infections are candidiasis (yeast infection); examples of parasitic infections are crab louse, scabies, and trichomonas.
- Some infections can be spread by non-sexual contact with contaminated blood and tissues, breastfeeding, or during childbirth.
- Some viral infections, like HPV, HBV, HIV, and HPV are difficult to cure.

- Bacterial infections are becoming more resistance to antibiotic treatment.
- Some infections may cause infertility as in the case of chlamydial infections.
- Some infections may cause cervical cancer in women like infection with Herpes simplex virus-2 and human papilloma virus.

STDs are causing a global problem

According to the World Health Organization (52,68):

- More than 1 million sexually transmitted infections (STIs) are acquired every day worldwide.
- Each year, there are an estimated 357 million new infections with 1 of 4 STIs: chlamydia, gonorrhoea, syphilis and trichomoniasis.
- More than 500 million people are estimated to have genital infection with herpes simplex virus (HSV).
- More than 290 million women have a human papillomavirus (HPV) infection.



6.2. Sex during menstruation

"وَيَسْأَلُونَكَ عَنِ الْمَحِيضِ قُلْ هُوَ أَدَىٰ فَأَعْتَزَلُوا النَّسَاءَ فِي الْمَحِيضِ وَلَا تَقْرُبُوهُنَّ حَتَّىٰ يَطْهُرْنَ"
(البقرة:222).

“And they ask you about menstruation: say, “It is harmful, so keep away from women during menstruation. And do not approach them until they have become pure” (2:222).

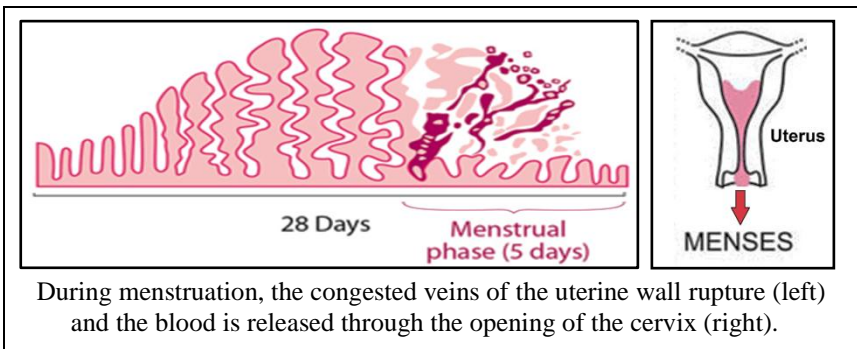
Sex during the monthly period of women is not only forbidden in the Qur’an but also in the Bible. According to the Bible, a woman is considered "unclean" during her period and sex is forbidden (Leviticus 18:19 - 22, 24).

During the menstruation, the veins of the uterus are congested and are prone to rupture and release of blood. Therefore, period sex could be messy and unhygienic.

On the other hand, the vaginal wall usually swells during the menstruation and gets irritated by intercourse. In addition, the low pH of the vagina which keeps off germs rises and may allow germs introduced by the penis of man to grow more rapidly. Therefore, the vagina during the period is more liable to be infected.

In addition, because the cervix is slightly opened to allow the blood to be released, the uterus is also liable to be infected, especially with the lowered immunity of women during menstruation.

Therefore, it may be concluded that the prohibition of the intercourse during the period is for our goodness.



During menstruation, the congested veins of the uterine wall rupture (left) and the blood is released through the opening of the cervix (right).

6.3. Alcohol

"يَسْأَلُونَكَ عَنِ الْخَمْرِ وَالْمَيْسِرِ قُلْ فِيهِمَا إِثْمٌ كَبِيرٌ وَمَنَافِعُ لِلنَّاسِ وَإِثْمُهُمَا أَكْبَرُ مِنْ نَفْعِهِمَا وَيَسْأَلُونَكَ مَاذَا يُنْفِقُونَ قُلِ الْعَفْوَ كَذَلِكَ يُبَيِّنُ اللَّهُ لَكُمْ آيَاتِهِ لَعَلَّكُمْ تَتَفَكَّرُونَ" (البقرة: 219).

They ask you about intoxicants and gambling. Say, "There is gross sin in them, and some benefits for people but their sinfulness outweighs their benefit" (Qur'an, 2:219).

During the early days of Islam, consumption of liquor was prevalent. It was then prohibited by Islam gradually. The Prophet Muhammad (PBUH) said that alcohol initiates all offenses against the laws of God (Ommul-Kaba'air).

People who get drunk suffer from slurred speech and impaired judgment and motor skills, among many other side effects. They then suffer from headaches, nausea and other unpleasant side effects (hangover).

About 2 billion people worldwide consume alcoholic drinks. It is estimated that over 76 million people are currently affected by dependence and abuse. Alcohol causes 1.8 million deaths a year, which represent 3.2% of all deaths worldwide.

6.3.1. Public offenses

Alcohol was found to be closely associated with violent crimes, including murder, rape, assault, child and spousal abuse. In the U.S.A, about 3 million violent crimes occur each year in which the offender was drunk.

6.3.2. Economic and social effects (54)

- Alcohol abuse may lead to depression and suicide.
- It can lead to physical aggression e.g. slapping, hitting and beating of women and children.
- Alcohol causes psychological abuse, e.g. humiliation and intimidation of women and children.
- Heavy drinkers waste thousands of pounds on alcohol, they have fewer employment opportunities, and they suffer from their increased medical expenses.
- Heavy drinkers have lower performance and are more likely to have work accidents.

6.3.3. *Effect on health (54,55)*

- Long-term alcohol abuse can cause serious health problems like:
- Liver damage, cirrhosis, and cancer.
- Damage to the ends of neurons, which affects nerve communication and may result in neurons' loss in some parts of the brain, and memory problems, confusion, and paralysis of the eyes.
- It may damage heart muscle and increase the risk of experiencing strokes.
- It causes hypertension and 2% of the cases of coronary heart disease.
- It increases the risk pancreatitis and the development of diabetes.
- In women, it may affect the foetus negatively, leading to the birth of disabled children.



Alcoholic drinks contain alcohol which is sometimes so high that it burns our organs, like the liver.



Drunken people suffer from slurred speech and impaired motor skills and judgment. On the long term, alcohol kills brain cells.

6.4. Dead Meat and Blood

"حُرِّمَتْ عَلَيْكُمْ الْمَيْتَةُ وَالِدَّمَ وَالْحُمُ الْخَنِزِيرِ" (المائدة:3).

*Forbidden to you (for food) are dead meat, blood and the flesh of swine”
(Qur’an, 5: 3).*

6.4.1. Risks of Consuming Dead Meat and Blood

God is our Creator and therefore, He knows what is good or what is bad for us. He has forbidden us to consume dead animals and blood, not only in the Qur’an as mentioned in the above verse but also in the Bible.

“Only you shall not eat the blood; you shall pour it out on the earth like water” (Deuteronomy, 12:16)

“He must not eat anything found dead or torn by wild animals, and so become unclean through it. I am the Lord” (Leviticus, 22:8).

Blood is a good medium for growth of most microorganisms. Microorganisms can grow to hundreds of millions in both blood and dead tissues of animals, producing large amounts of harmful toxic metabolites and toxins (56).

Some toxins and toxic metabolites are heat stable and may withstand the heat of cooking and may cause health problems. In addition, the high bacterial load in dead animals is a source of exogenous endotoxins which may cause a surge of inflammation. Endotoxins cannot be destroyed through heat or acid treatment.

On the other hand, animals may die as a result of an infection with one of the zoonotic pathogens. Zoonotic pathogens cause dangerous bacterial, viral and parasitic diseases in both humans and animals. If the number of the zoonotic pathogenic microorganisms in a dead animal is large, there is a possibility that some might not be killed during cooking and might cause infections to humans.

Animals may also die after eating poisonous plants. Therefore, eating poisoned animals could be harmful.

6.5. Swine

Pork accounts for 36% of the world's meat intake. Interestingly although Christians eat pork, it is prohibited in the Bible and there is no mention in the Bible that Jesus ever ate pork.

"You shall not eat any of their flesh, and you shall not touch their carcasses; they (pigs) are unclean to you" (Leviticus, 11:7-8).

Certainly, God has forbidden pork in His revealed Books for a wisdom. In the following paragraphs, we try to find out some scientific reasons. Nonetheless, there are, most likely, other physical, behavioural, mental and spiritual risks which are yet to be discovered.

6.5.1. Risk of microbial infections(57,58)

The number of microbial infectious diseases transmitted from pigs to man is rather large. They include viral, bacterial, fungal and parasitic diseases. It should be mentioned that some of the following diseases may be also transmitted by consumption of some other animals.

- **Viral diseases which include:** influenza (type A), Japanese encephalitis, Vesicular stomatitis, Epstein–Barr (human herpes virus 4), Foot and mouth, Hepatitis E.

There have been several pandemics of swine flu. The most recent pandemic outbreak was in 2009.

In 1918, a pandemic swine flu with a nickname the Spanish flu infected 500 million people (20 to 40 percent of the world's population). From 50 to 100 million was killed (59).

- **Bacterial diseases include** undulant fever (*Brucella* spp.), diarrhoea (*Escherichia coli*), typhoid (*Salmonella* spp.), skin infections and bacteraemia (*Staphylococcus aureus*), enteritis and diarrhoea (*Yersinia enterocolitica*), tuberculosis (*Mycobacterium* spp.).
- **Parasitic protozoan infections like** *Toxoplasma gondii* and *Sarcocystis* spp., **and helminthic infection with worms** like pork tapeworm and trichina, pinworm, hookworm, and Ascaris. The following are two dangerous worms acquired through pork consumption.



The number of dead people in the swine flu pandemic in 1918 in the city of Philadelphia overwhelmed the ability to handle the bodies. Therefore, they were forced to bury people, without coffins, in mass graves.

Tapeworm

Humans are directly infected from pork meat contaminated with cysts of the worm (cysticercus), which matures the intestine into a 2-3 meter tapeworm. Segments of the worm loaded with eggs are detached and released with faeces into the environment to be eaten by pigs where they hatch, invade the blood and encyst in the tissues of different organs.

In addition to consuming the nutrients of the infected person, if somebody ingests tapeworm eggs, through contaminated hands the hatched larvae in the intestines migrate through blood and form cysts in different tissues. If the cysts happen to occur in the **brain**, they may **seizures** and serious **brain damages (65)**.

Trichina Worms (pork worm)

Trichina Worms are commonly found in the muscles of swine in the form of cysts. If meat or meat products of infected pigs are eaten undercooked, the cysts grow in the intestine humans into adult worms which mate to produce thousands of new larvae. The new larvae travel through the blood to encyst in human muscles **causing fever and severe pain**. Cysts in the heart or brain **cause fatal myocarditis and encephalitis (65)**.

6.5.2. Risks of metabolic syndromes and fatal diseases

Pork meat is rich in fats, which may contain up to 32% polyunsaturated fatty acids (mainly omega-6). Excess omega-6 contributes to diseases such as impaired immune function, inflammation, fatty liver, heart diseases, increased blood pressure, increased blood sugar levels and obesity (72).

It was also reported that pork consumption was strictly proportional to dangerous diseases like liver cirrhosis and cancer, and multiple sclerosis (60-62). Therefore, these diseases are less common in Muslim countries where pork is forbidden and in countries like Brazil where beef consumption far exceeds pork consumption

6.5.3. Risk on workers in pork production

- 1- Workers in pork production (hog farming) have an increased risk of reduced hand strength and respiratory symptoms (63).
- 2- Workers in pork meat industry (hog farming) are at risk of suffering from **progressive inflammatory neuropathy (PIN)**. This is a disease that was identified in 2008, by the Centers for Disease Control and Prevention. The condition is characterized by acute paralysis, pain, fatigue, numbness, and weakness, especially in extremities. It was initially believed that workers might have contracted the disease through inhaling aerosols from pig brains blown through a compressed-air hose and that this exposure to pig neural tissue induced an autoimmune response that might have produced their mysterious peripheral neuropathy (64).
- 3- Workers in pork production are also liable to acquiring microbial infections.



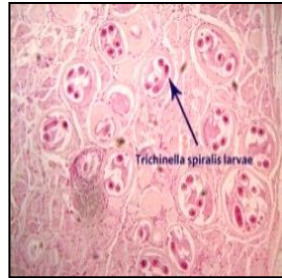
Pigs transmit a large number of bacterial, viral and parasitic diseases.



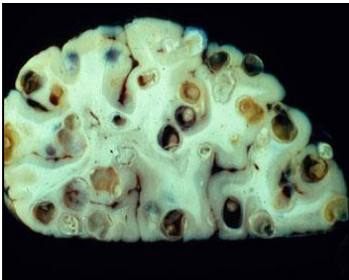
Tapeworm



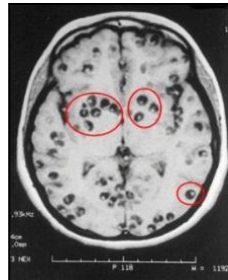
Trichina worm



Large numbers of trichina cysts in muscles.



Cysticercosis in a human brain which is caused by swallowing the tapeworm eggs.



7. CONCLUDING REMARKS

The Qur'an was revealed to the Prophet Muhammad (PBUH), who lived in an illiterate society in the Arabian Desert, in the 7th century. Unlike the other previous revelations, which suffered from complete or partial distortions, the Glorious Qur'an has been well preserved, because since its revelation it has been recorded and memorised by heart.

In the Glorious Qur'an, there are numerous precise scientific facts which have been fairly recently discovered. In this book, we have reviewed more than 75 of these scientific facts which deal with biology, embryology, cosmology, and geology.

It is possible that the Prophet Muhammad (PBUH) could have known all these scientific facts, which were not by any mean known at his time unless the Qur'an was inspired to him by God?

The Glorious Qur'an, therefore, is the living Divine miracle of the prophet Muhammad (PBUH).

The main purpose of the revelation of the Qur'an is to guide mankind to the Straight Path of God; the religion of **Islam**. Islam is the same religion conveyed by all prophets of God including Noah, Abraham, Moses, and Jesus (PBUT). Islam means obedience and submission to God. Islam is followed by nearly one-fourth of the human race and it guarantees the happiness of mankind in this life and the life to come.

"الرَّكْعَةَ كِتَابٌ أَنْزَلْنَاهُ إِلَيْكَ لِتُخْرِجَ النَّاسَ مِنَ الظُّلُمَاتِ إِلَى النُّورِ" (ابراهيم: 1).

"A Book (the Qur'an) which We have revealed unto you in order that you might lead mankind out of darkness into light" (Qur'an, 14:1).

"يَا أَيُّهَا النَّاسُ قَدْ جَاءَكُمْ بُرْهَانٌ مِنْ رَبِّكُمْ وَأَنْزَلْنَا إِلَيْكُمْ نُورًا مُبِينًا" (النساء: 174).

"O people! A proof has come to you from your Lord, and We sent down to you a clear light" (Qur'an, 4:174).

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