

Scientific  
Indications  
in the  
Holy Quran





# SCIENTIFIC INDICATIONS IN THE HOLY QURAN

ইসলামী ব্যাংক-  
একি জেসামেন সৌজদেব

**Written by a Board of Researchers**

**Done under the Project Science in Al-Quran**



**ISLAMIC FOUNDATION BANGLADESH**

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written by a Board of Researchers  
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أَوَلَمْ يَرَ الَّذِينَ كَفَرُوا أَنَّ السَّمَوَاتِ وَالْأَرْضَ كَانَتَا  
 رَتْقًا فَفَتَقْنَاهُمَا ۖ وَجَعَلْنَا مِنَ الْمَاءِ كُلَّ شَيْءٍ حَيًّا ۖ أَفَلَا  
 يُؤْمِنُونَ (٢١: ٣٠)

### Front-Page (Big-Bang)

"Do not the unbelievers see that the heavens and the earth were joined together as one single entity before we clove them assunder...." —Al-Quran 21 : 30

### Front-Page

Special-effect image of the Big-Bang, devised by Michael Freeman (by courtesy of Dialogue-1 (1984) p. 17).

وَفِي خَلْقِكُمْ وَمَا يَبُتُّ مِنْ دَابَّةٍ آيَاتٌ لِّقَوْمٍ يُوقِنُونَ ۙ (٤٥ : ٤)

### Back-Page (DNA molecule)

"And in your nature and in (that of) all the animals which He scatters (over the earth) there are messages for people of assured faith." —Al-Quran 45 : 4

### Back-Page

The Master-molecule of life-DNA, the hereditary blueprint of life, [by courtesy of Dialogue 3 (1989) p. 54].

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## FOREWORD

It was the kind design of Merciful Allah that the Islamic Foundation Bangladesh took up the task of unfolding the scientific Indications in the Holy Quran. The Quran is the Book of Guidance and this guidance covers all the designed areas of human activity. Thus, it is only natural for a young mind to enquire about the stand of the Holy Quran in the matter of the acquisition of knowledge in general and that of science in particular. We would soon be entering into the twenty first century which will witness unprecedented achievements in science and technology. We feel that the young men and women of our time who are eager to pursue a career in science and technology must know that the Holy Quran has laid the highest emphasis on the study of His Creation. Very few are aware of this emphasis. Also, it is the duty of every Muslim to realise that the knowledge emanating from a study of Allah's Creation of both living and non-living matter should be utilised profitably for peace and the welfare of mankind. Such studies would also enable one to have a great appreciation of the Magnificence and Master-plan of Allah's Creation. It is with these ideas that we undertook a project titled 'Science in Al Quran' from the Department of Research. This project was able to involve some of the leading scholars of the country who worked hard over a number of years to carry the work to completion. The result of their dedicated work was the first edition which came out in 1990. The Foundation could not offer much to these scholars except encouragement. The scholars themselves do not claim perfection in their work. This popular and prestigious publication of Islamic Foundation Bangladesh was out of market within a short time, because of its high demand and appreciation Nationally and Internationally. In this context, Islamic Foundation Bangladesh has launched the publication of the second edition from the Department of Publication. This work would be amply rewarded if the young minds of the present age, in particular, are stirred to think about the glory and purpose of Allah's Creation.

May Allah forgive us for the errors that might have crept in inspite of the best of our efforts.

I take this opportunity of thanking our distinguished scholars who have worked with commitment and dedication for the present volume and also all

members of the staff of the Islamic Foundation whose sincere service contributed to the work.

Finally, I would like to express our heart-felt gratitude to the Almighty Allah for having enabled us to uphold, only partially, the Infinite Glory of His Creation.

We hope, the second edition of this publication will continue to contribute to our quest of science and technology in the Islamic perspective and brighten the image of Islamic Foundation Bangladesh, dedicated to the service of Islam, Muslim Ummah and Mankind.

Let Allah accept our endeavours.

**Director General**  
Islamic Foundation Bangladesh

# Preface

The Holy Quran is the Book of guidance. This guidance is for the whole of mankind and covers all activities of human life. Since science is an important human activity and is an essential one for the progress of mankind, it is natural to expect that the Quranic guidance will address itself to the aspects of science. It is no wonder that the Holy Quran does so most beautifully. Almost one-eighth of the total number of verses in this book is devoted to science and technology. The Quran is not a book of science as such and hence one cannot hope to find all the principles of science embedded in it; nevertheless, the Quran has its own style of dealing with the facts and principles of science. It deals with the essence of scientific principles and makes statements about a number of phenomena in a suggestive form hinting at the highest organising principles. One Quranic statement speaks volumes about a particular scientific discipline. An example may make this point clear. In verse 3 : 191, Allah has indicated that anyone pondering over nature will reflect : "our Lord! not for naught hast Thou created (all) this!....." This assertion that nothing has been created for nothing is actually the most fundamental article of faith to the modern ecologist who realises that the universe has a fine tuning and that we must not disturb it. There are about 30 million life-forms. Only 5 millions have been studied so far. We do not know the functional utilities of many of these life-forms. However, many a time, it has been found that man has disturbed the life-styles of some of these forms and has paid very dearly for this. Even if we do not know the function of a particular living variety, we should take all care to see that it survives, as its elimination may upset the overall ecological balance of nature. Thus the entire basis of science of ecology is no other than the Quranic assertion that nothing has been created for nothing.

Another example is the Quranic reference to the order and proportions of things. In verse 25 : 2 it has been stated: "It is He Who created all things and ordered them in due proportions". Anyone interested in the symmetry properties of nature and in the relative proportions of things would realise that the issues of order and proportion are, in fact, linked to the question of survival of living things. For example, man could not be drastically

different in size from what he is now and yet be compatible with the gravity field of the earth and other environmental factors. Also within a given living body, the different parts follow different proportions. In the case of plants these proportions can be understood in the *Fibonacci* numbers. It is the proportion of things that lends beauty and symmetry to an object. Thus, proportion is one of the most important aspects in the overall Grand Design of creation.

Still another fascinating example of the Quranic style in the presentation of scientific facts in an eye-opening manner can be found in verse 96 : 2 which refers to the creation of man from *alaq* (that which clings) within the mother's womb. The successive phases in the development of a human being from an embryonic stage to a full grown foetus have been mentioned in sura *Al-Muminun*. These phases were mentioned in the Holy Quran in the seventh century (Christian era) when the science of embryology was not even born. Incidentally, embryology is a very recent discipline which has been developed over a period of not more than 100 years. Thus, it is indeed amazing that the successive phases of human embryologic development as referred to by Allah in the Holy Quran have been discovered recently. Allah has asked man to ponder over His creation and development so that man can go to the depths of biology and unveil the mysteries of life. Again, a mention of a whole chain of biological phenomena in a very abbreviated form invites man to study medical science in all its details and at the same time appeals to his mind to think of Allah, Creator of all creations. Thus, the very mention of such scientific phenomena bolsters, in an elegant manner, the idea that an understanding of Allah's Magnificence is intimately connected with the scientific understanding of His creation. What we call creation is a kind of Signature (*ayat*) of Allah. Science helps man understand this Signature. From what has been said, it should be clear that the Quran has a particular style of inviting attention to the craftsmanship in nature and that in such invitation, the Quran has placed its highest emphasis on the acquisition of knowledge.

The question which disturbs the minds of the young boys and girls of today is : why in spite of the strongest Quranic exhortations present from the beginning (*Iqra Bismе Rabbika al-lazi Khalaq*) to the end of the Quranic verses, about two-thirds of the Muslim Ummah remain illiterate,

economically poor and backward in science and technology? This is indeed, a very vital question which needs to be addressed in a very serious manner. The answer to this may be in the fact that although we recite the Holy Quran, many of us cannot comprehend its meaning because of lack of knowledge. Allah Himself has proclaimed that the Holy Quran is for "a people who think". In other places in the Quran, it has been mentioned that only people with *Ilm* can comprehend His Signs. Incidentally, most of the phenomena which have been mentioned as Signs in the Holy Quran are of a scientific and technological nature, thus it is no wonder that *Ilm* unless otherwise qualified stands for science. The early Muslims derived inspiration from the Holy Quran for the acquisition of knowledge. They considered knowledge in its entirety. And the humanities and the sciences were studied in an integrated manner. It is the pursuit of *Ilm* which gave the Muslims the power and the prestige with which they ruled a vast empire for more than a thousand years. This glory later faded away due to a number of reasons. However, the lesson that one learns from the history of the Muslim civilization is that knowledge in general and science and technology in particular must be practised along with religion. In fact, according to the Quranic mandate, science like other human activities is an integral part of religion. While science teaches us how nature works and enables us to use this teaching for generating products and processes for the satisfaction of our needs, religion teaches us the values that Allah has asked us to practise so that the value and utility aspects of life may be blended together in a harmonious manner.

Thus talking in terms of the modern perspectives of life, one would need both religion and science. Science imparts material knowledge; religion teaches us the ethics of using that knowledge. Religion invites man to ponder over creation and the Creator, science provides the language for understanding creation and it is the creation which acts as the Signature of the Creator. Thus, there is no real conflict between science and religion.

Unfortunately, the modern men and women of today are neither aware of the emphasis the Holy Quran attaches to the acquisition of knowledge nor can they relate some of the statements in the Holy Quran to the facts of science. This unawareness of the scientific indications in the Holy Quran is firstly owing to the fact that many recite from the Quran but do not understand the meaning of the verses due to their not having a good

knowledge of Arabic; secondly most of those who know Arabic and know the meaning of the verses cannot appreciate the scientific indications because of not having an exposure to the rudimentary facts of science. Those who profess to be theologians do not, when they speak to the public, dwell upon such verses; they usually talk of the punishments in the grave and in the hell and of the rewards in the heaven. The young folks, while listening to them, sense that somehow or other, these preachers do not address themselves to the burning problems of the day like, basic education, eradication of poverty, social injustices etc., not to speak of the scientific methods of dealing with them. Thus, the younger folks get an erroneous idea into their heads that the culture of science and the culture of Islam do not go hand in hand. The scientific backwardness of the Muslim countries of the third world, and their strong dependence on imported goods even for the satisfaction of some of the basic needs of life, lend further support to their erroneous ideas about Islam. And yet it is the practice of science which enabled the early Muslims to carry the torch of learning and give a lead to the other nations. And it is science again, which if properly practised according to the ethics of the Quran, can be used as an instrument of change in Muslim societies.

Thus, in order to convince Muslim youth that there is no conflict between science and the Quran and also that a deeper scientific understanding of nature, can lead to a deeper appreciation of the Wisdom and Powers of the Creator, it is essential that the scientific indications in the Holy Quran are understood and explained to the uninitiated. The present volume, through the infinite Mercy of Allah, is an attempt in this direction.

A few words about the genesis of this work would be in order. A few of us, namely the late Mr. A.Q. Choudhury, Mr. Ferdouse Khan, Prof. Mafizul Mannan and myself had been thinking independently of searching in the Quran for verses of scientific significance. When our thoughts were revealed to Mr. A.F.M. Yahya, the then Director-General of the Islamic Foundation Bangladesh, Dhaka, he reacted almost ecstatically and acted as a catalytic agent for bringing us together. In the meanwhile, a book entitled *Quraney Bigyan* (Science in the Quran) by Dr. Md. Ghulam Muazzam was published by the Islamic Library, Rajshahi (1966) and another book entitled, *Science in the Quran* by the eminent scholar M. Akbar Ali, author of

several volumes in Bengali on "*Muslim Contribution to Science*" was published by Malik Library, Dhaka, Bangladesh (1972-76). Another oft quoted book, *The Bible, the Quran and Science* (1976) by the illustrious French physician, Maurice Bucaille also appeared. The latter has dealt with selected verses of the Holy Quran. Also a booklet entitled *The Scientific Findings and the Holy Quran*, written by M. Ferdouse Khan was published by the Islamic Foundation Bangladesh (1974). These have dealt with selected Quranic verses. The Book by M. Akbar Ali quoted Quranic verses having a bearing on scientific facts and has a good reference value. But the actual scientific explanations of the happening quoted in the verses were not given in some places. Also the scanning of the Quranic verses for scientific indications was not exhaustive, Thus, it was strongly felt by Islamic Foundation that the present work would be of great interest to the members of the Muslim Ummah in general and to Muslim youth in particular. The Foundation then immediately launched a project titled *Science Al-Quran*; the project was subsequently approved and a committee consisting of experts (whose names appear on the front page) from various branches of science, was formed. The Chairmanship of this Committee fell on me, although personally I did not consider myself fully competent to shoulder this responsibility. But since this was a great opportunity for me of being somewhat wiser about the subject from constant contacts with the learned experts, I accepted the challenge hoping that we as a group would receive the Mercy and Blessing of Allah in fulfilling the task. The *modus operandi* for doing the work which took us a few years to complete, was as follows: The Committee met thrice a week. We went through the verses systematically from the beginning to the end and depending on the nature of expertise of the committee members, verses which seemed to have a scientific bearing were allocated to the concerned experts. They studied these verses deeply at home and after due deliberations a draft paper highlighting the scientific indications of a particular verse in the Quran was produced by the relevant expert. This paper was circulated to other members who made a very critical analysis of the draft. It happened a number of times that not only had many drafts to be revised considerably but some involving months of work were rejected. The members took such rejections in good grace keeping in mind that the strength of arguments and their compatibility with other verses of the Quran were recognised as major criteria for our deliberations.



We must add some words of caution. The Holy Quran, coming from the Almighty Allah, is based on Absolute Truth, as has been indicated in the Quran. Anybody having faith in this Absolute Truth is welcome to use the Quran as a test for our scientific principle and not vice versa. Incidentally it may be mentioned that Maurice Bucaille in his book, *The Quran, the Bible and Science* already asserted: "There is not a single verse in the Holy Quran which is assailable from the scientific point of view". Our present work fully supports this assertion. A question which may be posed in this connection is: what if we come across a verse which cannot be explained from the point of view of science? The answer to this question lies in the fact that science, for purposes of investigation of truth, has accepted a certain methodology. This methodology is, however, not without its limitations. There is nevertheless, a possibility that there could be a part of reality which transcends our biological limitations and evades the scientific methodology employed. Thus, all truths may not be subject to the accepted methodology of science. Nevertheless, the scientists cannot leave things open-ended and have to have a starting point and a set of methods for the investigation of truth. However, they have to bear in mind that if a certain verse of the Quran cannot be explained by the science of today, all they can say is that at the present stage of our scientific knowledge, that verse cannot be comprehended. Further advances in sciences would probably shed further light on the verses. If we look at the progress of science we see that this progress has indeed been phenomenal. Yet one is astonished to find that only fifty years ago, the present-day household item transistor was not discovered, that the electrification of the world began only a little more than 100 years ago, that 90 years ago, man did not know how to fly, that sixty years ago, the DNA, the master-molecule of life was not known, that even 40 years ago, the first artificial satellite had not been launched, not to speak of landing on the moon. Within the last one hundred years, man has learnt an awful lot, but only to realise that what he has learnt is only a tiny part of what is yet to be learnt. Thus, if any verse is not understandable from the scientific point of view at the present moment, there is every possibility that future advances in science could shed better light on the verses. The delightful experience is that as man dives deeper into the secrets of matter, and gains more and more knowledge, his grasp of the message of the Quran becomes clearer and clearer

as indicated earlier. This is also borne out by the Divine declaration in the Holy Quran that this Book is for a people who understand. The pursuit of science i.e., of knowledge in a broad sense enhances this understanding.

Finally, we must sound another note of caution. We do not pretend at all that our understanding of the scientific indications in the Holy Quran has been perfect. We have only tried to do the job with the best of our capability which is, of course, limited. And the readers would do well to bear in mind that the last words on any subject can hardly be spoken and that the wisdom of Allah is infinite and inexhaustible. We can only try to do our best, with the Blessings of Allah, to unfold only a par of His wisdom. The true interpretation of the verses is best known to Allah Who revealed them. In fine, we would like to record our deepest sense of gratitude to Allah for having given us this opportunity of attempting to understand some of the verses revealed by Him, from the scientific point of view. Our thanks are due especially to the erstwhile Director-General of Islamic Foundation, Mr. A. F. M. Yahya and his successors for the co-operation they have extended to us in bringing this work to completion. We also thank the numerous scholars with whom the members of the committee have had discussions in order to clarify many points in our exposition. The staff of the Islamic Foundation who have worked with us for long hours for months and years on the present work also deserve our thanks. We would like to record our deep sense of appreciation of the efforts of Maulana Abdul Jabbar Chakhari, Mr. A. N. M. Abdur Rahman, Mr. M. Abdur Rob and Mr. M. Ruhul Amin for the completion of the present work.

We conclude with a prayer which our Lord has taught us رَبِّ زِدْنِي عِلْمًا "(Oh, Lord, increase me in knowledge)". We also ask for His forgiveness for any lapse on our part which might have inadvertently occurred in the present task.

M. Shamsheer Ali  
Chairman  
Committee on  
Science in Al-Quran

25th December 1990

Islamic Foundation Bangladesh, Dhaka



## ١- بِسْمِ اللّٰهِ الرَّحْمٰنِ الرَّحِیْمِ

**1:1 In the name of Allah, the Most Beneficent and the Most Merciful.**

The two words *al-Rahman* and *al-Rahim* form an important part of Sura *Fatiha*. These two attributes of Allah occur in the Holy Qur'an 57 and 95 times respectively<sup>1</sup>. It is, therefore, quite natural for an inquisitive mind to try to comprehend the significance of these two attributes.

Out of the innumerable gifts and blessings through which Allah *Rahmanur Rahim* has manifested His '*Rahmat*' and vindicated the truth of the attributes under discussion, only a few are cited below from different fields of science :

1. Let us start with life history of man in the mother's womb. Here, in the womb, there is an almost closed chamber filled with a fluid. This chamber is a novel device in which the boundless mercy of Allah is manifested by the fact that it is well fortified to protect the immersed foetus from external shock and invasion of harmful germs. In this ideal environment, the foetus is nourished, developed and fashioned from a tiny fertilized ovum to a full grown baby. The survival of the baby in the womb without respiration furnishes yet another surprise. The mechanism of safe delivery of a 4-8 pound baby through a narrow passage also provides another example of the merciful devices of Allah.

2. It is Allah, the Merciful Who arouses immeasurable love in the hearts of parents but for which the survival of the baby in an alien environment of this world cannot be thought of. This sort of filial affection is also found in all living beings.

3. On its release to earth the baby finds, readily available, the most ideal nourishment in the milk from the mother's breast.

4. On birth, the baby finds gratis and also in abundance an atmosphere of air, moisture, heat and light by the gracious decree of Allah, but for which his existence on earth would have been impossible. The air, it may be pointed out, is a well balanced mixture of oxygen, nitrogen, moisture and carbon dioxide in right proportions to nourish and sustain normal life. The balanced nature of the constituents of air is also maintained almost

constantly by Allah providing self regulating cycles among plants, men, animals and micro-organisms.

5. Besides, Allah has provided numerous protective devices in the human body in the form of tenacious yet soft skin-covering with its wonderful power of regeneration and repair and its innumerable sensory nerve endings ; the power of blinking and the formation of tears in the eyes to remove foreign bodies and keep the cornea moist ; hair in the nasal and ear entrances to prevent free access of harmful foreign bodies ; eye-brows to act as shades against glaring light ; finger and toe nails which confer firmness ; the thumb with its special ability to grasp ; controlling sphincters of urethra and anus to prevent incontinence ; coagulating power of blood in the right measure to prevent excessive haemorrhage, etc.

6. The function of internal organs like the heart, which pumps blood; lungs which purifies blood by inhaling oxygen and exhaling carbon dioxide; intestines which digest and absorb the nutrients ; the liver which mainly detoxicates the injurious chemicals ; kidneys which filter the blood and the brain which controls both voluntary and involuntary functions of the body without any conscious effort of the individual concerned, is another proof of Allah's mercy to us.

7. Production of antibodies in the human system to fight against disease producing germs and other harmful agents also speak of Allah's mercy.

8. It is Allah, *Rahmanur Rahim* Who has very graciously made provision for various types of nourishing food materials for mankind, in fact, for all living beings in the form of fruits, grains, vegetables, meat, fish, etc.

9. The most important source of energy of our earth is the sun. The electromagnetic radiations emanating from the sun include long wavelength radio waves, infrared rays, visible light, shorter ultra-violet rays, and x-rays. Solar wind originating from the outer atmosphere of the sun contains ions and electrons which bombard the earth at a tremendous velocity of 900,000 miles per hour. Violent activity sometimes occurs in the regions around the sun spots causing solar flares during which highly energetic particles, x-rays and other radiations of the spectrum reach the earth. Cosmic rays constantly bombarding the outer atmosphere of the earth are nuclei of atoms moving at tremendous velocities. These mostly originate from the sun and perhaps from supernova or explosion of a star. When cosmic rays interact with the earth's atmosphere, they produce x-rays, a part from these various solar activities producing lethal x-rays and ultra-violet rays. A type of neutron

stars called x-ray pulsars produce tremendous amounts of lethal x-rays. The intensity of solar wind, cosmic rays, ultra-violet rays, and x-rays would have proved lethal to life on earth, if Allah the Merciful did not make provision for ingenious filtering devices in the atmosphere (ionosphere) for various rays, and a trapping device due to the earth's magnetic field (magnetosphere) for electrons and ions by means of which these deadly radiations and particles are prevented from reaching our earth.

10. Allah manifests His blessings in yet another unique creation of His, viz. water. Its role in the existence of the biological world needs no elucidation. The most important part that water plays in the protection of aquatic life from freezing to death needs, perhaps, a little elaboration. It is the only substance so far known which is denser in the liquid state at 4°C (3.98°C to be precise) than when it solidifies to ice at 0°C. Consequently, the solid ice sheet at or below 0°C floats on water. The ice-sheet, it may be stated, acts as an insulator, because of which the whole of water content of lakes, for instance, may not be frozen to solid ice even though the temperature of air above the ice sheet remains below the freezing point for a long period.

On the other hand, if ice were heavier than water, it would sink to the bottom and gradually build up from there. Lakes, rivers and ponds in cold climatic regions, and Arctic seas would be frozen as solid ice; consequently almost all aquatic life would have frozen to death. The unique property by which ice floats on freezing is the manifestation of the infinite mercy of Allah *Rabbul Alamin* for life to thrive and prosper even in the hostile cold climatic region.

Thus as one ponders over creation, one comes across countless examples of Allah's mercy and beneficence.

## Reference

1. Baqi, M. F. A., *Al-Mu'Jamul Mufahras li-Alfazil Quran* 1364/1944, p-307.

## ١- الْحَمْدُ لِلَّهِ رَبِّ الْعَالَمِينَ ۞

**1 : 2 Praise be to Allah, the Sustainer and the Cherisher of the worlds.**

The meaning of *Rabbul Alamin* is that Allah is the Sustainer and the Cherisher of the *Worlds*. The plural use of the word 'world' refers in the conventional sense to the plant world, animal world, human world and material world. In order to comprehend the significance of the use of the plural form 'worlds', one has to recognise that there are worlds within and beyond our familiar world. Modern scientific knowledge enables one to classify these worlds in terms of a length scale.

How big or how small is the unit of this scale ? In the case of the elementary particles like proton, the unit is of the order of  $10^{-13}$  cm or less. On the other hand, the size of the known part of the universe is about  $10^{28}$  cm.\* What a tremendous difference in size between the smallest and the largest of the creation of Allah that we have known till now. Such a big scale may be divided conveniently into four types of parts or sizes :

1. From the proton to the world of giant molecules ;
2. From giant molecules to plants and animals (i.e. from  $10^{-5}$  cm to the order of  $10^{+5}$  cm);
3. Our planet earth ( $10^9$  cm);
4. From our planet to the known part of the universe (i.e,  $10^9$  cm to  $10^{28}$  cm).

The differentiation of the length scale in the above four parts may be arbitrary. But these parts represent four different kinds of worlds. The interesting thing is that matter behaves differently in different regions of the length scale. This may become apparent as we discuss the inherent characteristics of the different worlds:

- This figure means that twenty eight zeros should be placed after the digit-1 (one) i.e. 10000000000000000000000000000000. How large this number is can be understood from the fact that in order to cover this distance ( $10^{28}$ cm), light travelling at the rate of  $3 \times 10^{10}$  cm/sec (i.e. 186,000 miles/sec) would need a total time of more than ten billion years (1 billion =  $10^9$ ).

**Worlds of size 1** : Let us consider the microcosmos, i.e. the world of elementary particles, nuclei, atoms, etc. The laws of this world are not directly perceptible to our senses; we cannot see the constituents of this world. For example we cannot see an atom. To understand why we cannot see very small things, we have to comprehend what the act of observation actually means. When we observe an object, light waves do scatter from it and enter into our eyes. Without such scattering, things would not make themselves appear to us. Now, if a light wave falls on an object and completely engulfs it, then obviously light cannot be scattered from this object. Thus, for light to scatter from any object, the size of the object must be larger than the wavelength of the visible light incident on it. The size of an atom is much smaller than the wavelength of visible light. So, when a light wave falls on an atom, it covers the whole of the atom and as a result, the light cannot be scattered. Hence the atom cannot be seen. In order to collect information about the atom, we have to employ wavelengths smaller than the size of the atom.

But these waves are not visible to our eyes. These are the x-rays or more powerful gamma-rays. In comparison to the visible light waves, these small waves are much more energetic. The investigation of atoms with these energetic waves is beset with a problem : to have information at a certain moment about a particle means that we must determine its position and momentum. But when powerful radiation is employed to determine the whereabouts of an electron, for example, (namely, where it is and what it is doing, i.e. its position and momentum) then the quanta of this radiation give a heavy jolt to the electron, thereby disturbing both its position and momentum. The diffracted radiation, of course, gives some information about a position and a momentum of the electron. But these are not the position and the momentum which the electron would have had, if it were not disturbed by the radiation quanta. Thus, there is some uncertainty in the information about the electron at the time the radiation quanta impinge on it. The uncertainties in the measurements of position and momentum, however, are not unrelated. In fact, the product of these uncertainties is of the order of  $h$  (a universal Planck's constant). This is known as Heisenberg's uncertainty principle. All this demonstrates that the truth which we obtain about the state of the electron by using powerful radiation is only an apparent truth and not the real truth. The degree of departure of the apparent truth from the real truth would depend on how much we have



disturbed the object while observing. This points to an important philosophical aspect of the micro-world namely, that in such worlds, the very act of observation is a kind of disturbance and the Measure has an interaction with the measured, a feature hitherto unseen in the world of the large. In fact, the micro world is guided by a different kind of mechanics namely quantum mechanics which is quite distinct from classical mechanics which governs the motion of matter on a big scale. Thus the laws of motion of the small and the laws of motion of the large are dramatically different from each other. This provides us with further support for classifying worlds in terms of a length scale.

**Worlds of size 2 :** Objects of these worlds are directly perceptible to our senses—we see them. And the interesting thing is that while we see them, we do not actually disturb them as we do in the world of the tiniest things. Why we do not disturb things here in the act of observation can again be made clear through the example of observing an ant. The size of the ant is much larger than the wavelength of visible light. Thus light can be easily scattered from the ant and that being so the ant can easily be seen. True, photons (the particle of light) impinging on the ant do give a jolt but this jolt is hardly appreciable in view of the heavy mass of the ant compared to the mass of an electron considered earlier while discussing the behaviour of the micro-world. Since the act of observation does not bring about any appreciable change in the position and momentum of the objects observed, the observer in these worlds does not influence events here, the measurer does not disturb the measured. Also, classical mechanics seems to be perfectly suitable for describing kinematic behaviour in these worlds.

**Worlds of size 3 :** The planet earth has been given a unique position in the classification of worlds on the basis of a length-scale. This is because the lives and environments of many an organism including man, the vicegerent of Allah have been conditioned by Allah through the atmosphere, gravitational field and the motion of the earth , etc. The rotation of the earth on its axis and around the sun provides a standard of time. The circumference of the earth, appropriately subdivided into smaller sections, provides us with a standard of length. The gravitational pull of the earth is a vital phenomenon for all life existing on its surface. The interaction between the different air systems of the earth determines the delicate ecological balance of the existence of all life-forms on the planet earth. This helps us understand, to some extent, the magnitude of the

vastness of the universe in relation to its own size. Thus, considered from many points of view, the planet earth occupies a sufficiently privileged position so as to be called a world by itself. The motion of the planet is regulated by classical mechanics and is a predictable one.

**Worlds of size 4 :** Here we are far out into space and are dealing, on most occasions, with large distances and large masses. Although the laws and concepts of Newtonian physics are used in the motion of such masses, both the special and the general theory of relativity are involved for an accurate description of the motion. Because of the large distances involved, the information about the macro cosmos is usually obtained with the help of radio signals. Since the range of size 4 is very very large, a large number of worlds can be accommodated within this range. In fact, it is quite likely that such worlds (living and non-living ) with all their wonderful varieties may exist elsewhere in the universe in a form identical with or presumably different from our own.

The earth is a planet to the star, the sun. The sun is a star belonging to the galaxy, the Milky Way, which contains about 100 billion stars. And about 100 million galaxies have, so far, been detected in the universe. Stars, with properties regarding mass, surface temperature, luminosity, present and future age in the stable condition (on the main sequence), etc. which are comparable to those of the sun, most probably have planets revolving around them, with earth like characteristics. About a quarter of the stars of the Milky Way galaxy have such properties. Making allowance for binary and multiple stars, it is estimated that there are about 20 billion such stars in our galaxy alone.

Considering the identified 100 million galaxies and making allowance for all sorts of handicaps, it is undoubtedly a very cautious estimate that there are at least 1 billion stars with planets having life on them<sup>1</sup>.

Life chemistry on the earth depends on the production of complex carbon compounds and the presence of liquid water as solvent. In other habitable planets of other stars, life chemistry may be identical with that on the earth, or may be different. For example. silicon may replace carbon as the basic bio-chemical element, liquid ammonia may play the role of solvent, etc.

The present estimate is that each star like the sun with life-time some billions of years in the stable condition (on the main sequence) possesses at least one planet on which life has developed. Upto 1978, forty different kinds of complex molecules including some organic molecules like

formaldehyde, cellulose, etc. have been detected in the inter stellar medium. This is a powerful indicator that life may have also evolved somewhere else in the universe.

The above discussions on the different types of worlds point to the fact that if Allah had declared Himself as the Sustainer of the universe and not as the Sustainer of the worlds, these all the fine intricacies and characteristics of the different worlds would not appear to be so meaningful. In fact, the different worlds that we have characterised so far in terms of a length scale which is the only basic thing we have been able to measure so far, are different in all aspects. Each type of world has its own structure, its own probing techniques, its own mechanics. And it is Allah alone Who has all the information about all the worlds.

Apart from the material worlds and their classification discussed above, one may also wonder about the spiritual world. However, with all the tools and techniques of modern scientific methodology at our disposal, the spiritual world does not lend itself to an analysis in the same sense that living or non-living matter does. It could very well be that the present scientific methodology accepted so far for the study of matter is quite inadequate to probe into the mysteries of the spiritual world. It is for this reason that we have not been able to dwell on the spiritual world which is best perceived through personal experiences.

**Sustenance of the worlds:** So far we have discussed only the structures of the different worlds; now let us talk of their sustenance. Whether a world is small or big, Allah has made wonderful arrangements for the sustenance of all the inhabitants of that world. In this connection, let us consider the world of the small. A large number of micro-organisms surround our life and environment and without many of these, our existence would be endangered. Some of the micro organisms, e.g. virus, bacteria, microscopic fungi, etc. are so small that they cannot be seen by the naked eye unless aided by a powerful microscope. These organisms can be placed in a world which lies between the first and the second scales mentioned in the beginning of our discussion. The organisms are varied in nature and their mechanisms of food collection are so very novel. Some collect food from the soil, some collect from the plant body and still some others collect from animal bodies. And they all store their food. It is not only that Allah has made provision for the food of these micro-organisms but that through these organisms, arrangement has been made for the sustenance of plants and

higher animals. These micro-organisms are like soldiers - Allah has given them the power to fight and also to proliferate. If this proliferation becomes considerable and poses a threat to any life, then Allah has also arranged for a biological control to combat the imbalance in the number of these micro-organisms for purposes of maintaining an ecological balance in nature. If we now leave the micro world and look at the inhabitants of a comparatively bigger world, e.g. insects, birds and beasts, higher plants and human beings, then also the stupendous varieties existing in these higher forms of life simply captivate our eyes. Each life form has its own food, its own communication signal, its own housing pattern, and its own reproduction mechanism. But the wonderful thing to note is that Allah has left none without food, none without shelter, none without a defence mechanism. Whether they inhabit a small or a large world, they have a means of sustenance and Allah is their Sustainer.

However, if by *Rabbul Alamin*, we mean that Allah is the Sustainer of the living worlds, then the story remains incomplete. By the sustenance of the world is actually meant both the living and inanimate worlds. We are familiar with the sustenance of the living worlds but the sustenance of inanimate objects may sound somewhat strange. The fact of the matter is that without the sustenance of inert matter, the sustenance of living matter would simply not have been possible. Allah has arranged for the stability of the basic elements needed for the existence of life. This stability has been arranged through the governance of matter. If atoms were not stable, the solar systems would not be stable. In order to ensure the stability of matter Allah has introduced four forces namely, nuclear force, weak nuclear force, electro magnetic force and gravitational force. The first three are operative in the range of sizes 1 and 2 mentioned earlier while the fourth one although universal works mainly between large bodies, i. e. between bodies of sizes 2, 3 and 4. It is quite interesting to note that just as big solar systems consisting of a sun and its planets exist, similarly a tiny solar system also exists in the atom consisting of the nucleus and the electrons whirling round it in specified orbits. The big solar system is controlled by an attractive gravitational inverse square force, i. e. a force proportional to the inverse of the square of the distance between the two bodies. The tiny solar system is governed by an attractive electro magnetic force namely the Coulomb force, again an inverse square force. The two worlds are so vastly different in scale, the forces governing them are so vastly different in strength (in fact the

gravitational force is about  $10^{+38}$  times weaker than the electromagnetic force). Yet the distance dependence of the forces remains the same. What a superb organisation of matter in which it can be shown that the minutest of details mattered the most ! Even if matter passes from one state to another or if matter is converted into energy or vice versa, the mode of conversion is so fashioned that it preserves an ecological balance of nature conducive to all forms of lives and their environment, as are known till today.

Interestingly enough, newer and newer worlds of both living and non-living types are being revealed with the progress of modern science. It is significant to find that more than 1400 years ago, Allah had hinted, in the Quranic revelation, at all such worlds through the plural use of the word "world" .

In conclusion, it can be said that the various types of worlds of inanimate and living matter which we have discussed so far are indeed governed and sustained by Allah through the operation of a magnificent set of rules. Indeed, Allah is the Sustainer and Cherisher of the worlds.

### Reference

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۝-الَّذِينَ يُؤْمِنُونَ بِالْغَيْبِ وَيُقِيمُونَ الصَّلَاةَ وَمِمَّا رَزَقْنَاهُمْ يُنْفِقُونَ ۝

2:3 Who (those who fear Allah) believe in the unseen, are steadfast in prayer, and spend out of what We have provided for them.

**Faith in the Unseen:** In this Surah, Allah *Rabbul Alamin* tells us of the great importance of believing in the 'Unseen'. Believing in the Unseen is a very important requirement next to *Taqwa* for receiving guidance from Him.

Is such a faith illogical from the scientific point of view? Quite the contrary in fact. Sir Arthur Eddington<sup>1</sup>, in his famous Cambridge lectures, shows that all the fundamental laws and constants of physics are deduced unambiguously from a *priori* consideration. These laws are very successful in explaining the objective world. So he concludes, "In the age of reason, faith yet remains supreme., for reason is one the articles of faith."

A few illustrations would make this point more clear. Quantum physics starts with the assumption of a strange particle called photon which carries light energy. This particle does not have any dimension or charge. It does not have any property found on any physical object. Its rest mass is zero and moving mass is indeterminate. The branch of science that this assumption has given birth to is considered to be one of the greatest achievements of the human intellect.

De Broglie assumed that all microscopic particles can be associated with a wave when in motion. This is known as a matter wave. Since this is a complex wave, it does not have any physical parallelism and it is purely abstract in nature. A wave is completely determined by measuring any two of the three parameters, namely, wave length, frequency and velocity. It is possible to measure all these parameters for the well-known electromagnetic and mechanical waves. But for the matter wave, frequency and wave velocity can never be determined by any instrument. The matter wave is a mathematical artifice and its precise determination is inaccessible to observation. Yet believing this matter wave solves complicated problems in atomic and nuclear physics. Thus the matter wave is a an article of faith in modern physics.

It is a faith that a moving particle behaves like a wave, and wave mechanics is based on this faith. Heisenberg's uncertainty principle states that the position and momentum of a particle cannot be accurately measured simultaneously and the product of the uncertainties in these measurements cannot be below a certain minimum. The existence of this lowest limit was initially an article of faith to the effect that the smallest unit of action exists. This faith was verified experimentally and the smallest unit was found to be  $h=6.63 \times 10^{-34}$  joule-sec. known as Planck's constant.\*

In the theory of relativity it has been possible to combine the effects dependent on time with space. But the theory in itself is *priori* one. Scientists and mathematicians have not yet been able to remove subjective effects of generic characteristics common to all observers. The theory of relativity again is another magnificent triumph of human intellectual endeavour.

The role of faith is also discernible in the pronouncement of Einstein, the greatest scientist of modern age, in respect of the 'Unified Field Theory'. This great scientist spent the last 30 years of his life in search of a wider law covering both gravitation and electromagnetic fields. He firmly stuck to his faith to the last day of his life that such a law exists. Scientists including Prof. Abdus Salam have still been working on it with partial success. The researches of Salam have been concerned with finding a Grand Unification Theory (GUT) of interactions namely the gravitational interaction, the electromagnetic interaction, the weak nuclear force and the strong nuclear force. Why should one attempt to unite these apparently disjointed interactions? After all there is no difficulty in our understanding of nature even without the unification of these forces. The desire of the physicists to unite these forces into a single one emanated from a faith, namely, that these forces are different manifestations of one and the same entity. Salam's efforts and success in unifying the electromagnetic and the weak nuclear forces were understandably spurred by the spirit of verses 3 and 4 of Surah 67 (Al-Mulk) which led him to acquire an overriding faith in the order and harmony of creation. Thus pattern-seeking<sup>2</sup> in laws, itself implies faith in the grand scheme of Allah's Creation. In fact, there are hosts of other such matters in the scientific domain that are based on 'Faith'.

- \* This constant multiplied by the frequency gives the minimum energy associated with each quantum of light called a photon.

All these discussions from the point of view of modern science, point to the role of faith in man's progress in knowledge. So faith as demanded by Allah in the 'Unseen' is not illogical. For the Unseen is beyond our comprehension due to our generic limitations. What has been said here emphasises the fact that faith in the Unseen may not be inconsistent with the correct understanding of the materialistic world.

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١٩- أَوْ كَصَيْبٍ مِّنَ السَّمَاءِ فِيهِ ظُلُمَاتٌ وَرَعْدٌ وَبَرْقٌ يَّجْعَلُونَ أَصَابِعَهُمْ فِي  
 آذَانِهِمْ مِنَ الصَّوَاعِقِ حَذَرَ الْمَوْتِ ۗ وَاللَّهُ مُحِيطٌ بِالْكَافِرِينَ ۝

2 : 19 Or (another similitude) is that of a rain-laden cloud from the sky ; in it are "darknesses", thunder and lightning. They press their fingers in their ears to keep out the stunning thunderclap, the while they are in terror of death. But Allah encompasses the disbelievers.

A cloud is a mass of condensed water vapour in the form of tiny drops or particles of water that floats in the air. Rain-clouds which are associated with thunder are known as "cumulo nimbus", also called thunder-heads; these are tremendous mountain-like cloud masses covering 10 to 100 square miles and reaching great vertical height with the top at 30,000 to 40,000 ft. They can begin from near the surface of the earth to above 6,500 ft.

The base of cumulo-nimbus is dark because of its great depth which may extend upto 30,000 to 40,000 ft. The solar rays while penetrating it are reflected away by the water and ice particles comprising the cloud and ultimately little light can get through to reach the surface of the earth, and the cloud when seen from below looks dark. The darkness within the cloud-mass is, therefore, not uniform; near the top of the cloud the darkness is very thin and as one proceeds towards the bottom the darkness gradually deepens. Thus we find that within the cloud there are layers of varying degrees of darkness.

Another phenomenon occurring inside the rain-cloud is the accumulation of electric charges. Reliable data on charge-carrying particles and their motion within the cloud are not fully available. A variety of explanations for the origin and nature of the charged regions have been proposed, most of which are based on the idea that the electrification is caused by the falling of precipitation particles electrified within the cloud by such processes as ion capture, contact electrification, freezing and drop break up<sup>1</sup>. Alternatively, it is suggested that the transport of charged cloud particles by updrifts and down drifts produces the regions of changes in the cloud. According to another explanation<sup>2</sup> when the cloud particles and raindrops carried by strong

updrafts of air reach the freezing temperature region of the cloud, the water droplets freeze into ice-pellets ; while freezing they burst and throw off tiny splinters of ice. These ice-splinters carry away a positive charge and leave behind a negative charge. The positively charged ice-splinters, being much lighter, are carried to the top of the cloud by the strong upcurrent of air. The heavier ice-pellets with negative charge remain at the lower level of the cloud thus completing the charge separation within a cloud. When the build-up of electric charges becomes so great that the intervening air can no longer insulate them, an enormous spark then discharges itself across the positive and the negative areas. The voltage between the two oppositely charged, or between one of them and the earth may grow upto about 1000 million volts. The spark may occur entirely inside one cloud, or it may leap from a cloud to another, or from the cloud to the earth. These sparks are characterized by dazzling flashes of light. Lightning is nothing but such a luminous discharge in the atmosphere.

The massive surge of electric charges in the lightning channel causes tremendous heating ( $10,000^{\circ}\text{C}$ ) ; sudden expansion of the air takes place and sends out sound waves producing a loud explosive resounding noise, which we hear as the thunder.

Thus we find that in the rain-clouds there are (i) layers of darkness and (ii) accumulation of electric charges which produce simultaneously (a) luminous sparks called lightning and (b) terrible explosive sound we call thunder.

The above explanations of the formation of clouds and the causes of thunder and lightning, as supported by the investigation of modern atmospheric science, do clearly illustrate the meaning of the above mentioned ayat wherein darkness, thunder and lightning have been beautifully interwoven into each other.

## References

1. *Encyclopaedia of Science and Technology*, McGraw Hill, 1977, p. 688.
2. *World Book Encyclopaedia*, Vol. 7, 1966. p. 432.

٢٠- يَكَادُ الرِّبْقُ يَنْخَطِفُ أَبْصَارَهُمْ كُلَّمَا أَضَاءَ لَهُمْ مَشْرَافِيهِ ۖ وَإِذَا أَظْلَمَ عَلَيْهِمْ قَامُوا ۗ وَكُوشَاءَ اللَّهِ لَذَهَبَ بِسَمْعِهِمْ وَأَبْصَارِهِمْ ۗ إِنَّ اللَّهَ عَلَىٰ كُلِّ شَيْءٍ قَدِيرٌ ۙ

2 : 20 The lightning all but snatches away their sight every time the light flashes forth for them they walk therein, and when it darkens against them they stand still. If Allah willed He could destroy their hearing and their sight. For Allah has power over all things.

Human vision is sensitive to light commonly known as the visible spectrum which ranges from 3800 Å to 7200 Å in wavelength (1 Å=1 Angstrom= $10^{-8}$  cm.). The response of the eye to light is determined by pigments in two cells of the retina called rhodopsin (rod) and idopsin (cone). Rods and cones are light reception cells. Light falling on these produces an impulse due to photochemical reaction. Rods are adapted to night vision and operate at dim light. Cones function in bright light and are responsible for colour perception. There are animals having only day-time or only night-time visions. Man is fortunate in having both day-time and night-time vision by the activities of cones and rods. Several cells in the retina code and transmit the signal produced by the rods and cones to the brain where a visual image is produced.

In front of the crystalline lens of the eye is the iris at the centre of which there is a circular opening called pupil. The function of the iris is to regulate automatically the opening in the pupil, like diaphragm in the camera, according to the intensity of light. The diameter of the pupil is dilated at low intensity and contracted at moderate intensity. The study of visual sensitivity with intensity of light shows that cones and rods become insensitive at very intense light. Lightning produces a very intense light all on a sudden and human vision is temporarily blurred owing to non-response from rods and cones.

۲۲- الَّذِي جَعَلَ لَكُمُ الْأَرْضَ فِرَاشًا وَالسَّمَاءَ بِنَاءً ۖ وَأَنْزَلَ مِنَ السَّمَاءِ مَاءً  
فَأَخْرَجَ بِهِ مِنَ الثَّمَرَاتِ رِزْقًا لَكُمْ ۗ فَلَا تَجْعَلُوا لِلَّهِ أُندَادًا ۖ وَأَنْتُمْ تَعْلَمُونَ ۝

2 : 22 Who has made for you the earth as a bed, and the heavens your canopy ; and sent down rain from the sky ; and brought forth therewith sustenance for you from fruits ; then set not rivals unto Allah when you know.

**Who has made for you earth as a bed :** We find the surface of the earth flat, and because of this flatness we can comfortably lie down on it and rest. The same idea has been expressed in verse 20:53 (*Sura Taha*) and in verse 43:10 (*Sura Zukhruf*): “Who has made for you the earth as a spread out carpet ( مَهْد )”. These verses imply that the earth is flat and thus they appear to be inconsistent with the scientific fact that the earth is round. It is possible to resolve this apparent contradiction by recourse to the following explanation.

We know that the larger a sphere, the less is the curvature of its surface. The earth is an enormous sphere with a radius of about 6400 km. (about 4,000 miles) and in our daily life we deal with only a small portion of its surface ; this portion may be taken as flat for all practical purposes. The extent of curvature entailed in this portion is imperceptible; even a long distance of one mile on the surface of the earth will subtend (contain) at the centre of the earth an exceedingly small angle less than one-seventieth of a degree.

In this context it may be stated here that, mathematically a plane surface may be defined as the surface of a sphere whose radius tends to infinity.

**And the heavens your canopy :** In this ayat Allah *Rabbul Alamin* tells us that the atmosphere which is commonly known as the sky acts as a protective and beneficial covering over man’s head. There are several layers in the atmosphere containing a mixture of some gases and an ionised layer enveloping the earth.

The first layer is called troposphere and this extends upto 8-16 km. (5-10 miles) above the earth’s surface. This layer contains nitrogen and oxygen

molecules in the proportion of about 4:1 by volume, water vapour, carbon dioxide (CO<sub>2</sub>), traces of other gases and dust. The water vapour and a little amount of CO<sub>2</sub> act as a blanket to conserve the surface heat at night like the glass roof of a green house. This layer prevents long wavelength reradiated by the earth at night to pass through. This is known as the green house effect.

The next layer in the atmosphere, which extends about 70 km. (44 miles) above the troposphere, is called the stratosphere. In this there is a layer of ozone molecules (O<sub>3</sub>). This ozone layer about 30 km (19 miles) above the earth protects all living beings from harmful ultra-violet and x-rays coming from the sun.

There is a special ionised layer of gases called ionosphere extending about 320 km (200 miles) above the stratosphere. This ionosphere helps us in long distance radio communication by reflecting short radio waves.

Above the atmosphere scientists have recently discovered a magnetosphere which acts as a protective magnetic shielding. Electrons and protons emitted from the sun are trapped in this layer. Without this magnetic shielding the background radiation on our planet would have been several times higher killing all life forms as we know them today. Matters in the form of electrons and protons stream away from the corona having temperature 2000000<sup>0</sup> K. Temperature of the solar wind, as it reaches the outer atmosphere, is about 100,000 degrees Kelvin. The magnetosphere thus protects us from the high temperature of these particles and also from their harmful radiation effect. The limits of the magnetosphere are about 64,000 km (40,000 miles) towards the sun and they extend outward at least  $6 \times 10^6$  km (4 million miles) from the earth's surface opposite the sun.<sup>1</sup>

All these details discussed about the sky and outer atmosphere have come to our knowledge only during this century. These protective and beneficial processes as found in nature speak of Allah's Infinite Mercy for His creation. Without these man could not have survived on-earth. Are all these accidental or do these speak of Allah the Most Benevolent and Merciful?

**And sent down rain from the sky; and brought forth therewith sustenance for you from fruits.** Water is one of the most basic requirements for all plants in their nourishment, growth, reproduction, and, in fact, for their very existence. All metabolic reactions within the plant cell occur in a watery medium, and it is through this agency that the various mineral nutrients are drawn from the soil, and the prepared food substances

are transported to the different organs of the plant. In order to fully appreciate the significance of this part of the verse, it is important to understand the water cycles in nature, and the vital role of water in plant cell activities which ultimately lead to the production of plant food substances referred to in the verse as 'fruits' for man's sustenance.

The process that culminates in the yield of mature fruits passes through certain interesting phases. A part of rain water falling on the earth percolates into the soil to unite with the vast accumulation of underground water. Most of the plants we see around have an intricate plumbing system which has its beginning in the roots where water, along with the minerals such as iron, calcium, phosphorus, potassium and many other essential elements, is absorbed from the soil by a process known as osmosis through root hairs. The absorbed water and minerals ascend through a complex network of narrow tubes which carry this sap to all parts of the plant. The excess water in plants is ultimately transpired from the aerial parts through microscopic openings into the surrounding air. The water molecules absorbed by plants from the soil are partly utilized in producing sugar by a process that no one has yet been able to reproduce in the laboratory. In this ingenious process called photosynthesis, molecules of sugar with stored potential energy are synthesized, and are commonly met with in this form in stems (e.g. sugarcane), roots (e.g. sugar beets), bulbs (e.g. onions) or seeds (e.g. peas and maize). Sugar in its turn gives rise to starch molecule for storage. Both these substances are acted upon by the various plant enzymes yielding an infinite variety of chemical compounds. Plants also synthesize fats and scores of other products using the same energy source, sugar and are transported to fruits for storage.

The synthesis, in plants, of a completely different form of food, protein, is also partly dependent on rain water. During rain, the lightning causes some of the atmospheric nitrogen to react with oxygen, and the resultant oxides of nitrogen are washed down by the rain to the soil in the form of nitrous and nitric acids which react with the soil minerals to be converted into nitrites and nitrates, the last process being also partly aided by the soil micro-organisms. It may be mentioned that a species of bacterium is also capable of fixing atmospheric nitrogen in the roots of leguminous plants (e.g. pulses) and later enriching the soil with nitrogenous nutrients. The plants quickly absorb these nitrogenous materials along with water to build up new amino acids which are precursors of plant proteins. Incidentally all

proteins are synthesized out of the various combinations of twenty or so different kinds of amino acids. It is interesting to note that animals cannot synthesize proteins directly from the simple inorganic nitrogen compounds but depend on plants for their protein build up.

Botanically speaking, a 'fruit' is essentially a fertilized ovary of the flower, and the general definition of the term includes all cereals and edible pods of pulses. According to the nature of stored food and its nutritive value, fruits can be categorized into those that are rich in carbohydrates like the cereals and dates, proteinaceous like ground nuts and other pulses and those which are predominantly fatty like the African oil palm. Certain fruits, in addition to these three classes of food, also contain some minerals and vitamins which are so essential for the healthy growth and development of our bodies.

It hardly needs mention that Allah the Merciful so graciously tries to draw the attention of mankind by pointing out to them in these two brief lines the ingenious devices. He has created the atmosphere and the soil for providing him with sustenance in the form of one of the most important foods namely, the various types of luscious fruits having pleasing colours, appetizing flavour, soothing taste and texture.

Should not man be grateful to Him !

۲۴- فَإِنْ لَمْ تَفْعَلُوا وَلَنْ تَفْعَلُوا فَأْزِقُوا النَّارَ الَّتِي وَقُودُهَا النَّاسُ وَالْحِجَارَةُ ۗ أَعَدَّتْ  
لِلْكَافِرِينَ ○

2 : 24 But if you cannot, and surely you cannot, so fear that fire whose fuel will be men and stones which is prepared for the disbelievers.

(Hell) fire whose fuel will be men and stones

Fuel is a substance which is used for producing heat energy either by means of release of chemical energy by combustion or nuclear energy by nuclear fission or fusion. Stones that are known to us are not only non-combustible, in some cases these may be used to quell down combustion. Stones that are to be used as fuel, therefore, must be of a type that, when disintegrated at high temperature, release constituent elements. The released element or elements should then undergo exothermic chemical reactions

with environmental substances and would thus maintain the temperature of the furnace. To make the matter clear we may consider a very simple stone called calcite (i. e. marble or limestone) which is mostly the natural form of calcium carbonate. It decomposes at about 550° C. into calcium oxide and carbon dioxide when heated freely. The calcium oxide melts at 2570° C and it can be made to boil in the electric furnace at a still higher temperature. For its decomposition into elemental calcium and oxygen it would require even higher temperature. The released calcium would reunite with oxygen at lower temperature or unite with other environmental substances producing heat energy and thus would maintain or enhance the temperature of the environment. Limestone or marble is a very simple example of stone. There are stones of much more complicated composition and structure which may require much higher temperature for decomposition into its constituent elements than that required for marble acting as fuel. Thus, it is obvious that the name of stone is mentioned in the above verse as a fuel for hell to make the rejectors of faith conscious of the extremely high temperature of the fire of hell created for their punishment. Similarly the human bodies will also burn and act as fuel at that high temperature.

٢٨- كَيْفَ تَكْفُرُونَ بِاللَّهِ وَكُنْتُمْ أَمْوَاتًا فَأَحْيَاكُمْ ثُمَّ يُمَيِّتُكُمْ ثُمَّ يُحْيِيكُمْ ثُمَّ إِلَيْهِ تُرْجَعُونَ ۝

2: 28 How can you reject the faith in Allah ? Seeing that you were without life, And He gave you life ; then will He cause you to die, and will again bring you to life ; and again to Him will you return.

For understanding this verse an explanation of the creation of the first human life and the mechanism of procreation inherent therein is needed. Some scientists believe that human beings appeared on earth through a process of evolution from the simplest unicellular organism like amoeba. The interpretation of this verse can be sought in the explanation of the appearance of the first life on earth from atoms and molecules. The most convenient definition of life as molecular biologists believe is perhaps at a stage where something evolves that is capable of using itself for building



similar structures. At the molecular level as we know today, life begins by the combined chemical activities of a very complex molecule called deoxyribnucleic acid (DNA) and an enzyme (a protein). DNA is the master code or blue print for life ; it controls and generates the process of replication. The enzyme acts as the catalyst. Thus, if one can explain the creation of DNA and the enzyme helping its chemical activities, one explains the origin of life.

Another explanation of this verse lies in the fact that human beings before their birth have no physical existence. The earliest existence of a man is the fertilized ovum containing DNA from both the parents. The ovum and sperm of parents are composed of atoms and molecules obtained from nutrition. Now all food is obtained from vegetable and animal kingdom. All the ingredients of food such as protein, fat, carbohydrate and vitamins are organic compounds which are derived from the inorganic elements and molecules present in the earth and its environment. The mechanism for the conversion of elemental carbon, nitrogen, hydrogen, oxygen, sulphur, iron, manganese, cobalt, etc. into organic or organometalic molecular form by plants for use by animals is a complicated process and it is a manifestation of Divine mercy. Thus the atoms and molecules constituting a human being are scattered on earth as some inorganic elements which are processed into organic forms by the plants. Ovum and sperm are produced from food consumed by parents in turn and the foetus develops into a full grown baby through nutrition received by the mother. So the statement in the Quran that all men were without life before birth is true.

Some scientists think that once DNA is there, the process of life is automatic. But is it possible for the development of DNA automatically from nature as some believe? The structure of the DNA molecule is highly complex but most organised. According to the second law of thermodynamics for any uncontrolled process disorderliness increases. There is an increase in orderliness only when there is a purposeful planning behind. So the emergence of DNA in the form as we know it today has been possible only by Allah's mercy. The so called test tube baby is nothing but the outcome of fertilization in a test tube of ripe ovum obtained from the mother with the sperm from the father in a test tube. Such fertilization outside a mother's womb also occurs in marine creatures as a natural phenomenon. If the fertilized human egg is successfully implanted in the

mother's womb, then pregnancy may be successful. So life in a test tube baby is not created by scientists.

The scientific explanation for the emergence of the first speck of life on earth fits with the various verses in the Quran. However there are many questions that these scientific theories cannot explain. It is true that the ultimate constituents of both animate and inanimate objects are atoms and molecules. But it is not possible to explain how combination of atoms in a living being bring about life. Human life is not merely a bundle of chemicals. All the atoms and molecules as found in man by scientists being put together in a jar do not make life. We do not know where the spark of life comes from. Human being is a combination of matter and consciousness. Science can explain only the material aspect of life. This is the limitation in the present methodology of science which explains everything from materialistic point of view. Human life is not fully defined without incorporating the human qualities like consciousness, conscience, love, affection and emotion. Science cannot explain these cardinal qualities in life.

So it is not difficult to believe that man had no existence before fertilization, but was mere lifeless inorganic atoms and molecules. Similarly when man dies, his body is again reduced to elements, whether the body is burnt by fire, or desintegrated by microbes in the grave or devoured by wild animals and birds or fishes. The same elemental materials may again be recycled to produce other animals and man.

٢٩- هُوَ الَّذِي خَلَقَ لَكُمْ مَا فِي الْأَرْضِ جَمِيعًا ثُمَّ اسْتَوَىٰ إِلَى السَّمَاءِ  
فَوَسَّعَهَا سَبْعَ سَمَاوَاتٍ وَهُوَ بِكُلِّ شَيْءٍ عَلِيمٌ

2: 29 It is He Who has created for you all things that are on the earth. Then He directed Himself to the heaven, and gave order and perfection to the seven heavens. And He is Knower of all things.

The first part of this verse which is of great significance to mankind in general and Muslims in particular has a number of important implications. Firstly, this verse implies the supremacy and special role of man for whom all things on earth have been created by Allah. Secondly, since Allah has

stated in this verse that all things on earth have been created for man, it is indeed obvious that none of these things are useless, i.e. without any benefit for man. Thirdly, since Allah and Allah alone has created all things on earth for man, each of these things should be utilised by man with profound gratefulness to Him. For such utilization, man must gain systematic knowledge about them and acquire the necessary scientific and technological know-how.

The verse accords a special status to man who has been designated elsewhere in the Quran as the vicegerent of Allah. If man has to act as the vicegerent of Allah, he must have all things at his service. His physical, intellectual and spiritual satisfaction must be achieved through the proper use of these things which comprise living and non-living matter with a host of varieties, i.e. with different hues and colours, taste and textures, forms and figures.

The verse clearly indicates that every thing on earth has utility for man. Incidentally the modern ecologists are making us believe in the usefulness of all that exists around us so that we can live in harmony with the symphonies of nature. That everything existing on earth has some benefit for man is now being increasingly realised and appreciated by all. This meaning of the verse receives additional support from some later verses in the Holy Quran wherein Allah declares clearly that nothing has been created for nothing (3 : 191). We shall have occasion later to cite a large number of examples in our understanding of this declaration. For the moment, however, it suffices to add that although many of the species of insects, birds, lizards, mammals snakes, etc, may seem useless and some of them even harmful, with the increasing knowledge of science and technology we are gradually finding out the utility of many of them. Our present knowledge is too inadequate to understand the usefulness of all organisms, large and small.

The present verse should act as an eye opener for the Muslim *ummah* who possess natural resources of various kinds but not the technology to fully exploit them. If Muslims carry on scientific research on the various materials scattered around them then all things on earth which Allah has created for man are bound to assure them a happy, prosperous and grateful existence and make them feel the vicegerency of Allah. The verse thus makes the pursuit of science and technology imperative for a Muslim in order that he can derive the fullest benefit out of what Allah has created for man.

**Then He directed Himself to heaven and gave order and perfection to the seven heavens :** In this part of the verse it is stated that Allah directed His attention to the creation of the sky. Previously it was supposed that the sky is a solid dome hung over the earth and in this dome are fixed the sun, moon, stars, planets and other celestial bodies. But this early picture of the solid dome has not been scientifically substantiated. The celestial bodies are not fixed in any dome but are whirling in space (21 : 33 ; 36 : 40). So creation of the sky here means creation of the celestial sphere with all the celestial bodies contained in it, i.e. the universe.

Astronomers have found it convenient to divide space into seven encompassing regions<sup>1</sup>. These are :

*First region* contains the sun and terrestrial planets, Mercury, Venus and Earth. The radius of this spherical region is 8 light minutes.

*Second region* contains the solar system, including the outer planets, Mars, Jupiter, Asteroids, Saturn, Uranus, Neptune and Pluto. The radius of this spherical region is 5 light hours.

*Third region* contains some 20 near neighbours of the sun. The radius of this spherical region is 20 light years.

*Fourth region* contains the Milky Way galaxy. Previously it was thought to be the entire universe. But about 100 million such galaxies have been detected. Our Milky Way galaxy is a gravitationally bound rotating congregation of about 100 billion stars. The radius of this spherical region is 50,000 light years.

*Fifth region* contains some 20 loosely bound cluster of neighbouring galaxies. This is known as local group of galaxies. The radius of this spherical region is 2 million light years.

*Sixth region* contains cluster of local group of galaxies. This is known as the local super-cluster. It is the largest of celestial formations. Enormous volumes of relatively empty space have been found between super-clusters. The radius of this spherical region is 75 million light years.

*Seventh region* is the limit of the known universe. It contains all super-clusters of galaxies. It also contains quasars, the most curious of all the

celestial bodies, spread out in all directions at great distances detected upto 20 billion light years and beyond.

Number seven seems to be mysteriously connected with the universe. There are seven categories of celestial objects. These are: (1) stars (2) planets, (3) satellites, (4) comets, (5) nebulae, (6) galaxies, (7) quasars. There are seven types of stars. These are (1) brown dwarf stars, (2) main sequence stars, (3) red-giant stars, (4) pulsating stars, (5) white dwarf stars (6) neutron stars and (7) black holes.

The universe is not uniformly dense, as is required in continuous creation theory.<sup>2</sup> It is seen that density of the first region containing the Sun, Mercury, Venus and the Earth is about 1.4 gm per cc; whereas the density of the 4th layer containing neutron stars, and black-holes is more than  $10^{14}$  gm per cc. Thus the regions have some distinctive features in densities.

Dr. Maurice Bucaille<sup>3</sup> has explained seven heavens by stating, "number seven means no more than plurality ; there are therefore, many heavens and earths. Earths, such as our own, may be found in the Universe -- a fact which has not yet been verified by man in our time."

Sheikh Muhammad Abduh<sup>4</sup>, the Egyptian scholar, has sought aid from the general law of gravitation in his explanation of the heaven and its wonderful structure. He said, "heaven is what is above you overhead. You would imagine, on hearing the word heaven, the universe above your head in which exist the sun, the moon and all planets running in their courses and moving in their orbits. This is the heaven, which Allah has built i.e. raised up and He made every planet in it as a brick so to speak, from the structure of a roof, a dome, or a wall surrounding you, and He tied them up each to its neighbour or neighbours--by the tie of the general gravity, exactly, as the different parts of any specific building are tied together by means of the material placed before them to hold them fast together."

Some commentators have interpreted number 'seven' as 'many'. In that case the verse means "He fashioned many heavens (or skies)." It has been observed *inter alia* in verse 1 : 2 that most probably there are many other worlds, like our own earth, in the universe. Each such world has a sky over it. So there are many skies. The sky of any other world (i.e. planets with living organisms on them), of some other star of our galaxy, the Milky Way, may contain the same stars as we see. But as the perspective will be

different, constellations will be different. Hence the sky of such world will look different.

Allah has made all the skies complete with celestial bodies, stars, planets, satellites, comet, nebulae, galaxies and quasars, within a comprehensive grand design.

The origin of the celestial bodies, as we understand has been explained in Appendix 1.

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وَوَضَعْنَا عَلَىٰ غَمَامِهِمُ الْغَمَامَ وَأَنْزَلْنَا عَلَيْهِمُ الْمَنَّاءَ وَالسَّلْوَءَ كُلًّا مِنْ طَيِّبَاتِ  
 مَا رَزَقْنَاكُمْ وَمَا ظَلَمُونَا وَلَكِنْ كَانُوا أَنْفُسَهُمْ يَظْلِمُونَ ○

2 : 57 And We caused the white clouds to overshadow you and sent down on you manna and quails (saying) : Eat of the good things wherewith We have provided you -- they wronged Us not, but they did wrong themselves.

*Manna and Salwa* : References to manna and salwa occur in the Holy Quran three times (2 : 57; 7 : 160; 20 : 80-81). In every case the words *نزلنا* or *انزلنا* are significant and imply that these substances were providentially supplied to the Israelites to sustain them during their long sojourn in the barren desert under the guidance of prophet Musa (a.s.). Further in these verses, the Israelites have been commanded to eat these good things that have been provided to them. But no further details as to the sources of these two kinds of nourishment are given in the Holy Quran. The following discussion is an attempt to identify these two items of food.

*Manna* : The word *manna* is apparently derived from the Hebrew word, *man-hu<sup>1</sup>* or the Arabic *man-hua* (meaning 'what is this?'), which the Israelites presumably must have said to themselves when they first saw the substance on the ground unexpectedly. The word *manna* subsequently came to have a symbolic significance for any food produced apparently miraculously at the time of scarcity on the barren deserts. Different kinds of substances under this name have been known from the ancient times particularly in the eastern Mediterranean countries where they are still regularly used in the preparation of sweets or as laxatives. The name, in the present day, is applied to any of the following items.:

- a) the entire organism like edible alga or lichien, the latter being an association of an alga and a fungus in synthesis and in mutual benefit.
- b) an exudation from shrubs or trees produced either :

- i) directly by man-made wounds as in the case of commercial tapping on the bark of the manna ash (*Fraxinus ornus*), or
- ii) indirectly as a plant sap being excreted by insects like aphids or coccids which feed by sucking up plant juices, or
- iii) the resinous exudates of the trees caused as a result of punctures formed by certain insects.

Excepting the first one, all other exudates are obtained from the various species belonging to the tamarisk tree (*tamarix*). The word MANNA is therefore applied to diverse substances.

The identity of the *manna* of Israelites can be found in a substance which should fulfil the following three conditions : (a) it must be a product available in and around Sinai which has been accepted by the commentators of the Holy Quran as a land of the wandering Israelites, or it must be a substance blown down by strong winds from a land neighbouring Sinai peninsula ; (b) the substance must have nutritive value ; and (c) it must be produced in a quantity large enough to satisfy the appetite of numerous Israelites in the desert of Sinai peninsula at the time these events took place. According to some Biblical scholars there were about two million of them but no such data is provided in the Quran.

**Algal theory :** Gelatinous algae like *Nostoc* occurring as small pear-shaped vesicles are known to grow with unbelievable rapidity during the night when there is an abundant fall of dew and when the surface of the ground is quite moisty. These algal growths, being soft and gelatinous, disappear next morning when the sun evaporates the dew and dries up the ground, only to reappear the next night. Based on this peculiar property of these organisms, the Biblical scholars put forward the algal theory to identify *manna* which is described in the Old Testament as that which grew up during the night when the ground was moist but 'withered away' and 'stank' when the heat of the sun fell upon it (Exodus 16 : 13-21). The contents of *Nostoc* colonies have an abundant oil as reserve food. Recently it has been shown that *Nostoc* can fix atmospheric nitrogen in its body and thus becomes a source of nitrogenous material and may develop some nutritive value. There is a report of a species of *Nostoc* (*N. collinum*) having covered an area of several square miles in the Bombay state of India in the year 1855<sup>3</sup>. It was not unlikely that the local residents of the area believed that it fell from heaven. The very evanescent nature of



these algal colonies, and the improbability of their forming a rich growth in a predominantly arid and uncongenial environment like that of Sinai peninsula would make *Nostoc* a weak contender for *manna* of Bani Israel.

**Lichens** : The name refers to a strange association of a fungus and an alga living together in perfect harmony for mutual benefit. They are usually found as crusts or leaflike or much branched light green to greyish structures on the surface of trees, rocks or stones. Several lichens belonging to the genus *Lecanora* occur on rocks and occupy vast tracts of the barren plains and mountains in many parts of western Asia and north Africa. They are irregular, wrinkled, and slightly flattened pellets measuring an average of 10 mm in two planes and 6 mm thick. After long periods of drought they curl up and break loose from their substratum. Some-times they are rolled into small balls of the size of peas. Being extremely light, they are carried up by the winds and often transported in the air to great distances, ultimately falling to the ground forming layers of several centimetres thick. In such places where they fall, they are unknown to the natives in any other state excepting that in which they found them. These, having dropped so mysteriously from the skies, would, very understandably, be regarded by the tribesmen of the desert as having truly fallen from heaven. This phenomenon can be biologically explained as a mode of vegetative reproduction in which the dispersed pieces of lichen body are potentially capable of growing into new plants when the conditions are favourable. Such a shower of lichens was reported to have occurred in Iran in 1854 during a great famine much to the joy and thanks-giving of the starving inhabitants.<sup>4a</sup> A similar phenomenon of 'rain food' was recorded in Turkey in 1891 where it coincided with drought and famine.<sup>4b</sup> A lichen species, *Lecanora esculenta* is presently found over a wide area stretching from the Iranian deserts and the Kirghiz steppes through south USSR and Turkey to north Syria. Then, after a gap through the Sinai desert, Egypt, and the eastern north Africa, this species of lichen is again found in Algeria, Morocco, and the south slopes of the Atlas mountains. Though this *manna* lichen is now absent from the Sinai peninsula, it is not unlikely that it existed there during the time of prophet Musa (a.s.). Even assuming that these lichens were absent in the Sinai region at that time, their transference by high winds from the African mainland

was very likely. These lichens are edible by virtue of the presence of a jelly which gives them food value in deserts in times of dearth. Throughout their geographical range the nomadic tribes know them well. They can be cooked in various ways, and occasionally lumps of lichen are ground and used as an admixture with meal for baking bread. It is probable, therefore, that such lichens constituted, in part at least, the *manna* of Israelites on account of their sudden appearance in the form of rain food in large quantities, and their nutritive value.

**Resinous exudations from shrubs and trees :** The great Persian scholar and scientist, Al-Biruni (973-1050 AC) was apparently the first person to publish the observation that the *manna* (ghazanjabin or taranjabin in Persian) or honey dew obtained from the leaves of the desert bush, camel thorn (*Alhagi maurorum*) is actually produced through the agency of a tiny insect.<sup>5</sup> This exudation solidifies on the branches and is collected by shaking the twigs over a cloth. This saccharine substance called 'Alhagi manna' was considered at one time as a kind of sweet dew falling from heaven on certain plants. An eye-witness account of the occurrence of such a 'bread of heaven' in the region of Mt. Sinai was published as early as in 1458 by Breitenbach who writes that it falls about day break like dew or hoar-frost and hangs in beads on grass, stones and twigs, and that it is sweet like honey.<sup>6a</sup> Then, in 1823, a German botanist, Ehrenburg published an explanation that *manna* is nothing more than a secretion exuded by tamarisk trees when they pierced by a certain type of insect,<sup>6b</sup> an observation which had already been made by al-Biruni in the case of the desert bush called camel thorn more than 800 years ago. This insect called *Gossyparia mannifera* provokes the exudation of *manna* by puncturing the branches of tamarisks in Sinai peninsula. A hundred years later after Ehrenburg's paper, a *manna* expedition was organized by Bodenheimer and Theodor to Sinai peninsula. Their findings confirmed the observation of Breitenbach and Ehrenburg that the tiny insects mentioned above live primarily of tamarisk trees which are indigenous to Sinai.<sup>6c</sup>

Other authorities have shown that insects called aphids which parasitize on plants, insert their very fine mouth parts through the sap in the plant's transport system whose pressure forces the liquid material through the aphid's digestive tract forming droplets of 'honey dew' at the

hind end of the aphid.<sup>7</sup> This sweet excretion is liquid at first but becomes viscous and solidifies into crystals covering the branches or falling on the ground as white grains. The 'honey dew' consists of a number of compound sugars, some amino acids, phosphorus compounds and inorganic ions. The resinous exudates from the tamarisk trees caused by punctures made by insects consist of sucrose, levulose, glucose, dextrin, and water<sup>8</sup>. Thus, there is reason to believe that these exudates and the sweet excretions of the insects themselves which feed on these trees could have contributed partly to the nourishment of the Israelites. It is, however, doubtful whether the quantity of these two types of manna produced would be comparable to 'rain' of lichen manna. The Bedouins living in the desert still collect the tamarisk *manna* early in the morning before it is melted by the sun, or eaten up by the ants as pointed out by Bodenheimer and Theodor.

**Salwa** : *Salwa* is the Arabic word for quail (*Conturnix*),<sup>9</sup> a migratory bird related to pheasant, partridge, and turkey under the order Galliformes. A particular species of this, *Coturnis vulgaris* is a well-known migratory bird found all over Europe, Asia and Africa. The bird is about the size of a small partridge, and breeds in large numbers in the Palestine area making its appearance suddenly in certain periods of the year, usually in March. In winter, the birds migrate to warmer parts of Africa. It is a well established fact that the migratory birds, among other techniques, make use of wind currents in their long flights. Aided by favourable winds they return from Africa to the eastern Mediterranean region quite suddenly, often in tens of thousands appearing during a single night. Such large flights are said to have been witnessed by many Indian army officers between Egypt and Palestine during the First World War.<sup>10</sup>

Quails have flight muscles adapted for quick contraction to help the birds to zoom with a sudden burst of energy, but are meagerly supplied with blood vessels which carry oxygen and other energy fuels to the muscle fibres, and thus are incapable of sustained action.<sup>11</sup> If the birds are flushed several times they become exhausted and can be easily picked up by hand. It is not unlikely that this physical weakness of the birds must have been exploited by the 'children of Israel'.

The flesh of quails which is proteinaceous, along with the carbohydrate food of manna would form a nicely balanced diet. The fact that *manna*

appeared along with the quails lends support to the assumption that *manna* consisted, in part at least, of lichens being transported by highwinds from the African mainland.

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۶۰- وَإِذِ اسْتَسْقَىٰ مُوسَىٰ لِقَوْمِهِ فَقُلْنَا اضْرِبْ بِعَصَاكَ الْحَجَرَ فَانْفَجَرَتْ  
 مِنْهُ اثْنَا عَشَرَ عَيْنًا قَدْ عَلِمَ كُلُّ أُنَاسٍ مَّشْرَبَهُمْ كُلُوا وَاشْرَبُوا مِنْ  
 رِزْقِ اللَّهِ وَلَا تَعْثَوْا فِي الْأَرْضِ مُفْسِدِينَ ۝

2: 60 And remember Moses prayed for water for his people ; We said, 'Strike the rock with your staff.' Then gushed forth therefrom twelve streams. Each group knew its own place for water. So eat and drink of the sustenance provided by Allah, and do not evil nor mischief on the face of earth.

The earth's crust is composed of three categories of rocks, igneous, sedimentary and metamorphic. Igneous rocks are solidified directly from magma, the molten silicates. Solidified lava, basalt and granite are examples of this category. Sedimentary rocks are formed, when igneous rocks are eroded and laid down as sediments. Shale rock is a sedimentary rock. It is formed when mud is forced into layers under great pressure. Sand-stone and limestone are other examples of sedimentary rocks. These are in part calcareous remains of countless marine creatures. Igneous and sedimentary rocks subjected to intense pressure and heat form metamorphic rocks; thus limestone is metamorphosed into marble.

The strata, composing the earth's crust, may be permeable or impermeable, according as whether they allow water to pass through or not. Sand and gravel are permeable while clay and hardstone are impermeable. Rain water flowing through soil and rocks, over impermeable strata collect in hollows to form streams, open, underground or covered by layer of sand. Water comes out of the covered streams, whenever the covering layers of sand are removed.

In the present verse, Allah asks prophet Musa (a.s.) to strike the rock, and he with his superior knowledge as Prophet, struck at the right place to get twelve separate streams for the twelve tribes.

٦١- وَإِذْ قُلْتُمْ يَا مُوسَى لَنْ نُصِيبَكَ عَلَى طَعَامٍ وَاحِدٍ فَادْعُ لَنَا رَبَّكَ يُخْرِجْ  
لَنَا مِنَّا ثَمَرَاتٍ مِّنَ الْأَرْضِ مِنْ بَقْلِهَا وَقِثَآئِهَا وَفُومِهَا وَعَدَسِيهَا وَبَصِلَهَا قَالَ  
أَنْتُمْ بِأَيِّ آلَاءِ رَبِّي تَكْفُرُونَ قَالَ يَا زَيْدُ هُوَ الَّذِي هُوَ أَدْنَىٰ إِلَهُكَ فَأَنْتُمْ عَمَّا سَأَلْتُمْ

2 : 61 And remember you said : " O Moses ! we cannot endure one kind of food (always) : so beseech thy Lord for us to produce for us of what the earth grows, its pot-herbs, and cucumbers, its wheat, lentils, and onion." He said : "Will you exchange the better for the worse ? Go you down to any town, and you shall find what you want!"...

**Pot-herbs, cucumbers, wheat, lentils and onion :** In the Holy Quran, there are twenty direct references to botanically identifiable plants in addition to eighteen instances where plant products or attributes of plants are mentioned in various contexts. The Holy text, further, cites a few trees, carrying symbolic meaning, whose identity, in most cases, still remains a mystery.

The ethnobotanical records show that the five food plants mentioned in the above verse were present in Egypt when the Children of Israel started their exodus under the leadership of prophet Musa (a. s.). During their wanderings in the barren deserts, tired of the monotonously uniform food of *manna* and *salwa* (quails), they began grumbling. Evidently hankering after the delicacies of Egypt which they were deprived of, they complained to prophet Musa (a.s.) to beseech Allah to produce these five items of food which are discussed below:

**بقل** **Pot-herbs :** The word includes one or more kinds of leaves or the whole herbs cooked and eaten. In the floristic accounts of the deserts of Libya and Saudi-Arabia, Keith<sup>1</sup> and Migahid<sup>2</sup> mention the occurrence of *biqu* which is commonly known in English as purselane (*Portulaca leracea*). It is a small prostrate herb with succulent leaves occurring throughout the warm parts of the world and especially plentifully in the arid to semi-arid situations of the deserts. The fleshy leaves are used as a pot-herb and relished in many parts of the world including Egypt. This, along with some

more leafy vegetables, must have contributed towards the pot-herbs of the Israelites during their stay in Egypt.

**قثاء Cucumber (*Cucumis sativus*):** The Arabic word *qiththa* means cucumber, a well-known vegetable of the gourd family. The origin of this plant is not conclusively known but de Candolle<sup>3</sup> thought that it had been cultivated for over 3000 years in India and then spread to the west. It was in Egypt at the time of the 12th dynasty<sup>4</sup> which flourished during around 1991 BC<sup>5</sup>. The food value of the cucumber lies chiefly in its sugar and vitamin content. The edible portion contains approximately water 95%, protein 0.7%, fat 0.1%, carbohydrate 3.4%, and fibre 0.4%. It is regarded as a low calorie diet ( فوم ).

According to Steingass<sup>6</sup> the Arabic word *fum* or *tum* stands for garlic, wheat or other corn for bread or grey peas.

**(b) Garlic (*Allium sativum*):** This plant was known in Egypt in pre-dynastic times (before 3000 BC)<sup>7</sup> and also to the ancient Greeks and Romans. It consists of approximately : water 64%, protein 7%, fat 0.2%, carbohydrate 28%, and fibre 0.8%. Because of its pungency, it is generally regarded as a flavouring agent rather than as a vegetable in its own right. Allicin of Garlic by virtue of its active principle allicin has anti-bacterial properties.

**Wheat (*Triticum dicoccum*):** It is the most important cereal crop in temperate climates. There are about twelve different species of wheat out of which Emmer wheat (*Triticum dicoccum*) is the oldest of the cultivated variety of wheat which was grown in early historic times. The oldest grains of this wheat date from 6750 BC<sup>8</sup> being found in excavations at Jarmo in the uplands of eastern Iraq. All authorities now-a-days agree that cultivated emmer wheat was grown in ancient Egypt. An Egyptian harvest mural dating to the time of the fifth dynasty (approx, 3500 BC) shows a farmer cutting the stalk of an ear of wheat<sup>9</sup>. The wheat grains furnish meal or flour which is the chief bread stuff. The whole grain contains approximately water 13%, protein 11.5%, fat 2%, carbohydrate 70%, and fibre 2%.

Of the three alternative meanings of the Arabic word *fum* as given by Steingass, garlic must have been used as a flavouring agent by the Israelites in Egypt but could have hardly formed an item in their staple food. On the other hand, wheat by virtue of its being an important cereal crop in ancient Egypt, and due to its nutritive value must have formed the staple diet.

The third alternative meaning of the word *fum*, viz, grey peas can be ruled out of consideration here on account of their late introduction into Ethiopia from south-western Asia during the Abyssinian invasion of Arabia in the 4th or 6th centuries.

**عَدَس** Lentils (*Lens esculenta*): Having probably originated in the Near East or the Mediterranean, this well-known pulse has been under cultivation since pre-historic time and known to the ancient Egyptians and Greeks. The whole seed contains approximately water 11.2%, protein 25%, fat 1%, carbohydrate 55.8%, and fibre 3.7%. Due to its high protein content it is widely used in soups and stews.

**بَصَل** Onion (*Allium cepa*): It is believed to have originated in an area which includes Iran, Pakistan and the mountainous countries to the north of these. Onions have been cultivated since ancient times in the Middle East and India. They were a popular food in ancient Egypt as they were depicted on tombs as early as 3200-2780 BC.<sup>10</sup> They have also been found with the mummies. Onions were eaten by the builders of the pyramids and were used in their religious and funerary offerings. The Bible also refers to onions, giving the same circumstances of the Israelites when they complained of their hardships remembering the onions that they ate in Egypt (Numbers XI 5). Compared with the fresh vegetables, they are relatively high in food value, intermediate in protein content and are rich in Calcium and reboflavin. Mature onions contain approximately water 86%, protein 1.40%, fat 0.2%, carbohydrate 11%, and fibre 0.8%.

The assorted food of Israelites which they apparently enjoyed in Egypt must have formed a tasty meal on account of spices, cucumber, and pot-herbs along with the staple wheat and lentils. The dietary requirements for twenty four hours for men vary from 2400-6000 or more calories depending on whether one is sedentary, or a labourer or an athlete. Carbohydrates have a calorific value 200 calories per 500 grams whereas 100 grams each of proteins and fats supply an energy of only 400 and 900 calories respectively. But the amount of calories is not the only factor in judging the adequacy of human nutrition. Even 3000 calories, if obtained entirely from bread, will not nourish a person. Man needs some specific kinds of substances- vitamins and particularly certain amino acids that are rare in plant proteins. *Manna* which is also a carbohydrate food consists of sucrose, levulose, glucose, and dextrin, all of which gives instant energy as compared to wheat bread whose starch has to be first broken down during digestion into sugars.



The nutritional value of lentil protein is high (25%) but the proteins from animal sources have a higher value and are more easily digested and absorbed than those obtained from vegetable sources. A good animal protein like that provided by meat of quails has a balanced amino acid composition and fats for which a judicious combination of a pulse, cereal and an oil seed can be a substitute. This would place the flesh of quails alone as a far superior source of protein to lentils and wheat combined together.

A combination of *manna* and *salwa*, consisting of not only the required calories of energy but also easily digestible protein, vitamins and essential amino acids would definitely rank as a superior food to the spicy assortment of items which the Israelites hankered after on account of their taste but which was in essential relatively of a lower food value. The infinite wisdom of the Almighty through the words of Musa (a.s.) reprimanding the Israelites, saying "Will you exchange the better for the worse" is amply reflected in the verse.

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٤١٣- ثُمَّ قَسَتْ قُلُوبُكُمْ مِنْ بَعْدِ ذَلِكَ فَهِيَ كَالْحِجَارَةِ أَوْ أَشَدُّ قَسْوَةً وَإِنَّ مِنَ  
 الْحِجَارَةِ لَمَا يَتَفَجَّرُ مِنْهُ الْأَنْهَارُ وَإِنَّ مِنْهَا لَمَا يَشَقَّقُ فَيَخْرُجُ مِنْهُ الْمَاءُ وَإِنْ  
 مِنْهَا لَمَا يَهْبِطُ مِنْ خَشْيَةِ اللَّهِ

2 : 74 Thenceforth were your hearts hardened : they became like rock and even worse in hardness. And surely among the rocks there are some from which rivers gush forth ; others there are which when split asunder send forth water, and others which sink for fear of Allah.

**Rocks and streams :** In this verse Allah speaks about three types of rocks (i) water flows through one type, (ii) springs come out through another type, and (iii) the third type lies embedded in the crust of the earth.

Rocks of the first type, through which rivers gush forth have been noted in verse 2 : 60.

When rain water falls upon permeable strata, it naturally tends to find the lowest level, through the shortest and steepest course, until its further progress is arrested by impermeable strata. Above this stratum, rain water moves underground to the lowest point, at which impermeable strata outcrop. There under high pressure water bursts out in the form of a spring or artesian well. If the water supply is constant, the spring is perennial, otherwise intermittent. This is the second type of rock, which when split asunder send forth water, as spoken of by Allah.

Rocks like basalt, granite, marble etc. generally lie embedded in the earth's crust, as if for fear of Allah. This is the third type of rock Allah spoke about. The above scientific explanation of the three kinds of rock provides a wonderful allegorical description to the hardness of the hearts of different kinds of sinner, the first kind weeping voluntarily with repentance, the second kind weeping when a great calamity befalls them and the third kind lamenting with no higher motive than fear. But the hardened sinners will be worse than the hardest of rocks--it will never melt. A similar explanation has been provided by A. Yusuf Ali although a scientific explanation of the rocks was not provided therein.

The interesting point to note here is that the scientific classification of rocks into three different types as presented above has been known to man only in recent times whereas the three kinds of rock were mentioned in the Divine Revelation fourteen hundred years ago. Thus it is no wonder that Quranic verses could have been only revealed by Allah with His Supreme Knowledge.

### **Reference**

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۱۱- بِرَبِّهِمُ السَّمَوَاتِ وَالْأَرْضِ إِذَا قَضَىٰ أَمْرًا فَإِنَّمَا يَقُولُ لَهُ كُنْ  
فَيَكُونُ ○

**2: 117 The Originator of the heavens and the earth ! When He decrees a thing, He said unto it only: Be ! and it is.**

This verse deals with the most fundamental concept of Allah being the Creator of the universe.

There are profound problems in understanding the creation of the universe. It invites serious contemplation about the ingenuity and flawless skill involved. From time immemorial man has been curious to understand the creation of this vast Universe and the earth he lives in. This inquisitiveness gave birth to many mythologies at different times. The beginning of the 20th century witnessed an epoch-making breakthrough in man's eternal quest to understand the origin of the universe. Advanced astronomical methods led to the discovery of Hubble's law. General theory of relativity and George Gamow's ingenuity led to the celebrated "Big-Bang" theory as the explanation of the origin of the universe (21 : 30).

Evidence for such an explosion of the primordial fireball of ultra small size came from the discovery in 1965 by Wilson and Penzias of a cosmic micro wave background radiation of equivalent temperature of 3°K, for which they were awarded a Nobel prize. It is exactly this background radiation which is explained as a remnant of the Big-Bang itself. The steady state theory which was seriously presented as the alternative explanation for the origin of the heavens and the universe was discarded as it failed to explain this background radiation.

In 1929 Hubble observed a linear relationship between the distance of a galaxy and its velocity of recession. The greater the distance, the greater is the velocity. The constant of proportionality is known as Hubble's constant. Small departure from linearity leads to markedly different conclusions about the past and future of the universe. At present Hubble's constant is accepted as 55 units (Km/sec/megapar sec). Accordingly about 19 billion years ago

there was no earth, no moon, no sun, no star, no galaxy i.e. there was no heaven or earth.

At the beginning of the creation there was an enormously hot (more than  $10^{32}$  degrees K) and infinitely dense primeval fireball of vanishingly small size. According to the Big-Bang theory, creation started with a violent explosion of this primeval fireball, followed by its expansion. With the start of expansion, started the evolution of our space and time. Matter at first consisting mostly of electron, proton, some amount of deuteron, helium and hydrogen immersed in an immense sea of photon began to form blobs of ionised gas. Due to force of expansion, the blobs continued to fly apart from each other. Individual blobs tended to contract due to their own gravitation. As a result of interaction of two opposite forces, a turbulent motion appeared within the blobs, which assumed different shapes, spherical, spiral and so on.

When the universe was only one second old, it had a temperature  $10^{10}$  degrees K and density 1gm/cc. If at that moment, the rate of expansion was less by only one part in thousand billion, then the universe would have collapsed after a few million years. If the rate had been greater by a similarly small amount, expansion would have reached such a magnitude that no gravitationally bound system would have been possible. In either case, no heavens with heavenly bodies and no earth with all the beauties of life would have been possible. This establishes the ingenuity and flawless skill of the Originator, and one is compelled to bow down in admiration.

When the universe was 10 to 100 seconds old, most of the helium nuclei in the universe were formed. If at that time all the protons in the universe were absorbed in the process of formation of helium nuclei the universe would contain mostly deuterium or helium nuclei, but no hydrogen nuclei (protons). The result would have been catastrophic, because the nuclear process in the sun and the stars is based on hydrogen, and not on deuterium. If deuterium had been the major product, then the stars would have exploded as in a hydrogen bomb.

When temperature dropped to  $3000^{\circ}$  K, hydrogen atoms formed out of protons and electrons. Matter consisting mostly of hydrogen atoms with some amount of helium began to form blobs which continued to fly apart from each other. At this stage about  $10^{10}$  years after the big-bang, matter in blobs was concentrated by gravitational forces giving birth to

protogalaxies and eventually to galaxies taking 250 million years. Stars were formed out of the nuclear gas and dust in the galaxies. As matter in stars condensed, the central part of the rotating solar nebula contracted to form the protosun, outer rings gave birth to planets and satellites. This took 750 million years.

Due to gravitational contraction the interior of the sun became as hot as  $15 \times 10^6$  K degree. At this high pressure and temperature the sun acted like a fusion reactor. When 2 hydrogen nuclei are fused together at this temperature, a deuterium nucleus containing one proton and one neutron is formed. Next the deuterium nucleus fuses with yet another nucleus of ordinary hydrogen to become an isotope of helium with two protons and one neutron. Finally two of these helium isotopes fuse to make one nucleus of ordinary helium. A small fraction of mass is converted into energy which according to Einstein's famous formula is given by  $E=mc^2$  in the fusion process. Here E is the energy released, m is the mass converted into energy and c is the velocity of light. The energy released keeps the sun shining. This solar energy is the basis of all our food and energy and in fact, it is essential for plant and animal life.

By successive additions of a helium nucleus one can produce heavier nuclei like neon, magnesium, silicon and so on. In these processes of fusion, one should be able to produce a beryllium nucleus by the fusion of two helium nuclei. But nature bypasses the production of beryllium which is unstable. What would have happened if beryllium were a stable nucleus? If beryllium were a stable nucleus, all helium in the star would have been consumed rapidly in the fusion reaction forming beryllium, and in subsequent reactions forming carbon, oxygen etc. The rapidity with which energy is released in such reactions would have made the stars explode as a supernova. In fact, Fred Hoyle calculated that the process would terminate in stellar explosion by the time carbon was formed. Thus the universe would have vast quantities of carbon, but no heavier elements like sulphur, silicon, iron etc. Of necessity, beryllium had to be unstable. But, then there was another problem. If carbon cannot be formed from beryllium, how would carbon be formed? Carbon could be formed by fusing three helium nuclei, but the probability for this process is very low. Hoyle calculated that for the probability to be large, a resonant reaction is to take place. And, for this reaction the carbon nucleus has to have a particular excited state. This state was looked for and it was

found that such an excited state at the appropriate energy does exist in the carbon nucleus.

The process of creation of the earth started with the creation of the sun, and through various stages it has been made to acquire the present form. The earth, beginning some 4500 million years ago, as a dim, red-hot whirling globe of interstellar gas and dust, passed as temperature came down, through a liquid state. Subsequently after some 1000 million years, solidified crusts were formed in many parts; lightnings and volcanic activities abounded, a steamy atmosphere surrounded the planet. As the earth's surface cooled water-vapour condensed, and heavy rain poured. This downpour of rain formed rivers, lakes, seas and oceans. Life was not yet created and the earth's surface having no trace of life, formed a barren landscape of mountains, deserts, volcanoes and steaming lava fields.

Little is known about the subsequent 3000 million years, which elapsed after consolidation of the earth's crust. Later, life was created in the warm seas. It was very primitive : at first uni-cellular, then came the sea weeds and sea invertebrates. The earliest vertebrates, a primitive type of fish, did not appear for another 100 million years. As plants began to grow on land, invertebrates started invading land and growing there. Creatures, capable of living on land, increased in number. Thus the domination of marine creatures ended.

By this time earth's surface was, and still is broken into several cold, rigid, and about 100 kilometers thick plates, floating on a warm, relatively plastic, partially molten region, called aesthenosphere. Driven by thermal convective motion in the mantle, and by gravity, these plates move. This is known as plate tectonics. This movement was considerable by this time. Due to collision of continental plates, enormous folded regions of mountains thrust up. Thus by the time, the domination of marine creatures ended, lofty mountains emerged in Europe and Asia.

The next 140 million years may be called the age of reptiles. During this period, reptiles increased in number and size; birds and mammals then appeared, but remained inconspicuous. Dinosaurs, the giant reptiles, dominated life on land for most of the period. Rockies, Andes, the Panama ridge mountain emerged due to plate tectonics during this period.

During the last 65 million years, mammals grew in number in earth. For the last 100,000 years homo-sapiens are dominating. Due to continental

plate tectonics, the Himalayas and Alps emerged, and powerful earth movements led continents and seas to take the present form.

All these arguments show that deuterium nuclei not being the major product in the fusion process, the synthesis of and the creation of the earth through various geological stages (heavier nuclei bypassing beryllium nucleus) are not accidents of nature; these are part of a Grand Design to keep the universe in existence. The above arguments do also demonstrate how apparently little things matter a good deal in the overall blue-print of the universe. Indeed, Allah is the Mastermind of the universe.

١٦٤- إِنَّ فِي خَلْقِ السَّمَوَاتِ وَالْأَرْضِ وَالْخِلَافِ اللَّيْلِ وَالنَّهَارِ وَالْمَاءِ الَّتِي تَجْرِي فِي الْبَحْرِ بِمَا يَنْفَعُ النَّاسَ وَمَا أَنْزَلَ اللَّهُ مِنَ السَّمَاءِ مِنْ مَّاءٍ فَأَحْيَا بِهِ الْأَرْضَ بَعْدَ مَوْتِهَا وَبِكُلِّ دَابَّةٍ مَّا تُصَرِّفُ الرِّيحَ وَالسَّحَابِ السُّعْطِرِ بَيْنَ السَّمَاءِ وَالْأَرْضِ لَآيَاتٍ لِّقَوْمٍ يَعْقِلُونَ ○

2:164 In the creation of the heavens and the earth; in the difference between the night and the day; in the ships that ply on the sea with that which benefits mankind; in what Allah sends down from the water in the sky, and thereby He revives the earth after its death and disperses therein all kinds of animals; in the change of the winds, and in the clouds obedient between the sky and the earth; indeed there are Signs for a people that are wise.

In this single verse the attention of the wise has been specifically drawn to a number of 'Signs' of Allah, namely:

- (a) the creation of the heavens and the earth;
- (b) the difference between the night and the day;
- (c) the ships plying on the sea for the profit of mankind;
- (d) the rain which Allah sends down from the sky thereby reviving the earth after its death dispersing all kinds of animals therein;
- (e) the change of the winds; and
- (f) the clouds obedient between the sky and the earth.



**(a) The creation of the heavens and the earth:** The scientific theories about the creation of the heavens and the earth as widely accepted today have been discussed in detail in 2:117 and appendix II. We have shown quite in detail the thought provoking tokens of the greatness of Allah in the purposeful creation of the Universe. The multitudes of bodies and structures of the universe range from a single galaxy to mammoth clusters containing as many as 500 galaxies in a cluster.

At every stage of the creation of the universe one observes Signs of *rahmat* of *Allah Rabbul Alamin*. The universally accepted theory of 'Big-Bang' tells us that the universe started from a sudden expansion of an ultra dense, ultra hot and ultra small primeval fire ball and after explosion the universe contained exotic particles and antiparticles immersed in a sea of photons in the earliest stage of creation. If the rate of expansion had been slightly greater or smaller than the actual rate, then there would have been a stellar explosion long before the formation of stars and solar systems. How nucleo-synthesis inside stars produced heavy elements starting from hydrogen atoms when the universe was as cool as 3000°K has been described in detail. In this process of nucleo-synthesis which proceeds by fusion reaction, the production of beryllium is bypassed as otherwise the stars would have exploded without progressing further in the stellar evolution. In the process of nucleo-synthesis only 25 to 30% of the mass of the universe was converted into helium nuclei. If at that time all the protons in the universe were absorbed, then there would have been no stars and suns, because the nuclear process in these is based on hydrogen. The remnant of the big explosion that took place at the beginning ( $t=0$ ) was observed recently as 2.76 degrees K by two American physicists establishing the validity of the big-bang theory which is in excellent conformity with the Quranic description about the creation of the universe (21:30). This cosmic microwave, background radiation discovered by Wilson and Penzias is indeed one of the Signs of Allah for the creation of the universe and provides a wonderful proof of this creation.

The earth is one of the nine big-sized planets in the solar system. It is a surprise to notice that it is only the earth out of all the other planets revolving around the sun at various distances that has the congenial condition for life to thrive and prosper. It is only the earth out of all the major planets that has a temperature neither too cold nor too hot for life to continue. It is only the earth that contains water and an atmosphere of

balanced air congenial for the existence, growth and development of life including that of man, plants and animals. None of the sister planets in our solar system contains all the necessary and essential condition for life. On the contrary, the atmosphere of the various planets other than that of our earth contains gases such as ammonia, methane, hydrogen, nitrogen, helium etc. inimical to the growth and sustenance of life.

All these discussions most eloquently speak of the meticulous planning, gracious ingenuity and purpose Allah the Great has shown in the creation of the universe and the planet earth for the habitation of man. Verily these are the "Signs for a people that are wise" as the Holy Book declares.

**(b) Difference between night and day :** Here Allah refers to the difference between the periods of day-time and that of night-time. Day-time is the duration for which the sun remains above the horizon and night-time is the duration for which the sun remains below the horizon. The fundamental difference between day-time and night-time is the presence and absence of the sun. With the advent of night-time, the pattern of activities changes; day-time activities are slowed down and special devices are used for activities of the night-time. The sun goes down, the moon and the stars come out. Day-animals stop seeking food, start seeking shelter, night-animals come out in search of food. Day-birds fly back to their nests, night-birds come out. Light and heat cease to come primarily from natural sources, artificial sources are to be employed for the purpose, photosynthesis by green plants stops, new kinds of activities start within the plants. The sea-breeze changes direction. Thus the whole pattern of activities changes with the change of day-time into night-time.

There is a difference between day-time and night-time in length also. Lengths of day-time and night-time depend on place and time, i. e., on the part of the earth and day of the year.

The earth has got two motions: (i) diurnal motion of rotation about its axis, and (ii) annual motion of revolution about the sun. Due to this annual motion of revolution, the earth occupies, or the sun appears to occupy, different positions in the sky on different days of the year. This path of the earth or the apparent annual path of the sun, is a great circle, known as the ecliptic. Again due to the diurnal motion of rotation of the earth, the sun (as well as other heavenly bodies) appears to move in small circles parallel to the celestial equator (great circle of intersection of the plane of the equator with the celestial sphere). Sizes of these small circles depend

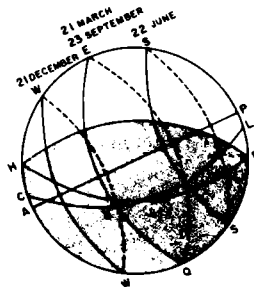


Fig. 1 Solstices and Equinoxes

HR-Horizon, EQ-Celestial Equator, CL-Ecliptic, P-Pole, PA-Polar Axis, SS-Summer Solsticial Colure, WW-Winter Solsticial Colure, Shaded Portion-Below the horizon.

on the apparent positions of the sun in the sky (ecliptic) i.e. on the day of the year. Each such small circle intersects the horizon into unequal parts (see Figure I). Horizons are different in different places of the earth. So the length of the part of the small circle, on which the sun appears to remain above the horizon, (i.e. the length of the day-time) is different from that below the horizon, (i.e. the length of the night-time). And these lengths depend on the (latitude and longitude of the place) part of the earth and on the day of the year. In polar regions, the sun remains above the horizon for six months and remains below the horizon for another six months.

There are two days, on which day-time and night-time are of equal length every-where. The two great circles, the ecliptic and the celestial equator bisect one another at two points, known as equinoctial points. The sun appears to occupy these two points on two days, March 21 and September 23. So, on these two days, the sun appears to be on the celestial equator and its daily path (being always parallel to the celestial equator) is the celestial equator itself. And during day-time, the sun appears to remain on the part of the celestial equator above the horizon and during night-time below it. But the celestial equator and the horizon, being both great circles, bisect one another; so the part of the celestial equator above the horizon is equal to the part below. Hence on these two days, lengths of day-time and night-time are equal.

There is another kind of change, periodic change, of day-time and night-time. At any place, day-time is followed by night-time, again night-time is followed by day-time, and this periodic change continues.

Diurnal motion of rotation of the earth about its own axis is the cause of this periodic change or alternation of day-time and night-time. Being on the rotating earth itself, we are oblivious of this motion, and ascribe to the sun, a relative motion of revolution. During this revolution round the earth, the sun remains alternately above and below the horizon. This periodic change of the sun's remaining above and below the horizon, i.e. the day-time and night-time continue as the apparent revolution of the sun (i. e. the rotation of the earth) continues.

The periodic change can also be explained in terms of the earth keeping the sun fixed. Due to the rotation of the earth, every point on it gets and remains exposed to the sun for sometime and due to the curvature of the earth gets hidden from the sun and remains so for sometime. The duration for which a place remains exposed to the sun is the day-time and the duration for which it remains hidden is the night-time at the place. Thus as the rotation of this earth continues the periodic change of day-time and night-time continues.

Though the sun has its own motion, it does not affect day-time and night-time at a place on the earth, since wherever the sun may be, it radiates heat and light always in the same way.

In all these changes of day-time and night-time, lies a Sign for contemplation by the wise.

**(c) Ships plying on the sea:** This portion of the verse speaks of ships/boats plying through the sea/river by which people get benefit.

Different experts have translated the portion in different ways. These differences, though not serious, give an idea about the differences in the view points of the experts.

Anyway this part of the verse is concerned (1) firstly with the plying of ship/boat in sea/river and (2) secondly with the benefit acquired therefrom. Scientific problems involved in ships/boats sailing are (1) floating on water : (2) plying ; (3) finding direction in the vast expanses of the ocean.

As is well known there were/are various types of ships/boats throughout the world. Sea-going vessels large enough were used in ancient times by the Phoenicians, Egyptians, Greeks, Romans, Chinese, Scandinavians; they were propelled by oars, sails or both. Small open vessels generally called boats were/are propelled by sail, oars, poles, paddles etc. Some of these such as Dhows in Arabia, and Junks in China were/are used in seas also. All these

ships/boats were made of wood. Ocean sailing ships were replaced by steamship by the beginning of the 19th century and later in the century steel began to supersede wood.

The Quran speaks of ship in general term without any mention of time, place and type.

The plying of ship/boat in sea or river depends entirely on its capacity to float on water. The peculiar property by which a heavy body on being put into some shape can float in a lighter medium is known as buoyancy, the upward thrust or supporting power of a fluid (liquid and gases) upon a body wholly or partly submerged in it. Because of this special property so graciously given by Allah in the fluids (liquids and gases) we see ships/boats sailing in water. So far as is known the Greek philosopher, Archimedes in the 3rd century BC was first to announce this property of fluid stating that the buoyancy or buoyant force is equal to the weight of the floating body and that weight is equal to the weight of the fluid displaced by the immersed part of the body. This is known as Archimedes' principle.

According to scientists the buoyant forces act all over the immersed part of the body at right angles to all surfaces, tending as it were, to force the body out of the liquid. They may be resolved into one upward force which acts through the centre of the mass of the liquid displaced. This point is known as the centre of buoyancy. This centre of buoyancy is dependent upon the shape of the underwater portion and is largely influenced by the depth (draught) to which a vessel sinks giving rise to a displacement of water. This displacement in amount will depend upon the shape or form of the body. Ships float at different depths (draughts) depending upon the shape of their form.<sup>2</sup>

Numerous forces act on a ship's structure, some of a static nature and some dynamic. The static forces are due to the differences in weight and support which occur throughout the ship, while the dynamic forces are created by hammering of the water on the ship, the passage of waves along the ship and by the moving machinery parts.<sup>3</sup> When a ship passes through waves, alterations in the distribution of buoyancy cause alterations in the bending movement. The greatest differences occur when a ship passes through waves whose length from crest to crest is equal to the length of the ship.<sup>4</sup>

An important phase of flotation especially in ship design is the degree of stability. If the buoyant force acts through the centre of gravity, the body

will be in equilibrium. A solid body submerged in liquid does not come so readily to stable equilibrium because of the very slight compressibility of liquids, the presence of highly compressible gases in the pores of the body or in bubbles clinging to it and the unusual coefficients of expansion of the body and the liquid. If, however, the body has a lower mean density than the liquid it will float partly submerged to a level and in a position with reference to the vertical, determined by the Archimedes principle. There is one point of the ship called the metacenter which remains vertically above the centre of displacement. This point must be higher than the centre of gravity, as the resulting couple then tends to restore the ship to its normal position; if it is lower, the ship is unstable and will capsize. The height of the metacenter above the centre of gravity (metacentric height) is a measure of the stability in the given vertical plane.<sup>5</sup>

As stated before ships/boats were plied in the sea/river by different methods. For centuries vessels in seas sailed by using the oars and the wind caught in some kind of sail. Early in the 19th century steam was applied successfully in navigation. Steam engines were followed by steam turbines. Both methods of power production underwent many improvements across the years before the diesel engine came into maritime uses. By the 1970's experiments had been made with nuclear power.

In sailing through the sea what confronts the navigator is how to find the right direction to reach his destination. In old days navigators did the feat, so far as is known, depending on the sun and stars. Arab navigators in the Indian Ocean developed a quite advanced technique of finding their way as they had been doing much the same thing in their deserts for centuries. In plane sailing to not very far off places there was not much difficulty but for far off places knowledge of the shape and size of the earth plagued the navigator and thus developed astronomical knowledge of longitude, latitude and so on. The shortest distance between any two points on the earth represented by the length of the arc of the great circle which passes through these points. The navigator follows the great circle which passes through the port he is leaving and his destination. To assist the navigator in laying out his course tables, charts and diagrams have been worked out which obviate much calculation. The navigational difficulties faced in trading with distant lands and exploring the earth through the sea, not to speak of naval warfare acted, as a stimulus in the development of astronomy. Another important problem which confronted the navigators was the best way of

predicting the ocean tides. Astronomy and hydrodynamics solved the problem.

Practical tide-tables are to be made by a judicious combination of tidal measurements with astronomical theory. The most accurate method of prediction is based on harmonic analysis in which the lunar day, solar day, variation of the declination of the sun and the moon and so on are taken into consideration.

The science of navigation was completely transformed in the first half of the present century. Upto 1939-45, most aircraft and ships found their way by compass, map-reading, an occasional radio bearing on long flights over the sea. With the discovery of radar, mariner's vision was, so to say, extended as it allowed him to 'see' in fog or in the dark as far as he could 'see' on a clear day. Since the seventies a new system uses earth orbiting satellites by which the position of the ship can be calculated with a small computer.<sup>7</sup>

**(d) In what Allah sends down from water in the sky and thereby He revives the earth after its death and disperses therein all kinds of animals:** The water mentioned in this verse refers to the water-content of the clouds hovering in the sky. A number of forces created by Allah are at work in the formation of rain-drops and the fall of rain on the earth.

A cloud is a mass of condensed water vapour in the form of tiny drops that floats in the sky. These droplets, driven by the up-drifts and the down-drifts of air, rise and fall within the cloud. During down-drifts, the larger droplets fall faster and collide and fuse with smaller droplets, thus gradually growing in size and weight. Eventually they may become too heavy for the up-drifts and fall down to the earth as rain-drops.

Rain can also form by another process. Droplets in the cold upper part of a cloud freeze into ice-crystals. Several of these crystals join together to form a snow-flake which, being heavier, falls down through the cloud and in warm weather it melts of the way and reaches the ground as rain-drops.

There are two other processes of rainfall or precipitation, namely, cyclonic and orographic. The gradual convergence and contact of a warm air mass and a cold air mass along an extended front by cyclone may result in cooling leading to precipitation. In the orographic process the rising of an air mass as it strikes a topographic barrier like a mountain may result in precipitation.

It may also be mentioned here that rain-drops coming down from the sky carry with them into the soil oxides of nitrogen the formation of which is caused by lightning. Nitrogen dioxide reacts with water to form a mixture of nitric and nitrous acids. Ordinary green plants absorb from the soil nitrogen (in the form of nitrates) to make proteins and other substances.

The water sent down from the sky by Allah is responsible for a train of natural events exemplified by the two most significant phenomena, namely: (a) the revival of the dead earth and (b) the dispersal of all kinds of animals.

(a) The dead earth indicates land without vegetation consequent to drought caused by the continued absence of water supply. The coming to life of the earth implies all the physical and chemical changes in the earth that follow the rains leading to the germination of seeds, the growth of plants and their final blooming. The availability of rain water has a profound influence on the vital attributes of soil like pH (a measure of hydrogen ion concentration), activities of the soil, flora and fauna, soil texture, structure, and porosity on which depends the soil environment favourable for the germination of seeds and penetration of roots. Thus, the one great fundamental factor besides others, which moulds the vegetation of the earth is water. The world's rainfall record ranges under very broad limits. The humid tropics with very heavy rainfall have luxuriant vegetation. At the other end of the scale are the world's deserts where rain is sporadic and absent for years together causing long droughts. In presence of showers, the sterile sands come to life as the long dormant seeds germinate, put forth shoots, bloom, and produce new seeds which lie embedded in the soil until the next downpour. The seeds with firm, hard coats retain their viability for longer periods, waiting until the outside conditions are exactly right to start growth. This occurs when the seed imbibes water from the soil by imbibition through the seed coat thus reactivating its protoplasm. There is a rapid increase in respiration and a mobilization of reserves due to synthesis and activation of hydrolytic and respiratory enzymes. The complex food materials stored in the seed are broken down, energy is released, and the cells of the embryo begin to enlarge and divide. The first part of the seedling to emerge is the root which anchors itself in the soil and probes the earth for water. The decaying vegetation, with the action of rain water, forms top soil which develops a highly beneficial quality by holding large quantities of water and storing plant nutrients that are absorbed by the roots. Germination may be slowed down or prevented by soil water deficit which depends on the



degree of contact between the seed and surrounding moisture laden soil particles. In plants where regeneration is through means other than seeds, e.g. in some grasses, it is often the underground perennating organs that take up the function of seeds, and react to rainfall in the same way as the seeds.

The physical impact of the rain drops on the soil surface itself causes the disturbance large enough to force some of the seeds to the upper layers where they can get enough oxygen to be immediately followed by germination. A heavy downpour of rain thus awakens the seeds which have been lying dormant during the drought, and results in an infinite number of seedlings to sprout on the hitherto barren soil.

(b) The rain falling on the ground and the consequent plant revival is intimately connected with the biological activities of the various animals. Along with the germination of seeds, millions of insect eggs and cocoons also burst open releasing adult beetles, wasps, ants, crickets, and locusts which are scattered over their predatory grounds. Their lives will be soon over but they leave behind a new supply of eggs to resist the next drought period. The flooding by rain water results in temporary puddles which form the breeding ground of frogs, toads, and an immense variety of aquatic animals. The ultimate succession of plants to a climax of forest supports its own distinctive animal life. Birds of prey nest in the topmost branches. Just beneath live monkeys and brightly coloured birds. On the ground live most of the quadruped mammals, all kinds of lizards, and snakes. Leopards and other cats move between the ground and lower trees. The habitat of all these creatures is admirably suited to their individual mode of life and type of predation. All the animals must depend upon plants for the initial supplies of food in a universal phenomenon of relationship known as 'food chain' which starts with plant species as a 'primary producer of food'.

Another chain of events starting with the rain is the turning of the hills and dales into lush green pastures which attract herds of wild cattle, goats and antelopes that begin mass migration in search of food. This applies also to the manifold other kinds of herbivorous animals and early man himself who depended partly on wild plants for his sustenance.

Again, the rains start the streams cascading from the hills to meet with the rivers towards their final journey to the sea. The migration of many kinds of fish and other aquatic animals towards suitable breeding grounds is dependent, besides other factors, upon the hydrological changes in the rivers.

The various animals cited here are only a few examples of 'all kinds of beasts' which are more than one million in species comprising the 27 phyla of the animal kingdom.

Thus, the swiftly changing phenomena in nature beginning with rain, revival of the dead earth into green vegetation, and its relationship with the ecological distribution of all beasts are, indeed, the Signs of the infinite wisdom of the supreme Creator, if only we can understand.

**(e) In the change of the winds :** Wind is air in motion and this motion is caused by the difference in air pressures; wind blows from higher to lower air-pressure zones. The speed of flow is determined by the degree of difference in air pressures.

Change of winds may be localized such as sea and land breezes and may be very widespread such as trade winds.

**Sea-breeze :** Land having a lower specific heat and greater absorbing power than water, becomes more heated than the sea by the sun's heat during day time. Consequently, in the evening the air above the land becomes more heated and rises up by the higher pressure of the cooler air above the sea. The cooler air from the sea blows towards the land causing what is known as sea breeze.

**Land breeze :** Good heat absorbers are also good heat radiators. During the night the land loses more heat than the sea. When the temperature of land becomes lower than the sea, high pressure of cooler land air drives the lighter air of higher temperature above the sea. So cooler air from over the land blows towards the sea causing what is called the land breeze.

**Trade winds:** The region, along the equator is the hottest part of the earth's surface. The air over this region, called the doldrum, is warmer and lighter than the air on either side  $30^{\circ}$  N and S, known as horse latitude so that it is forced upwards by the higher pressure of the cooler air. As the warm air rises, other air flows in from both poles of high pressure air, known as polar caps, to replace it. These currents of cooler, heavier air would be due north-south but for the rotation of the earth, the winds blow towards the equator from the north-east in the northern hemisphere and from the south-east in the southern hemisphere. These winds are called trade winds.

A number of beneficial effects of change of wind we already know. The wind as it blows:

- (a) carries the clouds to different places causing rain-fall over a wider region,

- (b) carries away and disperses the polluted air and brings in its place fresh pure air,
- (c) helps pollination by carrying pollen grain from the anther to the stigma and this ultimately brings about increased production of fruits, and
- (d) brings about a sort of temperature balance in the atmosphere.

In addition, there are seasonal changes of wind also. Thus, in winter, an area of high pressure develops in Siberia. From this area dry wind blows from north-easterly to south-westerly direction. This is known as winter monsoon. In the summer, as the sun 'moves' northward, land in south Asia gets heated and an area of low pressure develops there. Moisture laden air from over the Indian Ocean rushes towards this centre of low pressure. As it ascends the slope of the Himalayas, it is cooled by expansion, clouds form and heavy rains result. This is known as 'monsoon'.

Besides, by dint of the inventive genius given to man by Allah man has been employing, from time immemorial, the wind-force to serve his purpose in various ways, such as in running wind-mills and in plying boats and ships with the help of sails.

Thus we find that in the diurnal and seasonal variation of winds a number of Signs of Allah are discernible to the thinking people. The more we ponder over them, the deeper will be our understanding.

**(f) In the clouds obedient between the sky and the earth :** Weather scientists have identified various kinds of clouds and classified them into ten broad categories as briefly described below:

(a) **Cirrus clouds:** These are wispy, white feathers of ice-crystals. They form high above all other clouds. Some of them occur as much as ten miles above the earth's surface.

(b) **Stratus clouds:** These clouds are usually formed only a few hundred feet above the ground. They are thin fog-like clouds seen most often in the early morning or late evening when the air is still.

(c) **Cumulus clouds:** These are beautiful heaped up masses of white clouds that float across the sky on a summer day. They travel about a mile above the earth and cast swift moving shadows on the ground. When the sun is warmest in the mid-afternoon, cumulus clouds increase in size and number, and their tops may reach heights of several miles. In the evening they disappear in the flatness of stratus clouds.

(d) **Nimbus clouds:** These are dark grey rain-clouds. They have rather a shapeless formation. The lower half of nimbus clouds is heavy with moisture which often turn into falling rain-drops.

The various kinds of clouds mentioned above also appear in combination. The combinations of cloud forms are usually classified according to the heights at which they occur.

(e) **Alto-cumulus clouds** are round, billowy, white or greyish masses of small cumulus clouds packed closely together at heights of from 8,000 to 20,000 feet.

(f) **Alto stratus** is a thick, grey-blue cloud sheet that lies from 6,500 to 20,000 feet above the ground.

(g) **Cirro-stratus**, a thin, white sheet formed of ice crystals, occurs at 20,000 feet.

(h) **Cirro-cumulus**, a patch of cloud forming among cirrus clouds, looks like ripples in the sand on a sea-shore. Cirro-cumulus clouds form at heights above 20,000 feet.

(i) **Cumulo-nimbus** clouds also called thunder heads, are massive, cauliflower shaped clouds that can stretch through all cloud levels.

(j) **Strato-cumulus** are water-droplet clouds that range from near the surface of the earth about 6,500 feet in height.

All these different kinds of clouds, variegated in their shapes, size and appearance, are restricted in their movements in accordance with the physical laws ordained by Allah. Horizontally they trail along as far as the blowing winds would carry them; vertically they rise to various altitudes ranging from quite close to the surface of the earth to a height of about ten miles. Beyond this upper limit the air is too thin to sustain cloud particles.

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6. *Hansbury Brown, (ed.) Man and the Stars*, p. 81-82, 1978
7. *Encyclopaedia Americana.*

١٦٨- يَا أَيُّهَا النَّاسُ كُلُوا مِمَّا فِي الْأَرْضِ حَلَالًا طَيِّبًا وَلَا تَتَّبِعُوا خُطُوَاتِ الشَّيْطَانِ  
 إِنَّهُ لَكُمْ عَدُوٌّ مُبِينٌ ○

2 : 168 O mankind eat of that which is lawful and pure on the earth, and follow not the foot steps of the devil. Lo he is an open enemy for you.

Here Allah permits mankind to eat what is lawful on the earth. Since Islam is a complete code of life, and food are essential for remaining alive, regulations about food are found in Islam. There are clear verses in the Quran about the food which is lawful (5:5-6, 5: 91)

There are no restrictions about vegetables and fruits (2:22) and fish or marine food (6:141, 16: 69). The question of lawfulness is mainly concerned with animal meat. Islam provides detailed laws about the eating of lawful animals and birds.

The word pure means wholesome and clean. Rotten or contaminated food is not pure. It seems that by the word 'pure' Allah expects us to take only clean and wholesome food which will be useful for our nutrition.

١٦٢- يَا أَيُّهَا الَّذِينَ آمَنُوا كُلُوا مِن طَيِّبَاتِ مَا رَزَقْنَاكُمْ وَاشْكُرُوا لِلَّهِ إِن كُنتُمْ رَائِيَةً  
 تَعْبُدُونَ ○

2:172 O ! you who believe, eat of the pure things where with We have provided you, and render thanks to Allah, if it is He Whom you worship.

From this verse it is evident that a true Muslim must be careful about the meat and other foods and realise that only pure food is lawful for them. Detailed discussion on the subject is given in verse 2:168.

١٤٣- إِنَّمَا حَرَّمَ عَلَيْكُمُ الْمَيْتَةَ وَالدَّمَ وَنَحْمَ الْخِنْزِيرِ وَمَا أُهِلَّ بِهِ لِغَيْرِ اللَّهِ  
 فَمَنْ اضْطُرَّ غَيْرَ بَاغٍ وَلَا عَادٍ فَلَا إِثْمَ عَلَيْهِ ۗ إِنَّ اللَّهَ غَفُورٌ رَحِيمٌ ۝

2 : 173 He has forbidden you carrion, and blood and swineflesh and that on which the name of any other than Allah has been pronounced during immolation. But he, who is driven by necessity, neither craving nor transgressing, it is no sin for him. Lo, Allah is Forgiving, Merciful.

In verse 168 and 172 of this Sura Allah declared that all lawful and pure things are allowed as food. Here Allah declares some of the foods which are not lawful:

**Carrion:** Carrion or dead animal and birds is forbidden as food. This includes the carrion of lawful animals and birds as well. This is quite scientific and hygienic. If an animal dies of itself it is difficult to know why it died. It might have died of a poison, toxin or highly infectious disease like anthrax. Eating of such animal meat will not be good for health. Anthrax in animals is a communicable disease and the handling of carrions died of anthrax is risky as it may cause fatal infection in man.

**Blood:** Blood here means the circulating blood or flowing which flows during slaughter by cutting throat (vide 6:145). The circulating blood contains the toxic metabolic products, toxins and pathogenic microorganisms if present. All these are harmful if present in food. Besides it is reasonable to believe that removal of flowing blood with its harmful contents should render the meat more wholesome.

**Swineflesh:** Meat of swine is forbidden in this verse. In verse 145 of sura 6 Allah declares that swineflesh is forbidden because it is 'foul' رَجَسٌ and polluted. The following scientific reasons for its convincing, though there may be many more reasons besides these which may be discovered in future:

(a) A parasitic infection known as *Trichiniasis* is spread through swineflesh. The name of the parasite is *Trichinella spiralis*, the smallest nematode (round worm) known to infest man.

Human infestation results from eating raw or inadequately cooked pork containing encysted larvae. The larvae mature in the upper intestinal tract and mate; about one week after ingestion new larvae find their way through the blood stream to body muscles, where they cause centres of inflammation followed by encystment and small calcifications. The disease is worldwide, and about 15 per cent of the United States population is said to be infested although the majority of cases remain asymptomatic. The degree of severity of the infection is believed to depend on the number of trichinae contained in the ingested pork. It is estimated that about 20 million persons are affected by *Trichiniasis in the United States of America*. It is further stated that heavy infestation in man may cause death. The mortality of symptomatic cases runs from 5 to 40 per cent depending on how early proper treatment is begun. Purgatives which may be effective in removing other worm infestations from the intestinal tract, are rarely effective trichinella infestation and there is no specific therapy available for the disease. Once the trichinae are encysted in muscle tissue they cannot be dislodged, and only symptomatic analgesic treatment is feasible in the later chronic stages. Death is usually from cardiac or respiratory failure in the acute phase. In fact, worms may invade heart muscle causing myocarditis and involvement of muscles of the diaphragm leading to death by respiratory failure. "The Government of the United States does not approve pork for various meat products unless the pork is quick frozen or is stored for 20 days less than—15°C, which kills the trichina worms.<sup>1</sup>" It is interesting to note that in spite of extensive and advanced hygienic control, the United States is unable to prevent this dreadful disease. So the only way to prevent trichiniasis is to avoid swineflesh.

(b) Another worm named *Taenia solium* (a cestode or tapeworm) is also spread by infected swineflesh.

(c) Swine by nature are filthy, in their habits.

## Reference

1. *The World Book Encyclopaedia*, Vol.vii, p. 279, 1966.

١٨٣- أَيَّامًا مَعْدُودَاتٍ ۖ فَمَنْ كَانَ مِنْكُمْ مَّرِيضًا أَوْ عَلَى سَفَرٍ فَعِدَّةٌ مِّنْ أَيَّامٍ أُخَرَ ۗ وَعَلَى الَّذِينَ يُطِيقُونَهُ فِدْيَةٌ طَعَامُ مِسْكِينٍ ۚ فَمَنْ تَطَوَّعَ خَيْرٌ فَهُوَ خَيْرٌ لَهُ ۚ وَأَنْ تَصُومُوا خَيْرٌ لَّكُمْ إِن كُنْتُمْ تَعْلَمُونَ ۝

2 : 184 (Fast) a certain number of days; and (for) him who is sick among you on a journey, (the same) number of other days; and for those who can afford it there is a ransom; the feeding of a man in need—but who so does food of his own accord, it is better for him; and that you fast is better for you if you did but know.

And (for) him who is sick among you or on a journey (the same) number of other days

Fasting from dawn to sunset during the 9th lunar month of the Muslim calendar (Ramadan) every year is obligatory for all adult Muslims—male and female. This Ramadan fasting (*Siam* in Arabic) means total abstinence from any food or drink and even smoking and sex during the period of fasting. But there is exemption for those who are sick or journeying who need not fast, but they will have to keep the fast for the number of days missed, when they are cured or return home. This concession is a mercy from Allah, as He declares in the next verse 2:185, just after the mention of exemption, for the second time, "Allah desires for you ease and He does not desire hardship for you."

So the purpose of such concession is to avoid hardship to the fasting persons. The exemption from fasting due to illness is justified as abstinence from food and drink for the whole day may harm the patient. There are diseases in which patients need food, drink and medicine at regular short intervals as in cases of severe diarrhoea and dysentery; acute infections like lobar and bronchopneumonia, acute appendicitis, acute meningitis, typhoid fever, severe diabetes mellitus and acute abdominal colics etc. In severe diarrhoea and dysentery, fasting may lead to dehydration and electrolyte imbalance; in severe diabetes fasting may cause hypoglycaemic coma (unconsciousness due to very low blood sugar level). In diseases with high



fever and vomiting, fluid replacement is essential. Thus, such exemption in illness is quite scientific and medically sound.

However, in mild diabetes one may not suffer from any inconvenience due to day long fasting. In certain acute infections, if long acting anti-biotics are available, then one may keep the fast and take medicine only at night.

Mild sicknesses like common cold, scabies, mild trauma, headache etc., which do not cause much hardship, should not be considered enough reason to avoid fasting in the month of Ramadan. But, the responsibility to decide to keep or break the fast in illness is on the person who is sick.

The exemption during journeys is also justified, as the traveller (*musafir*) may not get sufficient opportunity to have regular food ('*sehr*'\* in particular), rest and sleep during the journey, which are essential to maintain normal health. So to avoid any hardship and difficulty, Allah, in His infinite mercy, exempts the travellers from fasting during journeys and short stays (less than 15 days) away from home (more than 48 miles). However, like mild sickness, comfortable journeys and stays abroad, which do not cause any significant hardship in keeping the fast, may not be considered sufficient excuse to avoid fasting. But one is entitled to keep the fast or avoid it during all types of journey.

### **And that you fast is better for you if you did but know**

Some people think that day long fasting for a month may cause malnutrition and thus harm the faster. But since the Ramadan type\*\* of fasting is not starvation, but only a change in meal times for one month, there is no cause for deterioration of health, if one takes a balanced diet at night.

In this verse Allah clearly declares that fasting in Ramadan is good for mankind. We do not yet know all the physical and spiritual benefits of Ramadan fasting. However the scientific study on the effects of Ramadan fasting on health carried on during 1958-1965 in Dhaka and Rajshahi medical colleges (Bangladesh), showed some distinct physical benefits of such fasting:

1. There is slow, harmless and mild loss of weight in 80% of fasting subjects.<sup>1,2</sup> This loss of body weight may be useful as a therapeutic method

\* *Sehr* is unique in Islamic fasting. It means late night meal before dawn.

\*\* Ramadan fasting is less severe than *Lent* or 24 hour starvation practised by followers of some other religions. The fasting period is from dawn to dusk and one is expected to take meal just before dawn when the fasting begins for the day.

to treat the patients for obesity (over weight). But such patients will have to avoid over eating and fatty foods even during night and non-fasting periods of the year.

2. Abnormal gastric acidity: Both hypo and hyperchlorhydria are mostly changed to normal acidity (isochlorhydria) due to month long fasting in Ramadan.<sup>3,4</sup> Since fasting normally reduces gastric acidity (lowest gastric acid is normally found in the early morning before the taking of any food following 'fasting' after dinner); Ramadan fasting should naturally help in reducing, and preventing hyper acidity which is one of the important factors which cause peptic ulcers.

3. Incidence of peptic ulcer is much less in Muslim majority countries and Muslim populations of countries of mixed religions. This may be due to regular Ramadan fasting; and absence of alcohol in their diet. Dr. E.T. Hess of Wusasa Hospital, Zaria, northern Nigeria wrote in 1960: "As regards your inquiry reference cases of peptic ulcer, the incidence of this disease here amongst the Africans living in a tribal manner appears to be absolutely nill".<sup>5</sup> Cleave further reported higher incidence of peptic ulcers among the Chinese in Indonesia and Malayasia than the local Javanese and Malay Muslims.

These observations support the idea that reduction of gastric acidity and conversion of hypo and hyper acidity to normal level due to fasting in Ramadan may be partly responsible for very low incidence of peptic ulcers in Egyptian villagers, Northern Nigerians, Javanese and Malay Muslims.

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١٨٥- شَهْرَ رَمَضَانَ الَّذِي أُنزِلَ فِيهِ الْقُرْآنُ هُدًى لِّلنَّاسِ وَبَيِّنَاتٍ مِّنَ الْهُدَى  
 وَالْقُرْآنِ ۚ فَمَن شَهِدَ مِنْكُمُ الشَّهْرَ فَلْيَصُمْهُ ۗ وَمَن كَانَ مَرِيضًا أَوْ عَلَى  
 سَفَرٍ فَعِدَّةٌ مِّنْ أَيَّامٍ أُخَرَ ۗ يُرِيدُ اللَّهُ بِكُمُ الْيُسْرَ وَلَا يُرِيدُ بِكُمُ الْعُسْرَ  
 وَلِتُكْمِلُوا الْعِدَّةَ وَلِتُكَبِّرُوا اللَّهَ عَلَىٰ مَا هَدَاكُمْ وَلَعَلَّكُمْ تَشْكُرُونَ ۝

2 : 185 The month of Ramadan in which was revealed the Quran, a guidance for mankind, and clear proofs of the guidance, and the criterion (of right and wrong). And whosoever of you is sick or on a journey, (let him fast) the same number of other days. Allah desires for you ease; He desires not hardship for you and (He desires) that you should complete the period, and that you should magnify Allah for having guided you and that peradventure you may be thankful.

This has been already discussed under explanation to verse 2: 184.

وَكُلُوا وَاشْرَبُوا حَتَّىٰ يَتَبَيَّنَ لَكُمُ الْخَيْطُ الْأَبْيَضُ مِنَ الْخَيْطِ الْأَسْوَدِ مِنَ الْفَجْرِ ۚ

2 : 187 ...And eat and drink until the white thread of dawn appears to you distinct from the black thread.....

In this verse Allah says that in the month of Ramadan, it is lawful to eat and drink until the first white glow of dawn is not distinguishable from the black darkness of night, i.e. till the advent of dawn. Due to the rotation of the earth, a place comes to such a position that though the sun is still well below the horizon sun rays cannot reach the place directly; the sky is illuminated by the reflection of the sun rays on clouds, dust, etc. suspended in the atmosphere; this is astronomical dawn, or astronomical morning twilight. It does not begin as long as the stars of the sixth magnitude

(faintest possible star visible to the naked eye) can be sighted in zenith. Astronomers have found by calculation that this is possible when the sun is  $18^\circ$  or more below the horizon. Hence at a place dawn begins, when the sun is  $18^\circ$  below the horizon.

The time, that dawn lasts, is measured by the time the sun takes to pass over  $18^\circ$  of its arc.<sup>1</sup> This depends on the latitude of the place and declination of the sun, i.e. on the position of the place on the earth and on the day of the year. It is shortest at the equator, since the sun's apparent diurnal path there intersects the horizon at right angles, and the perpendicular is the shortest distance. On equinoctial days at the equator dawn lasts for  $1^h 12^m$  i.e. dawn begins  $1^h 12^m$  before sunrise.

At places near  $30^\circ$  latitude north, dawn lasts about  $1^h 15^m$  in March,  $1^h 25^m$  in June. In Bangladesh food and drink can be taken in the month of Ramadan about  $1^h 20^m$  before sunrise.

It is very difficult to understand what is meant by the statement: "white thread of dawn appears distinct from its black thread." As it appears, whiteness of dawn merges continuously into the blackness of night, and at no time, is there any visible sharp distinction between them. But as stated above, at the start of astronomical dawn, though the stars of the sixth magnitude cease to be visible in the zenith, similar stars remain visible just to the west of the zenith. So, theoretically, there is a time, when at the zenith, a faint distinction between the areas of visibility and non-visibility of stars of the sixth magnitude exists, like two threads juxtaposed together.

In this connection Allama Yusuf Ali says, "Those in touch with Nature know the beautiful effect of early dawn. First appear white indefinable streaks of light in the east, then a dark zone supervenes; followed by a beautiful pinkish white zone clearly defined from dark; this is the true dawn, after that the fast begins."<sup>2</sup>

Further research is necessary to get a clear understanding of the verse and the meaning of white and black threads as referred to in this verse.

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۱۸۹- يَسْأَلُونَكَ عَنِ الْاِهْلَةِ قُلْ هِيَ مَوَاقِيْتُ لِلنَّاسِ وَالْحَجَّةِ

2 : 189 They ask you concerning the New Moon. Say, they are but Signs to mark fixed periods of time in (the affairs of) men and pilgrimage...

In this verse Allah says that the (crescent) moon is to be regarded as a symbol for fixing the time of affairs of man as well as for fixing the time and date of pilgrimage.

Thus it is suggested that the moon may be used as the basis for construction of the calendar. A calendar is required to count the period or interval of time to mark unambiguously every moment, past, present and future. For this purpose units of time should at first be selected. Basic units must be intervals which every one can recognise easily. Three units are in use in forming a calendar; these are, solar day, lunar month and tropical year. These three units are connected with three separate activities of the solar system.

A day or more precisely a solar day is the interval of time of one complete rotation of the earth about its axis with respect to the sun.

A lunar month is related to the moon and is the interval of time the moon takes to revolve round the earth, relative to the sun. If a month is defined as the interval between two successive identical phases of the moon (e.g. two consecutive new moons), it is found that this interval (i.e. the lunar month) varies from 29 days to 30 days, and has an average length of, not exactly 29.50 days, but 29.5306 days. Thus there is difficulty in filling days into months.

The third unit of time, the tropical year is the interval that the earth takes to make a complete revolution around the sun, with respect to equinoctial points or seasons. This is marked by recurrence of seasons, which can be seen at night by the changing pattern of the stars and in day time by the changes in the path of the sun.

The main problem is that the number of solar days and lunar months in a tropical year, are not whole numbers. Thus in a tropical year, there are

365.24222 solar days, and 12.3683 lunar months. Thus as the number of days would not fit exactly into months, so neither would the number of days nor number of months exactly fit into the year. Though the fractions seem very small, they would accumulate over several years to make serious errors. So attention has to be paid to these minor errors. The Julian calendar was introduced in 46 BC decreeing that the year would consist of 455 days.<sup>1</sup> Again the Gregorian Calendar was introduced in all Roman Catholic countries by omitting 10 days from the year 1582. This corrected calendar was introduced in England in 1757 by calling 2nd September 14th September, with country-wide demonstration chanting 'Give us back our 11 days'.<sup>1</sup>

As suggested in the verse, a calendar can be constructed simply on the basis of the moon. Such a lunar calendar has the units, solar day, lunar month and lunar year of 12 lunar months. The Hijri calendar is such a calendar and is in use in Muslim countries. A normal Hijri year consists of 12 lunar months of alternate lengths of 30 days and 29 days, (the lunar month beginning at the new moon). Since the average length of a lunar month is 29.53 days, while that of a Hijri month is 29.50 days, the calendar will go out of step with the moon by about 0.36 days ( $8^h 38^m$ ) in one year, and it would soon become noticeable that the month no longer starts with the new moon. To overcome this difficulty, the Hijri calendar is divided into cycles of 30 years; for the first 19 years of each cycle, the 12th month has its normal value of 29 days, but for the next 11 years, it has 30 days. By this simple device, the average length of the calendar month is increased from 29.50 days to 29.530566 days, which is about .000033 days or 3 seconds shorter than the true lunar month. The calendar keeps the month in step with the moon so accurately that it would take about 2500 years for it go wrong by one complete day.<sup>1</sup> The Gregorian calendar would go wrong by one complete day in 3300 years<sup>2</sup>.

The solar calendar is changed by man and needs calculations which are not obvious to the layman. The lunar calendar, guided by the appearance of the new moon is easy for people in general. The progress of a lunar month from its beginning on the new moon is visible to them as the moon passes through its different phases. Allah has provided, so to say, a simple visible calendar in nature for our easy reference. For simplicity Islamic calendar is universal.

In the lunar calendar the seasons are not fixed in it. Dates of seasons drift slowly through the calendar. The lunar month of Ramadan drifts through all the seasons of the year. The average length of the Hijri year is about 11 days shorter than the solar year. So the seasons coincide with lunar months at intervals of about 33 years. Though the lunar calendar does not seem to be suitable for every day requirements of modern life, it works very satisfactorily for religious purpose, e. g. keeping the fast, performing pilgrimage, etc.

It may be added here that one advantage of the lunar calendar is that Muslims in different parts of the world can have the Ramadan both in summer and in winter.

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٢١٣- كَانَ النَّاسُ أُمَّةً وَاحِدَةً

2 : 213 Mankind was one single nation....

All mankind belongs to the only one existing species of man which the famous scientist Linnaeus named *Homo sapiens*. In the beginning, the human population was probably subdivided into many smaller populations in size from communities of several hundred persons to family sized groups. During the course of time the smaller groups colonized newer areas. Many of these groups became genetically isolated or cut off from mingling with other groups. Mutations that occurred in each small isolated population group could become established rapidly. Natural selection acted to preserve certain traits that improved chances of survival.

There is ample evidence that the most diverse varieties formed in this manner can and do interbreed and produce fertile offspring. Yet, populations of the human species differ considerably in appearance. There is a great range in size and skin colour, wide differences in the texture and distribution of hair on the body, in the shape of the skull and in the facial features such as nose and lips. On the basis of such differences, anthropologists have attempted to classify human populations. A number of similar populations have been grouped into a race or ethnic group. The major races are distinguished into Caucasoid (wavy hair, narrow nose, white skin), Negroid (wooly hair, broad nose, black skin), Mongoloid (straight hair, moderately broad nose, yellow-brown skin), and Australoid (curly hair, moderately broad nose, brown skin). But many subdivisions can be made within each of these groups, and wide transition zones link each to others.

The evolution of human populations occurs through mutation, selection, migration and geographical isolation, the cumulative effect of these factors being responsible for the development of measurable differences between the native people in different geographical localities. Before the mass migrations of populations in the last 500 years or so, there was a rough correlation between geographical areas and certain human physical characteristics. The members of the various human populations are no longer isolated by widths of oceans or the heights of mountains. Travel and communication are



breaking down the barriers of distance. Due to marriages between persons of different populations, the gene pools of these populations are losing their differences.

An American physiologist, William C. Boyd proposed a human classification in 1903 based on the frequencies of the genes determining blood types. The four blood types, A, B, AB, and O as discovered by Landsteiner in 1901 are determined by three specific allelic genes and their various combinations. An analysis of samples of blood from populations all over the world for blood clarification has been very valuable in helping scientists understand the relationship among human populations. By the help of these studies, the anthropologists are able to trace the large migrations of early human populations to Europe and Asia, and later to America and Australia.

Despite the fact that we can divide *Homo sapiens* into races on the basis of percentage of differences of many inheritable traits, the different members of the human species are still much more alike than they are different. All possess strictly comparable organs and physical characteristics, and remarkable uniformity in most chemical characters. The body chromosomes of man (23 pairs) in all his constituent races and blood groups are also the same. Man differs from other living primates in having proportionately large brain, small canine teeth, ability to walk upright, to use tools and to speak. All racial types are known to be completely, interfertile and persons of mixed racial ancestry are in their turn fully fertile. By biological criteria, all men living today are of one 'nation'.

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٢١٩- يَسْأَلُونَكَ عَنِ الْخَمْرِ وَالْمَيْمِرِ قُلْ فِيهِمَا إِثْمٌ كَبِيرٌ وَمَنَافِعُ لِلنَّاسِ وَإِثْمُهُمَا أَكْبَرُ مِنْ نَفْعِهِمَا وَيَسْأَلُونَكَ مَاذَا يُنْفِقُونَ قُلِ الْعَفْوَ كَذَلِكَ يُبَيِّنُ اللَّهُ لَكُمُ الْآيَاتِ لَعَلَّكُمْ تَتَفَكَّرُونَ ۝

2 : 219 They ask you (O ! Muhammad) about alcoholic drink and game of chance. Say: In both is great sin, and some utility for men; but the sin of them is greater than their usefulness. And they ask you what they ought to spend. Say: That which is superfluous. Thus Allah makes plain to you (His) revelation that haply you may reflect.

**Alcoholic drink and game of chance :** The term 'al-khamr' as used in the Holy Quran and the Hadith of the holy Prophet means any material which causes intoxication. It comes from the Arabic word *Yakhmur* which means to cover or to curtail. Al-khamr is so called because it covers or curtails the proper functioning of the brain. It is commonly used as a synonym of wine or alcoholic drinks because these were the only intoxicating material used by the Arabs at the time of the Holy Prophet Muhammad (sm.). However, the Prophet has explicitly brought out this general meaning of 'khamr' in his famous Hadith quoted by Salim ibn Abdullah ibn Umar, "All intoxicants are khamr and all types of khamr are forbidden." However in the present discussion we shall limit ourselves to the evils of alcoholic drinks.

By the term game of chance the accepted meaning is all types of gambling like lottery and betting.

In this verse, it is stated that when the followers of the Holy Prophet at Madina asked him about the attitude of Islam to alcoholic drinks and gambling, he was directed by *Allah Subhanahu Ta'ala* to say that in both of them there is great sin. Sin means disobedience to Allah and all disobedience is harmful to mankind. Besides, in the same verse sin has been contrasted with utility. That alcoholic drinks and gambling are closely associated with much of the crime and social ills is well-known to all, but few are aware of the actual harm caused by alcoholic drinks as proved by scientific research.

The usefulness of alcoholic drink and gambling is negligible, but Allah has also mentioned this aspect of the matter.

Among the utility of alcohol we find that it is readily absorbed and provides some energy in the form of calories, stimulates respiration and dilates blood vessels. The energy supplied by alcohol is of insignificant nutritional value and the other changes are of no true benefit to our health. But alcohol (ethyl alcohol) has many uses though not as a drink. The benefits or uses are:

(i) Seventy per cent alcohol in distilled water is a good antiseptic and is widely used to sterilize the skin before injection, drawing of blood, surgical operations and also moistening the washed hands of surgeons, which helps to dry the hands quickly.

(ii) Alcohol as tinctures (solutions of substances in alcohol) like tincture iodine is useful as antiseptic and commonly used to clean the skin before surgery.

(iii) Alcohol is used to extract many chemicals which are easily dissolved in it, and it is widely used as a solvent of certain scents.

(iv) Alcohol is widely used as a reagent and in the preparation of certain reagents used in chemistry and biochemistry.

(v) Alcohol is also a good preservative.

The effects of alcohol on our health show that it is always harmful as a drink. The harmful effects of alcohol based on research are given below:

1. The most important drug effects of alcohol are those on the brain. The higher functions of the brain are inhibited first. The pharmacologists agree that the effect of alcohol on the brain is always a deterioration of functions and never an improvement<sup>2</sup>. It is generally agreed that alcohol is a narcotic and not a stimulant. The narcotic and depressive action starts from the very beginning of its direct action on the central nervous system (CNS). "The deceptive early appearance of stimulation and the euphoria, which misleads the subject into a too favourable view of his performance after he has taken alcohol, arise from the release of the lower nervous centres from control by the higher, by depression of the latter. In a dose such as is contained in 2 to 3 ounces of whisky (alcohol 40% of volume), alcohol causes a disorder of attention, concentration, memory and power of reasoning ; sensory acuity in all fields and the sense of time are impaired and sensory motor co-ordination is disturbed. His inhibitions being lowered, his self criticism blurred, his sense of well-being and confidence unusually enhanced, the

individual is obviously less able to assess risks and to deal with any situation calling for judgement and discriminating response...If blood alcohol level rises to a concentration of 0.15% (150 mg) or over the individual cannot drive a car without risk to the public."<sup>3</sup>

2. Newman and Fletcher<sup>4</sup> studied the effect of alcohol on vision of 50 subjects. At a concentration of 0.115% and above all showed some impairment of vision. Goldberg<sup>5</sup> observed that impaired vision is the chief cause of increased traffic accidents by the alcoholics. He wrote, "Alcohol had the same effect on vision as the setting of a grey glass in front of the eyes, or driving with sun glass in twilight or darkness; a stronger illumination is needed for distinguishing objects and, dimly lit objects will not be distinguished at all. When a person is dazzled by a sharp light he needs some time to see again clearly. Under the influence of alcohol such a person takes a longer time before he can see clearly again."

3. Though 7% alcohol in water causes temporary increase of hydrochloric acid in gastric secretion, due to liberation of a histamin like substance or gastrin<sup>6</sup>, higher concentration (15 to 20%) inhibits gastric secretion and may cause marked inflammation of gastric mucosa (gastritis) due to its irritating effect. Vomiting frequently occurs after rapid drinking.<sup>7</sup> Besides repeated smaller dose of alcohol in smaller concentration may lead to hyperchlorhydria, which is an important factor in the development of peptic ulcer—a disease more common in countries where alcohol is a permissible social drink.<sup>8</sup>

4. Gronman<sup>9</sup> observed an increase of 5 to 10% in pulse rate, blood pressure and total blood flow (not coronary) following ingestion of 2.3 oz. of whisky.

5. Ninety to ninety five per cent of ethyl alcohol ingested is oxidised in the liver.<sup>10</sup> Alcohol causes impairment of normal liver function.<sup>11</sup> Duncan<sup>12</sup> observed a marked drop in the liver glycogen level in rats receiving 3 gms of alcohol per kg body weight, which corresponds to 18 fluid ounces of 100-proof whisky or a 60 kg person. It has now been experimentally established<sup>13, 14</sup> that alcoholic fatty liver or hepatic steatosis is due to ingestion of alcohol and not due to the lack of carbohydrate or nutrition in the alcoholics. This direct effect of alcohol on the liver has been demonstrated in rats.<sup>15</sup> This fatty liver may lead to cirrhosi of the liver and rarely sudden collapse and death due to fat embolism.

6. The efficient transmission of nerve impulse from brain to voluntary muscles is impaired by the presence of alcohol in the brain and causes erratic muscular response. The impairment varies from thick speech and staggering gait to complete paralysis of voluntary muscles. Lengthened reaction time is one criterion of deficiency of muscular response. Alcohol in the brain causes a longer time lag before the voluntary muscle can obey the brain. Forbes<sup>12</sup> found that a blood concentration of 0.10 to 0.20% causes an increase of 10 to 30% in reaction time. At a speed of 30 miles per hour a car travels 44 feet per second, so that an increase of a fraction of a second in applying the brake may be a serious safety hazard in an emergency.

7. Brussels<sup>16</sup> writes, 'Ethyl alcohol is a poison and local irritant. Contrary to popular opinion, alcohol is not a stimulant, the resulting overt elation is misconstrued as stimulation.' Doctor Cuaron<sup>17</sup> of Mexico disclosed, "alcohol the 'king of poison' in Mexico is the direct cause of most of the criminal offences like aggression, homicide, theft, attacking women and property damage etc". Forel<sup>18</sup> wrote, " Experience shows that in all countries where the alcoholic habit reigns, it accounts for one-half to three-fourths of the crimes, a great share of suicides, of mental disorders, of deaths, of diseases generally, of poverty, of vulgar depravity, of sexual excesses, venereal diseases and of dissolution of families. In Switzerland, careful statistics of 15 largest cities show that one-third of the male suicides, and one-tenth of deaths in men above twenty years are wholly or essentially referable to alcohol".

8. The main risk of drinking alcohol is that it is such a habit-producing narcotic that it is very difficult to restrict oneself to a smaller dose due to the intense urge it produces for drink. There is really no safe dose of alcohol as a drink, the end result of chronic alcoholics is a disease called alcoholism. It is defined as "a chronic illness, psychic, somatic or psychosomatic, which manifests itself as a disorder of behaviour characterised by the repeated drinking of alcoholic beverages to an extent that it exceeds the customary dietary use and compliance with the social customs of the community and that interferes with the drinker's health or his social or economic functioning".<sup>19</sup> Thus an alcoholic is any individual who has lost control of his drinking habit or who cannot abstain and clinically he is a person in whom a pattern of excessive drinking has resulted in identifiable undesirable effects.

9. **Anti-social behaviour** : Loss of inhibition caused by alcohol results in anti-social behaviour which was known to the Roman intellectuals as well. The renowned Roman philosopher and senator, Seneca<sup>20</sup> wrote, "Drunkenness kindles and discloses every kind of vice, and removes the sense of shame that veils our evil undertakings. For more men abstain from forbidden actions because they are ashamed of sinning than because their inclinations are good." The role of alcohol as a causative factor in acts of violence has been repeatedly emphasized in recent careful studies.<sup>21</sup>

10. **Alcoholism and Insanity**: Alcoholism is one of the important causes of insanity. Acute delirious insanity commonly known as delirium tremens results from either prolonged over-drinking or sudden stoppage of drink. The latter can be cured under prolonged medical care. It is characterised by hallucination of sight usually taking the form of terrifying animals, and alcoholic mania in which the patient is very noisy. Repeated attacks may result in mental deterioration, dulling and gradual loss of memory<sup>22</sup>.

11. **Death rate**: Tashira and Lipscombe<sup>23</sup> reported the average death rate among alcoholics in California as 2.5 times the normal. They found 24% violent deaths among alcoholics compared to 9% of violent deaths in the adult population. Dahlgren<sup>24</sup> reported an increase in deaths due to drowning, accidents and suicide in alcoholics. Kessel and Grossman<sup>25</sup> reported a suicide rate in alcoholics 80 times greater than in normal males.

12. The treatment of alcoholism is not satisfactory. Besides, occasional abstinence even when spread over a few years is not enough for treatment of alcoholism as "alcohol dependence is often a chronic relapsing illness."<sup>26</sup>

The above scientific facts prove that alcohol is more harmful than useful.

Gambling has also been mentioned in the same verse (2:219) along with alcoholic drink. "Gambling in the broadest sense is deciding some matter by pure chance or by hazard. In its more limited sense, it means an effort to gain something of value by risking the loss of something on a matter of chance. Philosophers and psychologists agree that gambling appeals to two basic traits of human nature, the desire for gain and the exhilarating thrill of uncertainty."<sup>27</sup>

Like alcohol, gambling also has little benefit but much harm. Among the benefits of game of chance are:

1. A gambler may earn a large sum of money with a small investment or little physical labour.
2. He earns by sheer luck.

### 3. Gambling with a small bet is often regarded as recreation by some.

From ancient to modern times gambling has been practiced in a number of forms for financial gain in every country of the world, although it has been vigorously opposed and suppressed by various groups from time to time. All countries now-a-days have laws for the regulation of gambling. Such a regulation is considered necessary partly because of the harm done by the heavy losses from gambling and by disputes growing out of it, for the history of gambling from the earliest ages is full of incidents featuring duels, murders, suicides and thefts."<sup>27</sup>

That the harm of gambling is much greater will be evident from the following:

1. Though a gambler may earn a good amount sometime, he is usually a loser in the end. A gambler earns occasionally but he is a frequent loser.
2. Like alcoholic drink, gambling is also a habit producing social evil. Mr. Kenna<sup>28</sup> a psychologist in the University of New South Wales, Australia, began a thorough investigation among the gamblers of Britani, who bet a few shillings on horses a week to those who play for thousands of pounds a night in gambling clubs. He said, "Not enough is known about gambling. There is no body of evidence to show what makes people gamblers, or where the border line between recreation and addiction begins. A thorough investigation may well reveal that addiction to gambling is a disease just like alcoholism." It is well known that like alcoholism, gambling may produce an uncontrollable urge to gamble even if it causes heavy financial loss to the gambler.
3. Like alcoholic drunkenness, gamblers are often ashamed of their action, when the urge to gamble is absent.
4. Due to heavy financial loss, many solvent and socially well-placed gamblers become poor and the family is utterly impoverished.
5. Consequent upon financial trouble, the family life of a gambler may become unhappy and even dissolution may occur.
6. In case of shortage of money to gamble, a gambler may misappropriate others, money, steal or even indulge in various deceptions and crimes to get sufficient funds for gambling.
7. Gambler who earns a large sum of money by pure chance and not by efficiency, labour or knowledge, is a bad example in the society for people who work hard to earn an honest living.

8. Gaining money by lottery is like stealing from a large number of people through an organised institution in a subtle way.
9. State lotteries and lotteries to help social organisations do not inculcate the spirit of benevolence, rather they induce people to run after financial gain, a prospect so remote as to be a form of self deception.

So there is enough evidence for the Quranic statement that drinking and gambling yield small benefit compared to the harm they cause.

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۲۲۲- وَيَسْأَلُونَكَ عَنِ الْمَحِيضِ قُلْ هُوَ أَذًى فَأَعِزُّوا نِسَاءَ فِي الْمَحِيضِ  
 وَلَا تَقْرُبُوهُنَّ حَتَّى يَطْهَرْنَ ۚ وَإِذَا طَهَّرْنَ فَأْتُوهُنَّ مِنْ حَيْثُ أَمَرَكُمُ اللَّهُ ۗ  
 إِنَّ اللَّهَ يُحِبُّ التَّوَّابِينَ وَيُحِبُّ الْمُتَطَهِّرِينَ ○

2 : 222 They question you (O! Muhammad), concerning menstruation. Say: It is discomfort and pollution, so let women alone at such times and go not unto them till they are cleansed. And when they have purified themselves, then go in unto them as Allah has enjoined upon you. Truly Allah loves those who turn unto Him, and loves those who care for cleanness.

Menstruation is a monthly course of bleeding from the uterus for 5 to 7 days for all adult women during the reproductive period unless pregnancy occurs. Though it is a physiological phenomenon, yet it is not devoid of any danger like micturition and defaecation. The Quranic statement that it is a discomfort is supported by scientific observations.

1. Wilfrid Shaw<sup>1</sup>, a famous gynaecologist wrote, "a feeling of uneasiness during normal menstruation—specially in the lower, abdomen is quite common." Some girls get severe pain during the first period, and in some, pain may last throughout life during each menstruation.

2. Dr. Joan Graham<sup>2</sup> wrote, "Since there is chance of spreading disease and getting infection during menstruation, it cannot be regarded as absolutely normal and physiological."

3. Dr. Katherin Dalton<sup>3</sup>, a British lady doctor carried out research to study the effect of menstruation on the performance of young girls in hospitals, hostels, and prisons during 1959-1961 in the United Kingdom. She published five papers in a British medical journal based on the findings of her study. She observed that just before and during the period, the efficiency and physical fitness of the girls are markedly lowered. Dr. Dalton observed that the lack of interest, inattentiveness, a tendency to avoid games and talkativeness are increased by 26% to 36%. Girls who have developed bad habits, have a tendency during this period to commit greater offences. She

further wrote, "from among the students of 6th grade 11 prefects were selected of age 16 to 18 years, who were empowered to punish the girls who commit offences in the class. It is interesting to note that these prefects increase the intensity of punishment during their own menstrual period. They begin to increase the punishments at the beginning of their period and continue to increase during the period and again become normal after the period." Dr. Dalton then posed a question, if such behaviour is true for all women, specially the teachers, magistrates and others engaged in administration.

4. Dr. Erdelyi<sup>4</sup> of Illinois, USA, studied the effects of menstruation on 729 Hungarian female athletes. He found that their standard in tennis and boat race was markedly reduced during menstruation.

So the above mentioned scientific observations are enough to justify the statement that menstruation is a state of minor illness when all women should avoid physical labour and risk of infection.

Then Allah forbids sex relations during menstruation. This is also medically justified.

During a period, the opening of the uterus (*os-uteri*) which normally remains closed by mucus plug, becomes open to allow the menstrual blood to flow out. The bleeding comes from the necrosis of the lining of the uterus which grew in thickness during the post-menstrual period. If fertilised ovum or embryo does not embed there, the newly grown endometrium undergoes necrosis, hence bleeding. There is no menstruation if pregnancy occurs.

As a result of the opening of the *os-uteri*, there is every chance of bacterial infection from outside if coitus takes place during that period. Besides, the infection if already present in the birth canal may easily spread inside. This spread will be dangerous as the uterus is directly connected with the peritoneal cavity through the two fallopian tubes on two sides of the uterus. So if there is infection in the female passage like gonorrhoea and syphilis the infection may readily spread inwards following coitus resulting in serious diseases viz., endometritis salpingitis, peritonitis and even pelvic cellulitis in the female. If the female suffers from leucorrhoea due to a parasite called *Trichomona vaginalis*, the male partner may get trichomonal urethritis. On the other hand the infected male may easily introduce venereal diseases into the female partner more easily during the menstrual period.

One should realise that, "Sex relation is an emotional phenomenon and proper hygienic control may not be possible at the time. So when the inner lining of the uterus is not intact and the os-uteri is open, the chance of spreading infection in the female partner is obvious.<sup>5</sup>

Dr. Graham<sup>2</sup> opines, "the reason to forbid coitus during the menstrual period is not psychological but hygienic."

Besides, coitus during the period when blood is flowing is against the aesthetic sense of a decent person. So it should be forbidden for aesthetic reasons as well.

However, in Islam menstrual blood is considered unclean, not the menstruating woman. Only sex relation is prohibited, but one should not regard her as an unclean object as is done in some other societies. So, all the regulations in this respect are scientific and hygienic.

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۲۲۲- نِسَاءُكُمْ حَرْثٌ لَكُمْ فَأْتُوا حَرْثَكُمْ أَنَّى شِئْتُمْ  
وَقَدْ مَوَّأَىٰ لَكُمْ

2 : 223 Your wives are a tilth to you: so approach your tilth as you will and send (good deeds) before you for your souls.

**Wives as Tilth:** In this verse wives have been mentioned a tilth to husbands.

To a farmer his tilth is a precious possession which yields him crops for sustenance and satisfaction. He is free to cultivate it at any time and in any manner, but unless he is careful and considerate he will come to grief. Prior to sowing, he is to complete certain essential prerequisites such as appropriate tilling of the soil, cleaning the ground of weeds and other harmful elements, adequate provision for irrigation and proper manuring. Otherwise, the soil will degenerate and yield very poor crops.

A good farmer starts sowing when his land is fully ready to receive the seeds. Further, he sows the seeds at the appropriate time, he knows that summer crops will not grow in winter and vice versa.

Similarly a husband, before copulation, should see that his wife is ready both physically and mentally for the act i.e., for receiving the seeds. He should not approach her when she is unclean i.e., during her menstruation-period, or when she is ill, or during the 40 days (verse 2: 232) following child birth. Keeping in mind the limitations detailed above, the husband can chose his own time and manner of approach.

In this connection Abdullah Yusuf Ali writes as follows in his translation of the Holy Quran (vide note 249. p.88):

"Sex is not a thing to be ashamed of, or to be treated lightly or to be indulged to excess. It is as solemn a fact as any in life. It is compared to a husbandman's tilth; it is a serious affair to him: he sows the seed in order to reap the harvest. But he chooses his own time and mode of cultivation. He does not sow out of season nor cultivate in a manner which will injure or exhaust the soil. He is wise and considerate and does not run riot. Coming from the simile to human beings, every kind of mutual consideration is

required, but above all, must remember that even in these matters there is a spiritual aspect. We must never forget our souls, and that we are responsible to God."

۲۲۸- وَالْمُطَلَّقَاتُ يَتَرَكْنَ بَأَنفُسِهِنَّ ثَلَاثَةَ قُرُوءٍ ۚ وَلَا يَحِلُّ لَهُنَّ أَنْ يَكْتُمْنَ مَا خَلَقَ اللَّهُ فِي أَرْحَامِهِنَّ إِنْ كُنَّ يُؤْمِنُنَّ بِاللَّهِ وَالْيَوْمِ الْآخِرِ ۗ

2: 228 Women who are divorced shall wait, keeping themselves apart, three monthly courses. And it is not lawful for them that they should conceal that which Allah has created in their wombs if they are believers in Allah and the last day...

**Iddat:** According to this verse a Muslim woman after divorce will have to wait for three menstruations before she can marry again. This is no doubt wise and scientific to avoid any future conflict about the paternity of children born after remarriage of the divorced women. Islam gives utmost importance to the true paternity of children or various reasons including the question of inheritance.

If pregnancy occurs, menstruation stops. This is known as amenorrhoea. It is the earliest symptom of pregnancy. Amenorrhoea has not the same significance in the case of a woman whose periods were previously irregular, nor in a woman of menopausal age (stoppage of menstruation). 'Pregnancy has been known to occur in a girl before a menstrual period has been observed, and it may arise during a period of amenorrhoea, for example during lactation or following discontinuation of oral contraceptives. Difficulty may arise if there is bleeding during early pregnancy. Such bleeding may come from the cavity of the uterus before the *decidua capsularis* fuses with the decidua vera; but it is not to be regarded as menstrual bleeding.<sup>1</sup> Such bleeding in early pregnancy will be regarded by lay people as true menstruation, though pregnancy is still there. The Islamic provision of waiting for three successive menstrual periods will ensure that the divorced woman was not pregnant by her previous husband and will prevent any possible conflict about paternity of the future child of the divorced woman. If this rule is not observed there is a chance that the

divorced woman was with child produced by the divorcing husband, even if she had one or two "courses" of bleeding.

If three months are allowed, in spite of bleeding due to threatened abortion, other signs of pregnancy will also be apparent.

Besides if such precaution is not taken and if sex takes place soon after divorce then there is the possibility of superfecundation or superfactation by the next husband over above the pregnancy due to the previous husband<sup>2</sup>. Islamic provision will thus prevent such possible medicolegal complications as are more easily detected in mixed races when a white woman gives birth to two foetuses—one white and one black or vice versa.

As for not disclosing what is in the womb, it is mostly based on the fact that unless the woman concerned gives a correct statement about her period, it is very difficult to prove her pregnancy and even her menstrual period. The medical tests available are not practicable. So Allah declares it illegal to conceal about the pregnancy, because if pregnant, she cannot marry again unless she is delivered of her child. Thus there is a chance of false statement to avoid long delay of remarriage. Islam makes such concealment a great sin to avoid social problems.

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۲۳۳- وَالْوَالِدَاتُ يُرْضِعْنَ أَوْلَادَهُنَّ حَوْلَيْنِ كَامِلَيْنِ  
لِمَنْ أَرَادَ أَنْ يُتِمَّ الرَّضَاعَةَ

2:233 The mothers shall give suck to their offspring for two whole years if the father desires to complete the term....

**Suckling Period:** In the case of all mammals, the mother's breasts undergo certain changes to produce milk for the new born. This is the only food for some time for all mammalian offspring including human babies. But breast feeding was a taboo among the aristocrats in Arabia in the 7th century as it has been discouraged till recently in modern societies. But the Quran enjoins breast feeding for two whole years. There are many advantages of breast feeding over artificial feeding for which very recently medical scientists are also emphasizing the importance of breast feeding (lactation period). Lactation is secretion of milk from the breast. It is inhibited during pregnancy by the action of placental oestrogen on the hypothalamus and anterior pituitary. Immediately after delivery, the inhibition is removed and an outflow of prolactin initiates lactation but never before the placenta is cast out or ceases to function. Once lactation is initiated, it is maintained by suckling or stimulation of the nipple. By a nerve reflex operating via the hypothalamus, suckling stimulates the secretion of prolactin, GH (Growth Hormone) and ACTH (*Adreno corico trophin*) and inhibits the release of *gonadotrophins* (sex hormones). Lactation may continue even up to 4 years if the nipple is stimulated regularly.<sup>1</sup>

Actual delivery of milk from the nipple is caused by contraction of myoepithelial cells around acini and ducts, which are stimulated by oxytocin, released by the hypothalamus and anterior pituitary gland in response to stimulation of the nipple. This oxytocin is responsible for strong contraction of the puerperal (after delivery) uterus during suckling or handling of the breast. Such after-pains as are due to uterine contraction worsen at the baby's feed times. But such contraction helps the uterus to involute to its normal size and expel the uterine contents.<sup>1,2</sup>



During the first two or three days after delivery, the breasts secrete only colostrum, yet the baby must be "put to breast regularly in order to promote bonding between the mother and baby, to stimulate the secretion of milk and to teach the baby to suck."<sup>2</sup> The colostrum is the thin, yellowish milky fluid containing upto 20% protein, in which immunoglobulins predominate (Ig), representing the antibodies found in maternal blood. It contains more minerals and less fat carbohydrate than does milk. So colostrum is very helpful for the new born babies. In the recent past, artificial feeding which has become so wide spread throughout the world is perhaps an indictment of the apathy of doctors, nurses and others who are in a position to give advice and education to future parents, in the face of the immense power of commerce and advertising. The trend is encouraged by the changes in society and our way of life which seem to make artificial feeding more convenient. But "modern research reveals more and more reasons why the milk from his own mother provides the baby the best form of nutrition and the best protection against infections, especially enteric infections, and against the development of hypersensitivity. Several mechanisms are involved in protection against infections. These include maternal secretory IgA and lysozymes which either kill organisms or prevent their adherence to the intestinal wall, lactoferrin which ensures rapid absorption of iron so that it is not available for the essential needs of replicating organisms, and encouragement of growth of lactobacillus bifidus to the exclusion of other pathogenic organisms which flourish in the more alkaline intestinal environment provided by the ingestion of cow's milk. While secretory IgA is thought to be an important factor against the development of hypersensitivity, avoidance of the powerful antigenic effect of cow's milk protein is equally important."<sup>2</sup>

Thus modern science is advocating the usefulness of breast feeding, which was ordained in the Holy Quran in the early 7th century.

There are other important benefits of breast feeding which are also worth noting. Breast feeding not only provides adequate nutrition to the infant, but it is a two way process which was intended to provide a pleasurable experience for both parties. This feed-back to the mother can make the feed time something to look forward to, rather than a routine duty to feed the baby. An important part of the process is to help the mother fall in love with her baby. In this way the mother infant attachment is made secure, so that she will not wish to be parted from her baby in the early months, and

her continuous presence will give the baby security and the mother a proper understanding of its needs throughout the early development.

Breast feeding is highly beneficial also for the mental health of the child. Psychologists and psychiatrists have found that the root cause of many mental ailments and delinquency may be traced to insecurity and deprivation of love during infancy. The baby feels secure and reassured in the warmth of its mother's lap and breast and intensely enjoys the soothing physical touch.

Cow's milk contains more fat than the baby can cope with, so one must dilute it but while doing so the necessary concentration of other essential ingredients are lowered. Besides boiling or pasteurisation of milk destroys vitamin C completely. Mother's milk is well balanced according to the need of the child containing adequate nutrients, vitamins and immunoglobulins. Besides the temperature of the mother's milk is ideal for the baby.

"There is also cumulative evidence that the health of the breast is best preserved when they are allowed to fulfil their physiological function."<sup>2</sup>

During pregnancy there is an increase in the excretion of several urinary amino acids, histidine and threonine being the ones most markedly affected.<sup>3</sup>

Threonine excretion increases steadily throughout gestation, whereas histidine reaches a maximum at about 4 months, and thereafter remains at more or less the same level till term.<sup>4</sup> During lactation the excretion level falls rapidly, often to values below those found in the non-pregnant state.<sup>5</sup>

After abortion, menstruation begins within 4-5 weeks (mean time 22-23 days) and the first period is ovular in 75-85% cases. But after delivery at term, the return of ovulation and menstruation depends on lactation. In women who do not breast feed, menstruation usually reappears in 6-8 weeks and 90% have a regular cycle in 3 months, but usually much later in lactating women. Lactation and ovulation are antagonistic, either because prolactin and gonadotrophins cannot be produced simultaneously or because prolactin blocks the action of gonadotrophins. It also said that the ovaries of breast feeding women are to some extent refractory. The suppression of the ovarian output of oestrogen explains why lactation encourages involution of the uterus." So lactation delays menstruation in general.<sup>1</sup>

Lactation also delays pregnancy as "Amenorrhoea (absence of menstruation) may persist for as long as 2 years in lactating women, though not in all cases. In a small percentage of cases (10-30%) menstruation may return within 3-6 months. When menstruation begins in lactating women, the

cycle is not regular at first and the first period is anovular in 60% cases. Despite such observations, lactation does undoubtedly lower fertility. It is now an accepted view that failing lactation allows a return of menstruation i.e. ovulation and possible future pregnancy. If contraception is not practised 75% of non-lactating women conceive again within 6-9 months of delivery as against 7-10% of those who breast feed."<sup>1</sup>

So Quranic advice to breast feed for 2 years will no doubt help in natural family planning in a large number of cases. Besides a gap of minimum three years is essential for the mother to regain her normal health after each pregnancy.

In recent times modern societies are again turning back to breast feeding which is so beneficial to both mother and child.

In the early pre-Islamic Arab society, well-to-do families used to employ foster mothers (from among lactating women) to suckle their babies. Our Holy Prophet (sm.) was also similarly suckled by his foster mother Bibi Halima (r) the Quran permits such arrangement if both parents agree. Such arrangement will not physically harm the baby as it will suck the milk of this foster mother which is expected to have similar composition to its own mother's milk.

Of course, if for some reason, the mother is unable to suckle her baby or there is disease of the breast, there is no sin in resorting to artificial feeding. Besides after 3-4 months all babies must be provided with solid or semisolid food along with milk. If mother's milk is not adequate cow's milk must be given after suitable dilution.

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۞-هُوَ الَّذِي يُصَوِّرُكُمْ فِي الْأَرْحَامِ كَيْفَ يَشَاءُ ۚ لَآ إِلَهَ إِلَّا  
هُوَ الْعَزِيزُ الْحَكِيمُ ۝

**3:6 He it is Who fashions you in the wombs as He pleases. There is no Allah except He, the Exalted, the Wise.**

The Quranic verse draws our attention to two most exciting biological phenomena connected with the continuity of life in human species, namely the beginning of pregnancy and the diversity of the physical traits which all human foetus develops inside the uterus by Divine decree.

Life begins for each human being when a minute wriggling sperm of the male parent plunges into a mature ovum of the female. It is at this moment of fusion of the sperm and ovum (a process called fertilization), that not only the existence of a new human being but also its sex and individuality is determined. During the first month of human life, the fertilized egg undergoes a miraculous change first by a cleavage into two cells, and further by subsequent divisions and redivisions is transformed into a creature with a head, body, heart, and with the appearance of arms, legs, ears, stomach and brain.<sup>1</sup>

Secondly, the verse points to the master designing by the Supreme Hand, the intricate patterns of human form in the gravid uterus, determining the cast of our features, the form of our finger prints, and all those subtle differences which set apart one man from another and resulting in the absolute individuality and uniqueness of every person. Biology not only recognizes this but in fact supplies evidence for a rational explanation of this uniqueness. In the first place, the sex of every child is normally fixed at the instant of conception from the moment the father's sperm enters the mother's egg. Each body cell of a normal human individual has 46 chromosomes—22 pairs, and the two sex chromosomes becoming the 23rd pair<sup>2</sup>. Among the two sex chromosomes of the male, one is X and other Y, while the female has two X's forming the pair. The male produces two kinds of sperm; one half carries an X chromosome and the other half carries a Y chromosome. All the eggs, however, carry X chromosomes. When an egg is fertilized by a sperm bearing a Y chromosome, the baby is male (XY), and

when the egg is fertilized by a sperm containing an X chromosome the baby is female (XX). The combination of these chromosomes is beyond human control, and Allah decides if the child will be a male or a female.

The physical basis of inheritance of characters by the offspring lies in the sex cells in more or less discrete units for which Johannsen suggested the word, 'gene' in 1909. Each normal chromosome contains its specific number of genes, and since the chromosomes are paired, each gene has also its mate, one inherited from the father and one from the mother. When the two genes are alike, they will have equal weight in affecting the characteristics and the result is one of blending. Frequently, however, one gene is stronger and exerts the dominating influence over the other apparently inert one. Although a child gets half of his genes from his mother and the other half from his father, it receives only half the total genes (never all) each parent possesses. It is a matter of divine decree (interpreted as chance by biologists) which character a child will inherit from its parents. It is even more of a gamble (in truth, again, a divine decree) which if any, genes it will inherit from ancestors several generations back. A child may resemble one parent in one trait and the other in another trait, may be intermediate the parents in a third, and resemble neither in a fourth.

Heredity seems notoriously capricious to a casual observer, but the uniqueness of each individual in the mother's womb is preordained by the Supreme Creator. Thus each individual is distinct in appearance, size, colour of skin, and many other traits so much so that no two persons are exactly alike. It is quite interesting that even the thumb impressions of different people are so different that it is a reliable method of identifying individuals. Again, in spite of differences in various details, there are some similarities in the members of each race. This marvellous unity in diversity is a fact which should provide us with sufficient evidence to believe in the Supreme Creator, Allah.

Sometimes, the foetus may have some developmental defects like congenital heart diseases, anancephale, polydactility and so on. Some of these defects are compatible with life while the others are incompatible. But all these are beyond human control though a few of them may be diagnosed in the womb by ultrasonic scanning. There is no doubt that such variations are also ordained by Allah.

From the above discussion, it is evident that Allah the Almighty can mould the human babies in their mother's wombs in whatever way He

pleases out of an infinite possibility of combinations of genes. The intricacies of creation and development of the human embryo indicate that Allah is the One with all wisdom and knowledge. So whatever He creates is according to His infinite, wisdom whether we may or may not comprehend it.

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٢٤- تُولِجُ اللَّيْلَ فِي النَّهَارِ وَتُؤَلِّجُ النَّهَارَ فِي اللَّيْلِ وَتُخْرِجُ الْحَيَّ مِنَ الْمَيِّتِ  
 وَتُخْرِجُ الْمَيِّتَ مِنَ الْحَيِّ وَتَرْزُقُ مَنْ تَشَاءُ بِغَيْرِ حِسَابٍ ○

3 : 27 You cause the night to pass into the day and You cause the day to pass into the night. And You bring forth the living from the dead, and You bring forth the dead from the living. And You give sustenance to whom You choose, without stint.

**Alternation of day and night :** It is our common experience that everyday at dusk the night enters into the day and at dawn the day enters into the night, the transition being gradual. This penetration of the day into the night or vice-versa occurs on account of the following factors:

- i) The diurnal rotation of the earth about its own axis as ordained by Allah.
- ii) The spherical shape (strictly speaking oblate spheroid) of the earth and the atmosphere surrounding it, as willed by Allah.

The diurnal rotation of the earth brings about the day and the night and their alternation. This has been fully explained under verse 2 : 164. The round earth and its atmosphere make the merging of day and night gradual, covering a period of time which we call twilight.

During twilight a soft, mellow, diffused glow persists for sometime immediately after the sun sinks below the horizon (from sunset to nightfall) or before it rises above the horizon (from daybreak to sunrise). This phenomenon is caused by the rays of the sun that are scattered by the particles in the earth's atmosphere so that they still reach the earth ; the faint glow of twilight lasts until the sun is about  $18^0$  below the horizon.

The duration of the twilight varies from place to place. Near the poles the length of twilight varies at different times of the year, but at the equator it is always about the same. The sun's path above the earth hardly varies at the equator and the length of time the sun takes to drop  $18^0$  below the horizon does not vary. Twilight lasts about an hour at the equator. In the north and south of the equator the sun's path above the earth varies, causing

the length of twilight to vary. During the polar summer there is a period when the sun never drops below the horizon. Just south of the arctic circle, the summer sun never drops as much as  $18^{\circ}$  below the horizon. As a result twilight lasts all night from sunset to sunrise.<sup>1</sup>

It is also to be noted that at a particular place on the earth the twilights do not occur at the same hours of the day throughout the year. This is caused by the annual revolution of the earth around the sun. The earth along its annual course occupies at different times different positions with respect to the sun, making the duration of day-time and night-time different. On two occasions during the year, on March 21 and Sept 23, we come across equal duration for the day and the night, whereas on June 22 the day-time is the longest and the night-time is the shortest in the northern hemisphere while on Dec 22nd the day-time is the shortest and the night-time the longest and vice versa in the southern hemisphere. Consequently, the time of appearance of twilights correspondingly varies.

**The cycle of the living and the dead :** For a rational explanation of this verse, one has to comprehend the scientific definition of the two words 'the living' and 'the dead'. 'The living' stands for organisms which are themselves composed of non-living molecules but constituted into tissues with the spark of life that endows them with the capacity of carrying on all the life processes called metabolic activities. 'The dead' implies matter consisting of non-living molecules without the virtue of life activities namely nutrition and reproduction. It is Allah the Almighty Who can breathe in 'the spirit' into a collection of non-living molecules at the appropriate moment and this subject is beyond the scope of our present day knowledge. The present discussion is mainly centered on the circulation of matter from the non-living material into the living beings for their survival and the reversion of the living to the non-living. This universal phenomenon known as 'cycle of matter' can be elaborated as follows :

Life is supported in the regions of the earth known as the biosphere which includes the oceans, the surface of the continents up to a depth, and the lowest part of the atmosphere. Plants assimilate all the constituent elements of their living matter in mineral form and convert them into the diverse organic constituents of plant tissues which in their turn serve as food for animals. The elements that are combined in organic form in the bodies of living organisms must eventually be converted once more into inorganic form. This is the process known as mineralization of organic compounds



which occurs through combustion such as forest fires and burning of organic fuels by man, through the respiratory activities of animals and plants, and most importantly, through the decomposition of plants, animals, and their organic by-products by micro-organisms that are capable of digesting and oxidizing these compounds. This flow of matter can be further elucidated by referring to some basic chemical elements that make up about 98% of the material found in living organisms.

**Carbon** : Green plants can convert solar energy to chemical energy by a process called photosynthesis. Whenever the plants utilize this energy through respiration carbon dioxide is released again either into the air or into water. The plants are consumed by animals, and all organisms after death leave in their bodies carbon compounds accumulated during their life time.

**Water (H<sub>2</sub>O)** : Animals including man may pick up water by drinking while plants absorb it from the soil. In all organisms, some water becomes chemically incorporated into living substances, later to reappear when the substances are broken down. Eventually, all water taken in by organisms returns to the atmosphere, in plants largely through the leaves, in animals through breathing or evaporation from the skin or when animals discharge their wastes.

**Nitrogen** : Nitrogenous compounds are synthesized by plants after absorbing nitrogen from nature through the help of various microbial agents or through assimilable nitrogenous compounds available in the soil. These serve as a nitrogen source for the entire animal kingdom. Unlike plants, animals do excrete a significant quantity of nitrogenous compounds in course of their metabolism in the form of ammonia, uric acid, and as urea.

**Calcium** : Compounds of calcium are quite common in the rocks of the earth, and are picked up by animals in the dissolved state with water. Land plants obtain calcium compounds from the soil. Many kinds of animals use these in building skeletons in the form of bones or shells while the plants utilize calcium in the formation of cell wall. When animals and plants die, their skeletons and shells accumulate in the soil or on the bottom of oceans, lakes, and ponds for final disintegration.

**Phosphorus** : It is assimilated by living organisms in inorganic form as phosphates. In the living cells phosphorus is incorporated into the high energy phosphate compounds, nucleic acids etc. Upon the death

of the cell, it is again liberated as inorganic phosphate by a process called hydrolysis.

**Sulphur** : It is an essential constituent of living matter in the form of amino acids, cystine, methionine, and some co-enzymes. It is abundant in the earth's crust and is available to living organisms principally in the form of soluble sulphates. The organic sulphur compounds synthesized by plants serve as nutrients for animals and plant micro-organisms that decompose the dead plant and animal bodies, liberating hydrogen sulphide gas into the atmosphere.

**Magnesium** : It is a part of the chlorophyll molecule in green plants and is absorbed from the soil, and later enters the living cells of the herbivorous animals through grazing. In both cases, magnesium finds its way back to the soil after the death and decay of animals and plants.

**Trace elements** : Elements like zinc, copper, molybdenum are considered as trace elements, since they are indispensable in minute quantities in activating the specific enzymes in the living cells. These occur as contaminants of the major constituents of nutritive media, and in the dust particles from the air. The entry and exit of these also follow the same course as the essential elements mentioned above.

Thus, the possible meaning of 'bringing forth the living from the dead, and the dead from the living' as proclaimed in this Quranic verse, is strictly in accordance with modern scientific knowledge.

## Reference

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٣- قَالَ رَبِّ اَنۡىۤ يَكُوۡنُ لِىۡ غُلَامٌۢ ؕ وَقَدْ بَلَغَتۡنِى الْكِبَرُ وَاٰمِرٰتِى عَاقِرٌ  
 كَانَ كَذٰلِكَ اللّٰهُ يَفْعَلُ مَا يَشَآءُ ۝

3 : 40 He (Zachariah) said : My Lord ! How can I have a son when age has overtaken me already and my wife is barren? He was answered : So (it will be). Allah does what He wills.

**Son to Zachariah in old age :** Prophet Zachariah (a.s.) prayed for a son and in response to that Allah sent an angel and informed him that Allah had granted his prayer and he would get a son to be named Yahya. Then prophet Zachariah was astonished over the announcement of the angel because he thought to himself that he had no possible chance to beget a child. So he exclaimed, "My Lord ! How can I have a son when I am very old and my wife is barren." He was told that so it would be as it was the desire of Allah.

Now there is really no exact age limit for a man to be able to procreate and many elderly persons get children through their younger wives. Scientifically even old men may be able to copulate and if they have a normal number of sperm, there is no reason why they should not be able to procreate. In this verse it is not mentioned how old prophet Zachariah (a.s.) was. So we may safely assume that though aged, he was able to procreate. Havelock<sup>1</sup> writes, "In man sexual desire and even sexual potency are often found at an advanced age." He further states, "It is a delated question how far there can be said to be any period in man corresponding to the menopause. If so, it is certainly vague, as indeed is sufficiently indicated by the fact that the sperm secreting function has no necessary final term and may be continued to advanced old age, even in one reported case to the age of 103."

In women menopause (cessation of manstruation) occurs between wide limits of age--35 to 55, but most commonly between 45 to 50 and is completed within two to three years.<sup>2</sup> So a woman cannot bear a child after menopause.

From the above discussion it is clear that procreation of a son by prophet Zachariah (a.s.) was quite possible.

As for his wife, the Quran does not mention her age which might be within the maximum reproductive age limit of 55 years. In that case there is no difficulty in explaining her pregnancy. The point which seems impossible to the prophet Zachariah (a.s.) was not for her age, but it was believed that she was barren. Now barren is a vague term and in the absence of scientific investigations, the barrenness may be only apparent rather than real. If a woman does not bear any child even after a few years of marriage she may be labelled as barren. But there are many instances when one becomes pregnant even after 16 years of marriage.

Such women are often regarded as barren or sterile (primary). So in this case physiologically the mother of Yahya (a.s.) might have been considered barren, because she did not bear a child after her marriage and her husband thought she was barren. Besides when both the partners are physiologically normal, yet pregnancy may not occur for no obvious reason.

There are several possible causes of primary infertility in females, the more important of which are noted below :

- a) Anovular menstruation due to subclinical adrenal failure and vit. B<sub>12</sub> deficiency. It represents about 4% of the cases of infertility in women.
- b) Pelvic adhesions due to inflammation which may interfere with the passage of the ovum from the ovary to the fallopian tube.
- c) Partial or complete obstruction of both the tubes due to inflammation or spasm. This represents 10% of infertility cases.
- d) Uterine hostility to the spermatozoa or fertilized ovum.
- e) Uterine agenesis (absence).
- f) Cervical and vaginal hostility to spermatozoa due to heavy discharge, excessive acidity and tough vaginal septum or hymen.
- g) Production of antibodies against spermatozoa like spermagglutinins and spermatozoa--immobilization antibody, which is found in sterile women (never in virgins or during pregnancy).
- h) Tumours of uterus like leiomyoma and adenomyosis.
- i) Coital errors.

So, pregnancy is no doubt controlled by the Almighty Allah. In this case Allah made the birth of prophet Yahya (a.s.) possible by His decree and that was not physiologically impossible though rare. Thus a rare event which is generally not possible can become a reality if decreed by Allah.

## References

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٣٤- قَالَتْ رَبِّ أَنَّى يَكُونُ لِي وَلَدٌ وَلَمْ يَمْسَسْنِي بَشَرٌ ۖ قَالَ كَذَلِكَ اللَّهُ يَخْلُقُ  
مَا يَشَاءُ ۖ إِذَا قَضَىٰ أَمْرًا فَإِنَّمَا يَقُولُ لَهُ كُن فَيَكُونُ ۝

3 : 47 She (Mariam) said : My Lord ! How can I have a child when no mortal (man) has touched me ? He (Angel) said : So Allah creates what He wills. If He decrees a thing, He says unto it only : Be ! and it is.

**Virgin birth of Isa (a.s.) :** The astonishment of Mariam (a.s.) on hearing the divine message is understandable. The birth of a baby to a woman whom a man had never touched seemed naturally impossible, and the Jews did never believe in the virgin birth of Isa (a.s., Jesus Christ). But in this verse Allah clearly states that Isa (a.s.) was born of virgin Mary by His decree as it is within His power to create whatever He wants to create. According to the Quran, the birth of I'sa (a.s.) the son of Mariam (a.s.) is a 'Sign' of the All Powerful Allah, and the Muslims believe in this miraculous birth of Isa (a.s.). Such a virgin birth in human beings is unusual and it cannot be properly explained scientifically with our present state of knowledge. But knowledge in this field is gradually expanding and we are beginning to have a glimpse into the mystery of births of offspring resulting without a male partner. Besides, whatever Allah creates in the material universe he subjects it to a set of rules. If we look for any evidence of birth without a male partner in His vast creation we find this in natural parthenogenesis (Parthenos = virgin, genesis = origin) or virgin birth.

In the animal and plant kingdoms the usual method of multiplication is through a process of sexual reproduction. This involves fusion of male and female sex cells (gametes), which means the participation of two parents in the process of procreation. But occasionally in some plants and animals new individuals are produced by a single parent through a process of sexual reproduction. This process is common in unicellular lower plants and lower animals like amoeba, plasmodia and hydra. It is not called parthenogenesis.

It is generally agreed that in the case of animals, a mature ovum contains within itself all the material potentiality to form a new being. But

sometime in some animals and under certain conditions an ovum may develop into a new individual without fertilization by a spermatozoa, which is known as natural parthenogenesis. This is found in lower animals, specially arthropods. So, "Parthenogenesis is a modified form of sexual reproduction by the development of an egg without its being fertilized by a sperm. Such potentiality of the ovum to develop further without fertilization can be released experimentally by a variety of mechanical, chemical and physico-chemical means, such as pricking, exposure to alternation of toxicity and reaction in the surrounding medium and treatment with various kinds of radiation etc. <sup>1</sup>"

Each species of living organism has a specific number of chromosomes in its body cells. During the production of sex cells, the chromosome number becomes half by a complicated process of cell division, so that each of the sex cells produced carries only half the number of body chromosomes (haploid number). During fertilization the union of male and female gametes forms a zygote. The haploid number of chromosomes contributed by the two gametes results in regaining the original chromosome number (diploid number) of the species.

In the case of natural parthenogenesis in lower animals, the egg develops without the usual reduction division, which means that it will have the diploid number of chromosomes and the egg develops into a normal adult. There is another type of parthenogenesis, in which reduction division does occur and the egg (in this case called monoploid) can develop whether fertilized or not. The monoploid offspring without fertilization develops into males, the diploid offspring after fertilization develops into females. This strange kind of reproduction occurs in bees, ants, wasps and their relatives. Here one finds sexual and asexual reproduction going on almost simultaneously.<sup>2</sup> In certain insects known as thrips and in aquatic animals belonging to Rotifera, males are unknown, the offspring being produced always parthenogenetically.<sup>3</sup> In a colony of honey-bees, the queen bee produces males by parthenogenesis, but also lays fertilized eggs that produce 'workers' and females.

In the year 1900, experimental biologists first studied artificial parthenogenesis in a wide variety of invertebrates. But during the last few decades ova of frogs and even mammals like rabbits have been stimulated artificially to develop without fertilization. The results have been usually incomplete and rarely survived beyond the embryonic stage. But there are

records of viable offspring occasionally in the case of rabbits. The biologists of the agricultural Research Centre at Beltsville, Maryland, USA found that a small percentage of eggs laid by a new breed of turkey are parthenogenetic. Although their development rarely continues until hatching, a particular parthenogenetically raised turkey lived to the age of 161 days.<sup>4</sup>

Parthenogenetic development in mammals except rabbits has never been observed to lead to living offspring. In human beings, no evidence of parthenogenests is known. But the experimentally observed parthenogenetic phenomena in vertebrates including mammals like rabbits illustrate the fact that apart from its normally necessary chromosomal contribution, the spermatozoa play little part in embryogenesis. However, there is some evidence that the plane of bilateral symmetry is determined in many animals by the direction and place of entry of the spermatozoon. Nevertheless both in this determination and the early polarization of the zygote, there must be a considerable flexibility, because the blastomeres resulting from its early segmentation are totipotent, and may separate to form complete embryos, as in the formation of uniovular twins.<sup>5</sup>

So when parthenogenesis is possible in mammals, we may presume that Almighty Allah used His law of parthenogenesis occurring naturally in the lower animals, for the virgin birth of Isa (a.s.), if the blastomeres of the developing zygote being totipotent may divide to form uniovular twins, and if a monoploid egg can develop without fertilization, then the 23 chromosomes of the ovum of Mariam (a.s.) could also duplicate and develop parthenogenetically, since Allah wanted it so. Thus we feel that though the virgin birth of a human being does not generally occur in nature, such a possibility cannot be biologically ruled out.

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٨٣- اَفْعَلِدْ دِيْنِ اللّٰهِ يَبْعُوْنَ وَ لَهٗ اَسْلَمَ مَنْ فِي السَّمٰوٰتِ وَ الْاَرْضِ طَوْعًا وَّ كَرْهًا  
 وَ اِلَيْهِ يُرْجَعُوْنَ ۝

3 : 83 Seek they other than the religion of Allah, when unto Him submits whosoever is in the heavens and the earth, willingly, or unwillingly, and unto Him they will be returned.

**Submission to Allah willingly or unwillingly :** In the light of our present day knowledge we know that in the heavens and the earth there are following classes of objects and beings :

- i) Non-living material such as atoms and molecules and substances made up of them.
- ii) Non-Living non material such as energies in their various forms, and various forces of nature.
- iii) Living material such as plants and animals including man.

The Quran also mentions two other classes of being, jinns and angels, which we cannot account for in ordinary scientific terms.

Of the above, all material objects, whether as minute as the electron or as big as the stars and nebulae, carry on with their activities according to the laws of nature as ordained by Allah. Similar is the case with the various forms of energy, forces of nature which must function according to the laws decreed by the Almighty.

All of them, whatever their class, nature and kind may be, have to obey these laws and cannot go beyond these. All the laws are not known to man so that there may be instances where natural laws may seem to have been violated. but it is not actually so.

As all laws are known to Allah, and all activities are performed according to these laws, and apparent violation of any such law also follows a Grand Scheme designed by the Creator ; and so any such apparent violation also performs a very special function.

Consider for example, the exchange of mesons between nucleons (i.e. protons or neutrons) in the nucleus. We know from the mass energy relation



$E=mc^2$  that it takes an energy of 140 Mev to create a meson. In fact, with the availability of energy, mesons have been created in accelerators in the laboratory. The question is, how is energy provided in the nucleus without any additional excitement from outside. Apparently, the energy conservation law seems to be violated by an amount  $\Delta E=140$  Mev. One can explain this violation only by saying that the energy violation takes place for an exceedingly short time at which we cannot measure.

Processes taking place within this short time and violating energy conservation are said to be virtual. The interesting thing to note is that the violation of the energy conservation which is one of the laws of Allah's creation, does not, however, take place in a haphazard way. Energy violation takes place according to a principle, namely,  $\Delta E \cdot \Delta t \geq h$  (Planck's constant), which is a form of expression of Heisenberg's uncertainty principle in the microscopic world. This deviation from laws also follows a law ; nothing can happen outside the chain of laws ordained by Allah.

The decrease density of water on solidification into ice may seem to be an anomaly of nature. In general, the density of any liquid increases as it is cooled and ultimately the density becomes maximum on solidification. The only exception is water the density of which becomes maximum at 4° C (3.98° to be exact) and if the temperature is reduced further, its density decreases to a minimum on becoming ice at 0°C. The x-ray and neutron diffraction studies of ice reveal that ice has a crystalline structure in which each oxygen atom is surrounded tetrahedrally by four other oxygen atoms (Fig. 2). Unlike the structure of other solids, this is a very open structure which causes ice to have a low density<sup>1</sup>. Thus, this anomaly is found to follow a law; this has been ordained by Allah for the immense benefit of mankind and other aquatic creatures.

Of the living organisms known to us, human beings are endowed with higher intelligence and freedom of will and action in accordance with Allah's design for a superior function. Those of them who understand the laws ordained by Allah, comprehend consciously the existence of Allah, and always seek His pleasure of their own accord.

But those of them, who through wrong exercise of the freedom granted to them by Allah in the intellectual and material fields, and through their evil deeds, have developed "disease in their hearts" and perversity in their nature, are foolish and haughty enough to be heedless, but are also subject to a Grand Scheme of the Creator.

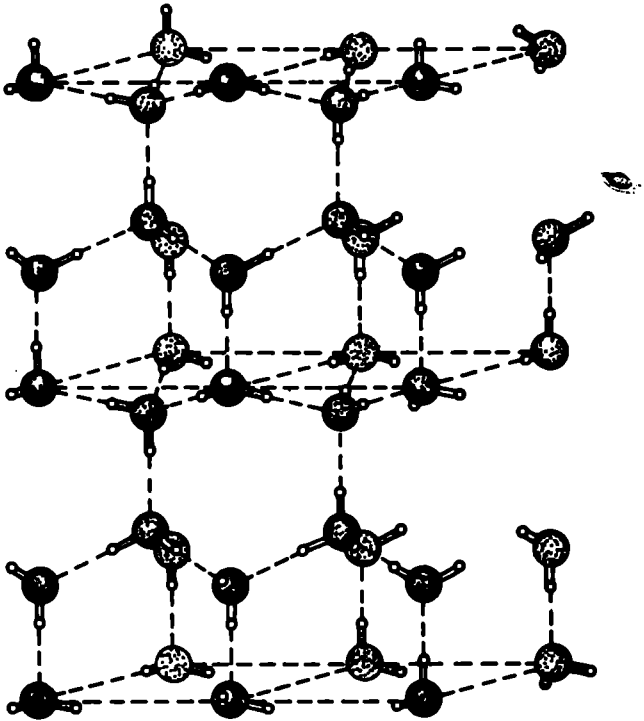


Fig. 2 : The arrangement of molecules in the ice crystal. The orientation of the water molecules, as represented in the drawing, is arbitrary; there is one proton along each oxygen-oxygen axis, closer to one or the other of the two oxygen atoms (after Pauling).

Though mentally unwilling, the evil-doer cannot but submit to the will of Allah. Every cell of his body, all physiological functions within his body, his physical development and ultimately his death, all take place according to natural laws willed by Allah. That is, his whole self excepting his arrogant mind submits to Allah. The arrogance of the evil-doer is due to abuse of the freedom granted to him.

Thus from the above discussion it is evident that all creations in the universe willingly or unwillingly submit to the laws of nature laid down by

Allah. But man has been endowed with limited freedom of thought and action, and thus has the distinction of being the best of the creations (Ashraful Makhluqat). Because of this freedom man may choose any way of life he desires. But due to his limited knowledge, he is prone to select a wrong one. So Allah, through His infinite Mercy and Wisdom has been kind to provide us, through His prophets, a code of life or '*Deen*' to use our freedom.

### Reference

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۱۳۷- قَدْ خَلَتْ مِنْ قَبْلِكُمْ سُنَنٌ ۖ فَسِيرُوا فِي الْأَرْضِ فَانظُرُوا كَيْفَ كَانَ  
عَاقِبَةُ الْمُكَذِّبِينَ ○

**3 : 137 Many were the ways of life that have passed away before you : travel through the earth and see what was the end of those who rejected Truth.**

**Fate of those who rejected the truth:** The Quran in this verse speaks of the various ways of life of the people of the past and asks the believers to travel through the earth to see the consequences of the people who denied, i.e. did not follow the laws and rules ordained for them by Allah.

There are many verses in which the believers have been urged to take to travel: 3: 137; 6: 6, 11; 12: 109; 16: 36; 22: 46; 27: 69; 30: 9, 42; 35: 44; 40: 21; 47: 10. The purpose defined is to know of the past ; and to see the consequences of the people who did not follow the message.

These verse do not refer to any particular people or country or period. It is interesting to note that the territory popularly known as the Fertile Crescent had witnessed the rise and fall of many civilizations. Some of these have been specifically mentioned in the Quran and these are instances which were easily comprehensible to the Arabs. A line drawn from Egypt through the Mediterranean, lands of Palestine and Syria, then following the Tigris and Euphrates, through Mesopotamia to the Persian Gulf makes this Crescent. About 4,000 years ago this mighty semicircle around the Arabian desert, which is called the Fertile Crescent embraced a multiplicity of civilizations. Here lay according to the archaeologists, the centre of civilizations from the Stone Age right up to the Age of Graeco-Roman culture.

Egypt's mighty pyramids and Mesopotamia's massive temples with staged towers, Zigguras, are the evidences of the prehistoric civilization of this region. In ancient Egypt reigned the pharaohs and in Mesopotamia between Tigris and Euphrates reigned the kings of Sumer and Akkad.

But according to the Quran prophets were sent to all the peoples of the world (5 : 51 ; 10 : 47 ; 13 : 7 ; 15 : 10 ; 16 : 36 ; 17 : 15 ; 26 : 208 ; 28 : 59 ; 35 : 24 ; 35 : 37).

So, for a Muslim living any where on the earth, this would mean the past of the people of that country along with that of the people of other places of the world specially, those referred to in the Quran.

The Quran asks the believers to see the consequences for those who defied the message of Allah preached by the prophets. As prophets were sent to all nations as mentioned in the Quran, the messages of all the prophets and the people to whom they were sent, must be known for a full understanding of the importance of this verse. But our present knowledge of past history is imperfect. We do not know all the facts.

Even if we confine ourselves to the prophets named in the Quran, difficulties arise as the revelations made to all of them are not known, not even available even in interpolated and unauthentic forms except in the cases of the Taurat (Torah), the Zabur (Psalms) and Injil (New Testament). Revelation to Hazrat Ibrahim, Ismail, Ishaque, Yaqub (peace on them) and his tribes as stated in the verse 3: 84 are not available as yet.

Only one thing is known that all the prophets preached not only against polytheism, but also against all sorts of vices. If the consequence of those who defied the messages be taken to mean total destruction, it is very difficult to take 'polytheism' by itself alone as the cause as there are many ancient polytheist nations still there. So there must be some other reasons also.

An analysis of the activities of the Quranic Prophets and the people among whom they preached shows that those who suffered total destruction are: (i) the people of Hazrat Nuh (a.s.) and Hazrat Lut (a.s.), (2) the Ad, (3) the Thamud, and (4) the people of Madyan. These people besides being polytheists indulged in various vices enumerated in the Quran. These vices--moral degradations, were and are the causes of the downfall of so many nations as can be known from history.

Any way to know about the people of the past, recourse is to be had to history, but history seldom goes beyond about 2,000 to 3,000 BC in some countries. To know about the period beyond this i.e., the pre-historic period the only means is archaeology--the study of the material of the man's past (archai=ancient things; logos=science, theory). The main aim of archaeology is to place the material remains in the historical contexts to supplement what may be known from other sources, e.g., written records and other materials.

For a century now the American, English, French and German archaeologists have been making archaeological investigations in the countries of the Fertile Crescent with a view to finding how far the materials found there corroborate the narratives of the Scriptures. The results so far achieved, help much to understand the Biblical/Quranic narratives in their proper perspective. Fruther investigations with the various modern advanced scientific techniques are sure to reveal more facts with greater accuracy.

In modern archaeology many modern scientific techniques of various disciplines of the physical and natural sciences are being used such as (1) physics for radio-active dating and aerial photography, (2) chemistry for chemical dating and archaeological chemistry, (3) geology, (4) climatology and paleobotany, (5) paleontology (study of fossil remains), (6) mineralogy, (7) geochronology, (8) dendrochronology (dating of tree by counting their growth rings), and others. These are used to determine accurately the dates of various materials found in the course of archaeological investigations.

By radio-active carbon dating in which the activity of the radio-active carbon (carbon 14) present in bones, wood and ash found in archaeological sites is measured, the approximate age of the material can be determined. This radio-active carbon dating, a by-product of research in atomic physics has revolutionized much of archaeological chronology. Although it is less than perfect, it has given archaeology a new dimension extending chronology as far back as 40,000 years. Other physical techniques of dating such as potassium-argon dating and dating by thermoluminescence are also being employed now. Potassium-argon dating has made it possible to establish the earliest remains of man and his artifacts in East Africa at least 2 million years old or probably further. The analysis of the flourine contents of bones has also been helpful in dating the bones.

It is only recently that some Muslim countries such as Egypt and Iraq have taken up archaeological investigation in their countries. Some attempts appear to have been made in the early days of Islam. Caliph Muawiya (661-680 A.C.) is stated to have made some investigations into what is popularly known as Shaddad's palace—referred to in the Quran (89 : 7) as the city of Iran with lofty pillars.

It is really unfortunate that no attempt has been made to know even about things mentioned in the Quran in spite of all these injunctions to take to travel to know about the past. This verse shows that the Muslims must try to know of the past. This they can do through scientific research and specially through archaeological investigations.

١٩٠- إِنَّ فِي خَلْقِ السَّمَوَاتِ وَالْأَرْضِ وَالاخْتِلافِ اللَّيْلِ وَالنَّهَارِ لآيَاتٍ لِأُولِي  
الْأَبْصَارِ

3 : 190 Behold ! In the Creation of the heavens and the earth and the alternation of night and day– there are indeed Signs for men of understanding.

#### Creation of the heavens and the earth

This Quranic verse can be considered in two parts. The first part, viz., "In the creation of the heavens and the earth", has already been elaborated under verse 2 : 164.

#### Difference of the night and the day

The second part, viz. "In the difference of the night and the day" has been discussed under verse 2 : 164.

١٩١- الَّذِينَ يَذْكُرُونَ اللَّهَ وِلسًا وَاَعْرُودًا وَاَعْلَىٰ جُنُوبِهِمْ وَيَتَفَكَّرُونَ فِي خَلْقِ  
السَّمَوَاتِ وَالْأَرْضِ رَبَّنَا مَا خَلَقْتَ هَذَا بَاطِلًا سُبْحَانَكَ فَقِنَا عَذَابَ النَّارِ

3 : 191 Those who celebrate the praises of Allah, standing, sitting, and lying down on their sides, and contemplate the creation of the heavens and the earth and say, "Our Lord ! You have not created this in vain ! Glory be to You, and save us from the penalty of Fire.

This verse has two aspects namely, (a) scientific significance of the utterances mentioned in the verse and (b) the type of men who make such utterances.

Let us dwell upon the first aspect. In fact, the above utterance forms the very basis of modern ecology which deals with life and environment. With the gradual expansion of scientific knowledge, man is beginning to learn that in the various interactions of matter and life in nature, there is no such thing as redundancy or waste. Firstly, Allah's creation is based on truth and wisdom ; minimum principles are operative in many different areas, e.g., the principle of least path in optics, the principle of least action in mechanics, the principle of least energy in the stability of matter etc. All speak of the most trite and tidy form of creation. Secondly, all forms of living and non-living matter display a Master-design which makes man reflect on the nature of things both within and outside his own system. Let us consider the case of bacteria. When we are attacked by certain bacterial diseases, we tend to think that bacteria are indeed a nuisance, little realising that without many of these bacteria, our existence would be jeopardised. The role of bacteria in nitrogen fixation and in producing many of our foodstuffs is well-known. Except for a number of pathogenic bacteria and viruses against which the human and other living systems can develop appropriate defence mechanisms also, the micro-organisms are of extreme importance in the maintenance of the very delicate ecological of nature.

Futhermore, a lot is being told these days of genetic engineering. But in its present form, genetic engineering means the employment of these bacteria to produce things we want. Thus, no wonder, Allah has made a micro-organism a complex laboratory.

The diversity of living and non-living forms of matter is simply stupendous. In the biological world, one notices that some living species are very odd looking, while some others are pretty to look at. Some move about in day-time and some during the night, some emit a particular odour, some behave as hosts and some as parasites, but the wonderful thing to notice is that none is without a function. And the stil more interesting thing is that the physical and biological functions of these species are not merely to live and die, but these functions are, in turn, linked with the existence of other forms of life. In the present state of our knowledge, we are not fully familiar with these interdependences in the plant and animal world. Thus, if we destroy a certain kind of species through lack of knowledge or through indiscriminate action, the existence of some other species is eventually endangered and ecology is terribly disturbed. So, if at a



certain time, any of the living organisms poses a problem, its population should only be controlled but certainly not destroyed.

The variety of life forms may have another purpose, namely, that one species may have to learn a lot from a completely different one in respect of adjustment with nature. Recently, in the wake of energy crisis in the world, people have been thinking that we humans can probably benefit a lot if we understand how micro-organisms solve their problems of energy production, energy storage and use, energy conservation etc. More recently, US scientists are hoping to find a clue to the problems of preservation of food by looking at the food management of the kangaroo rat although rodents are known to be notorious as destroyers of human food.

Some US mycologists have spied on the kangaroo rat and are beginning to think that the clue to our food preservation problems may well lie in the detailed study of the food handling of the kangaroo rat. These rats move the harvested legume pods to different areas of their burrows thus varying the conditions of airflow and temperature that promote the growth of particular moulds on the pods. These moulds, which produce mycotoxin, act as a pesticide against infestation by the beetles. By moving the seeds around, the rats cannot only promote but also control the growth of certain other moulds which ruin the pod supply. The wisdom of the kangaroo rat reflects the recently applied method of controlling pests with the help of another organism, a process known as biological control. Thus nothing in Allah's creation is without a purpose. We have so far dealt with some examples from the biological world. Let us now deal with one or two examples from the physical world. Take for instance the four forces of nature, namely, the gravitational force, the weak nuclear force, the electromagnetic force and the strong nuclear force. In view of the successful efforts of Salam, Weinberg and Glashow in unifying the weak and the electromagnetic force into what is called the electro-weak force and also in view of the current attempts at unifying all four forces into a single one, one may wonder why Allah has made four different manifestations of the forces. What, for example, was the necessity of the weak interaction. Well, the answer lies partly in the energy producing mechanism in the stars. The weak interaction is responsible for beta decay, a process in which either a neutron is converted into a proton, a negatively charged electron and an antineutrino, or a proton is converted into a neutron, a positively charged electron and a neutrino. This process is instrumental in the energy liberation mechanism of our sun which gives us

the solar energy. Thus if there were no weak force there would be no such mechanisms. Indeed there has to be a strong God to produce a weak force.

Again if one looks at the periodic table one notices that  $^8\text{Be}$  (beryllium-8) is unstable. But why is it so? Is it an accident of nature or a carefully contrived scheme? It can be shown that if  $^8\text{Be}$  were stable then we would not be here today (see 2: 117). Thus even the instability of  $^8\text{Be}$  is the manifestation of the infinite wisdom of the Creator for the very existence of the universe. What is apparently a small matter, matters so much to the Grand design of the Creator, Obviously man with his mounting exploration of the universe can only utter, 'Lord, Thou hast not created all this without purpose' (3: 191).

Now let us see the type of men who can make such utterances. Obviously these utterances cannot be made by the ignorant. Indeed Allah has proclaimed in another verse of the Holy Quran that only the wise can comprehend His Signs. Thus we can make the above utterances, only when we are in possession of knowledge through our efforts: We would spontaneously all the time remember Allah standing, sitting and lying on our sides and only then glorify Him. Such contemplation can come from an active culture of science which the Muslims once had when they attained glorious peaks in human history. But then for long, the Muslims have been without the cultivation of science and have ceased pondering over the secrets of Allah's creation. Thus in conclusion it could be remarked that the significance of this verse would be fully comprehended by the Muslims only when they engage themselves in scientific activities vigorously and unravel many of the secrets of Allah's creation. Then and then only, their heads would bow down in humility to Allah with the utterance, 'Oh Lord, Thou hast not created all this without any purpose'(3: 191).

يَا أَيُّهَا النَّاسُ اتَّقُوا رَبَّكُمُ الَّذِي خَلَقَكُمْ مِنْ نَفْسٍ وَاحِدَةٍ وَخَلَقَ مِنْهَا زَوْجَهَا  
وَبَكَ مِنْهُمَا بِجَالٍ كَثِيرًا وَنِسَاءً

4:1 O mankind ! Be careful of your duty to your Lord Who created you from a single person and from it created its mate and from them twain has spread abroad a multitude of men and women. . .

Allah describes the creation of mankind from a single portion of his mate from the same person and from the two halves of the whole mankind who spread all over the world.

The word *نفس* means soul, self or person, and usually prophet Adam (a. s.) is meant by this word. Then Allah created Adam's mate Hawa (Eve) (a.s.) from the same *نفس* (Nafs). If it is taken to be a person [i.e. Adam (a.s.)], then Hawa (a.s.) was created out of the person of Adam. This is not easy to explain in the present state of our scientific knowledge. However, the fact here is that both Adam and Hawa were created from the same source, so that there would be no problem of incompatibility for biological multiplication.

That all human beings are the children of the same pair may be accepted scientifically. From the biological point of view all men belong to one species (*homo-sapiens*) in spite of different colours and race. Even the primitive people and the aborigines are similar to the civilized people in every aspect of anatomy, physiology, biochemistry, haematology, embryology, genetics etc. So, though the creation of the first man and woman still remains a mystery to science, the emergence of mankind from the single pair has ample scientific evidence. This is true for all the living species in the world.

حُرِّمَتْ عَلَيْكُمْ أُمَّهَاتُكُمْ وَبَنَاتُكُمْ وَأَخُوتُكُمْ وَعَخَوَاتُكُمْ وَخَالَاتُكُمْ وَبَنَاتُ الْأَخِ  
وَبَنَاتُ الْأَخْتِ وَأُمَّهَاتُ الْمَنِيَّةِ الرِّضَاعَةِ وَأَخَوَاتُكُمْ مِنَ الرِّضَاعَةِ وَأُمَّهَاتُ نِسَائِكُمْ  
وَأَبْنَاؤُكُمْ الَّذِينَ فِي حُجُورِكُمْ مِنْ نِسَائِكُمُ الَّذِينَ دَخَلْتُمْ بِهِنَّ لَئِنْ لَمْ تَكُونُوا  
دَخَلْتُمْ بِهِنَّ فَلَا جُنَاحَ عَلَيْكُمْ وَخَالَاتُكُمْ الْأُمَّهَاتُ مِنَ الْأَخِ وَالْأَخَوَاتُ مِنَ الْأَخْتِ  
بِمَعْرُوبَيْنِ الْأَخْتَيْنِ إِلَّا مَا قَدْ سَلَفَ ۗ إِنَّ اللَّهَ كَانَ غَفُورًا رَحِيمًا ۝

4:23 Prohibited to you (for marriage) are : your mothers, daughters, sisters, father's sisters, mother's sisters, brother's daughters, sister's daughters..... except for what is past ; for Allah is Oft-forgiving, most Merciful.

**Forbidden Marriage :** In the early history of mankind when human populations were limited and restricted to remote regions, mating partners were taken from the members of the same blood groups. As human populations became organized into different ethnic groups and more civilized, inter-marriage between the various societies gradually developed although the custom of consanguineous marriage persisted in certain primitive societies.

This Quranic verse draws our attention to the prohibition of marriage with a number of blood relationships. The discussion here is centred on only those referring to mothers, daughters, sisters, father's sisters, mother's sisters, brother's daughters and sister's daughters. The prohibition against the other relationships mentioned in the same verse is largely on account of moral reasons and is beyond the purview of the present discussion.

In any population, harmful mutations will arise from time to time. A majority of these will be recessive, that is, their harmful effects will not be apparent. Many of these recessive mutants or their descendents are rapidly lost from the population by chance. This phenomenon is accentuated during inbreeding or preferential mating of blood relatives as a result of which homozygotes are formed. Increasing homozygosity with generational inbreeding result in marked reduction in fitness known as inbreeding depression. The closer the degree of blood relationship of individuals mated, the more rapidly do the effects of inbreeding appear with greater likelihood of producing defective offspring.<sup>1</sup> Some members of the royal families of Europe, who tended to be inbred, suffered from such genetic defects as mental retardation, haemophilia, and certain types of insanity which occurred in many generations.<sup>2</sup>

On the other hand, the offspring from parents genetically more distinct, i. e., distantly related or not related at all demonstrate improvement in many respects of biological performance such as size, growth-rate, fertility, and mental faculties, a phenomenon known as hybrid vigour. In the present civilized societies, the prohibition of consanguineous marriage, as spelt out in the Holy Quran, has served as a kind of eugenic method of improving the quality of human species.

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٣٣- يَا أَيُّهَا الَّذِينَ آمَنُوا لَا تَقْرَبُوا الصَّلَاةَ وَأَنْتُمْ سُكَرَىٰ حَتَّىٰ تَعْلَمُوا مَا تَقُولُونَ  
وَلَا جُنُبًا إِلَّا عَابِرِي سَبِيلٍ حَتَّىٰ تَغْتَسِلُوا

4 : 43 O you who believe! approach not prayers when you are under intoxication until you can understand all that you say, nor in a state of ceremonial impurity (except when travelling the road) until after washing your whole body.....

Here Allah forbids people to approach prayers when one is intoxicated or in a dazed state of mind, when one cannot understand what he utters. Islamic prayer or 'salat' is a direct communication between the devotee and his Creator. During prayer he is expected to utter the Quranic verses and different prayers with full sense and a spirit of reverence to Allah. But if one is intoxicated by alcoholic beverages, one loses the sense of understanding and judgement. The harmful effects of alcohol on the brain (central nervous system) have already been discussed in detail in connection with verse 2 : 219

So prohibition of intoxicated persons from going to prayer is reasonable because such a person is unfit for fulfilling the obligation of proper prayer in Islam.

This restriction was a step in the process of total prohibition of alcoholic beverages in Islam.

- حُرِّمَتْ عَلَيْكُمُ الْمَيْتَةُ وَالدَّمُ وَحُمُّ الْخَيْزِرِ وَمَا آوَىٰ إِلَى اللَّهِ يَكْفُرُ بِهِ وَالْمُنْجَنِقَةَ  
وَالسَّوْفِيَّةَ وَالْمَعْرُوبَةَ وَالطَّيْحَةَ وَمَا أَكَلَ السَّبْعُ إِلَّا مَا ذُكِّرْتُمْ وَمَا  
ذُبحَ عَلَى الْغُلْبِ وَأَنْ تَسْتَقْسِمُوا بِالْأَزْوَاجِ ذَلِكُمْ فِسْقٌ

5 : 4 Forbidden unto you (for food) are carrion, blood, swineflesh, and that which has been dedicated unto another than Allah and that which killed by strangling, or by violent blow or the dead through falling from a height and that

**which has been killed by the goring of horns and the (partly) devoured of wild beasts, saving that which you make lawful (by the death-stroke), and that which has been immolated unto idols. And forbidden also is the division (of meat) by divining arrows : this is on abomination.**

In this verse Allah mentions several types of forbidden animal food of which three, viz (1) carrion, (2) blood and (3) swineflesh have already been discussed under verse 2 : 173. The remaining types are discussed here.

The meat of the strangled animal is forbidden. The importance of shedding off flowing blood has already been discussed under verse 2 : 173. When an animal is killed by strangulation, it dies due to suffocation leading to asphyxiation. As a result excess CO<sub>2</sub> gas is accumulated in blood which will form harmful compounds. Besides there is no chance of removing the flowing blood containing toxic waste products, and circulating bacteria. So meat of an animal (or bird) killed by strangulation may contain harmful bacteria and toxic products and hence is less wholesome as food. Meat containing blood with bacteria and toxic products do not keep well for long periods.<sup>1</sup> The bleeding is not possible once the animal is dead, even if the blood vessels are cut later on.

**Animal killed by beating or violent blow :** This is a cruel method like beating by a stick, striking by an axe and killing by bullet or electric shock. The violent death will also mean that from the meat flowing blood has not been expelled because bleeding occurs if the heart continues to beat and the animal remains unconscious and the brain gets anoxia. Convulsions occur in the animal lying with an open neck wound. "The convulsions are due to the contraction of the muscles in response to the lack of oxygen in the brain cells. The muscles, by these contractions, squeeze out blood from the blood vessels in the tissues to pour it into the central circulation system to be sent to the brain, but this is lost on the way (due to our cutting of big vessels in the neck) and the brain cells consequently keep on sending messages to the muscles to wring out blood, until the animal dies. Convulsions thus occur when the animal becomes unconscious. Their occurrence confirms that the animal is unconscious"<sup>2</sup>. Because the animal becomes unconscious from massive haemorrhage on *dhabeh*, it does not feel pain while bleeding.<sup>2</sup>

“The convulsions which are beneficial for healthier and tastier meat, are a loss to the meat trade. In an abattoir the operator has to wait for the convulsions to die down before he can dress the animal. To save this waste of time from the point of view of trade, immediately after bleeding, the spinal cord is destroyed (by the greedy meat trader), Consequently, the animal does not convulse.”<sup>2</sup>

So the Muslim way of *dhabeh* allows these convulsions and the Holy Prophet (sm) has categorically forbidden the dressing of an animal before the slaughtered animal is dead.

Stunning by axe or hammer will have a similar effect. As for the most modern method of electric stunning, the Meat Inspection Branch of the United States Department of Agriculture came to the following conclusion in 1953 : “The use of electric stunning methods by plants which operate under Federal meat inspection has not been permitted as a result of experiments which were conducted several years ago at the university of Chicago. These experiments indicated that electric stunning in hogs resulted in changes in tissues which could not be differentiated by gross examination from similar changes produced by disease.”<sup>4</sup>

In 1955 the Danish Ministry of Justice issued a circular which said, “stunning with electricity causes extravasation in meat, sanguinary intestines and fracture in the spinal column, pelvis and the shoulder blades through shock. The blood in the meat makes it more susceptible to putrefaction and has a detrimental effect upon its taste. The properties of the meat which would co-operate with the salt in extracting the blood traces are interfered within the animal undergoing shock convulsions prior to slaughter”<sup>2</sup>.

In 1958 British regulations were amended and stunning was prohibited “the reason being that stunning seriously affected the quality of British bacon.”<sup>3</sup>

Besides “electric stunning hastens the onset of putrefaction in meat. The explanation of the phenomenon lie in the high lactic acid level following electric shocks prior to bleeding. High lactic acid alters the bacterial resistance of meat”<sup>3</sup>. Like electric shock a violent blow will cause death, and bleeding will not be sufficient as the heart will not beat as the nerve connection is totally cut off. If the head is severed by one sharp blow, there will be sudden contraction of voluntary muscles which will expel important nutrient fluid and like electric

shock some lactic acid will also form. Besides since the heart will stop, there will not be sufficient bleeding, which is needed for better meat.

So the ban on the meat of animals killed by violent blow or beating is scientifically justified.

If an animal falls from a height and dies it may be due to shock, broken neck, concussion or even drowning, if it falls in water. The effect of shock, broken neck and concussion will be similar to those due to violent deaths. The drowning will similar to asphyxial death or strangulation

If an animal is killed by another animal during a fight either among themselves, or being induced by man, the meat of such an animal gored to death is also forbidden. Besides the inhuman and cruel aspect of this method of obtaining meat allows two animal to fight to death, the dead animal therefore belongs to the category of violently slain animals, a question we have already discussed.

If an animal is partly eaten by a carnivorous animal and dies due to the injury, the meat of such animal is forbidden. The reason is justified on three grounds : (a) that the animal partly eaten may have died due to poison from the attacking animal's bite, (b) it might have struggled hard to survive to produce a large amount of lactic acid and (c) flowing blood was not lost to a great extent.

But if such an animal is found alive, then Allah makes it permissible if His name is pronounced over it, that is if *dhabeḥ* ذبح is performed. Since the animal is still alive it signifies that the attack was recent. Besides an injured animal is sure to die of hunger or further attack by ferocious animals. Under the circumstances it is better to slaughter it in the name of Allah and make meat lawful for consumption.

Now let us see what medical science says about the Muslim way of slaughtering animals الذبح which is exactly like the Jewish way of slaughter (*shechita*).

Lord Horder, a Doctor of Medicine, states, "I made careful observation of the process called '*Shechita*'. This consists in a clear and instantaneous cutting of all the blood vessels of the neck, together with the wind-pipe and gullet, in fact, all the soft structures up to the spine. The animal loses consciousness immediately. It is difficult to conceive a more painless and a more rapid mode of death. For a few seconds after the cut, the animal makes



no movement. Its body is then convulsed ; the convulsive movements continue for about a minute and then cease.’’<sup>4</sup>

The interpretation of these facts is clear. The cut is made by a knife so sharp and so skilfully handled that a state of ‘syncope’, with associated unconsciousness, follows instantaneously upon the severing of the blood vessels, the rapid loss of blood and the consequent great fall in blood pressure. The movements of animals which begin about 90 seconds after the cut and continue for about 90 seconds, are epileptiform in nature and are due to the bloodless state of the brain (cerebral ischaemia with complete anaemia). Sensation has been abolished at the moment of the initial syncope’.

Careful and critical scrutinizing of this method of slaughtering leaves in no doubt whatever that it is fraught with less risk of pain to the animal than any other method at present practised. Dr. Leonard Hill (M.D., F. R. S), Director, Dept. of Applied Physiology, National Institute of Medical Research, UK, said, "erroneous deductions are made from observations of the movements made by the slaughtered animals after loss of consciousness. To the ignorant any sign of movement and in particular movements which appear ‘purposive’ in character is taken as conclusive evidence of feeling and yet we know that the body of even a decapitated animal will make such movements though the animal is dead.

As to the immediate cessation of the blood flow in the brain when the carotid arteries were cut, I proved that this was so in the case both of unanaesthetized calves and goats. The blood pressure in the peripheral end of the carotid artery that is, the end direct connection with the arteries in the brain, fell almost to zero in a second or two after cutting both carotids, a proof that the blood flow, in the brain had ceased within that period.

It has been asserted that the vertebral arteries might convey blood to the brain and maintain consciousness after cutting of the carotids. This cannot be so, for, in the ox and the sheep (unlike human beings) the vertebral arteries do not supply the brain, but the muscles of the head’’<sup>5</sup>

"According to the evidence of Openshaw, consulting surgeon to the London Hospital, confirmed by post mortem examination, no bruising is produced by this operation’’<sup>2</sup>.

The popular belief that convulsion of the slaughtered animal is due to pain is erroneous. Thus it is clear that the Muslim and Jewish way of slaughtering is the most humane and least painful method of slaughter.

From the above discussion it is clear that all these prohibitions were for the benefit of mankind.

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۞ يَا أَيُّهَا الَّذِينَ آمَنُوا إِذَا قُمْتُمْ إِلَى الصَّلَاةِ فَاغْسِلُوا وُجُوهَكُمْ وَأَيْدِيَكُمْ إِلَى الْمَرَافِقِ  
وَامْسَحُوا بِرُءُوسِكُمْ وَأَرْجُلَكُمْ إِلَى الْكَعْبَيْنِ

5 : 6 O you who believe ! When you rise up for salat (prayer), wash your faces, and your hands up to the elbows, and lightly rub your heads and (wash) your feet up to the ankles.

Washing for cleanliness plays a very important role in the life of a believer. The water used for *Wudu* or bath must be clean and free from odour and possess its normal colour and taste. In the above verse, four procedures of washing with water in the performance of *wudu* (ablution) are declared *fard* (obligatory) and all these are based on hygienic principles. Besides these, *wudu* also includes washing of hands up to the wrist, cleaning the mouth by gargling, brushing the teeth, cleaning the external ears and the nostrils as *sunnah* of the Holy Prophet (sm.).

1. **Washing face:** It is both cleansing and refreshing in all seasons. The face and the hands are the most exposed parts of the body, hence prone to contamination by dust, dirt and harmful microbes. In fact, the human skin always harbours some harmful germs like staphylococci, streptococci, E. coli etc. in the mouth of sebaceous glands and sides of hair roots. By the help of the fingers these organisms may be transferred to the external ears, nostrils and other parts of the body. Unclean hands may also contaminate food and drinks. In fact, the skin is a natural barrier to these microbes, but any minute injury to the skin may allow their entrance and multiplication causing such of illness as boils, carbuncles, cellulitis, septicaemia, pyaemia etc. So to wash the hands and then wash the face is no doubt helpful to avoid infection and injurious effects of other foreign bodies on the skin of the face. The eye brows, eye lashes, moustache and beard also need frequent washing as these are also easily contaminated. If the face is unclean then dirt and germs may easily pass into the mouth and sebaceous secretions and perspiration may keep them arrested on the skin. So washing the face before *salat* as an obligatory part of *wudu* is undoubtedly hygienic and scientific. If

one washes the face about 5 times a day, the danger of infection through the skin of the face is minimised.

2. **Washing hands up to the elbow:** This part is also often exposed and the hands, due to their use are most prone to contamination. So washing hands up to the elbow (hand and forearm) as a compulsory part of *wudu* is again hygienic.

3. **To rub the head lightly:** This is done by wet hands. The head and its hairs are also often left exposed. So there is always a chance of accumulation of dust and dirt including microbes on the head and hairs. Consequently it is wise to wipe off the foreign particles with wet hands. It is also hygienic. In this process of *maseh* or light rubbing, the neck is also rubbed by the wet hands as Sunnah of the Holy Prophet (sm). This is refreshing specially after sleep or after a period of physical activities.

4. **To wash the feet up to ankles:** The two feet are mostly exposed specially in hot countries. They are easily contaminated by dust and dirt. So washing the feet during *wudu* is also scientific and hygienic. Clean feet are essential to avoid the spread of infection and dirt during congregation.

In very cold weather the Prophet (sm.) allowed that if leather socks have been put on after *wudu*, then for the next 24 hours rubbing of socks with wet hands will suffice in case fresh *wudu* is called for. This is not unhygienic and leather socks will prevent contamination of the feet.

Thus the four obligatory procedures of *wudu* are hygienic and beneficial to us.

١٤- لَعَنَ كُفْرَ الَّذِينَ قَالُوا إِنَّ اللَّهَ هُوَ الْمَسِيحُ ابْنُ مَرْيَمَ قُلْ فَمَنْ يَمْلِكُ  
 مِنَ اللَّهِ شَيْئًا إِنْ أَرَادَ أَنْ يُنَزِّلَ السَّمَاءَ بِمِزْجٍ مَاءٍ وَمَنْ فِي الْأَرْضِ  
 جَمِيعًا وَبِاللَّهِ مُلْكُ السَّمَاوَاتِ وَالْأَرْضِ وَمَا بَيْنَهُمَا يَخْلُقُ مَا يَشَاءُ وَاللَّهُ عَلَى  
 كُلِّ شَيْءٍ قَدِيرٌ ۝

5:17 In blasphemy indeed are those that say that Allah is Christ, the son of Mary. Say: "Who has the least power against Allah if His will were to destroy Christ, the son of Mary, his mother and all—every one that is on the earth? For to Allah belongs the dominion of the heavens and the earth and all that is between them. He creates what He pleases. For Allah has power over all things.

**Kingdom of Allah:** A territory is one's (a king's) kingdom, if in that territory, his command is supreme and every object in that territory is subject to the laws promulgated by him. Heavens constitute part of Allah's kingdom, because all the heavenly bodies, viz, stars, planets, satellites, pulsars, black-holes, nebula, galaxies, quasars and other bodies which may or may not be known to men, and all living and non-living things in these bodies are subject to the laws ordained by Him. None can go against His laws. Any violation of the laws decreed by Allah in the heavens and the earth, may have consequences also according to His laws.

Similarly, the earth is also Allah's kingdom. All the laws of nature which science has discovered and which are yet to be discovered are ordained by Him. The earth has seven layers; (1) inner solid core, (2) outer liquid core, (3) mantle, (4) plastic, partially molten region, (the asthenosphere), (5), cold, rigid region, (lithosphere), (6) crust (about 35 kilometer deep beneath the continents and 5 km under the oceans) and (7) atmosphere. Everything, living or non-living within these layers, are subject to the laws of science, as ordained by Allah. Plate tectonics, sea-floor spreading, magnetic reversal, subduction, hot-spot eruption and other activities on the surface of the earth and in the layers are not accomplished haphazardly, but according to laws ordained by Allah. Thus, the earth is Allah's kingdom.

The space between the sub-lunar region, and the uppermost layer of the atmosphere contains the ionosphere of the earth produced by x-ray and ultra-violet radiation from the sun. Above the ionosphere, the layer of atmosphere, there exists a region in which fast moving electrons and protons are trapped in the earth's magnetic field. This region is called the magnetosphere. On the inner side, it is limited by collision of electrons and protons with atoms and molecules in atmosphere. On the outer side it ends at a surface called magnetopause. It is the place where we can regard the earth's magnetic field as ending due to the pressure of the solar wind. This is also due to the laws of Allah. So, the territory between the heavens and the earth and all in between the heavens is Allah's kingdom.

٩٠- يَا أَيُّهَا الَّذِينَ آمَنُوا إِنَّمَا الْخَمْرُ وَالْيَيْبُسُ وَالأَنْصَابُ وَالأَزْلامُ رِجْسٌ مِّمَّنْ  
عَمِلَ الشَّيْطَانُ فَأَجْتَنِبُوهُ لَعَلَّكُمْ تُفْلِحُونَ ○

**5:93 You who believe! Intoxicants and gambling, stones and arrows, are an abomination,— of Satan's handiwork; eschew such (abomination) that you may prosper.**

The evil effects of drinking and gambling have already been discussed in connection with verse 2:219. The divining arrows mentioned in this verse was one of the gambling methods practised in Arabia.

ا- اٰحْمَدُ لِلّٰهِ الَّذِي خَلَقَ السَّمٰوٰتِ وَالْاَرْضَ وَجَعَلَ الظُّلُمٰتِ وَالنُّوْرَ

**6:1 Praise be to Allah Who created the heavens and the earth, and made the darkness and the light.**

The scientific theories about the creation of the heavens and the earth have been discussed in detail under verses 2 : 117, 2 : 164 and appendices I and II. There it has been shown that at every stage of the creation of the heavens and the earth, one is overwhelmed with the impossibility of anything being created at all in Nature without a master behind the creation. In this discussion we would delve into the scientific explanation of darkness and light, and the immense benefit that the creation derives from these.

The scientific explanation about the origin and nature of light and darkness attracted the attention of celebrated physicists like Descartes, Newton, Fresnel and Young during the last couple of centuries. In 1873 the famous Maxwell's equations were proposed combining together laws of electricity and magnetism yielding a type of wave which has all the properties of light waves and these electro-magnetic waves travel with the velocity of light. Later experiments yielded a complete picture establishing that the entire spectrum of electro-magnetic waves consisting of long wavelength micro-wave; radio-wave, infrared, visible light, ultra violet, short  $\gamma$ -rays and x-rays. Our eyes are sensitive only to the visible part of the spectrum. In 1904 Planck proposed that light energy is absorbed or emitted in discrete fashion. The idea of energy quanta for light (i. e. photons, the particles of light as we know today) could explain the experimental facts of black body radiation, photo electric, Compton and Raman effects. With this background knowledge about the dual nature (i. e. wave nature and particle nature) of light in 1913 Bohr proposed his famous atomic model which for

the first time could explain qualitatively the emission and absorption of light. According to this model atoms looked like a miniature solar system with electrons revolving around the nucleus in certain privileged orbits. If there is a vacancy in any orbit, then electrons from filled up orbits can jump to the vacant orbit obeying certain rules. Such an electronic jump from lower to higher orbit gives rise to the absorption of quanta of light energy, and if the electron jumps from higher to lower orbit, then a quantum of light energy is emitted. Total absence of the source of light or absorption of light by matter causes darkness. Exciting an atom by electrical discharge or by some other means such as heating, causes electrons to jump from lower to higher orbits producing excited atoms. When electrons from excited atoms jump to lower orbits releasing the energy these had received, light is produced. This simple picture of the atom proposed by Bohr was soon found inadequate to explain all experimental details and many adhoc rules emerged. Schrodinger proposed the most widely accepted atomic model in which Bohr's privileged orbitals were replaced by standing matter waves and he incorporated the idea of energy quantization. The idea of matter waves was suggested earlier by de Broglie. All experimental results of atomic spectroscopy—the branch of physics dealing with the absorption and production of light—could be explained very well with this model. Bohr's atomic model was found to be most average picture in this revised model and all the adhoc rules were the automatic outcome. The problems of atomic and molecular spectra were solved from another approach, namely quantum mechanics due to Heisenberg, Dirac and others leading to the same results. The mathematical formalism of quantum mechanics is quite abstract, but ultimately these two methods blended together into a unique approach.<sup>1,2</sup>

In spite of the great theoretical strides of quantum mechanics, light still happens to be the most mysterious phenomenon. The dual nature of light, by virtue of which light demonstrates its wave nature in some circumstance and its particle nature in others, makes it difficult to understand how this dualism coexists. According to the theory of relativity, the highest velocity is that of light and nothing can exceed this limit. Also the velocity of light is constant in vacuum. No material body can reach the velocity of light without changing its rest mass to zero. Photon—the mysterious particle, which carries light energy, has its rest mass equal to zero with the speed of light. When hydrogen nuclei fuse together forming a

helium nucleus, a tremendous amount of energy is released following Einstein's famous mass-energy relation in which energy equals the product of mass difference and square of velocity of light. Energy is released following this same relation in the case of the nuclear fission process, e.g., in an atom bomb.

The explanation of how the stars (the sun is our nearest star) have been shining for millions of years sending off tremendous amount of light energy is most fascinating. Inside the stars, hydrogen nuclei fuse together to produce helium nuclei through some intermediate steps. The helium nucleus has a mass less than the mass of the constituent hydrogen nuclei. This difference of mass is converted into a tremendous amount of energy according to the mass-energy relation mentioned earlier. This causes a huge amount of electro-magnetic energy which ultimately reaches our planet earth. Since the sun is the nearest star to the earth, at day time light forming the visible part of the electro-magnetic spectrum from the sun predominates. Light sent off from the far away stars makes a significant contribution to visibility at night. At the present rate of hydrogen consumption, scientists believe that the sun would give us light for billions of years to come.

It is the visible part of the electro-magnetic spectrum commonly known as light that produces the unique sensation of sight. The sense of sight is a gift from Allah. Plants carry out photosynthesis in the presence of light. This is a process by which chlorophyll (green colouring matter in plants), in the presence of light produces carbohydrate and oxygen from carbon dioxide  $\text{CO}_2$  (absorbed from the atmosphere) and water absorbed from soil. The process of photosynthesis helps to maintain the balance of oxygen and  $\text{CO}_2$  in the atmosphere. Carbohydrates in the various forms of mono and polysaccharides are deposited in the roots, stems, leaves and fruits of plants. Thus photosynthesis is a unique process that makes life thrive and prosper on this planet earth.

There are many other important benefits that light offers to the living world. Botanists have observed that flowering and fruition in plants are very sensitive to the amount of light energy received in a given time. Also zoologists have observed that some birds mate during the peak sun-shine hour. The phenomenon of total internal reflection of light helps aquatic creatures see distant objects thus facilitating their navigation. Total internal reflection is a process by which light scattered from objects inside water is



reflected totally inside instead of being refracted outside when light impinges on the surface at a critical or at higher angles. Observing the asymmetric distribution of light intensity around its direction of propagation (polarization) caused by some type of molecules, it is possible to distinguish between right handed and left handed molecules, which differ in their properties. The bioluminescence (bluish light without heat) emitted by fireflies and glow-worms has a biological advantage for one sex of these to attract the other sex for mating.

Scientists have put the visible as well as the other parts of the electro-magnetic spectrum at the service of mankind. Laser (light amplification by stimulated emission of radiation), a type of very intense but narrow beam of light in the visible part of the spectrum, is utilised in precision surgery such as curing cataract, in precision metal cutting, telecommunication, a weapon in modern warfare etc. Solar scientists are trying to systematically exploit solar energy for space heating, for the production of electricity, for refrigeration, for cooking and for the production of hydrogen fuel. Water heated in specially designed pipes by sun light is circulated for room heating in cold countries. Electricity can be produced from visible light by a device known as photovoltaic. Sun light can be the source of energy for refrigeration instead of electricity when special refrigerants are used. In solar cookers, food can be cooked by sun light without any fuel. Concentrating sunlight by Fresnel lenses, water can be dissociated into constituent hydrogen and oxygen. When hydrogen burns, it becomes water. Thus hydrogen is the most harmless and pollution-free fuel. A type of algae can also produce hydrogen from water in the presence of sun light (a process known as biophotolysis). Hydrogen promises to be the fuel of the future.

The invisible part of the electro-magnetic spectrum is also rendering immense service to mankind. With the help of radio and micro waves, radio and telecommunications are made possible. Infra red waves are used for the cooking and for the treatment of rheumatism. X-rays are widely used for medical diagnostic purpose and for detecting flaws in metals, alloys and precious stones. Trace elemental analysis is made by X-ray fluorescence. X-ray diffraction technique has revealed many crystal structures, among which the structures of DNA (deoxyribonucleic acid) and proteins have made it possible to understand bio-chemical activities at atomic and molecular levels. Also X-ray diffraction technique is applied in the design and control

of drug manufacture. X-ray and  $\gamma$ -rays are both used for the treatment of cancer. The Gama-ray camera provides both static and dynamic views of various human organs thus facilitating medical diagnosis.

Scientists have observed that the velocity, wavelength and frequency of light remain constant in vacuum. This property provides the most accurate standard of the measurement of short and astronomical distances and time. The primary standard of length at present adopted is the International prototype Metre preserved at Saures near Paris by the International Bureau of Weights and Measures. This standard metre is the distance between two fixed points engraved by gold on a bar made of 90% platinum and 10% irridium at 0°C and 76 cm. of mercury. Though this alloy has, minimum chance of being damaged by corosion and external conditions, in 1960 scientits agreed to accept a fixed violet wave emitted by the isotope of Kr<sup>86</sup> as the primary standard for length. At present the standard 1 metre equals 1650763.73 times the violet wavelength of Kr<sup>86</sup> in vacuum emitted from a discharge to be held at -20<sup>0</sup>C<sup>3</sup>. In 1964, the standard of time was fixed on the basis of the atomic clock which emits light of a particular frequency that remains constant for ever. For this the frequency corresponding to a particular wave emitted by Cs<sup>133</sup> was adopted as the standard. Standard one second equals the time for frequency 9192631770 of a wave emitted by Cs<sup>133</sup>. Large astronomical distances are measured in terms of velocity of light in vacuum. For example, one light year is the distance travelled by light in one year equal to  $9.46053 \times 10^{13}$  cm and one parsec equal to 3.26 light years.

Darkness, which may apparently seem to be of trivial significance, has a far reaching bearing on the continuation of the process of life on our planet. The rotation of the earth around its axis brings day and night to every part of the earth in every 24 hrs. excepting the polar regions. If there were no rotation of the earth, then one side of the planet would have been exposed to the sun and the other side dark for periods as long as Six months. Darkness after about 12 hrs. sunshine is responsible for cessation of photosynthesis so that there is not depletion in CO<sub>2</sub> and excess oxygen in the atmosphere then needed to maintain balance in the atmosphere congenial to life. Six-month long days and nights would have created extreme climatic conditions and imbalance in photosynthesis making it impossible for life to thrive and prosper. The darkness of night provides respite to day-time creatures.

From these discussions it is evident that Allah has provided a beautiful balance in nature by providing light and darkness. Light induced activities have made life grow and continue on this planet. Man has put light and the entire spectrum of electro-magnetic waves to use by utilizing the various properties. The colours of a rainbow, the sparkles in a pond glittering through the dark forest leaves, and the natural poetry of sunlight and sunset are testimony to the grandeur and majesty of light. Thus light, which has been imbued with a number of very interesting properties and which constitutes the basis of all organic life, does indeed make one proclaim. All praises be to Allah Who made darkness and light.

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۲۔ مَوَالِدِي خَلَقَكُمْ مِنْ طِينٍ ثُمَّ قَضَىٰ أ.

Who created you from clay, and then decreed a  
m (for you).

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life as a process consisting of a series of chemical carbon based molecules by which matter is taken into a assist the system's growth and reproduction, with waste pelled. The cells that make up human beings are e presence of four major types of organic substance, e, fats, nucleic acids and proteins in addition to an array of organic substance. The modern approach to the problem of the origin of life has been to determine how these organic substances could have come into existence.

It is believed that chemical reactions occurring naturally in the environment that surrounded the earth during its early history could have given rise to the first speck of life. The early atmosphere of the earth was largely composed of methane (CH<sub>4</sub>) with some amonia, hydrogen and water vapour. Scientists speculate that life began in the oceans in the presence of the primitive atmosphere through the action of naturally occurring lightning, ultraviolet radiation from the sun and/or cosmic rays with the formation of amino acids (23 building blocks of proteins) and other subunits of organic substances. This is known as the primary broth theory which received strong support when S. L. Miller in 1953 produced a host of amino acids in the laboratory by subjecting a mixture of hydrogen, amonia, methane and water vapour over a pool of water to strong electric discharges<sup>1</sup>.

Very soon serious objection was raised to this primary broth hypothesis. Creating amino acids was not explaining the production of proteins and DNA (deoxyribonucleic acid). Codes for reproduction and multiplication are contained in DNA located in a central nucleus. Due to the work of Crick and Watson the atomic structure of DNA was known by

9—

1958. Soon it was established that the first stage in making a new protein was the production on the DNA of a special form of a messenger RNA (ribonucleic acid) which contains the necessary information for constructing a particular protein. In the cell cytoplasm a series of amino acids, each labelled with a short length of nucleic acid, are present. When messenger RNA arrives there, the short RNA molecules attach themselves in the appropriate places on the messenger molecules thus ensuring the correct sequence and order of amino acids to make a particular protein.

The atomic structure of DNA was found so complicated that many scientists disbelieved that DNA could be created in the primary broth where the possibility of the various constituents of DNA being joined together in water was well nigh impossible. (It was Bernal who first made the suggestion that clay plays the most important role in creating the first speck of life<sup>2</sup>. Chemically, clay consists of stacked sheets of silicate with just enough space between individual sheets to allow air or water to circulate. Clay's electrical field would have imposed certain orientations on any compounds passing through them.<sup>3</sup>

Recently NASA (National Aeronautical Space Authority) scientists suggested that clay acts as a catalyst in producing proteins and DNA. The clay lattice can store energy in the form of electrons and then can release it when subjected to stress caused perhaps from the wetting and drying cycles when the tides rise and recede<sup>4</sup>. The released energy is then available to drive chemical reaction. Thus according to the NASA scientists clays have the unique property of storing energy and catalyzing reactions that join the building blocks into incipient strands of proteins and DNA. Though the last word in the matter has not yet been spoken, it is expected that further investigation in this line would throw more light in this subject. Scientists to-day believe that the first speck of life was evolved when complex amino acids and precursors of DNA in the primary broth passed through the layered structure of clay. The most dramatic event of all was the primordial advance from non-life to life, which obviously took place in the sun baked clays of ocean beaches. The scientific explanation of the role played by clay for creation of the simplest unicellular organisms like amoeba is in accord with the Quranic assertion. The DNA-protein cycle resemble a modern automatic

assembly line on a molecular scale, the whole process being tapecontrolled on a self-reproducing tape (DNA). In a human being this process has to occur in every cell for producing at least two thousand different proteins without a single mistake for a single mistake is normally lethal. One is spell bound in admiration for the organisation and mechanism by which protein synthesis takes place. However, the creation of a human being — the most magnificent of all creations innate with complex biochemical activities, is far off from the creation of an amoeba. The creation of the first human DNA with its unique autosynthesis process could not have happened without a purpose, direction and planning behind. Indeed, all these could happen only when there is a Master Mind for all these to happen.

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۞- أَلَمْ يَرَوْا كَمَا أَهْلَكْنَا مِنْ قَبْلِهِمْ مِنْ قَرْنٍ مَكَّنَّاهُمْ فِي الْأَرْضِ مَا لَمْ  
 لَمْ نَكُنْ لَكُمْ وَأَرْسَلْنَا السَّمَاءَ عَلَيْهِمْ مِدْرَارًا وَجَعَلْنَا الْأَنْهَارَ تَجْرِي مِنْ  
 تَحْتِهِمْ فَأَهْلَكْنَاهُمْ بِذُنُوبِهِمْ وَأَنْشَأْنَا مِنْ بَعْدِهِمْ قَرْنًا آخَرِينَ ۝

6 : 6 See they not how many of those before them We did destroy? We had established them on the earth more firmly than We have established you and We shed on them abundant showers from the sky and made the river flow beneath them. Yet We destroyed them for their sins and created after them another generation.

This verse is more or less a repetition of verse 3 : 137 in the sense that it draws the attention of the believing people to past history where they would find that many mighty and prosperous nations were destroyed because of their sins.

The verse does not specifically mention the peoples who were destroyed nor the nature of their sins for which they were destroyed. History as known to-day speaks of many historic and pre-historic nations who have gone out of existence. Only a few of such nations pertaining to the Fertile Crescent have been mentioned in the Quran as referred to in our discussion of verse 3 : 137.

According to this verse the Muslims are expected to know of the history of the ancient peoples and be aware of their activities which met with the displeasure of Allah resulting in their destruction.

۞- قُلْ سِيرُوا فِي الْأَرْضِ ثُمَّ انظُرُوا كَيْفَ كَانَ عَاقِبَةُ الْمُكذِبِينَ ۝

6 : 11. Say : "travel through the earth and see what was the consequence of those who rejected truth".

This has been discussed under verse 3 : 137.

٣٨- وَمَا مِنْ دَابَّةٍ فِي الْأَرْضِ وَلَا طَائِرٍ يَطِيرُ بِجَنَاحَيْهِ إِلَّا أُمَّةٌ  
 أَمْثَلُكُمْ مَا فَزَّعْنَا فِي الْكِتَابِ مِنْ شَيْءٍ ثُمَّ إِلَىٰ رَبِّهِمْ يُحْشَرُونَ ○

6:38 There is not an animal (that lives) on the earth, nor a flying being that flies on its wings, but (forms part of) communities like you. Nothing have We omitted from the Book, and they (all) shall be gathered to their Lord to the end.

‘Community’ means ‘body of living individuals’ with some common characteristics. Thousands of years of animal migration, growth, reproduction and natural selection has produced the complex web of life called a community made of the many species of organisms that live and interact in a particular environment aquatic and terrestrial.

But the Quranic verse obviously refers to the communities of individuals that belong to one species which crawl or walk on the earth or fly in the air. The simplest community is a mated pair. The larger units are populations which are organized into more and more complex systems of societies. If the conditions for life are favourable individuals multiply and soon form a population, the number in any environment depends upon several factors such as the time since the population began to grow, the amount of food, the available space and the presence or absence of the predatory creatures. Whether the communities consist of microscopic bacteria, mice or men, the same governing laws hold good. The social structure of vertebrate groups is made up of adult males, adult females, infants and juveniles. A division of labour is established by social behaviour and ability which determine the leaders, pathfinders, sentinels and guardians of the group. Human society shows a similar structure but is based on cultural rather than solely on biological processes. A soldier, a politician, a teacher, a physician, an engineer, an artisan and all other specialists of our society, although similar to one another in appearance, behave in different ways. Many beneficial effects are produced by forming groups. Grouping brings the sexes together



for reproduction and also permits specialization, the total effect being an increase in the efficiency of the group in satisfying its basic needs of shelter, security, food, water etc. If a society is to survive as a unit, it must evolve a system of communication for co-ordinating the activities of its members by sound, and senses of sight, touch, and possibly taste.

The problems of evolution of social organization in insects are among the most fascinating in the field of animal behaviour. For instance, termites build nests through group effort of their specialized classes performing specific jobs on which depends the survival of the group. The females that reproduce the members of the society have enlarged abdomens. The workers are sterile males and females of different sizes perform tasks according to their size, as gathering the food, building and repairing the shelter or rearing the young. The soldiers that protect the society are equipped with defensive and offensive devices like large and strong jaws for biting and even chemical substances which can be released and act like poison gas.

Bees display a spectacular community behaviour. Like human societies, they are known to have a division of labour. This aspect of the bees is known to all, and the queen-bee, the drone-bee, the worker-bee are familiar names also. We would, therefore, not deal with these but would rather focus the reader's attention on the mode of communication amongst the bees. Human societies communicate in different accepted languages. Members of the community also communicate with each other by a dance-pattern which gives information about two things. These are : (a) the existence of a food and (b) the address of the food. If the bee travels straight and then makes a clockwise turn and then moves straight again and makes a counterclockwise turn, as shown schematically in Fig. 3 (a), then this dance signifies that there is food around. The direction of the food is provided in the dance pattern in the following way. The bee indicates by its dance the direction of the food with respect to the direction of the sun. The direction of the sun is represented by a vertical line upward on the wall of the hive. If the dancer goes up vertically, it means that the place of food is in the same direction as the sun. If the source of food is at an angle of  $30^{\circ}$  at the left of the sun, the dance has an inclination of  $30^{\circ}$  at the left of the vertical line, as outlined in Fig. 3 (b).

The other bees watch the dancing bee and observe its position with respect to the vertical which corresponds to the direction of the sun and which also is the direction of gravity which the bees feel. When the dancing bee flies away, others move in search of food at a definite angle with respect to the direction of the sun as indicated by the dance. But what do the bees do when there is an obstacle hiding the sun ? For example, there may be a cloud or the sun may appear behind the mountain. This and similar other problems also been resolved. For further details, the books of von Frisch on bees which represent a monumental research on the community behaviour of the bees may be consulted.

Incidentally in sura *Nahl* (16 : 69) Allah makes a reference to the directed paths of the bees in which they have been instructed by Him to travel. The researches on the bees have thrown some light on these directed paths which are extraordinarily reflected in the dance pattern of the bees.

Thus the bees, indeed, form a wonderful example of the community aspects of creatures as indicated in the verse under discussion.

Ants are yet another example of the community behaviour experienced outside the human family. Who has not seen the disciplined movement of the ants, their food-exchange mechanism, their division of labour and has not praised their principle of food storage for the rainy days ? The division of work and the organisational heirarchy in the ant family is simply marvellous. Just as in the case of humans, one experiences the nurturing of babies by the mothers, similarly the queen ant is a devoted mother to the first generation of her offspring. She forces saliva, containing fat bodies, into the mouths of the young larvae and they grow rapidly. The workers of the first generation (the workers or soldiers) are the wingless normally infertile females ; they dig their way to the surface of the ground and go in search of food. The winged males after mating with the queens in the first and only nuptial flight seek refuge elsewhere and succumb in a matter of days. They bring it to the queen who recovers her strength and continues her egg-laying activities. Gradually, the workers take over the task of caring for the young. Eventually the queen becomes a sort of egg-laying machine, workers feed her by cramming food 'regurgitated' from their stomachs into her mouth. Thus the communal

existence of the ants is indeed a co-operative process as in the human society.

Ants display the power of co-operative ventures wonderfully when they are carrying a piece of foodstuff much larger in dimension compared to their own size. This along with other traits of their character points to their harmonious social living and amply provides another illustration of man-like community behaviour in the life forms created by Allah and mentioned in this verse.

قُلْ هَلْ يَسْتَوِي الْأَعْمَىٰ وَالْبَصِيرُ

6 : 50 Say : "can the blind be held equal to the seeing ?"

The gift of sight is a great favour from Allah. A person endowed with the organ of sight can see, can comprehend objects from a distance, can discern their individual colour, shape and size and can enjoy the beauty and the grandeur of the world. Further, they can see their paths enabling them to move forward with firm steps and to reach the desired destinations. In short, they can use the physical light that exists in abundance around them to their own benefit.

On the other hand a blind person, i.e., a person deprived of his faculty of sight, is immersed in total darkness; the light, colour and beauty that surround him go utterly in vain, because these are outside the scope of his experience; he cannot see, he is handicapped at every step.

It is obvious that a blind man and a seeing man can never stand on an equal footing; the difference between the two is immeasurably wide.

The statement "Can the blind be held equal to the seeing" has been used as a similitude. A similar statement also occurs in verse 40 : 58 (Not equal are the blind and those who see ). Here a blind man has been compared to one who is unable to comprehend and utilize the spiritual glow, i.e., the light of Allah that permeates the entire universe; he is thus unable to receive guidance and achieve spiritual advancement. The true devotees of Allah on the other hand, by virtue of their faith and righteous conduct, develop the

capacity to receive spiritual light, which generates in them clear spiritual vision; they see things in true perspective, choose and follow the "straight path" and attain great spiritual heights.

۶۳- قُلْ مَنْ يُنَجِّيكُمْ مِنْ ظُلُمَاتِ الْبَرِّ وَالْبَحْرِ

6 : 63. Say: "Who is it that delivers you from the darkneses of land and sea ?"

In this verse calamities associated with the darkness of land and sea have been alluded to. Such darkneses and their calamities may be enumerated as below:

1. The widespread darkness of night covers both land and sea, and is particularly dense when the moon is not visible. Miscreants are more active at night and a good many dangers lurk unseen. Further, unless one is wary enough, there is risk of losing one's way.

2. The dark clouds hovering over the land and sea may down torrential rains causing destructive floods, lightning causing loss of property and lives and hail storms causing widespread damage.

3. Darkness due to dense fog gathering over land and sea often limits visibility to only a few feet and frequent accidents, collisions and deviations from the route do occur. The situation is fraught with grave dangers for ships sailing on the sea and for vehicles and pedestrians moving over the land.

4. Hurricanes, which carry clouds with them, when sweep over sea and land at a great speed destroy ships on the sea and houses and trees on the land and take a heavy toll of human life.

5. Darkness of deep pits on earth involves mortal danger for unwary travellers. Further at the dark bottom of such pits there may be accumulation of harmful, even poisonous gases.

6. Darkneses of the depth of the sea signifies dangers of drowning.

7. Billowing waves agitating the surface of the sea have deeper darkness underneath, these strike boats and ships with a mighty force and push them beneath.

8. Deep inside the earth darkness reigns supreme and there originate the causes of great calamities such as earthquakes and volcanic eruptions.

Thus we find that calamities of various kinds and magnitude are associated with the darkness of land and sea and Allah alone through His mercy delivers us from such calamities.

٤٣- وَهُوَ الَّذِي خَلَقَ السَّمَوَاتِ وَالْأَرْضَ بِالْحَقِّ

**6:73 It is He Who created the heavens and the earth in true (proportion).**

There are signs of right proportion everywhere in the heavens and the earth with intelligent beings on it. Our universe has been endowed with laws of nature favourable to the creation and development of intelligent life. All the features of every day world and the astronomical scene are essentially determined by a few basic physical laws and constants, such as masses of the elementary particles and the relative strengths of the basic forces that operate between them. In many cases, a rather delicate balance prevails.

Nuclear reactions, for example, involve, balance of the strong nuclear force and electric force; the former attracting two protons together and the latter repelling them. This balance is on a razor-thin knife-edge as far as we are concerned. If the strong nuclear force were just a little bit weaker, then sub-atomic particles could not join together to form the nuclei of atoms. The only type of atom would be ordinary hydrogen (which has a single proton in its nucleus ) and without the other elements like carbon, oxygen and nitrogen, life just could not exist. On the other hand, if the strong nuclear force were just a little stronger, then all the hydrogen of the universe would have turned into helium and there would be no hydrogen today. Hydrogen is essential to us in two ways : it is a vital component of the chemicals make up living cells. and it is the fuel, which keeps the sun and other stars shining for thousands of millions of year.

The actual masses of the sub-atomic particles are important too. If the proton were not 1836 times heavier than the orbiting electrons in an atom,

then chemistry would be different, and in particular, the complex molecules essential to life (like proteins and DNA) would not be stable.

If the earth were a few percent points closer to the sun, it would have gone the way of Venus, baked red-hot under a thick blanket of atmosphere: only one percent further away, it would be in the grip of a permanent ice-age, like Mars.

If the rate of expansion of the universe had been less by an almost insignificant degree in the first second, then the universe would have collapsed long before any biological evolution could have taken place. Conversely, if the rate had been marginally greater, then the expansion would have such a magnitude that no gravitationally bound system (i.e., galaxies and stars) could have formed.

Thus it is obvious that Allah created the heavens and the earth in right proportion.

٩٥- إِنَّ اللَّهَ فَالِقُ الْحَبِّ وَالنَّوَى ۚ يُخْرِجُ الْحَيَّ مِنَ الْمَيِّتِ وَمُخْرِجُ الْمَيِّتِ  
مِنَ الْحَيِّ ۚ ذَلِكُمْ اللَّهُ فَأَنَّى تُؤْفَكُونَ ۝

6 : 95 It is Allah Who causes the seed-grain and the date-stone to split and sprout. He causes the living to issue from the dead, and He is the One to cause the dead to issue from the living. That is Allah : then how are you deluded away from the truth?

**Sprouting of seed grain and date-stones :** This verse can be considered in two parts; viz (i) germination of seed, and (ii) the natural cycle of the living from the dead and the dead from the living.

1. In this part Allah the Almighty draws our attention to one aspect of the wonderful artistry in nature in a process which to us is apparently so simple, viz, splitting of the seed involved in germination. The seed consists of a seed coat, an embryo or an incipient plant, and ample provision of nutrition stored in cotyledons or in a tissue called endosperm to be mobilized during the process of germination. After separation from the parent plant, the

embryo in the seed must wait, often through a dormancy period, until the conditions, both internally and externally, are exactly right to start growth on its own.

Under very unusual circumstances, the viability of some seeds can be preserved almost indefinitely. A record for longevity is held by the oriental lotus (*Nelumbium nucifera*) whose seeds, as carbon 14 dating has proved, has successfully survived centuries of dormancy. Three such seeds, recovered in 1951 from a peat deposit near Tokyo, germinated and developed their characteristic flowers after special treatment by experts.<sup>1</sup> But even this record was broken in 1967 with seeds of arctic lupine (*Lupinus arcticus*) found in a frozen burrow in Yukon, Canada and estimated by carbon dating to be at least 10,000 years old. A sample of these seeds germinated within 48 hours.<sup>2</sup>

The most common causes of dormancy in seeds are the physiological immaturity of the embryo and the impermeability of the seed coat to water and some times, to oxygen. Date seed, for example has an especially tough and stony coat, and germinates only when inhibitory chemicals in its coat are leached away gradually by rainfall which occurs at rare intervals in the desert.

Most mature seeds are extremely dry containing normally only 5 to 20 percent of their total weight as water. Thus, germination is not possible until the seed imbibes the water required for metabolic activities. Imbibition is the movement of water molecules into substance such as wood, gelatin or cellulose, the last being the component of plant cell-wall. The hydrostatic pressure developed by imbibition can be astonishingly high. The seeds which imbibe water may increase to many times their original size as a result of which considerable pressure may develop to split the seed coat. The first structure to emerge from most seeds is the embryonic root (radicle) which is positively geotropic, i.e., grows towards the earth and anchors the young plant, and absorbs water. The shoot (plumule) then emerges and grows negatively geotropically, i.e., away from the earth. During germination the food stored in the seed is digested and transported to the growing parts.

The two examples of seed quoted in the verse, incidentally, represent the extremes in the range of dormancy; the grain representing cereals with any

extremely thin seed coat and one of the shortest periods of dormancy, and the date stone with a heavy tough wall that remains dormant for a long period.

2. The germination of an apparently dead seed is often regarded as the beginning of life of a new plant while the formation of a seed signifies the termination of the life history of the plant. This phenomenon is further discussed under verse 2 : 28.

The phenomenon of dormancy or apparent death is found also in the other plant organs such as underground or aerial stems of trees adapted to temperate climate. The bulbs of daffodils and tulips lose their leaves and flowers before they go into a sort of winter sleep. So are the deciduous trees which shed all their leaves in autumn when their metabolic activities come to a very low ebb. The spring weather heralds new activity in the form of bursting of new foliage and bloom which is sustained with full vigour leading back to the death of winter thus completing the natural cycle of the living from the dead, and the dead from the living.

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٩٦- قَالَ لِقُ الْاِصْبَاحِ ۗ وَجَعَلَ الْيَلَّ سَكْنًا وَّ الشَّمْسَ وَّ الْقَمَرَ حُسْبَانًا  
 ذٰلِكَ تَقْدِيْرُ الْعَزِيْزِ الْعَلِيْمِ ۝

**6 : 96** He is the Cleaver of the day-break and He has appointed the night for tranquillity, and the sun and the moon for reckoning of time.....

At any place on the surface of the earth (barring the polar regions) night and day occur because of the diurnal rotation of the earth about its axis. At any instant during this rotation one half of the earth's globe is illuminated by sunlight and the duration for which it stays illuminated is called day there; at the same time the other half of the earth does not receive any sunlight and is thus plunged into darkness and the duration for which it stays dark is called night there. As the rotation continues night and day alternate at the same place. The transition from night to day and vice versa is gradual and not abrupt.

The dawn appears when the solar rays gradually penetrate the darkness of night and "spilt" it, so to say. Thus we find that the forces to which Allah has subjected the earth and the sun cause the dawn. In other words, Allah is the cleaver of the day break from the darkness of night.

After the day's tiresome work we rest at night when stillness prevails in a much greater measure under the cover of darkness. We go to sleep and get up next morning fully refreshed, tiredness completely gone; this enables us to face the coming day with new vigour. Hence we may say that Allah has made for us the night as the time for rest, recuperation and tranquility.

**The sun and the moon are for reckoning of time:** In this part of the verse, Allah says that the sun and the moon have been made to help men measure their time of activity. There are three natural units of time: day, month and year. Day and year are measured by the apparent motions of the sun, whereas the month is measured by the apparent motion of the moon.

A solar day is the period, in which the earth makes a complete rotation about its axis with respect to the sun; in other words, the period between the apparent successive crossing of the sun of a particular vertical. This period may be between two successive sunsets, or sunrises or crossings of the meridian. Scientifically a solar day is defined as the period between two successive lower culminations of the sun i.e., crossing of the sun of the meridian in the part containing nadir. The period of rotation of the earth with respect to a fixed star is known as the sidereal day. A sidereal day is 4 minutes shorter than the solar day and is used only for astronomical purposes.

A solar day is, again, divided into two natural divisions: day-time and night-time. The period for which the sun remains above the horizon is day-time and that for which it remains below the horizon is night-time. Generally people work during day-time and take rest during night-time. A day has artificially been subdivided into hours, minutes, and seconds, for measurement of shorter intervals.

As the sun appears to travel along the ecliptic with different velocities at different times of the year, an imaginary sun has been assumed (called the mean sun). which is supposed to move along the equator, with uniform velocity equal to the average velocity of the actual sun throughout the year. The period between two successive lower culminations of the mean sun is known as the mean day. Time measured according to the mean sun is known as mean solar time.

The moon is also a conspicuous time keeper. Phases of the moon inevitably govern most of the religious activities. The time taken by the moon, in moving from a certain position relative to the sun, around the heaven to the same relative position again, e.g., between two successive new moons (or any other phases) is called the synodic month. Average length of the synodic month or lunar month is 29d 12h 44m 2.8s. It mostly corresponds to our calendar month. The sidereal month of the moon is the time taken by the moon to pass from a certain star around the heavens back to the same star again. Its average length is 27d 7h 43m 11.5s.

The third unit of time is the year. It is based on the motion of revolution of the earth about the sun or apparent motion of the sun among the stars of

the zodiac. This is marked by the change of seasons, by the changing pattern of the stars at night and by the change in the path of the sun during day-time. The period in which the earth makes a revolution complete about the sun with respect to a fixed star is called the sidereal year, and the period with respect to the vernal equinox (in the spring when the day and night are of equal length i.e., 21st March) is called the tropical year, Difference between these two types of year is 20 min.

It is observed that in about 12 synodic lunar months the earth makes a complete revolution about the sun i.e., 12 synodic lunar months make almost a sidereal year. Actually a lunar year (12 synodic lunar months ) falls short of a sidereal year by 11 days.

Thus it is seen that Allah has made the sun and the moon to measure time.

٩٤- وَهُوَ الَّذِي جَعَلَ لَكُمُ النُّجُومَ لِتَهْتَدُوا بِهَا فِي ظُلُمَاتِ الْبَرِّ وَالْبَحْرِ  
 قَدْ فَضَّلْنَا الْآيَاتِ لِقَوْمٍ يَعْلَمُونَ ○

6: 97 It is He Who makes the stars ( as beacons) for you, that you may guide yourselves with their help through the dark spaces of land and sea; truly We have made plain the communication for a people who know.

### Stars as beacons

In this verse, Allah says that stars are so placed in the sky, that they can serve as a guide to those who know them and show the right direction when they are lost in the darkness and vastness of sea and desert. This guidance can be had without or with the help of instruments and tables.

**Without the aid of instruments and tables :** As the earth rotates about its axis, the axis, supposed to be extended both ways, seems to intersect the celestial sphere at two points, the north pole and the south pole. Due to the rotation of the earth, though the entire sky seems to rotate, these two poles remain fixed; so if one knows the poles, one knows the north and south direction. But since the poles are mere imaginary points, it

is not possible to know their exact positions. These can be known, only if there are stars situated at or near them. Near the north pole ( about 1 degree away from it), there is a second magnitude star, known as Alpha Ursae minoris, popularly known as polaris or pole star, which is visible from every place in the northern hemisphere. This star is situated at the top of the tail of the constellation Ursa Minor or little bear. So, those who know the constellation and the star, can easily find the north direction and hence all other directions. There is no such star near the south pole. But a constellation, known as crux or southern cross is situated in such a way that its longer arm points toward the south pole. So, for people of the southern hemisphere this constellation serves as a guide to the south and hence to other directions.

One other point is also obvious. As the celestial sphere appears to rotate, the stars apparently fixed on it, appear to revolve round the earth with the same set of stars remaining overhead at a particular place. Thus the stars, Beta Tauri (al Nath), Beta Geminorium (Pollux), Beta Leonis (Denebola), star cluster Pleiaedes and such other stars pass, more or less, overhead Dhaka (Bangladesh) at different dates and times of the year. An individual star passes over a particular place, on a particular date and at a particular time. Thus Beta Geminorium crosses the meridian at 9 p.m. on 28th May every year. In the darkness or vastness of sea or desert, one has only to look at the star to know the position of the direction of his destination. If he knows, which stars pass overhead with reference to his destination, he has simply to know the direction (which he gets from the observation of the pole star ) of those stars and go on moving in that direction till one such star lies overhead and he has reached his destination. Thus if one knows the stars, they guide one to one's destination, through the darkness and vastness of the sea and desert.

**With the aid of instruments and tables :** There are other methods, by which guidance can be had from stars in finding one's position in the darkness and vastness of sea and desert, with the help of instruments and tables.

It is known that the altitude of the pole is equal to the latitude of the place of observation. So with the help of a sextant, the altitude of the pole, hence

the latitude of the place, can be found, But to know the position of the pole is difficult. The star Polaris is not at the pole, but about 1 degree away from it. This 1 degree means a vast territory over the earth. So latitude is obtained by noting the declination ( angular distance of the star from the celestial equator) of the star passing through the zenith of the place. This gives the latitude of the place. Longitude is measured from the north and south line through Greenwich and is measured by the time interval between a star crossing the meridian of Greenwich and that of the place. The interval between these two times, when converted into angular measurement, gives the longitude of the place. For this, it is necessary to have a clock giving Greenwich time, and also an almanac from which times of crossing the meridian of a particular star, at that place and at Greenwich, are obtained.

There is another method, by which, the position of a particular place, on land, sea or in the air can be identified.

In this method, the following terms are used:

**1. Dead-reckoning position :** Position obtained by considering the speed, length of time travelled, and direction or directions of travel, is known as the dead-reckoning position.

**2. Geographical position :** The point on the earth's surface, which is exactly under the star selected at an instant is known as the geographical position of the star.

**3. Assumed position :** A position, near the dead-reckoning which is assumed to be possible position is known as assumed position.

The entire operation may be reduced to the following steps:

1. An assumed position (of the ship, say) may be selected based on dead reckoning or any other method.
2. A star (or any other celestial body ) is to be selected and its altitude is to be observed. Time of observation is to be noted.
3. From published data, the azimuth of the star, hence the bearing of the star's geometrical position is to be determined, and the computed altitude for the star at the assumed position is to be obtained.
4. Observed and computed altitudes are to be compared and difference in minutes of arc is to be measured and line of position (sumner line) is to be drawn at right angles to the bearing.

5. Similar procedure is to be followed with respect to a second star. The point of intersection of the two summer lines (lines of position) is the exact position (of the ship).

One may ask how navigation is made when stars are not visible. Allah has provided man with other methods which can be used in such cases.

۹۹- وَهُوَ الَّذِي أَنْزَلَ مِنَ السَّمَاءِ مَاءً فَأَخْرَجْنَا بِهِ نَبَاتَ كُلِّ شَيْءٍ فَأَخْرَجْنَا مِنْهُ خَضِرًا نُخْرِجُ مِنْهُ حَبًّا مُتَرَاكِبًا ۖ وَمِنَ النَّخْلِ مِن طَلْعِهَا قِنْوَانٌ دَانِيَةٌ وَجَنَّاتٍ مِّنْ أَعْنَابٍ وَالزَّيْتُونَ وَالرُّمَّانَ مُشْتَبِهًا وَغَيْرَ مُتَشَابِهٍ ۚ انظُرُوا إِلَى ثَمَرِهِ إِذَا أَثْمَرَ وَيَنْعِهِ ۗ إِنَّ فِي ذَٰلِكُمْ لَآيَاتٍ لِّقَوْمٍ يُؤْمِنُونَ ○

- 6 : 99 It is He Who sends down rain from the skies: with it We produce vegetation of all kinds: from some We produce greenery out of which We produce thick clustered grain; out of the date palm and its sheaths spring pendent clusters of dates; and gardens of grapes, and olives, and pomegranates, each similar (in kind) yet different (in variety); when they begin to bear fruit, feast your eyes with the fruit and the ripeness thereof. Behold, in these things there are Signs for people who believe.

In this Quranic passage, described by Yusuf Ali<sup>1</sup> as 'so fruity in its literary flavour and so profound in its spiritual meaning.....' the divine beneficence can be conveniently studied by breaking it up into the following events:

- (1) sending down of rain by Allah from the skies, (2) consequent growth of vegetation of all kinds, (3) production of thick clustered grains, (4) clusters of dates hanging from the sheaths, (5) gardens of grapes, (6) olives, (7) pomegranates, (8) each of these similar (in kind) yet different (in variety), (9) the ripe fruits—a feast to our eyes, and (10) a reminder that in these natural phenomena, are the Signs for people who believe.

1. The phenomenon of the fall of rain from the skies has been explained in the discussion under verse 2 : 164.

2. It concerns the salutary effects of rain which makes vegetation grow. The word نبات meaning plants, as commonly understood, includes all vegetation bearing green pigment, chlorophyll rendering them capable of preparing their own carbohydrate food. But plants also include groups that are devoid of chlorophyll, e.g. fungi and bacteria. The growth and sustenance of the green mantle of the earth is dependent on rains as the moisture, which is an essential factor in germination, also takes part in photosynthesis and promotes the production of new shoots and leaves. The plant kingdom is extremely large, the estimated total of all species being 3,50,000. They can be broadly classified into those which bear flowers and those that do not but reproduce exclusively by various other methods. Green plants show a tremendous diversity in size and structure from the microscopic unicellular alga like *Chlorella* to flowering trees like redwoods of California reaching upto 170 meters in height with diameters in excess of 11 meters.<sup>2</sup> The fungi, e.g. mushrooms and moulds, and the microscopic bacteria lack the green pigment and consequently are incapable of manufacturing carbohydrate. They depend for their life on dead and decaying organic matter or as pests on living organisms. The growth of these non-green plants is also dependent on the humidity which increases following the rains.

3. **Clustered grains** : Grain crops or cereals belong to the grass family and are, by far, the most important sources of plant food for man and for domesticated livestock. They consist mainly of starch with some protein and traces of minerals and vitamins. The so-called grain is actually the characteristic fruit of the grass family in which the seed coat is fused with the fruit wall. Under the category of grains, there is an infinite variety, the main grain crops of the world being wheat, rice, barley, millets, maize, oats and rye. Out of these, wheat and barley, well-known to the Arabs during the early Islamic days, have thick clusters or 'spikes' consisting of 2 or more rows of grains. The allusion to thick clustered grain in the verse is very appropriate on account of the characteristic dense arrangement of the grains in the ears of cereals.

**4. Dates :** The Arabian date palm (*Phoenix dactylifera*) is a fruit tree of very ancient origin with records of cultivation in the Middle East dating back to at least 3000 B.C. The importance of the date palm is very extensive, and a considerable part of the inhabitants of North Africa, Arabia, Iraq and Iran subsist almost entirely on its fruit. The male and female date trees are separate, and it is only necessary for the grower to plant one male tree to 50-100 females. One flower bunch, male or female, consists of over 100 slender branches enclosed by a sheath or spathe which protects the flowers in their bud condition. Fruit set can be improved by artificial pollination which most growers achieve by cutting off clusters of male flowers and fixing them among the branches of the female flower bunch at a time when the flowering branches are emerging from the sheaths. Palms may begin to bear about 4-5 years after planting and are in full bearing by about 15 years and may continue fruiting up to about 80 years of age. A good fruit bunch will have about 40 strands of fruit with 25-35 dates per strand. Such thick and heavy bunches laden with ripe fruits naturally remain pendant on the tree and a feast to the eyes until harvest. An average yield is About 100 lbs. of fruit per tree per year, with good trees yielding 150 lbs.<sup>3</sup> Some thousands of varieties of dates may be broadly classified into three types. (i) Soft dates which contain 60% sugar enough to preserve them naturally. These are grown on a large scale in Iraq and exported in pressed masses, (ii) The medium or semi-dry dates which are soft but do not contain enough sugar to preserve them naturally. They do not dry readily and generally are eaten fresh from the tree. (iii) Dry dates which are quite hard and not sticky even when ripe. They may be allowed to dry on the tree and can be stored when the palms are not bearing. These are esteemed in date growing tracts. The chief nutritional value of all these dates is in their high sugar content which varies from about 60% in soft dates to as much as 70% in some dry types. They also have some content of vitamins A1, B1, B2, and nicotinic acid.

**5. Gardens of grapes :** *Vitis vinifera* with its numerous varieties or cultivars is the source of dessert grapes, wine grapes, and those that are dried as currants, raisins, and sultanas. Grapes are one of the oldest of cultivated plants having been known to the ancient Egyptians about 6000 years ago as is abundantly proved by the paintings and representatives of it in the ancient



Egyptian tombs where the various processes of wine making are fully portrayed. The numerous cultivars may be grouped as wine grapes, dessert grapes, those grown outdoors or indoors, black or white, or dried grapes. The dessert grapes have a special taste, succulence, and flavour and may be amber-green to blue-black. Amongst the wine-grapes are varieties which are yellowish-green, purplish-black, bluish-black or green which are also called 'white'. Dried grapes include raisins which are dried on the vines, sultanas which are small seedless raisins, and currants that are derived from smaller fruited black variety. The grape plant is trailing or climbing and has to be supported on stakes or trellises for its proper growth. There are extensive vineyards in the Mediterranean countries whose climate is conducive to the growth and yield.

**6. Olives :** No tree is more closely associated with the history of man and the development of civilization than the olive (*Olea europaea*). To the people of the Middle East, it is a symbol of prosperity and divine blessing, beauty, luxuriance and strength. The fruit of this plant has been valued since ancient times, not only as food but also as the source of edible oil. The oil is also used in lamps, for anointing, and for many other purposes including medicinal and cosmetic uses. As an edible oil, it is used chiefly as cooking, as a salad oil, and for canning fish. The fruits are green at first and dark blue or purplish when ripe. When fully grown they are usually pickled in brinneeee...They are much used in various dishes, especially in the regional cookery of the Mediterranean countries. The olives, under domestication, have larger fruit size and higher oil content than their old relatives.

**7. Pomegranate :** (*Punica granatum*): It was held in great esteem in ancient times in Mesopotamia and Egypt. The Jewish king, Prophet Solomon (a.s.) was said to have an entire orchard of pomegranates. The fruit is a hard, thick skinned berry, crowned with persistent sepals, and divided inside into several chambers each containing numerous seeds embedded in pink or crimson, acid-sweet pulp. The ripe fruits develop a vivid orange-red colour. The juice of seeds is used in cool drinks and also for making a kind of wine. Because of its large number of seeds, the pomegranate came to be regarded as a symbol of fertility.

**8. Similar but different:** All individuals of a species are recognizably distinct from members of all other species showing a discontinuity of variation. But within each species where general characters are similar, there is a certain amount of variation into races or cultivars which is usually a result of interbreeding either in nature or by artificial means. The different races or cultivars can be perpetuated maintaining their characteristic features unless there is mingling of genetic material from other races. Thus, the individual species of cereal, date palm, grapes, olives, and pomegranates distinct from each other yet within each of their species range there is variation, each variety being recognized by the flowering time, size, yield, and time taken for maturity. Among the fruit bearing plants, shape, size, colour, consistency, taste, and flavour of juice in fruits, and oil content of fruits and seeds are also different in the various races or cultivated varieties.

**9. Ripe Fruits:** The attractive shades of colour seen in the ripe fruits are dependent on the various plant pigments or colouring matters occurring singly or together in different proportions in the cell sap of plants. Chlorophyll is the basic pigment which lends its green colour to certain varieties of grapes. But it is only one of the thousands of pigments found in plants. A second group of pigments known as carotenoids occur in not less than 60 kinds of compounds ranging in colour from lemon-yellow to tomato-red. The third family of colour is produced by the anthocyanin pigments which range in shades from palest pink through red flamboyant purple. The colour of the anthocyanins is governed by the acidity of the cell sap, as for example, they are red in acid, violet in neutral, and blue in alkaline medium. Pure red is very conspicuous and attracts birds and mammals including man. So, it is no coincidence that red is such a prominent colour among most of the ripe fruits. Presumably these colouring agents help to attract birds and other animals to assist in seed dispersal. The changes in colour that accompany ripening are the plant's signal that the fruit is ready to be eaten. The eating of the fruits by birds, other animals and human beings is a means of seed dispersal and continuity of plant's life.

**10.** In this Quranic passage, our attention is drawn to the obvious natural phenomena, which usually go unnoticed by us, and to reflect on the

divine beneficence. Emphasis is laid upon the importance of rain for the growth of greenery, and the production of grain and food crops. On pondering over the examples provided, it is especially revealing how the Almighty has created each species of fruit with an infinite variety all to the good of mankind, and the attractive colours of the ripening fruits which not only indicate that they are ready for consumption but through this process, get themselves dispersed to keep their race perpetual. These signs of Allah indeed constitute an invitation extended to believing men and women to reflect on the bounties of Allah and to be grateful for their divine provision.

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## ١٠١- بَدِيعُ السَّمَوَاتِ وَالْأَرْضِ

6 : 101 To Him is due the primal origin of the heavens and the earth...

This verse has been considered under verses 2 : 117 and 2 : 164.

١١٩- وَمَا لَكُمْ أَلَّا تَأْكُلُوا مِمَّا ذُكِرَ اسْمُ اللَّهِ عَلَيْهِ وَقَدْ فَضَّلَ لَكُمْ مَا حَزَمَ عَلَيْكُمْ  
 إِلَّا مَا اضْطُرَرْتُمْ إِلَيْهِ وَإِنَّ كَثِيرًا لَيُضِلُّونَ بِأَهْوَاءِهِمْ بِغَيْرِ عِلْمٍ  
 إِنَّ رَبَّكَ هُوَ أَعْلَمُ بِالْمُعْتَدِينَ ○

6 : 119 How should you not eat of that over which the name of Allah has been mentioned, when He has explained unto you that which is forbidden unto you, unless you are compelled there to. But Lo! many are led astray by their own lusts through ignorance. Verily, your Lord is best aware of the transgressors.

Allah justifies the injunction of eating the meat of animals killed in the name of Allah as He has already described in detail forbidden foods, the scientific basis of which has already been discussed before in the explanation of verse 2 : 173.

١٣٩- وَقَالُوا مَا فِي بُطُونِ هَذِهِ الْأَنْعَامِ خَالِصَةٌ لِلذَّكَورِنَا وَمُحَرَّمٌ عَلَى الْأُنثَى  
 وَإِنْ يَكُن قَيْتَةً فَهُمْ فِيهِ شُرَكَاءُ سَيَجْزِيهِمْ وَصْفَهُمْ إِنَّهُ حَكِيمٌ  
 عَلِيمٌ ○

6 : 139 And they say: That which is in the bellies of such cattle is reserved for our males and is forbidden to our wives; but if it

**be born dead, then they all may be partakers thereof. He will reward them for their attribution (of such false ordinances unto Him). Lo! He is Wise, Aware.**

Here, a superstition about food in pre-Islamic Arabia is discarded. The so-called special authorities used to declare that the offspring of certain cattle were forbidden for females and reserved for males. But if the offspring was born dead, then it was allowed for all including the females. It is obvious that such a declaration cannot have any scientific basis as food for male and female is the same so far as nutrition and physiology are concerned. So such a custom quite reasonably needed to be forbidden.

۱۴۱- وَهُوَ الَّذِي أَنْشَأَ جَنَّاتٍ مَّعْرُوشَاتٍ وَغَيْرَ مَعْرُوشَاتٍ وَالنَّخْلَ وَالزَّرْعَ مُخْتَلِفًا  
أَكْلُهُ وَالزَّيْتُونَ وَالرُّمَّانَ مُتَشَابِهًا وَغَيْرَ مُتَشَابِهٍ كُلُوا مِنْ ثَمَرِهِ إِذَا أَثْمَرَ  
رَاتُوا حَقَّهُ يَوْمَ حَصَادِهِ وَلَا تُسْرِفُوا إِنَّهُ لَا يُحِبُّ الْمُسْرِفِينَ ۝

6 : 141 It is He Who produces gardens with trellises and without, and dates, and crops of different kinds, and olives and pomegranates, similar (in kind) and different (in variety). Eat of their fruit in their season, but render the dues that are proper on the day that the harvest is gathered. But waste not by excess, for Allah loves not the wasters.

Most plants have strong erect stems which support branches and leaves. But some have weak stems which are not strong enough to bear the branches in the usual erect manner. Naturally they lie prostrate on the ground but, to reach the light, they have to compete with the associated plants each in a special way to sustain life depending on sturdier plants or their support. Hoisting themselves from the ground in which they are rooted, they may twine, or make their way up the

supporting trees that serve them as supports assisted in some cases by specialized organs known as tendrils, thorns or hooks. When such plants are under cultivation, artificial supports like stakes, trellises or latticed screens of various types are used depending on the habit of the plants. Under this category are included grape vines, beans of various kinds, peas, many of gourd family, etc. Those which do not need trellises are those that have stems strong enough to support themselves.

**Crops of different kinds:** The angiosperms or flowering plants are our chief source of food plants. Two plant families stand out as particularly important. The first of these is the grass family to which belong all our cereal crops on which the vast majority of mankind has always relied as the basic staple diet with wheat, barely, rice, and maize as the most important examples providing a convenient source of carbohydrate. The other family on which man depends largely is the pea family providing pulses valuable for their high protein content. In addition, in the temperate zone, the rose family is important providing fruits like apple, pear, plum, cherry, apricot, almond, peach, etc. The mustard family provides a wide range of vegetables of the cabbage and turnip groups and also rape-seed and radish. In the tropics, the palm family is important and this includes date, coconut, sago, palmyra, betelnut, and oil palms. Apart from these families there are others like the brinjal family yielding a remarkable diversity of food crops, e.g. potatoes, tomatoes, and chilies; and the orange family with citrus fruits rich in the vitamin 'C' content. There are other families of flowering plants that are cultivated as our food crops. Notable examples of these are the grapes in family Vitaceae, olives in the Oleaceae, sweet potato in the Convolvulaceae and pomegranate in the Punicaceae.

The above examples are only a handful of the bounty of sustenance provided by Allah.

**Olives, pomegranates similar (in kind) and different (in variety):** This subject has been discussed in detail in the explanation of verse 6 : 99.

۱۳۵- قُلْ لَا أُحَدِّثُ فِي مَا أُوحِيَ إِلَيَّ مُحَرَّمًا عَلَى طَاعِمٍ يَطْعَمُهُ إِلَّا أَنْ يَكُونَ مَيْتَةً أَوْ دَمًا مَسْفُوحًا أَوْ لَحْمَ خِنْزِيرٍ فَإِنَّهُ رِجْسٌ أَوْ فِسْقًا أُهِلَّ لِغَيْرِ اللَّهِ بِهِ ۚ فَمَنْ اضْطُرَّ غَيْرَ بَاغٍ وَلَا عَادٍ فَإِنَّ رَبَّكَ غَفُورٌ رَحِيمٌ ۝

6 : 145 Say: I find not in that which is revealed unto me any meat prohibited to an eater that eats thereof except it be carrion, blood poured forth or swineflesh for that is surely foul for abomination, which was immolated to the name of other than Allah. But whoever is compelled to eat, neither craving nor transgressing, for him your Lord is Forgiving, Merciful.

The significance and scientific justifications about prohibitions of dead animals, blood, and swineflesh have already been discussed in 2: 173. As for blood, in this verse it is clearly mentioned that only blood which is poured out during slaughter i.e., circulating blood is prohibited. This implies that the blood remaining in the muscles and organ is not prohibited.

۴- وَكَرَّمْنَا قَرْيَةً أَهْلَكْنَاهَا بِجَاءِهَا بِأَسْنَابِهَا أَوْ هُمْ قَائِلُونَ ۝

7 : 4 How many towns have We destroyed? Our punishment came to them in the night or while in their afternoon rest.

In this verse the Quran speaks of some town having been destroyed in the night or in the afternoon when the people were taking rest.

No mention has been made of the towns destroyed or of the people or the reasons for such punishment. In the Surah, however, mention has been made of the destruction for various offences, of the people and cities: (1) of the prophet Nuh (a.s) (7 : 64) by flood; (2) of the Ad (7 : 65) destroyed by a blast of wind (54 : 19, 69 : 6-7); (3) of the Thamud (7 : 78) destroyed by earthquake accompanied with blast (54 : 31); (4) of the people of the prophet

Lut (a.s.) destroyed by a shower of brimstone and earthquake (7 : 84, 11 : 82) and (5) of Madyan (7 : 91) by earthquake.

As no archaeological investigations have been made in these places except those supposed to be of the prophets Nuh (a.s.) and Lut (a.s.), little is known about the places and extent of destruction.

According to archaeologists the flood engulfed an area north-west of the Persian Gulf amounting to 400 miles long and 100 miles wide. Reckoning by the age of the strata containing traces of human habitation they think that the great flood took place about 4000 B.C.<sup>1</sup>

The destroyed cities of the people of the Prophet Lut (a.s.) are called al Mu'tafika in verse 53 of Surah *Najm* (53 : 53) corresponding to the Hebrew Mahbeka which is called in the Bible as Sodom.<sup>2</sup>

Archaeological investigation have been lately made in the region of Sodom and Gomorrah, known as the cities of the people of the prophet Lut (a.s.) and the present conclusion is that these cities lay in the area beneath the slowly rising waters of the section of the Dead Sea and that their destruction came through a great earthquake accompanied by explosion, lightning, issue of natural gas and general conflagration about 1900 B.C.<sup>3</sup>

The inscription of Sargon of the year 715 B.C. mentions the Thamud among the people of the eastern and central Arabia subjected by the Assyrians. The fall of Thamuds is probably due to one of the volcanic outbursts which led to the formation of more or less extensive fields of lava called 'Harra' in Arabia.<sup>4</sup>

Besides these, archaeological investigations continue to furnish information about many cities which are called 'lost cities'. Of these lost cities those of Babylon and Nineveh, Mohenjodaro and Harappa in Pakistan, Pompeii in Italy, Polunaruwa in Ceylon, Hallusas the capital of the Hittites in Asia Minor, Chichen-itza of the Mayas (Guatemala and Yucatan peninsula), Macchu Piccha of Urbamba of the Incas are now well-known. Except in the case of a few like Mohenjodaro of Pakistan and Pompeii of Italy, causes of destruction of these cities are not known as yet.

Sprawling skeletons of men, women and children, some showing sword or axe cuts uncovered at Mohenjodaro show that the city was attacked and



the people were slain without warning. The city was overwhelmed and destroyed by military assault.<sup>5</sup>

Pompeii was destroyed by one terrible volcanic eruption of Vesuvius on Aug. 24, 79 A.D. A vivid description has been given by Pliny the Younger, nephew of Pliny, the Elder, the great Roman scientist-historian. Pliny the Younger was at that time at Misenum at a short distance from Pompeii. He writes, "On the 24th August about one in the afternoon, my mother desired my uncle (Pliny, the elder) to observe a cloud of very unusual size and appearance. The cloud issued from the mountains of Vesuvius. It was at one moment white, at another dark and spotted as if it had carried up earth and cinders. Thereafter the cinders which grew thicker and thicker began to fall and then pumice stones too."

Pliny, the younger and his mother were not affected but his maternal uncle Pliny the elder, who went to observe the event, died along with thousands choked by fumes, smothered by ashes, and crushed beneath the falling buildings and on the wall of Pompeii villa, unearthed by archaeologists in the 18th century (1784 A.D.). Some one had written on the wall 'Sodom Gomorrah.'<sup>6</sup>

## References

1. Keller, W., *The Bible as History*, p. 51.
2. *A Short Encyclopaedia of Islam*.
3. Keller, W., *The Bible as History*, p. 95.
4. *A Short Encyclopaedia of Islam*.
5. *The Epic of Man*, Time-Life International (Netherland) N.V., p. 85, 1963.
6. Cottrel, L., *Lost Cities*, p. 147-152.

۞ وَلَقَدْ مَكَّنَّاكُمْ فِي الْأَرْضِ وَجَعَلْنَا لَكُمْ فِيهَا مَعَالِيشَ ۞  
 وَلَيْلًا مَّا تَشْكُرُونَ ۞

**7:10 It is We Who have placed you with authority on earth, and provided you therein with means for the fulfilment of your life. Small are the thanks that you give !**

The word authority mentioned in verse 7: 10 is indeed very thought-provoking. An interesting question in this connection is what is the seat of this authority? A little reflection will show that knowledge is, in fact, the seat of authority. That this is so, becomes apparent from the fact that only 100 years ago man did not know how to fly, and today, man is not only flying around the globe in a matter of hours but is embarking on an interplanetary voyage. Only fifty years ago, man did not know how to combat particular bacteria, and today he has been employing the same bacteria in the service of man. So much has happened in so short a time. These happenings have made man more and more powerful in harnessing the resources of nature in the service of mankind. He has acquired a certain authority over some of the forces of nature. This authority has, however, emanated from knowledge and knowledge itself is power. Thus Allah has made knowledge the seat of authority and has asked man to seek knowledge. This coupled with the fact that it was the knowledge of Adam (a.s.) which Allah had imparted to him that made him superior to angels. And it is man who has been called the vicegerent of Allah. Thus if man has to act as the representative of Allah on earth and has to conquer nature, then man has to seek knowledge which he can, then put it to beneficial uses to the satisfaction of Allah. It is the fear of Allah which should keep man from abusing the power of knowledge. As man increasingly sought knowledge, he has discovered the diversity of ways in which Allah has made arrangements for his sustenance. Thousands of microorganisms and also other agents of nature can be gainfully employed for fulfilling the material requirements of man. While on the one hand man has learn to take advantage of the resources

of nature and has learnt to multiply the production of foodgrains through the discoveries of high yielding mutants, on the other he is just beginning to realise that Allah has spread the *rizq* (sustenance) of man in a thousand and one things. All he has to do is to gain knowledge and use it and express his gratefulness to Allah. It is true that the resources of the earth are being depleted. But it is also true that man is having access to newer and newer resources and technologies. The vast potential of the sea is yet to be tapped. However it is to be remembered that while man establishes his authority over nature and has increasingly better controls over the environment and also while he finds the means for the fulfilment of his life, he must never forget to express his thankfulness to the All-powerful and the All-merciful Allah who is continually bestowing knowledge on one who is seeking it. Never for a moment should man stop brooding over the magnificent ways in which Allah has endowed him with authority and has provided him with means for the fulfilment of his needs.

۱۱- وَلَقَدْ خَلَقْنَاكُمْ ثُمَّ صَوَّرْنَاكُمْ ثُمَّ قَوْلًا لِّلْمَلَائِكَةِ اسْجُدُوا لِآدَمَ فَسَجَدُوا إِلَّا  
 إِبْلِيسَ ۖ لَّمْ يَكُنْ مِنَ السَّاجِدِينَ ۝

7 : 11 And We created you, then fashioned you, then We told the angels : Fall prostrate before Adam! And they fell prostrate, all except Iblis, who was not of those who make prostration.

The creation of man and the development of foetus in different shapes have already been discussed in connection with verse 3 : 6.

۱۲- قَالَ مَا مَنَعَكَ آلَا تَسْجُدَ إِذْ أَمَرْتُكَ ۚ قَالَ أَنَا خَيْرٌ مِنْهُ ۖ خَلَقْتَنِي مِنْ نَّارٍ وَخَلَقْتَهُ  
 مِنْ طِينٍ ۝

7: 12 He said : "What prevented you from bowing down when I commanded you?" He said : "I am better than he : You created me from fire and him from clay."

The creation of Satan from fire cannot be explained with the present knowledge of science. The role played by clay in the creation of DNA (deoxyribonucleic acid) and proteins has been explained under verse 6: 2. There, it has been asserted how at every stage of creation Divine mercy intervenes without which no organic life could have ever evolved.

﴿فَدَلَّهِمَا بِغُرُورٍ فَلَمَّا ذَاقَا الشَّجَرَةَ بَدَتْ لَهُمَا سَوْآتُهُمَا وَطَفِقَا يَخْضِفْنَ  
عَلَيْهِمَا مِنْ وَرَقِ الْجَنَّةِ﴾

7 : 22 So by deceit he brought about their fall; when they tasted of the tree, their shame became manifest to them, and they began to cover themselves with leaves of the garden.....

From this verse, the time of appearance of Adam (a.s.) may be inferred. This part of the verse says that from this time, Adam (a.s.) felt the urgency of covering his nakedness, and as there was no other man to weave cloth, he used the leaves of trees to hide the private parts. It is known from anthropology that the custom of wearing the leaves and bark of trees became prevalent during the later part of the age of Neanderthal man, who existed between 1,00,000 and 40,000 years ago. So it may be assumed that Adam (a.s.) appeared at least 50, 000 years ago.

﴿يٰۤاٰدَمُ قَدْ اَنْزَلْنَا عَلَيْكَ لِبَاسًا يُّوَارِي سَوْآتِكَ وَيُزِيْنُكَ ۗ وَ لِبَاسٍ مِّنَ التَّقْوٰى ۗ  
ذٰلِكَ خَيْرٌ ۗ ذٰلِكَ مِّنْ اٰيٰتِ اللّٰهِ لَعَلَّكُمْ يَتَّقُوْنَ ۝﴾

7 : 26 O Children of Adam, We have bestowed raiment upon you to cover your shame as well as to be an adornment to you. But the raiment of righteousness, that is the best. Such are among the Signs of Allah, that they may receive admonition.

With the realisation of shame associated with his sexual organ, man felt an urge to conceal it from the lustful gaze of others. Initially the covering was done by leaves appropriately sewn together. Allah created in him this

urge and also gave him higher intelligence and inventive genius through the application of which he succeeded, by gradual steps, to discover fibres and threads for weaving better durable cloth for his use.

Thus the raiment, which was once a mere crude covering device, became, as man's aesthetic sense and innovative ideas developed, an adornment serving two specific purposes : (i) protection from extremes of climatic conditions such as gruelling heat and biting cold, and (ii) beautification of the body by devising increasingly attractive colours, designs and texture suited to different occasions and changing seasons.

In course of time, dress, as a splendid adornment, became imperceptibly a part of man's personality. Thanks to the mercy of Allah Who enabled man to hit upon newer techniques; today's clothing has attained such superior quality and standard as to combine utility and comfort with artistry.

٥٤- إِنَّ رَبَّكُمْ اللَّهُ الَّذِي خَلَقَ السَّمَوَاتِ وَالْأَرْضَ فِي سِتَّةِ أَيَّامٍ ثُمَّ اسْتَوَىٰ  
عَلَى الْعَرْشِ ۚ يُعْشَى الْبَلَّ الْكَهَّارَ يُطَلِّبُهُ حُوَيْثُهَا وَالشَّمْسَ وَالْقَمَرَ وَالنُّجُومَ  
مُسَخَّرَاتٍ بِأَمْرِهِ ۗ أَلَا لَهُ الْخَلْقُ وَالْأَمْرُ ۗ تَبَارَكَ اللَّهُ رَبُّ الْعَالَمِينَ ۝

7:54 Your Guardian-Lord is Allah, Who created the heavens and the earth in six days and is firmly established on the throne (of authority). He draws the night as a veil over the day, each seeking the other in rapid succession. He created the sun, the moon, and the stars, governed by laws under His command. Is it not His to create and to govern? Blessed be Allah, the Cherisher and Sustainer of the worlds.

### Creation of the heavens and the earth in six days

In this part of the verse, Allah says that He created the heavens and the earth in six days. In other parts of the Quran, a day has been mentioned as consisting of 1,000 years (22 : 47) and 50,000 years (70:4). This shows a day to Allah means a period of time, which may be long or short. So what is actually meant in this verse is that the heavens and the earth were created

in six (periods or) phases. This is finely corroborated by cosmology and geology.

After the big-bang, the primeval fireball exploded into a rapidly expanding and cooling gas-cloud of protons, neutrons, and electrons immersed in an intense sea of radiation. At first the pressure of radiation maintained smooth expansion; but eventually matter, consisting mostly of hydrogen atoms, with some helium, began to form clumps. The clumps or blobs of gas continued to fly apart from each other, although matter in an individual blob tended to contract because of its own gravitation, At this time two opposite forces acted on the blob, the force of expansion and that of gravitation trying to contract it. Due to the turbulent motion within, the contracting gas blob took different shapes, such as spherical, elliptical, spiral etc. Thus the galaxies were formed in the first phase. With this ended the first phase or day of creation of the heavens. This took about 150 million years.

The galaxies or the contracting gas blobs disrupted into smaller parts. Each of these parts spun faster and faster as it contracted, becoming flatter, but continued to condense and break up into yet smaller blobs. The stars and solar system were formed from such a slowly turning, nearly spherical cloud of gas and dust, called the nebula. The rotating nebula continued to contract and left behind rings or blobs of matter in the disc that eventually became planets. Thus stars, planets, satellites were formed during the second phase. This completes the creation of the seven heavens in two phases or days. This second phase took about 1 billion years.

The creation of the earth as we see it today was made complete in our geological eras: pre-cambrian era, palaeozoic era, mesozoic era and cenozoic era. In the pre-cambrian era, the earth, beginning as a whirling blob of interstellar gas, passed through a liquid state and formed a solidified crust. Thick steamy atmosphere surrounded the planet. As the earth's surface cooled, water vapour condensed as rain to produce rivers and seas. The surface now formed a barren landscape of mountains, deserts, volcanoes and steaming lava-fields. This process took about 1 billion years. During the last 100 million years, one-celled organisms, invertebrates, and primitive

marine plants were created. This is the first day or first phase of creation of the earth.

In the second phase, i.e. in the palaeozoic era, the level of seas tended to rise and fall causing regular changes in the land area. Then the land area increased at the cost of the sea. This is the period of extensive mountain building and volcanic activities. During the latter part of this era there was considerable earth movement due to continental drifting. This era consisted of about 400 million years. Vertebrates such as fishes, amphibians, and reptiles were created during this era. Thus ended the second day or phase of the creation of the earth.

The third day or the third phase of creation of the earth is the geological mesozoic era. In this era, deserts and shrub-covered mountains made up most of the land area. The sea advanced again. Most land areas consisted of forests or swampy plains with lakes and rivers. Dinosaurs prevailed and predominated during this era. This era or the phase of creation lasted for about 150 million years.

The fourth phase of creation of the earth, i.e. the cenozoic era is the present era. Plate tectonics, i.e. powerful movements of the earth's crust, completed the formation of the Alps and the Himalayas. Continents and oceans took the present form. Ice ages existed during this era. Dinosaurs became extinct. Mammals were created during this phase. This era culminated with the creation of man.

Thus the creation of the heavens and earth was completed in six phases or six days.

Beside the interpretations of the length of the day we may note that the present age of the earth is estimated to be some five billion years while that of the universe is estimated to be about fifteen billion years. If we take the Quranic verse to mean that the earth was created in two days and the universe in 6 days and normalise the length of the day from the age of the earth, then one day turns out to be 2.5 billion years and six days would then mean 15 billion years which is approximately the age of the universe!

With the advancement of science, the ages of the earth and of the universe may perhaps turn out to be different from the present ones, but they may bear a ratio commensurate with that indicated in the holy Quran. In any

case, the interpretation of the day as a period appears to be the most reasonable.

**He draws the night as a veil over the day :** How day and night occur due to the rotation of the round earth about its own axis has been dealt under verse 3: 27. When the sun appears to sink below the horizon night sets in and its darkness gradually engulfs the brightness of day, it is, as if, the night is being gradually drawn over the bright face of the day.

**He created the sun, the moon, and the stars, (all) governed by laws under His command :** The intricacies in the creation of the heavenly bodies as far as understood today have been explained in 2:117, 2:164, and appendices I and II. Various laws have been observed through scientific investigations governing their function, activities and motion in space.

**The Sun :** The sun is situated at the centre of the solar system. All planets revolve around it. In the early 17th century Kepler derived the famous laws governing the motion of the planets around the sun. The first law states: "The orbits of the planets are ellipses with the sun at one focus of each ellipse". The second law states: "The line joining each planet to the sun (called the radius vector) sweeps over equal areas of space in equal intervals of time." Kepler's third law, sometimes called the harmonic law, states: "The square of the sidereal periods of any planets are proportional to the cubes of their mean distances from the sun". The unifying principle basic to these 3 laws was discovered by Newton. He realized from these three laws that the planets are pulled in orbits around the sun by a force he called gravitation. He stated the law of gravitation as follows: "Every particle in the universe attracts every other particle with a force that is directly proportional to the product of their masses and inversely proportional to the square of the distance between them". The sun being the most massive in the solar system, remains in its position while the planets revolve around the sun obeying these laws in the most exact and precise manner from millions of years in the past till the solar system continues. The sun along with other stars of the galaxy revolves round the galactic centre towards the sign of the Sagittarius with a slow speed of 250 km per second. The sun also rotates very slowly around its axis. This is a differential rotation, having different velocities at different parts of the sun. The synodic period of this differential rotation



increases with heliographic latitude, from 27 days at the equator to 31 days at a latitude of 60 degrees, north and south. Spectroscopic measurement shows that the period of rotation continues to increase right upto the pole<sup>1</sup>.

The relative distances of the planets from the sun can be determined with the aid of Kepler's third law. In this approach, as distances come as ratios, one of the distances inside the solar system has to be determined accurately by the parallax method. The distance from the earth to the sun is used for this purpose. The 1968 American Ephemeris and Nautical Almanac gives this value as 149,600,000 km or about 93 million miles. The sun's mass can be determined from Newton's gravitational law and is found to be  $1.99 \times 10^{30}$  kg, or 332,930 times the mass of earth. The sun is primarily composed of hydrogen and helium in the proportion of 3 : 1 with about 1% heavier elements like iron<sup>2</sup>.

The earth obtains most of its heat and light energy from the sun. The energy of heat radiated by the sun is governed by Stefan's law which states: "The total energy radiated by a black body is proportional to the fourth power of its temperature".

Stefan's law and another law called Wein's law stating: "The wavelength for which the radiation is most intense is inversely proportional to the absolute temperature", are used to calculate the solar temperature at the outer visible surface of the sun known as the photosphere and this is on the average about 6000° K. The region above the photosphere reaching to a height of several thousand km is called the chromosphere. Above this is the solar corona spreading about 10 solar radii. Matter in the form of electrons and protons streams away from the corona as solar wind. The amount of solar radiation received outside the earth's atmosphere is called solar constant, whose average value is 1.96 cal. per min. per sq cm of surface at right angles to the direction of the sun<sup>3</sup>. The amount of energy radiated by the sun as determined by Stefan's law is  $3.85 \times 10^{26}$  joules per second. In the central core of the sun energy is produced by thermo-nuclear synthesis (carbon cycle) in which carbon nuclei fuse with protons producing carbon and helium nuclei through various intermediate steps. In the remaining zones of the sun about 400,000 km in diameter, energy is produced by the proton-proton reaction of transformation of hydrogen nucleus to helium nucleus.

Solving Einstein's mass-energy relation about  $4.28 \times 10^9$  kg or 4,280,000 metric tons of solar matter is being converted into energy each second. At this rate of mass loss, the sun will continue to shine for over 100 billion years.

Many spots appear on the sun's surface (photosphere) which are relatively dark. Sunspots appear dark because they give off less radiation than the surrounding areas. A spot is accompanied by a magnetic field more than 3000 times as strong as that of the earth. Sunspots occur in pairs, with one frequently underneath, where it cannot be seen. If both spots are visible, they have opposite polarities. The rotation of the sun causes an apparent motion of sunspots from east to west. In any one sunspot cycle, all sunspots in one hemisphere (northern or southern) have same polarity and sunspots in the other hemisphere have the opposite polarity. Polarities for sunspots in one hemisphere change in every successive cycle following a law of sunspot polarity. It is seen that the number of spots and spot groups changes from day to day and from year to year, increasing to a maximum and again decreasing to a minimum, completing a cycle in a period of 11 years on the average, but the intervals vary from 7 to 15 years.

After completing one 11 year cycle, the accompanying sunspots with the opposite polarity appear for another 11 year cycle. Thus, the actual period of maximum and minimum reappearance with the same polarity of sunspots is 22 years.

Strong magnetic fields due to the rotation of the core are fundamental to the origin of centres of activities. Although the sunspots are the most obvious of the solar activities, there are many other kinds of temporary activity on the sun. Above the sunspot in the chromosphere is a much larger disturbed region, called the plage. In pictures of the sun, taken with suitable accessories the plage appears as a bright patch. Occasionally a brief very intense burst of light, primarily of hydrogen is observed in a plage. This is known as flare. It occurs above a sunspot. Above the chromosphere, the centre of activity extends, into the corona, in the form of condensation, which appears to be denser and brighter than the surroundings. Straight, curved, and loop shaped gas structures extend from the plage up into the corona. When they appear at the edge as very bright objects, they are called prominences. But when they appear on the disc, they are dark and are known

as filaments. These prominences and filaments may be 20,000 to 40,000 km in length and 5,000 to 10,000 km in thickness<sup>4</sup>.

**The moon :** The earth's nearest celestial neighbour and the only natural satellite –the moon – is only 238,857 miles from us on the average. The earth– moon system moves together through space, revolving around a common centre of mass, called the barycentre. The barycentre moves in an elliptical orbit around the sun, and the earth and the moon revolve around it. The product of the earth's mass and its distance from the barycentre is equal to the product of the moon's mass and its distance from the barycentre. Using this relationship gives the mass of the moon as  $1/81.3$  or 1.23% of the mass of the earth. It should be emphasized that Kepler's laws, restated for satellites, hold for the moon.

The moon has got set of complex motions. It rotates about its own axis, it revolves about the earth, it revolves, along with the earth, about the sun, it also revolves, along with the solar system about the galactic centre. It is in synchronous rotation, i.e. its period of rotation about the axis is the same as the synodic period of the revolution about the earth. So it shows the same face towards the earth. As it goes round the earth, the part common toward both the earth and the sun, is visible from the earth as well as is lighted by the sun. Such lighted portions of the moon as seen from the earth are known as phases. When the half of the moon that is lighted by the sun, is also the half visible from the earth, i.e. when the earth comes between the sun and the moon, it is the full–moon. If in such a case, the moon comes within the shadow cast by the earth, a lunar eclipse occurs. Again when the moon comes between the sun and the earth, the lighted portion of the moon is not visible, i.e. the moon is not visible from the earth. This is the new moon phase. If in such a case, the shadow of the moon falls on any part of the earth, a solar eclipse occurs which is visible from that part of the earth.

The moon causes tides. During the rotation of the earth, water of the sea toward the near side of the moon is closer to the moon than the solid earth beneath it. So gravitational attraction of the moon on the water is greater than that on the solid earth beneath. Thus, water of the sea toward the moon swells up and tides occur, whereas, water of the sea on the opposite side of the earth is further away from the moon than the solid earth beneath it. So

the attraction of the moon on the solid earth beneath the water is greater, i.e. the solid earth is pulled away from beneath the water. So water overflows the earth and thus tide occur. During one complete rotation of the earth i.e. in course of one day, tides occur twice, once when the sea is towards the moon and again when it is away from the moon. The sun is also a tide producer. When the sun and the moon are on the same or opposite side of the earth, the highest tides, called spring tides are produced. When the moon and the earth are 90 degrees apart, as seen from the earth, the lowest tides, called neap tides occur.

If the earth were not rotating of its axis, its lunar tidal bulge would occur on the line directed toward the moon. The earth's rotation causes the earth's tidal bulge to precede the earth-moon line ; because it takes some time for the tidal bulge to form and to recede and during this time, the earth's rotation carries the bulge away from the earth-moon line. The pull of the moon slows down the earth's rotation causing the day to grow longer. A time will come when the period of the earth will be the same as that of revolution of the moon about the earth. Then the earth will show the same face toward the moon, and lunar tides will no longer occur. But tides will still be produced by the sun. This will tend to slow the earth's rotation even more and more and make the day longer than the month. By the principle of conservation of angular momentum motion of the moon about the earth will become quicker. Thus the velocity of the moon will become greater. As the period of rotation of the moon about the earth decreases, according to Kepler's third law, the distance between them also decreases. Thus the moon will spiral in toward the earth, continually moving closer. Eventually it will get so close that the difference in the earth's gravitational pulls on the near and far halves of the moon will literally tear the moon apart. When this happens the lunar remains might take the form, at least in part, of a ring of particles around the earth.<sup>5</sup>

**Stars :** Allah has made certain laws for the stars to obey, which they do meticulously.

Stars are luminous, gaseous bodies that generate energy by means of nuclear fusion at the core. Below a certain mass (0.05 times the solar mass), the central pressure and temperature in a body are insufficient to trigger fusion reaction. The mass of a star determines its luminosity, temperature,

size and the way in which it evolves. Stages of evolution of stars of different masses have already been discussed in appendix 1. The stars move in their individual destined path and are kept at safe distances from each other. The star Proxima Centauri is nearest to our sun, being at a distance of 4.27 light-years. The sun is nothing but an ordinary star.

Diameters of stars range from tens of kilometers in the case of neutron or pulsars, thousands of kilometers in the case of white dwarfs, millions of kilometers in the case of stars like our sun, to several hundreds of millions of kilometers in the case of super giants. The size of a star changes drastically toward the end of its life, as it passes through the red giant stage.

There are stars, whose brightness varies with time. They are known as variable stars. About 25,000 variable stars have so far been catalogued. The period of variation ranges from a few hours to a few years. The range of amplitude of variation, i.e. range between maximum and minimum brightness, is very wide. There are three major groups of variables, eclipsing, pulsating and cataclysmic.

The stars have been classified according to the colour of light emitted by them and hence according to their temperature as it follows from Wein's displacement law stating: "The wavelength for which radiation is most intense is inversely proportional to the absolute temperature". This means that as a body gets hotter, the peak of the radiation shifts towards blue. According to this scheme, from hottest to coolest, the spectral types are O, B, A, F, G, K, M. There are further subdivisions in order to take care of small changes in spectral details. Temperatures range from 30,000°K to over 60,000°K in O stars which are relatively rare since they have short life times. B stars are somewhat cooler, 10,000°K to 30,000°K. A stars are cooler still, 7,500°K to 10,000°K. F stars have temperatures of 6000°K to 7500°K. G stars, the spectral type of our sun, are 5,000°K. K stars are relatively cool, only 3500°K to 5000°K. M stars are cooler yet with temperatures less than 3500°K. Their atmospheres are so cool that molecules can exist without being torn apart<sup>6</sup>.

In another classification a scale of magnitudes was used to indicate the brightness of stars. The inverse square law in photometry which states: "Intensity of light varies inversely with the square of distance from the

source", is used in calculating all absolute magnitudes. As the data of absolute magnitudes and spectral types were being collected, in about 1911 Ejnar Hertzsprung in Denmark and Henry Norris Russel in the USA noticed that on a diagram correlating the two, plotted points fell into distinct groups. A plot of temperature (or spectral class) versus brightness or magnitude is known as a Hertzsprung-Russel diagram or an H-R diagram, where the stars mainly lie on a diagonal band from upper left to lower right. Thus the hottest stars are brighter than the cooler stars. Most stars fall on this band which is called the main sequence or dwarfs. There is nothing strange about dwarfs : they are the normal kind of stars. The sun is a type G dwarf. Some stars are very bright or brighter than a main sequence star. These stars are called super-giants, bright-giants and giants depending on their brightness scale. Stars in a class of faint objects called white dwarfs, are located below and to the left of the main sequence. The importance of H-R classification is evident as it depicts the life and death of stars. For example, the sun is presently at the earlier stage when energy is supplied by fusing hydrogen nuclei into helium nuclei. But in a few billion years, when hydrogen nuclei in its core are exhausted, the time will come for the sun to brighten and redden faster and faster until eventually it swells and engulfs Mercury and Venus and reaches the earth. At this point the sun will be a gain and its great luminosity will sear and char everything on earth.<sup>7</sup>

In addition to the motion of rotation, a star has got two motions: proper motion and radial motion. Apparent angular motion of a star along the perpendicular to the line of sight, is the proper motion. For most of the stars it is very small and is considered negligible. Barnard's star has got the greatest proper motion of 10.3" per year. It is after thousands of years that a difference in the direction of proper motion causes a group of stars (constellation) to change their shape appreciably. Thus of the seven main stars of Ursa Major Dhubbe and Alcaid have values and direction of motion different from the other five ; so their shape is slowly and continuously changing. Shapes of the seven stars 100,000 years ago, at present, and 1000,000 years ahead are shown in fig. 4.

Radial motion of a star is its velocity along the line of sight. It is measured by Doppler's effect. It has no visible effect on the shape of the constellation. About 60% of the stars have radial velocity of about 20 km per second.

Stars are not distributed at random in space, rather they appear in clusters, There are two main types of clusters of stars; galactic clusters and globular clusters. The globular clusters contain older stars than do the galactic clusters. By studying red shifts of spectra from stars in galaxies, Hubble in 1929 announced his famous law which states: "The velocity of recession of a galaxy is proportional to its distance."<sup>8</sup> From this law one can calculate the time since the "big-bang" with which the universe was created and this happened about 15 billion years ago (for details see appendix II).

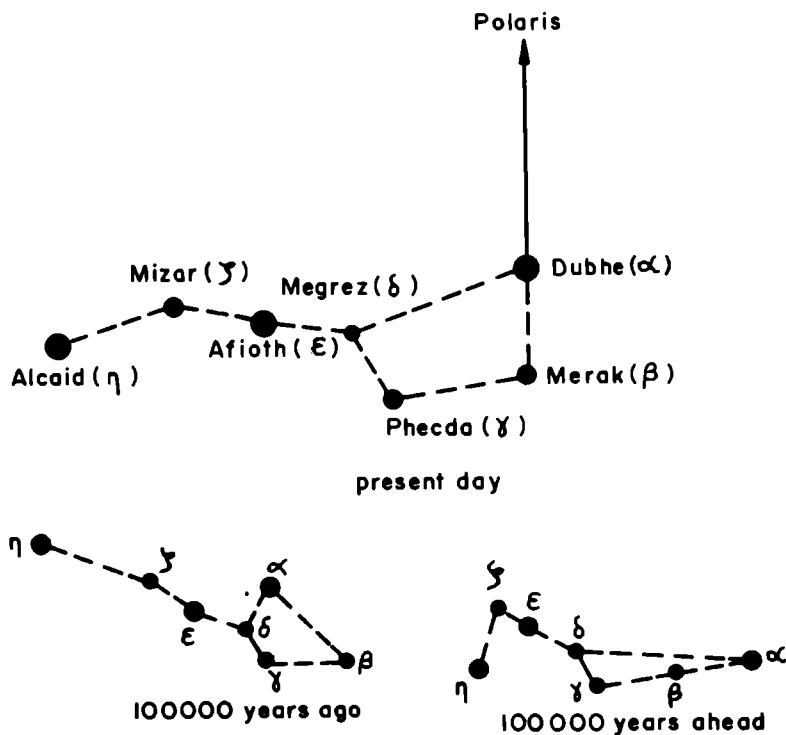


Fig. 4. Shapes of the seven main stars of Ursa Major as 100,000 years ago, at present and 1000,000 years ahead.

The above discussion clearly points to the various laws governing the function, activities, properties and motion in space of the sun, the moon and the stars. It is overwhelming to see such meticulous planning, organisation and discipline in such a vast universe of the sun, the moon and the stars. There is nothing really chaotic in the universe, which is governed by the laws set by the Creator.

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هـ- وَهُوَ الَّذِي يُرْسِلُ الرِّيحَ بُشْرًا بَيْنَ يَدَيْ رَحْمَتِهِ ۗ حَتَّىٰ إِذَا أَقْلَتِ  
سَحَابًا نُّقَالَ سُفُّهُ لَبِيبًا مَّيْمَتٍ فَأَنْزَلْنَا بِهِ الْمَاءَ فَأَخْرَجْنَا بِهِ مِنْ كُلِّ  
الثَّمَرَاتِ ۗ كَذَٰلِكَ نُخْرِجُ الْمَوْتَىٰ لَعَلَّكُمْ تَذَكَّرُونَ ۝

7 : 57 It is He Who sends the gentle winds like heralds of glad tidings, going before His mercy ; when they have carried the heavy laden clouds, We drive them to a land that is dead, maker rain to descend thereon, and produce every kind of harvest therewith. Thus shall We raise up the dead, perchance you may remember.

Wind is air in motion and blows from the higher air pressure zone to the lower air pressure zone. These pressures are caused by forces at work in the atmosphere in accordance with the laws ordained by Allah (vide 15 : 5).

In meteorology, the Beaufort scale gives a twelve-category classification of winds based on their blowing speeds. Four broad classifications have been indicated : (i) breezes (i.e. gentle winds) covering the first six categories ranging from light air flowing with a velocity of 1-3 miles per hour (1-3 mph) to strong breeze (velocity : 25-31 mph), (ii) gales covering the next four categories ranging from the mild gale (32-38 mph) to the whole gale (55-63 mph), (iii) storms having velocity 64-75 mph, and (iv) hurricanes having velocity above 75 mph.

In this verse we have translated رِيحًا as 'gentle winds' as the word signifies winds that are pleasant and not the winds that are too strong or violent for which the appropriate Arabic word used in the Holy Quran is حاصبا (vide 67 : 17).

It has been explained under 2 : 184 that, the gentle wind as it blows : (a) carries the clouds to different places ; (b) carries away and disperses the polluted air and brings in its place fresh pure air ; (c) helps cross pollination by carrying the pollen grains from the anther to the stigma of flowers and this ultimately brings about increased production of fruits ; and (d) brings about a sort of temperature balance in the atmosphere.

Of the beneficial effects mentioned above, carrying of clouds to different places is of the utmost importance. When the heavily laden clouds driven by winds to a barren land shower rain-drops thereon (vide verse 2 : 164 for details as to how raindrops form and come down) the "dead earth" becomes, by Allah's will, living, fertile and beautiful and produces every kind of harvest in abundance.

It is evident that in the absence of winds : (a) the barren land will not become fertile as rain-water will never reach it, (b) the air will get stagnant and polluted, (c) the fruit-yield will be badly affected and (d) the temperature balance in the atmosphere will be totally lost.

Hence we find that as the wind blows, it conveys the happy message that the mercy of Allah in the shape of manifold beneficial effects will immediately follow. The winds, thus, act as "heralds of glad tidings."

٥٨- وَالْبَلَدُ الطَّيِّبُ يَخْرُجُ نَبَاتُهُ بِإِذْنِ رَبِّهِ ۗ وَالَّذِي خَبثَ لَا يَخْرُجُ إِلَّا  
نَكْدًا ۗ كَذَلِكَ نَصْرَفُ الْأَيَاتِ لِقَوْمٍ يَشْكُرُونَ ۝

7 : 58 As for the good land, its vegetation springs up by permission of its Lord; while as for which is bad nothing comes up excepting a trifle (or excepting hard labour). Thus do we explain the Signs for people who are grateful.

The word البلد الطيب means good land which implies soil with congenial physical properties, adequate inorganic and organic nutrients as well as the required amount of water and a suitable gaseous environment. When such other factors as temperature, light, and rainfall or irrigation can be assumed to be present in the right proportion, a soil of the above description brings forth vegetation and produce of good quality. But the soils which are exhausted and barren fail to give satisfactory yields even in the presence of suitable temperature and adequate light and water supply. These two phenomena can be scientifically explained thus :

The earth is composed of 92 naturally occurring stable elements in the form of mineral compounds which consist of 2 or more elements in definite proportion by weight. The fragments of rock and minerals in the soil vary in

size depending on which the soil particles are broadly classified into coarse sand, fine sand, silt and clay. A mixture of particles of different sizes determine the textural classes of soils. The solid matter of soils consists of both inorganic and organic materials with varying proportions in different soils. The space between the soil particles is occupied by air and water, two of the essential factors which determine the growth and yield of plants. The chemical and physical properties of soils are critical in determining their capabilities to provide the inorganic nutrients, water, and the conditions necessary for maximum crop production. Each essential inorganic nutrient is circulated in a complex cycle among organisms within ecosystems and between those organisms and environmental reservoirs of the nutrient, thus keeping the soil equipped with a judicious supply of 13 elements categorized as macronutrients and micronutrients.

Soils under continuous cultivation show a steady decline of nutrient content which may be lost as a result of utilization by crop plants. Nitrogen may be lost by soil erosion, by leaching or when ground cover is destroyed by fire. In water logged soils such as swamps and marshes, nitrates are reduced to nitrogen gas and nitrous oxide which return to atmosphere. Through erosion, pollution, and loss in drainage water, large amounts of phosphorus are discharged into rivers and streams. The adverse activities of humans have drastic effects on the ecosystems and normal nutrient cycles. If the deficiency is not made good by fertilizers, the land becomes unfit for crop production. In acute cases, the soil remains barren in which no seed can germinate and grow. The case in Ethiopia is a recent example.

In the bounties of Allah springing from the good earth, and in the sterility of barren soils indeed Signs for us which should cause us to be grateful for His beneficence.

٦٣- فَكَذَّبُوهُ فَأَنْجَيْنَاهُ وَالَّذِينَ مَعَهُ فِي الْفُلِكِ وَأَكْرَقْنَا الَّذِينَ كَذَّبُوا  
بِآيَاتِنَا إِنَّهُمْ كَانُوا قَوْمًا عَمِينَ ۝

7: 64 But they rejected him, and We delivered him and those with him in the Ark. But we overwhelmed in the flood those who rejected our Signs. They were indeed a blind people !

A deluge as a punishment for the rejectors of Allah's Signs is mentioned in this verse. This kind of punishment was inflicted on the people of prophet Nuh (a.s). How this flood was caused has not been described in this verse.

Descriptions appear in verse 11 : 40, 23 : 27 and 54 : 11, 12. In the first two verses it is stated : 'oven gushed forth water' ; in verse 54 : 12 it is stated: 'We caused the earth to gush forth springs'; and in verse 54 : 11 it is stated : 'We opened the gates of heaven with water pouring forth'. These taken together show that the flood was caused by (1) rain and (2) water gushing from beneath the earth.

Among people of many races there is a variety of traditions of a gigantic and catastrophic flood. Though the Quran, the Bible and the Torah speak of a flood at the time of Prophet Nuh (a.s.), none of these holy Books mention the exact date and place of this occurrence. Causes of the flood mentioned in these holy Books are the same, rain water and water from beneath the earth.<sup>1</sup> The ecological history of the world in the context of these three religions can be divided into pre-flood and post-flood period. It is generally believed on the basis of the Quranic-description, that the resting place of Nuh's (a.s.) Ark as stated in verse 11 : 44 was Mount Judi and according to the Bible Gen 9 : 4 of the Old Testament Mount Ararat. The prophet Nuh (a.s.) belonged to the region of Mesopotamia in the valley of the two rivers—Euphrates and Tigris. Geologists have classified different types of flood due to different causes as follows : (1) river flood, (2) melted snow flood, (3) floods due to ice jams, (4) glaciers, (5) earth slides, (6) floods caused by meteorological disturbances, (7) floods due to non-tropical ocean storms, (8) Tsunamis flood due to faulting or some other sudden movement of the ocean floor or a sudden volcanic eruption.<sup>2</sup>

Florida geologist Emiliani and his coworkers<sup>3</sup> described physical evidence of coastal flooding 9600 B.C. Coastal floods are of 2 kinds. Some are caused by meteorological disturbances and others by seismic disturbances. Glacial cycles and the slow sinking of the ocean floors have caused the sea level to fluctuate from epoch to epoch. The last great flood, according to Fairbridge<sup>4</sup>, was accompanied with a 100 meter increase of the sea level at the end of the quarternary glacial age. Archaeological evidence in the valley of Tigris and Euphrates and geological evidence in the valley of Mississipi testify to

12—

calamitous and spectacular inundations some 6000 years ago. The first historical recorded flood so far known was the flood of river Hwang Ho in China in 2297 B.C. The flood as referred to in the Quran being due to (1) rain and (2) water gushing forth from beneath the earth, it seems that the flood according to modern geological classification was a mixture (1) river flood and (2) meteorological disturbances. A river flood is a major type of flood which may occur at any season. Chief causes of this flood are heavy rain and a marked rise of temperature. This kind of flood is predictable. For medium sized rivers draining 100 square miles forecasts based on rainfall records are possible. For larger rivers draining larger areas more accurate forecasts are possible. Prophet Nuh (a.s) with knowledge derived from Allah had predicted the flood as can be inferred from verses 7:62, 11:37, and 23:27. According to verses 54 : 11, 12, first came the rain and thereafter the meteorological disturbances. Meteorological disturbances are caused by seismic disturbances such as submarine earthquake, disturbances of the sea bed, etc.

According to Emiliani, on the average the sea level has remained relatively constant for the past 6000 years. The highest and the lowest sea levels during the last 6000 years oscillated between 10 to 12 ft. above or below the present sea level. The period of oscillation seems to approximate a 550 years cycle from 1100 and 1650 years harmonics.

Various details of the Mesopotamian story of the flood as have been revealed by fossil records, archeological investigations and Akkadian, Sumerian, Babylonian, Nineveh documents are so similar to those in the Quranic/Biblical account that there can be no doubt about this fact of the flood. Much has been written about the historical background of the traditions particularly since the publication of Sir Leonard Wolley's *Ur of the Chaldees*<sup>5</sup>. Other cities in the Mesopotamian river valley notably Kish, Fare and Nineveh also show flood layers, though none of them can be closely related in time. In other words the Mesopotamian flood evidence is that of purely local inundations of the Tigris and the Euphrates. The Quran refers to the flood as concerning the people of Nuh (a.s., 7 : 59, 25 : 39), i.e. the flood was local and not worldwide.

When seen in the light of modern knowledge the Quranic narrations of the flood are free from anything which might give rise to objective criticism.<sup>1</sup>

From the above discussions some important facts emerge about the flood, namely : 1. Nuh (a.s.) had constructed a strong and big "arc" under the guidance from Allah ; 2. the flood was caused by the combined geological and meteorological disturbances ; 3. Nuh (a.s.) being instructed by Allah could foretell the coming of a catastrophic flood ; 4. modern scientific investigation confirms the occurrence of such a flood in a region near Mesopotamia which most of the commentators of the Quran accept as the scene of the great flood.

Nuh (a.s.) may be considered as the pioneer in the engineering of ship building. It was unlikely for his people to have any experience in big ship building as they were not sea fearing people. Even with modern computers and tremendous advances in science and technology, meteorologists find it difficult to make accurate long term predictions particularly regarding flood in view of the large number of parameters involved in solving this meteorological problem. It is indeed surprising to see that Nuh (a.s.) could foresee this flood accurately and this he could only do when he was instructed by Allah. The Quran recorded this event 1400 years ago and modern scientific investigations confirm this.

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٨٠- وَلَوْ طَآءَ إِذْ قَالَ لِقَوْمِهِ أَتَأْتُونَ الْفَاحِشَةَ مَا سَبَقَكُمْ بِهَا مِنْ أَحَدٍ مِّنَ الْعَالَمِينَ ○

٨١- إِنَّا كُنَّا لَتَأْتُونَ الرِّجَالَ شَهْوَةً مِّنْ دُونِ النِّسَاءِ بَلْ أَنْتُمْ قَوْمٌ مُّسْرِفُونَ ○

7 : 80 And Lut said to his people : "Do you commit lewdness such as no people in creation (ever) committed before you ?"

7 : 81 "For you practice your lusts on men in preference to women : you are indeed a people transgressing beyond bounds."

The verse 7 : 80 indicates that the people of the prophet Lut (a.s) were sexually perverts and most of their men preferred male homosexuality over normal hetero sexual practice allowed by Allah. He further says that no nation or community before them committed such a sin in the world. From the Jewish Bible we come to know that land of the prophet Lut (a.s) was known as Sodom and Gomorrah, believed to be situated at the southern tip of the Dead Sea. This type of sexual perversion is known as sodomy.

This sexual perversion was believed to be known among the old nations like the Assyrians, Egyptians, Catthaginians, Seythians, Normans, Romans and Greeks, but nowhere it was a popular system nor was it universally practised by any nation. According to the Quran, the people of Sodom and Gomorrah were unique in this regard.

The nature of the crime of the people of Lut (a.s.) is clearly mentioned and male homosexuality has been specifically indicated by the term lewdness in verse 7 : 80. Homosexuality has been categorically mentioned as the transgression of the limits enjoined by Allah.

Modern science regards the sexual impulse directed towards persons of the same sex as an aberration and it is variously known as sexual inversion, contrary sexual feeling or more generally homosexuality.

In Europe during the Middle Age, homosexuality flourished in certain closed communities like military camps and cloisters and it is constantly referred to in the penitentials. Brussels<sup>1</sup> writes in Collier's Encyclopaedia

that homosexuality is commonly found in regressive mental disorders, psychopathic personalities, some alcoholic and drug-addicts and in residents of segregated institutions. Freud associated homosexuality with paranoia (mental derangement) and with alcoholism." Pederasty is the term given to the variety of sodomy found among men who seek relations with small boys.

In recent times in Western countries male homosexuality has been much publicised and some countries it is well tolerated. Since the last decade, an incurable disease called AIDS (Acquired Immune Deficiency Syndrome) has been reported among the homosexuals in the USA which caused large numbers of deaths. Later on the incidence of AIDS spread all over Europe and other parts of the world. It is a virus disease which lowers the resistance of the body against infection and proves fatal. AIDS has assumed the proportions of a major threat to human life like plague (See Appendix-III).

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٨٣- وَأَمْطَرْنَا عَلَيْهِمْ مَطَرًا ۖ فَانظُرْ كَيْفَ كَانَ عَاقِبَةُ الْمُجْرِمِينَ ۗ

7: 84 We rained down on them a shower. See what was the end of the sinners.

In this verse it is said that there was a shower on the people of the prophet Lut (a.s) who were sinners. Neither the nature of the shower nor its consequences have been indicated . For this we are to look into the verses in which the occurrences at the time of the prophet have been described. There are as many as 10 other verses which describe the event. The verses are : 7:4; 11:82; 15 :73, 74; 21:74; 27:58; 29:34; 37:136; 51:33; 54:31.

There is no mention of the place or country where these people lived and these happenings occurred except a hint in 2 verses (15: 76; 37:137) stating that it was on the caravan route the Arabs used at the time when the Quran was revealed. In the Bible in connection with prophet Lut (a. s.) it is stated, "Suddenly the Lord rained sulphur on the cities of Sodom and Gomorrah and destroyed them and the whole valley, along with the people there and everything that grew in the land, (Genesis 19: 24, 25)." The matter of Sodom and Gomorrah has been referred to in verse 7: 4.

Of the 11 verses in the Quran about the event, 3 verses (7:84, 26:173, 27: 58) speak only of rain (shower) without any description about the nature of the shower and the consequence there of. In 2 verses (11: 82, and 15:74.) it is said that hard bricks were rained. In one verses (15:74) it has been stated that the cities were turned upside down, i.e., there was an earthquake. In another verse (51:33) it is stated that stones of clay were sent. Two verses (15:73, 54:31) speak of blasts of loud sound overtaking the place.

٩١- فَأَخَذَ نَهُمُ الرِّجْفَةَ ۖ فَأَصْبَحُوا فِي دَارِهِمْ جَثْمِينَ ۖ

7: 91 Then the earthquake took them unawares and they lay prostrate in their home.

This verse refers to the damage caused to life and property by an earthquake. There are many examples of havoc caused by earthquakes 250,000 people died in San Fransisco in an earthquake. The earthquake in Bihar in 1934 and the one in Quetta also caused the deaths of thousands.

An earthquake is the trembling or shaking movement of the surface of the earth. The intensity of the phenomenon may vary from a slight tremor perceptible only with the aid of delicate instruments to a great convulsion causing considerable changes in the surface structure of the earth with consequent destruction of much life and property. The subterranean point of origin of an earthquake is called the focus and the point on the surface directly above the focus is called the epicentre.

The Richter scale for the measurement of earthquakes was introduced by C.F. Richter in 1935. In this scale magnitude  $M$ , of an earthquake is defined as  $M = \log_{10} (A/A_0)$  where  $A$  is the maximum amplitude, recorded by a seismograph at a distance of 100 kilometer from the epicenter,  $A_0$  is an amplitude of one thousandth of a milimeter. Earthquakes of magnitude 5.0 or greater generate ground motion sufficiently severe to be potentially damaging to structures.

For magnitudes less than 5.0 the ground motion is unlikely to be damaging because of its very short duration and moderate acceleration. Previously it was assumed that earthquakes are caused by the jerk given to the earth's surface by the subterranean movement of layers of rocks causing a fault.

An earthquake is also caused by gases or lava in volcanic activity, or collapse of roofs of caves. But now the situation has changed. In the past 20 years, there has been a revolution in earth sciences, which has brought new understanding of our planet. This revolution has resulted in a growing understanding of the forces which shape the continents and set them drifting. Our planet's surface is broken into a number of cold, rigid, 100 km thick lithospheric plates. They float on a warm, relatively plastic, partially molten region called the aesthenosphere. The plates move slowly, at 5 to 10 cm per year, apparently driven by thermal convective motion of rocks in the mantle and by gravity. Geologists are of the opinion that quantities of fresh rocks are slowly emerging

from the mantle, along the length of the sub-marine mountain range and are spreading out laterally forming new crusts that advance toward the continents. This phenomenon known as sea floor spreading causes the drift of the plates. Most terrestrial geological action happens as plates collide. Earthquakes, volcanic eruption, mountain formation etc. result from their massive slow motion-collision. If a plate of heavy oceanic rock jams against a more buoyant plate of continental rock, it is forced back down to the interior. As it sinks, it becomes hot and eventually melts. The less dense molten rocks rise and erupt through volcanoes. When two continental plates collide, earthquakes occur; in severe cases, continents crumple ; enormous folded ranges of mountain like the Rockies and the Himalayas, thrust up. So earthquakes occur at the boundary of plates, when the pressure of the plates exceed their strength. The crust then fractures and the plates shift so that the pressure decreases to an amount that the rocks can tolerate.

Violent earthquakes occur roughly in two zones of the earth's surface, one following a line drawn through the Mediterranean, Asia Minor, the Himalayas and the East Indies, being the boundary of the plates, Eurasian plate, Arabian plate, Australo-India plate, and Phillipine plate. The other time follows the western, eastern and northern Pacific, being the boundary line of Pacific plate, north American plate and south American plates.

۱۳۳- فَأَرْسَلْنَا عَلَيْهِمُ الطُّوفَانَ وَالْجَرَادَ وَالْقَتْلَ وَالضَّفَادِعَ وَالدَّمَآئِيتِ  
مُفَصَّلَاتٍ ۗ فَاسْتَكْبَرُوا وَكَانُوا قَوْمًا مُّجْرِمِينَ ۝

7 : 133 So We sent against them flood, locusts, vermin, frogs and the blood- open Signs, but they were arrogant and became a guilty folk.

The verse refers to the five calamities or 'plagues' sent against the Pharaoh and his people by Allah as Chastisement for their arrogance in spite of repeated warnings by the prophet Musa (a.s.) manifested in exaggeration and can be explained in the light of modern scientific knowledge.

الطوفان means continuous rain, far reaching storm or deluge. These phenomena are too obvious and too common in the tropical countries and need no further elaboration here. Likewise قمل meaning vermin or small insect parasites cause discomfort to human beings in addition to harbouring disease and acting as carriers of diseases. It may refer to lice causing great physical discomfort or plant pests whose pesticidal activities increase enormously under conditions which favour their rapid multiplication, and are not dealt with here further.

**Locusts :** Locusts belong to the order Orthoptera of the class Insecta which includes crickets and grass hoppers characterized by the possession of powerful chewing jaws, and enlarged hind legs for jumping. They look just like large grass hoppers and, when present in large numbers become gregarious, i.e. they tend to group together. They migrate during the day-time in swarms of many millions of individuals and depending on favourable air currents and thermal conditions will extend from ground level to a considerable height, perhaps 1000 m or more above the ground<sup>1</sup>. When they arrive in such numbers and with air speeds of 10-25 km per hour, they darken the sky. They lay their eggs in areas of bare ground close to the vegetation and reproduce in a spectacularly rapid manner in great numbers when conditions are favourable. The desert locust, *Schistocera gregaria* occurs from W. Africa to India, and extends north to Iran and south of Kenya. The migratory locust, *Locusta migratoria* is much more widespread extending through Africa eastwards up to Australia<sup>1</sup>. Locusts are always plentiful in the Near East, except at interval of years. They locate and identify their food using the visual and chemical senses. Attacking a wide range of crops including wheat, barley, rye and flax, which were under cultivation in ancient Egypt<sup>2</sup>, a full meal of the locust may amount to about 15% of its own body weight. In the course of a day, with continued access to food, the locust may ingest about its own weight of vegetation. In a swarm covering an area of 10 sq. km. the amounts eaten would amount to a total of about 2000 tons of vegetation eaten in one day<sup>3</sup>. Thus, the locusts are responsible for untold damage to food crops notably in Africa and Asia, and must have been one of the causes of famine in Pharaoh's Egypt.

**Frogs :** Frogs as pests were not unknown in ancient Egypt. When the rivers become foetid, a mass of organic matter and insect life would be collected making the conditions suitable for rapid multiplication of frogs. The sudden increase in frog population during Pharaoh's time might have also been due to some disturbance in the natural ecological balance such as large scale death of predators of frogs, e. g., Water snakes on account of pollution of water through red tides as discussed below.

**Blood :** This obviously refers to the 'red tides' a phenomenon that has been known from ancient times recurring again and again down to the present time. When the sea water is rich in plankton (minute form of floating organisms), especially dinoflagellates containing reddish or brown pigment, it loses the transparency and becomes red. This may cause the 'red tide' known from ancient time in many parts of the world. In some enclosed seas like the Red Sea, adjacent to Egypt, this condition is so common that it owes its name to it<sup>3</sup>. The factors that cause the red tide are not properly understood; nutrient levels, occurrence of trace metals, sewage run off, ocean salinity, temperature, winds, and light may all play some role. In unfavourable conditions, the dinoflagellates sink to the bottom and lie dormant in their resting cysts until the conditions are more favourable for their renewed activity. The poisons produced by some dinoflagellates are extraordinarily powerful nerve toxins. These are ingested by fish which may be poisoned directly. Shell-fish are not generally harmed but they accumulated the toxins and may become dangerous for human consumption. In 1972, the New England coast in the USA experienced its first red tide in which 26 people were poisoned by shell-fish contaminated by the dinoflagellate, *Gonyaulax excavata*. Red tides are a recurrent problem: During 1974, the west coast of Florida (USA) was ravaged by its 25th major red tide since 1844 when hundreds and thousands of dead fish littered the beaches<sup>4</sup>. Hastings<sup>5</sup> observes that when the Nile rises in June, its waters become discoloured and gradually turn to dull red colour as the river rises to its height in August. This is confirmed by many travellers who speak of offensive odours emitted at a later stage. This, coupled with the poisonous nature of the red tide, must have caused serious pollution of water in the Nil with

disastrous results on the health of humans and other animals during the time of the Pharaoh.

### References

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١٥٨- قُلْ يٰٓاَيُّهَا النَّاسُ اِنِّى رُسُوْلُ اللّٰهِ اِلَيْكُمْ جَمِيعًا الَّذِى لَهُ مُلْكُ السَّمٰوٰتِ وَ  
الْاَرْضِ لَا اِلٰهَ اِلَّا هُوَ يُحْيِىْ وَيُمِيتُ ۗ فَاٰمِنُوْا بِاللّٰهِ وَرُسُوْلِهِ الَّذِى تَرٰى اِلَى الْاَرْضِ  
يُؤْمِنُ بِاللّٰهِ وَكَلِمٰتِهِ وَالْبَعُوْةَ لَعَلَّكُمْ تَهْتَدُوْنَ ۝

7 : 158 Say : O men! I am sent unto you all, as the Apostle of Allah, to Whom belongs the dominion of the heavens and the earth : there is no god but He : it is He that gives both life and death. So believe in Allah and His Apostle, The unlettered Prophet, who believes in Allah and His Words; follow him that (so) you may be guided.

That the domain of the heaven and the earth belongs to Allah has been discussed under verse 2 : 117 and appendices I and II.

That Allah is the supreme master-mind behind the creation of life and death has already been discussed in connection with verse 21 : 30.

١٦٠- وَقَطَعْنٰهُمْ اثنى عشرَ اَسْبَاطًا اُمَمًا وَاَوْحَيْنَا اِلَى مُوسٰى اِذَا سَكَتَ قَوْمُهٗ  
اَنْ اَضْرِبَ بِعَصَاكَ الْجَبْرَءٖلَ فَاَلْبَسْتُمْ مِنْهُ اِثْنَا عَشْرَةَ عَيْنًا قَدْ عَلِمَ كُلُّ  
اُنَاسٍ مَّشْرَبَهُمْ

7 : 160 We divided them into twelve tribes or nations. We directed Musa by inspiration when his people asked him for water: "Strike the rock with your staff." Out of it there gushed forth twelve springs: each group knew its own place for water. We gave them the shade of clouds and sent down to them *manna* and *salwa*. (Saying) "Eat of the good things We have provided for you. To us they did no harm but they harmed their own souls.

'Strike the rock with your staff' : Out of it there gushed forth twelve springs: This point has been discussed under verse 2 : 60.

**The shade of clouds :** In open desert areas the solar rays fall directly upon the sand grains and heat them up quickly. The heated sands in their turn radiate heat and make the air above them extremely hot; in summer the heat may become unbearably torturing. Then, even the shadows cast by clouds come as great relief; the sands in the shady portion lose heat rapidly, rendering the shade appreciably cooler and much less torturing. Thus, for desert dwellers the cloud shadows have to be reckoned as a special favour from Allah. This verse mentions such a favour shown to the children of Israil when they were wandering in the dreary desert under the leadership of Hazrat Musa (a.s.).

**Manna and Salwa :** This has been discussed under verse 2 : 57.

۱۷۱- وَإِذْ نُنْفِئُ الْجَبَلَ فَوَاقَهُمْ كَأَنَّهُ ظُلَّةٌ وَظَنُّوا أَنَّهُ وَاقِعٌ بِهِمْ خُذُوا مَا آتَيْنَاكُمْ بِقُوَّةٍ وَاذْكُرُوا مَا فِيهِ لَعَلَّكُمْ تَتَّقُونَ ۝

7 : 171 When we shook the Mount over them, as if it had been a canopy, and they thought it was going to fall on them: "Hold firmly what We have given you, and bring (ever) to remembrance what is therein; perchance you may fear Allah."

Some commentators interpret this verse by translating the word as lifting up which implies a miracle. However, this word also means tremor which meaning has been considered by Allama Yusuf Ali and M. Pickthal. People living at the base of mountains have an awesome, frightening and fascinating experience when there is a tremor caused by an earthquake. The cause of earthquakes is understood from the present developments in plate tectonics.<sup>1</sup> The plate junctions are the weakest places in the earth's crust where volcanic activity, earthquakes and mountain building take place. The most common type of earthquake is caused when rocks break suddenly in response to geological forces within the earth. Rocks are elastic and energy is stored in them during deformation by tectonic forces. When the strain builds to a level that exceeds the strength of a weak part of the earth's crust, e.g., in the fault, opposite sides of the fault suddenly slip producing elastic



waves that spread out into the earth, producing an earthquake. Tremendous pressure is built up at the weakest places of the earth's crust due to water's coming into contact with hot magma (molten rock) in the interior of the earth's crust. The turbulent gas-charged magma at hot spots forces its way upwards by breaking, cracking or shifting of the crust when the pressure is too high for the crust to hold. Severe volcanic activity also may produce earthquakes, the reason being the same as that for tectonic earthquakes, i.e., spreading out of elastic waves to the earth's surface. Sudden shaking of the ground is also produced by collapse of underground caverns and mines, landslides, and large explosions of chemical or nuclear devices.<sup>2</sup>

An earthquake causes faults in the earth's crust, sometimes several miles deep and upto hundreds of miles long, along with horizontal and vertical movements. In the 1906 San Francisco earthquake there was a 20 ft. horizontal movement with the east block moving south. In the 1954 earthquake at Red Canyon fault scrap, Hebgen, Montana, a block was uplifted by 20 ft. At San Fernando, 1971, the movement was about 6 ft. up and 6 ft. horizontally to the left. The great naturalist John Muir wrote of his experience in Yosemite Valley in the Owens Valley earthquake of 1872. He had camped at the foot of a ragged rock mass, called Sentinel Rock, several thousand ft. high. He wrote, "At half past two o'clock of a moon-lit morning in March, I was awakened by a tremendous earthquake, and though I had never before enjoyed a storm of this sort, the strange thrilling motion could not be mistaken, and I ran out of my cabin, both, glad and frightened, shouting, 'A noble earthquake !' feeling sure I was going to learn something. The shocks were so violent and varied, and succeeded one another so closely that I had to balance myself carefully in walking as if on the deck of a ship among waves; it seemed impossible that the high cliffs of the Valley could escape being shattered in particular. I feared that the sheer-fronted Sentinel Rock, towering above my cabin, would be shaken down, and I took shelter back of a large yellow pine, hoping that it might protect me from at least the smaller out bounding boulders. For a minute or two the shocks became more and more violent flashing horizontal thrusts, mixed with a few twists and battering, explosive, upheaving jolts....."<sup>3</sup>

The above description by Muir shows the experience of persons living at the base of a mountain during an earthquake. They may feel that the tremor shakes the mountain and as if it is brought over them on the brink of falling over by the ferocity of the tremor. The shaking of a high mountain may bring the top over the people at the base and this may appear as a canopy for the time being. Also the mountain top may be inclined permanently by a tremor.

### References

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۱۸۵- أَوَلَمْ يَنْظُرُوا فِي مَلَكُوتِ السَّمٰوٰتِ وَٱلْأَرْضِ وَ مَا خَلَقَ ٱللَّهُ مِنْ شَيْءٍ ؕ  
 وَ أَنْ عَسَىٰ أَنْ يَكُونَ قَدِ اقْتَرَبَ أَجَلُهُمْ فَبِأَيِّ حَدِيثٍ بَعْدَهُ يُؤْمِنُونَ ۝

**7 : 185 Do they see nothing in the government of the heavens and the earth and all that Allah has created? (Do they not see) that it may well be that their term is nigh drawing to an end? In what Message after this will they then believe?**

This verse is most thought provoking, and focusses attention on the fact that Allah created everything from the tiniest particles to the vast universe with exactness and precision, all being governed by some laws ordained by Him. The laws governing the vast universe, galaxies, nebulae, stars and planets are outlined in appendices I and II.

In the microscopic world of atoms, protons, neutrons, electrons and many other tiny particles discovered by physicists, no chaos and disorderliness is observed. These tiny particles are found to be governed by a complex set of laws and they behave in specific ways as ordained by the Creator (for details see appendix IV).

The biological world including plant and animal life is governed by certain laws of nature ordained by Allah. (1) They are highly ordered and organized. Irrespective of their size and shape, each Living organism is made up of cells each of which consists of two major parts namely, (a) the jelly-like substance called cytoplasm and (b) the nucleus. Cytoplasm controls metabolism involving all chemical reactions that take place in the cells; the nucleus governs the structure and is the seat of chromosomes and DNA (Deoxyribonucleic acid). (2) Each living organism derives from the environment, the process being directly or indirectly dependent on the utilization of energy from the sun. A small fraction of this energy, captured in the molecule of chlorophyll in green plants, is converted to the dynamic energy that derives metabolic reactions associated with living systems, and these again operate in accord with the laws of thermodynamics. As for instance, the first law of thermodynamics states that energy can be changed from one form to another but cannot be created or destroyed. In plants one of the most vital of all energy transformations occurs when light energy

reaches the leaf of a plant. A part of the absorbed light is converted to heat, but some excites certain electrons in chlorophyll molecules and these eventually provide power to convert carbon dioxide to sugars which possess high energy compared to the carbon dioxide and water from which they were made. In due course, the carbohydrate is broken down by the plant or by a foraging animal with the loss of chemical or potential energy from the carbohydrate molecule. The loss of potential energy from sugar as it is oxidized can result in an increase of potential energy of some other compound.<sup>1</sup> Animals and non-green plants derive energy by consuming organic matter or by depending on other plants or animals, dead or living. (3) All life responds actively to their environment, viz. to light, heat, moisture, gravity and to chemicals. (4) They are adapted to the environment in such a way that they can carry on their biological activities efficiently. (5) All living organisms develop to a particular somatic (bodily) stage and reproduce at different levels: (a) molecules (e.g., replication of DNA molecule), (b) chromosomes (their replication in cell division), (c) cells (their division to form tissues), individuals (their sexual and asexual reproduction). Each DNA molecule besides having the ability to replicate itself, has a vivid memory and stores a vast number of codes and blue prints which it issues at the right time and place to trigger the building of all the cells and structures of a body, make them grow, and synchronize their operations at every moment during all their allotted life. (6) And, they pass information to the offspring through their DNA and thus maintain the genetic continuity.

In this verse, we are asked to contemplate not only the grand design and orderliness of the universe, but also the infinite combinations and permutations of the genes in the chromosomes determining the characters of the individuals of plants and animals. In spite of this tremendous variation, the specific identity of individuals and the genetic continuity are maintained in perfect order by certain ingenious laws of the Creator. Glory indeed to Allah who made DNA, the master molecule—the hereditary blue print for life.

## Reference

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١٨٤- يَسْأَلُونَكَ عَنِ السَّاعَةِ أَيَّانَ مُرْسِمُهَا قُلْ إِنَّمَا عِلْمُهَا عِنْدَ رَبِّي لَا يُجِئُهَا لَوْحٌ مَّقْتُلٌ إِلَّا هُوَ يُثَقِّلُ فِي السَّمَوَاتِ وَالْأَرْضِ لَا تَأْتِيكُمْ إِلَّا بَغْتَةً

7:187 They ask you about the (final) Hour—when will be its appointed time? Say: "The knowledge thereof is with my Lord (alone): none but He can reveal as to when it will occur. Heavy were its burden through the heavens and the earth. Only, all of a sudden will it come to you.".....

The scientific descriptions of the creation of the universe, the galaxies, the stars, planets, and our solar system have been given in detail in appendices I and II. The life story of a star, its birth, gradual changes with time and its death, has also been discussed there (also see 7 : 54). The sun is a star classified as G dwarf type. In a few hundred billion years, when hydrogen nuclei in its core are exhausted due to fusion, the sun will suddenly expand and become very bright and red; eventually it will swell and engulf the closer planets Mercury and Venus and would reach the earth. At this time there would be imbalance in the gravitational force in the solar system leading to great turmoils and tremors. The sun at this time will be so hot that it will burn and change everything on earth. Such an end of all forms of life on our planet was asserted in the Quran 1400 years ago. This confirmation by our present day knowledge of science creates ecstasy in the mind of a believer and shatters the confidence of a non-believer. Indeed this shows that the Quran is Divine in origin.

١٨٩- هُوَ الَّذِي خَلَقَكُمْ مِنْ نَفْسٍ وَاحِدَةٍ وَجَعَلَ مِنْهَا زَوْجَهَا لِيَسْكُنَ إِلَيْهَا فَلَمَّا تَغَشَّهَا حَمَلٌ خَفِيفًا فَمَزَّتْ بِهِ فَلَمَّا أَثْقَلَتْ دَعَوَا اللَّهَ رَبَّهُمَا لَئِنْ آتَيْتَنَا صَالِحًا لَنُكُونَنَّ مِنَ الشَّاكِرِينَ ○

7:189 It is He Who created you from a single person, and made his mate therefrom in order that he might dwell with (in love). When they are united, she bears a light burden and carries it about (unnoticed). Then when she grows heavy,

**they both pray to Allah, their Lord, "If You give us a good child we shall ever be grateful."**

The creation of mankind from the first pair of man and woman has already been discussed in verse 4:1.

In the present verse, 'light burden' means the early stage of pregnancy, when a woman does not feel any extra weight. This condition lasts for about 3-4 months of gestation. By the 20th week she begins to feel heavy and these phenomena are beautifully expressed by Allah in this verse.

۳۲- وَإِذْ قَالُوا اللَّهُمَّ إِن كَانَ هَذَا هُوَ الْحَقُّ مِنْ عِنْدِكَ فَأَنْزِرْ عَلَيْنَا حِجَارَةً  
مِّنَ السَّمَاءِ أَوْ آتِنَا بِعَذَابٍ آَلِيمٍ ۝

8: 32 Remember how they said: O Allah! if this is indeed the truth from You, rain down on us a shower of stones from the sky, or send us a grievous penalty."

This verse refers to the taunting challenge of the unbelievers in Makkah asking for punishment for their disbelief, by raining down showers of stone on them. It does not speak of any specific kind of stone. The word حجارة has been used in 9 verses (2: 24, 74; 8: 32; 11: 82; 15: 74; 17 : 50; 51: 33; 66: 6; 105: 4). Of those one is about stones from earth طه and 3 are stones from *sijjil* سجل and the other 5 are simply stated as 'stone' only. Stone according to the dictionary is a piece of rock or hard mineral substance (other than metals) of a small or moderate size. Commentators appear to have different views about stones from *sijjil* سجل and even about stones from earth. Some think these to be brimstones i.e. sulphur as stated in the Bible; others, however, interpret it as baked clay.

The matter of different kinds of rocks has been discussed in connection with verse 2: 60. The matter of showering of stones as punishment has been referred to in 3 verses (11:82, 15:74 and 51: 33) and this punishment was inflicted on the people of the prophet Lut (a.s.). This has been referred to in our discussion under verse 7:84.

How the stones were showered from the sky is not described. Such showerings come only in the case of the explosive type of volcanic eruptions and meteors. In the case of explosive volcanic eruptions, stones, various other materials and gases are thrown out and showered on the places around.

Typical highly explosive eruptions were that of Krakatoa in the straits of Sunda, Dutch East Indies, which in 1883 blew up about a cubic mile of rock which rose as dust 15 miles in the atmosphere; and that of mt. Polee on the Island of Martinique, West Indies which occurred in 1902. The latter eruption was without lava and consisted of a great cloud of incandescent gases and dust which destroyed the city of St.Pierre and almost its entire population of 28,000 inhabitants.

As far as is known, half of the observed meteors do come to the solar system from interstellar space, but the number of such objects as may be there is not known. Half of those meteors enter the earth's atmosphere with velocities less than 42 km (26 miles) per second while the remainder have velocities greater than that of the numbers of meteors which enter the atmosphere of the earth. Meteorites of the Sideriolite type are composed of the metallic and silicate materials.

The greater percentage of meteors fall to the surface of the earth as fine dust. But the air wave and earthquake that would follow the impact on the surface of perhaps several hundred tons moving with a velocity of many miles per second are almost beyond imagination. The results of such impacts are found in the huge meteor crater in Arizona and the more recent fall in Siberia.

The largest known meteor, Hoba, of about 60 tons fell in South Africa in 1920. Meteorite, Sikhola Alin, of more than 23 tons fell in 1947 in Eastern Siberia. The Norton country meteorite consisting of about 100 stones one of which was about 1 ton, fell in 1948 in Kansas, USA. Fortunately, large meteors are very rare. The fall of such an object on a city would completely destroy it.

٣٦- إِنَّ عِدَّةَ الشُّهُورِ عِنْدَ اللَّهِ اثْنَا عَشَرَ شَهْرًا فِي كِتَابِ اللَّهِ يَوْمَ خَلَقَ السَّمَوَاتِ  
وَالْأَرْضَ مِنْهَا أَرْبَعَةٌ حُرُمٌ ذَلِكَ الدِّينُ الْقَدِيمُ فَلَا تَظْلِمُوا فِيهِنَّ أَنْفُسَكُمْ  
وَكَاتِلُوا الْمُشْرِكِينَ كَاتِبَةٌ كَمَا يَفْقَاهُكُمْ كَاتِبَةٌ وَاعْلَمُوا أَنَّ اللَّهَ مَعَ  
الْمُتَّقِينَ ○

9 : 36 The number of months in the sight of Allah is twelve (in a year) so ordained by Him the day He created the heavens

**and the earth; of them four are sacred. That is the straight usage. So wrong not yourselves therein, and fight the Pagans, all together as they fight you all together. But know that Allah is with those who restrain themselves.**

This verse has got two parts, which may be considered to have some relation with astronomy. "Number of months in the sight of Allah is 12 months" is the first part and "He created the heavens and the earth" is the second part.

In verse 2 : 189 it has been observed that there are three natural units of time: day, month and year. The first unit, 'day' is the period of one complete rotation of the earth about its axis. This rotation may be with respect to the 'mean sun'. Then the period is called a 'mean solar day'. This is arbitrarily divided into 24 parts, each part is called a mean solar hour. This is again divided into minutes and seconds. The rotation of the earth may also be with respect to a fixed star. The period is then called a 'sidereal day'. These two types of 'day', defined here are not equal in length. A sidereal day is 23h 56m 4sec., i.e., about 4 minutes shorter than a mean solar day. A mean solar day is generally called a 'day'.

The second unit of time is a 'month', the period of one complete revolution of the moon about the earth. This revolution may be with respect to the sun. Then this month is called a 'synodic lunar month'. The revolution may again be with respect to a fixed star. Then the month is called a 'sidereal lunar month'. In this case also, the two months are not of equal length. A synodic lunar month consists of 29.53059 days and a sidereal lunar month consists of 27.32166 days.

The third unit of time is a 'year'. This is the period of one complete apparent revolution of the sun about the earth. This revolution may be with respect to the vernal equinox ; then this period is called a 'tropical year'. It keeps pace with seasons. The revolution may, again, be with respect to a fixed star, then this period is called a 'sidereal year'. It keeps pace with the heliacal rising of the stars. The two types of year are also not of equal length. A tropical year consists of 365.24219 days and a sidereal year consists of 365.25636 days. As the difference between the two types of year is very small, the heliacal rising of stars keeps pace with seasons for a long time. Thus in ancient Egypt, the heliacal rising of Sirius indicated the approaching season of inundation of the Nile.



The main difficulty with these three units of time lies in the fact that they are not simply related to one another, as is suggested by such statements as that, 30 days make a month and 12 months make a year. The above discussion shows that in 12 lunar months, whether synodic or sidereal, the earth cannot make a complete revolution about the sun; a part of the orbit is left uncovered. So 12 lunar months obviously do not make a solar year but constitutes what is called a lunar year. The difference increases with time; the gap becomes large after a large number of years, thus disturbing the relation between lunar months and solar seasons very seriously. This difference was noted even in ancient times. To compensate for this difference, an intercalary 13th month was inserted in some years. In some civilizations, this was done according to some rule, and according to the whim of the king in some other civilizations. Thus in India, a month having two new moons was termed an 'adhimash' and was considered to be an extension of the previous month to avoid the counting of the 13th month. Whereas in a clay tablet found in Assurbanipal's library it is stated, "Hamurabi (reigned from 2123 B. C. to 2081 B.C.) proclaims that as the year is not auspicious, the month next to Ululu shall be called second Ululu", thus counting that year, as one of 13 months. Although time can be counted on the basis of both solar as well as lunar periods, in the present verse, Allah emphasises the maintenance of 12 months in a period indicating that irrespective of the system one follows, the number of months must remain 12.

As regards the second part of the verse, 'He created the heavens and the earth' it has been observed in the verse 7:54 that the creation of the heavens and the earth was completed in six periods'. On analysing lunar soil as brought down by Neil Armstrong and other astronauts, it has been found, that the age of the lunar soil is the same age as that of the earth. So the moon has been revolving round the earth and making months since the creation of the heavens and the earth.

۱۱۶- اِنَّ اللّٰهَ لَهٗ مَلِكُ السَّمٰوٰتِ وَالْاَرْضِۙ يَحْيِيۙ وَيُمِيْتُۙ وَمَا لَكُمْ مِّنۡ دُوۡنِ اللّٰهِ  
مِّنۡ ذٰلِكۡۙ وَلَا تَنْصُرُوۡهُ

9: 116 Unto Allah belongs the dominion of the heavens and the earth. He gives life and He takes it. Except for him you have no protector nor helper.

This subject has been elaborated under the discussion on verse 2: 164.

۱۲۵- وَأَنَّا الَّذِينَ فِي قُلُوبِهِمْ مَرَضٌ قَوَّضْنَاهُمْ يَجْسَأُونَ لِجَسَدِهِمْ وَمَاتُوا وَهُمْ كَافِرُونَ

9: 125 But for those in whose hearts is a disease it only adds wickedness to their wickedness and they die while they are disbelievers.

In this verse the disease in the heart means disease of mind or mental disease. In Arabic the general term قلب includes both the physical heart as well as the abstract mind. In general the word قلب in the Quran means mind.

That mind can be diseased was not known to science until recently. The Viennese physicians Joseph Brener and Sigmund Freud in 1893 brought up the subject of psychic disease in the field of medicine and later on Freud (1896) developed the new method to treat mental illness.

It is interesting to note here that the mention of disease in the heart (mind) though spiritual in sense was made in the Holy Quran more than 1400 years ago.

۳- إِنَّ رَبَّكُمْ اللَّهُ الَّذِي خَلَقَ السَّمَوَاتِ وَالْأَرْضَ فِي سِتَّةِ أَيَّامٍ

10: 3 Verily your Lord is Allah Who created the heaven and the earth in six days,.....

This has been discussed in the explanation to verse 7:54.

۴- إِلَيْهِ مَرْجِعُكُمْ جَمِيعًا وَعَدَّ اللَّهُ حَقًّا إِنَّهُ يَبْدَأُ الْخَلْقَ ثُمَّ يُعِيدُهُ لِيَجْزِيَ الَّذِينَ آمَنُوا وَعَمِلُوا الصَّالِحَاتِ بِالْقِسْطِ

10: 4 To whom will be your return of all of you. The promise of Allah is true and sure. It is He Who begins the process of creation and repeats it, that He may reward with justice those who believe.....

In this verse Allah declares that he is the Originator of the universe and every form of life in it. Allah as the Originator of the heavens and the earth has been discussed from the scientific view point in verse 2: 117. Allah as the Originator of the first speck of life on earth has been explained in verse 2: 28. Various scientific theories about the creation of the universe and the origin of celestial bodies have been discussed under Appendices I and II.

### **It is He Who begins the process of creation, then repeats it.....**

The word **يَعِيد** in the verse has a wider application than is apparent, as it means 'repeat' or 'reproduce' as interpreted by the various commentators. If the first meaning is accepted, the verse would mean the repetition of the creation as a next stage of life in the Hereafter which is beyond the scope of our present discussion.

On the other hand, if the meaning implied is taken as 'reproduce', then the following scientific interpretation seems justified:

One of the features which distinguishes the living forms from the non-living is the power of reproduction. In lower organisms like amoeba and bacteria, this process is quite simple, and is accomplished without the involvement of sex by the method of fission of the entire organism into two equal parts, each of them subsequently developing into a new individual. In higher animals and man, the sexes are separate, and offspring is produced after the fusion of the sexual cells of male and female parents. Occasionally, this process is bypassed in some insects like honeybees, and a new individual can be produced even in the absence of the male parent (parthenogenesis). In the case of plants, reproduction can take place in three ways, viz. (a) sexual, by means of gametes or sex cells, (b) asexual through spores, and (c) by vegetative multiplication of any of the plant organs.

In the creation of all life, one of the manifestations of the grand scheme of the Creator is to perpetuate the life of every species created up to an ordained time. This is accomplished by the ingenious ways of reproduction mentioned above which reflect the wonderful working of Allah's Plan.

هـ-هُوَ الَّذِي جَعَلَ الشَّمْسُ ضِيَاءً وَالْقَمَرَ نُورًا وَقَدَرَهُ مَنَازِلَ لِتَعْلَمُوا عَدَدَ  
 السِّنِينَ وَالْحِسَابَ مَا خَلَقَ اللَّهُ ذَلِكَ إِلَّا بِالْحَقِّ يُفَصِّلُ الْآيَاتِ  
 لِقَوْمٍ يَعْلَمُونَ ○

10 : 5 It is He Who made the sun a shining glory and the moon to be a light (of beauty), and measured out stages for her, that you might know the number of years and the count (of time). Allah created not (all) but in truth and the righteousness. Thus does He explain His Signs in detail for those who understand.

The verse states that the sun and the moon shine by two different methods. Science finds this to be actually the case. The sun shines by the energy derived from nuclear reaction occurring at the centre, whereas the moon shines by the sunlight reflected from the lunar surface.

The verse also states that Allah ordained *manzils* or lunar stations, so that we may know how to compute the years and keep count of them. Now let us consider what the *manzils* are. The moon revolves round the earth, making a complete revolution with respect to fixed stars in 27.3 days. In course of this revolution, the moon seems to pass each day through a group of fixed stars lying about the lunar orbit. Thus for the 27.3 days, the lunar orbit is divided into 27 parts with groups of fixed stars. The group of stars, in each part, situated within a space on each side of the lunar orbit is called a *manzil* or lunar station. This is called a *nakkhatra* in Indian astronomy. The stars forming a *manzil* has got a configuration and a name. Thus there are 27 *manzils* or lunar mansions with 27 configurations. The different stages of the moon which we observe from crescent to crescent pass through the 27 *manzils*,\* which have been instrumental in the counting of time and the fixing of the year.\*\*

\* The names of *Manzils* are given in Appendix IV.

\*\* Astronomically, the period from the first entry of the sun in second entry into the same *manzil* comprises one solar sideral months (the moon passing through 27 *manzils* in each lunar year what is known as a lunar year).

٦- إِنَّ فِي اخْتِلَافِ اللَّيْلِ وَالنَّهَارِ وَمَا خَلَقَ اللَّهُ فِي السَّمَوَاتِ وَالْأَرْضِ لآيَاتٍ  
لِّقَوْمٍ يَعْقِلُونَ ○

10 : 6 Verily, in the alternation of the night and the day and in all that Allah has created in the heavens and the earth, are Signs for those who fear Him.

The alternation of the night and the day has been explained under verse 2: 164.

In the second part of this verse the attention of the God fearing has been drawn to "all that Allah has created in the heavens and the earth", designating them as His Signs. They have thus been urged to meditate upon the creation of Allah and try to understand them; with intensive efforts they may be able to unfold gradually the mysteries of creation filling their minds with awe and wonder. They will further realise that every created thing is, directly or indirectly, beneficial to mankind.

١٠- دَعْوُهُمْ فِيهَا سُبْحَانَكَ اللَّهُمَّ وَعَجَبَتُهُمْ فِيهَا سَلَامٌ ۗ وَأٰخِرُ دَعْوَاهُمْ  
أَنْ الْحَمْدُ لِلَّهِ رَبِّ الْعَالَمِينَ ○

10 : 10 Their prayer therein will be : glory be to Thee, O Allah! and their greeting therein will be peace and the conclusions of their prayer will be: Praise be to Allah, the Cherisher and the Sustainer of the worlds.

A reference is invited to the discussion on verse 1:2 where an attempt has been made to explain in detail the meaning of the phrase رب لعالمين (the Cherisher and the Sustainer of the worlds) : from the point of view of science; therein the significance of the use of the plural form of the word علم (world) has been especially emphasised.

١٣- وَلَقَدْ أَهْلَكْنَا الْقُرُونِ مِن قَبْلِكُمْ لَمَّا ظَلَمُوا وَجَاءَتْهُمْ رُسُلُهُم بِالْبَيِّنَاتِ  
وَمَا كَانُوا لِيُؤْمِنُوا ۗ كَذٰلِكَ نَجْزِي الْقَوْمَ الْجٰثِمِينَ ○

**10: 13 Generations before you We destroyed when they did wrong: their apostles came to them with clear signs but they would not believe. Thus do We require those who sin!**

This verse speaks of the destruction of various nations/generations for not believing the prophets who came to them with clear signs and for doing wrong. The names of nations/generations destroyed, or the wrongs for which they were punished or the names of the prophets whom they disobeyed have not been mentioned. The scientific mechanism through which destruction was wrought has been discussed in connection with verse 3:137.

١٩- وَمَا كَانَ النَّاسُ إِلَّا أُمَّةً وَاحِدَةً فَاخْتَلَفُوا

**10: 19 Mankind was but one nation, but differed (later).....**

The scientific explanation of this verse is discussed in detail under verse 2: 213.

٢٢- فَوَالَّذِي يُسَبِّحُكُمْ فِي الْبَرِّ وَالْبَحْرِ حَتَّىٰ إِذَا كُنْتُمْ فِي الْفُلِكِ وَجُرِينِ بِهِمْ رَبِّهِمْ طَيْبَةً وَفَرِحُوا بِهَا جَاءَتْهَا رُمُوحٌ عَاصِفٌ وَجَاءَهُمُ الْمَوْجُ مِنْ كُلِّ مَكَانٍ وَظَنُّوا أَنَّهُمْ أُحِيطَ بِهِمْ دَعَوُا اللَّهَ مُخْلِصِينَ لَهُ الدِّينَ ؕ لَئِنِ أَنْجَيْتَنَا مِنْ هَذِهِ

**10: 22 He it is Who enables you to traverse through land and sea; so that you even board ships; they sail with them with a favourable wind and they rejoice thereat; then comes a stormy wind and the waves come to them from all sides, and they think they are being overwhelmed; they cry unto Allah, sincerely offering (their) duty unto Him saying, "If you do deliver us from this, we shall truly show our gratitude."**

This verse speaks of sailing through the sea. When there is favourable wind, sailing is smooth and the people on board rejoice. But when there is stormy wind, waves coming from all sides tossing the ship, they cry to Allah for deliverance from this danger.

The scientific explanation to the mechanism of the plying of ships has been discussed in verse 2:164.

إِنَّمَا مَثَلُ الْحَيَاةِ الدُّنْيَا كَمَاءٍ أَنْزَلْنَاهُ مِنَ السَّمَاءِ فَاخْتَلَطَ بِهِ نَبَاتُ الْأَرْضِ  
مِمَّا يَأْكُلُ النَّاسُ وَالْأَنْعَامُ حَتَّى إِذَا أَخَذَتِ الْأَرْضُ زُخْرُفَهَا وَازِيدَتْ وَطْنَ  
أَهْلَهَا أَكْتَهُمُ قَدِرُونَ عَلَيْهَا أَنْتَهَا أَمْرًا لَيْلًا أَوْ نَهَارًا فَجَعَلْنَاهَا حَصِيدًا  
كَأَنَّ لَمْ تَعْنُ بِالْأَمْسِ كَذَلِكَ نَفْصِلُ الْآيَاتِ لِقَوْمٍ يَعْتَكِرُونَ ○

10:24 "The likeness of the life of the present is as the rains which We send down from the skies; by its mingling arises the produce of earth which provides food for men and animals; (it grows) till the earth is clad with its golden ornaments and is decked out (in beauty); the people to whom it belongs think they have all powers of disposal over it; there reaches it Our command by night or by day and We make it, like a harvest clean-mown as if it had not flourished only the day before! Thus do We explain the Signs in detail for those who reflect.

In this verse our worldly life has been compared to the vegetation produced by the earth when it is soaked by water from the sky.

Raindrops come down to the earth as welcome showers, mingle with the soil, moisten it and render it fertile. Innumerable kinds of plant grow producing vegetables, grains and fruits which provide food for men and cattle for their sustenance. Besides, because of vegetation and the variegated colours of its leaves, flowers and fruits, the earth becomes embellished with beauty and grandeur. The cultivators think that all these are outcome of their talent and endeavour; they become boastful and deem themselves potent masters of the show. What a mistaken idea! It is Allah who sends down rain from the cloud (formation of raindrops and growth of vegetation has been explained under (2:164) causing thereby the seeds to germinate, grow, and bear flowers and fruits. Allah and Allah alone has absolute power over all these. If He will, these will be destroyed in no time; a severe frost, a hailstorm, a hurricane, a flood, a swarm of locusts, an earthquake or volcanic eruption, even some blight or disease will suddenly overtake them

and leave the fields and orchards completely ravaged. Against such decrees of Allah men will be utterly helpless.

In like manner, we, throughout our earthly life are continuously soaked by the mercy of Allah; we visibly grow from strength and develop our personalities along various dimensions and become powerful beings. We strive and discover, we construct strong dwelling houses, build well-planned towns, tame rivers and conquer space, we produce art, we compose poetry, literature and music ; all these are items of beauty and joy for all of us. In our ignorance we feel proud and think that we are self-sufficient and master of what we achieve and possess. Should we not ponder over who has ordained laws for our growth, made provision for our sustenance, endowed us with intellect and power of thinking, and the invaluable gifts of feeling, hearing, and sight, without which none of our accomplishments would be possible. Our achievements will crumble if Allah withdraws His mercy and beneficence. Thus no matter how scientifically advanced man may become, the ultimate power and control over all causations rest with Allah.

٣١- قُلْ مَنْ يَرْزُقُكُمْ مِنَ السَّمَاءِ وَ الْأَرْضِ أَمَّنْ يَمْلِكُ التَّمْعَمَ وَالْإِبْصَارَ  
 وَمَنْ يُخْرِجُ الْحَيَّ مِنَ الْمَيِّتِ وَيُخْرِجُ الْمَيِّتَ مِنَ الْحَيِّ وَمَنْ يُدْبِرُ الْأُمُورَ  
 فَسَيَقُولُونَ اللَّهُ ۗ فَقُلْ أَفَلَا تَتَّقُونَ ۝

10 : 31 Say : "Who is it that sustains you (in life) from the sky and from the earth ? Or Who is it that has power over hearing and sight? And who is it that brings out the living from the dead and the dead from the living ? And who is it that rules and regulates all affairs? They will soon say, Allah." Say "will you not then show piety (to Him)?"

The salutary effects of rain resulting in the vegetation and sustenance to human beings has been discussed under verse 6:99. Verse 7 : 58 which has also been explained gives an account of the variety of foods Allah's bounty provides.

In this verse Allah mentions some of His special favours to mankind. The faculties of hearing and vision are unique in the sense that these are



scientifically found to be highly sophisticated and their complete mechanism is still not comprehended. Allah clearly mentions here that the powers of hearing and sight are entirely under His control and our knowledge so far completely agrees with this statement.

Let us novetry to understand the mechanism of hearing and sight.

**Ear:** The ear has three functions: hearing, equilibration and motion. The organ is divided into 3 parts: (i) the external ear consisting of the auricle and the tube up to the ear-drum; (ii) the middle ear consisting of the tympanic membrane (drum) and space up to the internal ear, having communication with the throat by a tube called Eustachian tube; and (iii) the internal ear consisting of a complicated labyrinth from which runs the vestibulocochlear nerve (8th nerve) into the brain.

The external ear is not essential for hearing, though the auricle (pinna) acts as a funnel to catch sound.

**Middle ear:** The tympanic membrane or the drum lies across the tube (external acoustic meatus ) at the end of the external ear. The cavity of the middle ear is about 8 mm x 4 mm and contains three small bones—the malleus (hammer), incus (anvil) and stapes (stirrup), collectively known as auditory ossicles. These are connected with the innerside of the drum and the chorda tympani nerve which runs across the cavity. The three small bones form a chain across the middle ear connecting the drum with the internal ear through the chorda tympani nerve. The ossicles convert the air waves, which strike upon the drum, into mechanical movements which affect the fluid in the inner ear (air-waves produce little effect upon the fluid directly ).

The Eustachean tube admits air from throat and thus keeps the balance of pressure on both sides of the drum. Deafness may occur by its closure and infection may reach the middle ear through the tube.

**Internal ear:** It consists of the membranous labyrinth divided into two parts. The forward part consisting of a small bony sacule and cochlear duct, and is concerned with hearing. In the cochlear duct is placed the spiral organ of Corti on which the sound waves are finally received and the sounds are communicated to the cochlear nerve, a branch of the vestibulocochlear nerve which communicates in filaments to this organ of Corti. The organ of Corti contains a double row of rods and several rows of cells with fine hairs of varying length. These rods and hair cells are probably concerned with different musical notes.

**The act of hearing:** When the sound waves in the air reach the ears and strike the drum it is alternately pressed in and pulled out causing a to-and-fro movement. This movement is communicated to the chain of ossicles in the middle ear. The foot of the stapes communicates these movements to the perilymph of the internal ear. Finally the motion reaches the nerve filaments of the organ of Corti which affect the nerve of hearing and thus conveys the impressions to the centre in the brain.

There are two theories of hearing: 1. The theory of Helmholtz who compared the organ of Corti to a piano and thought that each sound causes a vibration of a corresponding part of the Cortis organ. 2. The other theory is that the sounds cause vibration of the entire organ of Corti and the nature of the sound is analysed and perceived by the hearing centre in the brain.

**Mechanism of Sight:** The retina is a nervous structure and innermost coat of the eye ball. The optic nerve pierces the sclerotic and choroid coats and then spreads out to form the retinal layer which also contains blood vessels, pigment and nerve cells. Microscopically the retina consists of about ten layers. The outermost is the layer of pigment cells which prevents diffusion of light inside the eye. The next layer is that of rods and cones upon which light is received, and the impression is conveyed by the optic nerve to the occipital lobes of the brain, where the effect of light is perceived and the object is seen (for details vide explanation under verse 2:20).

There are 2 million fibres in the two optic nerves, most of which terminate in the lateral geniculate body of the thalamus. Each fibre from this body has terminals on 5000 neurons in the visual area of the occipital lobe and each of these neurons is in contact with about 4000 other neurons. There are about 6.5 million cones and about 115 million rods in the human retina. The eye is a camera as far as vision is concerned. The inverted image is formed in the back of the eye and the brain ultimately gives the perception of the object in normal position the mechanism of which is still beyond human knowledge.

Both hearing and seeing are highly complex mechanisms and these are entirely controlled by the laws ordained by Allah. These two faculties are essential to have normal life; without them many aspects of life will remain unexplored. For this reason Allah gives extra importance to these and cites these exmples as His special mercy on human beings. Unless one

can listen and see, it is not possible for one to fully understand the message of Allah.

**And Who is it that rules and regulates all affairs ?** That Allah rules and regulates the material world from the vast galaxies at great distances from us to the tiniest particles have been discussed under verse 7 : 54 and Appendix III. All affairs in the living world are regulated by Allah's rules (7: 185).

۳۳- قُلْ هَلْ مِنْ شُرَكَائِكُمْ مَنْ يَبْدَأُ الْخَلْقَ ثُمَّ يُعِيدُهُ ۚ قُلْ اللَّهُ يَبْدَأُ الْخَلْقَ ثُمَّ يُعِيدُهُ فَأَنْتُمْ تَكُونُونَ ○

10 : 34 Say : "Is there of your partners one that originates creation and then reproduces it ?" Say : "Allah produces creation, then reproduces it. How then, are you misled?"

For the amplification of the statement, producing of creation and its reproduction, refer to the explanation given under verse 10 : 4.

۵۵- أَلَا إِنَّ لِلَّهِ مَا فِي السَّمَوَاتِ وَالْأَرْضِ ۗ أَلَا إِنَّ وَعْدَ اللَّهِ حَقٌّ ۗ وَلَكِنَّ أَكْثَرَهُمْ لَا يَعْلَمُونَ ○

10 : 55 Is it not (the case) that to Allah belongs whatever is in the heavens and on earth? Is it not (the case) that Allah's promise is assuredly true? Yet most of them understand not.

This has been discussed under verse 5: 19.

۵۹- قُلْ أَرَأَيْتُمْ مَا أَنْزَلَ اللَّهُ لَكُمْ مِنْ رِزْقٍ فَجَعَلْتُمْ مِنْهُ حَرَامًا وَحَلَالًا ۗ قُلْ اللَّهُ أَدْنَىٰ لَكُمْ ۗ أَمْ عَلَى اللَّهِ تَفْتَرُونَ ○

10 : 59 Say : Have you considered what provision Allah has sent down for you, how you have made of it lawful and unlawful? Say : Has Allah permitted you, or do you invent a lie concerning Allah ?

Here Allah mentions the superstitious prohibitions of certain foods among the pre-Islamic Arabs. It is equally applicable to similar

superstitions among other nations. Islam clearly defines the prohibited foods and drinks while the pre-Islamic Arabs used to prohibit or allow certain foods without any scriptural sanction. Yet some of the prohibitions were attributed to divine authority about which they had no proof. The subject has already been discussed in connection with verse 6 : 139.

۞ وَمَا تَكُونُ فِي شَأْنٍ وَمَا تَتْلُوا مِنْهُ مِنْ قُرْآنٍ وَلَا تَعْمَلُونَ مِنْ عَمَلٍ  
إِلَّا كُنَّا عَلَيْكُمْ شُهُودًا إِذْ تُفِيضُونَ فِيهِ ۚ وَمَا يَعْزُبُ عَنْ رَبِّكَ مِنْ مِثْقَالِ ذَرَّةٍ  
فِي الْأَرْضِ وَلَا فِي السَّمَاءِ وَلَا أَصْغَرَ مِنْ ذَلِكَ وَلَا أَكْبَرَ إِلَّا فِي كِتَابٍ مُبِينٍ ۝

10:61 In whatever business you may be, and whatever portion you may be reciting from the Quran, and whatever deed you may be doing, We are witnesses thereof when you are deeply engrossed therein. Nor is hidden from your Lord (so much as) the weight of an atom on the earth or in heaven; And not the least and not the greatest of these things but are recorded in a clear record.

In this verse Allah asserts His complete knowledge of any of His creations, even the mass and other properties of the smallest particle that are hidden from ordinary perception.

More than three thousand years ago Democritus, a Greek philosopher, first introduced the idea that matter consists of *atmos*, i.e. indivisible particles. It was not until 1803 when Dalton laid the foundation of the modern atomic theory of matter. The word *atom* is derived from *atmos*. According to Dalton every element is composed of a large number of very small indivisible atoms. In 1811 Avagadro introduced the idea of molecule, constituted from the combination of 2 or more atoms. The structure of an atom was first revealed in 1911 by the famous experiment of Lord Rutherford. It was established that an atom consists of a small, dense nucleus surrounded by a cloud of electrons. The more energetic methods were employed for probing an atom, the more very small subatomic particles were discerned. By 1957 physicists discovered more than a hundred subatomic particles. Now physicists believe that every thing is made of leptons (electrons, muons and neutrinos) and quarks (for details see Appendix III).

Research for understanding the indivisible constituents of matter has added new horizon to the frontier of knowledge. These particles have incredibly small weights e.g. the mass of an electron is  $9.107 \times 10^{-28}$  gm." These particles interact with each other through one of the four forces of nature (for details see Appendix III). Man's present knowledge shows superb beauty in organization, exactness and discipline even at the subatomic level. Thus it is no wonder that Allah has not only created the smallest particle, but has also made arrangement for their organizations into different forms of matter and energy. As the probing techniques are continually improved, it may be possible in future to probe matter more deeply than has been possible until now and to detect particles smaller than the smallest so far known to us. The ultimate truth about the smallness of things is known to Allah, the Creator.

$$10^{-28} \text{ gm} = \frac{1}{1000000000000000000000000000000} \text{ gm.}$$

۶۰ هُوَ الَّذِي جَعَلَ لَكُمُ اللَّيْلَ لِتَسْكُنُوا فِيهَا وَالنَّهَارَ مُبْصِرًا ۗ إِنَّ فِي ذَلِكَ لَآيَاتٍ لِّقَوْمٍ يُسْمِعُونَ ○

10 : 67 He it is Who made you the night that you may rest therein, and the day to make things visible (to you). Verily in this are Signs for those who listen (to his message).

Our daily life is characterised by the alternation of rest and work and the fit environment for this alternation is the succession of nights and days in the world we live in.

The day is full of light because of the shining sun which makes things around visible to us (how light rays excite our sensation of sight has been explained under verse 2: 20) and enables us to perform efficiently our multifarious day-time physical activities. By the evening we get tired and pine for rest. On the setting of the sun the night appears with its darkness and cooler atmosphere and provides us with a suitable environment for sleep and recuperation. The difference between the night and the day has dealt with in detail under verse 2: 164.

٤٣- فَكَذَّبُوهُ فَجَعَلْنَاهُ وَمَنْ مَعَهُ فِي الْفُلْكِ وَجَعَلْنَاهُمْ خَلْفَةً وَأَعْرَضْنَا  
 الَّذِينَ كَفَرُوا بِآيَاتِنَا فَأَنْظِرْ كَيْفَ كَانَ عَاقِبَةُ الْمُنذَرِينَ ○

10 : 73 They rejected him, but We delivered him and those with him in the Ark, and We made them inherit (the earth), while we overwhelmed in the flood those who rejected our Signs. Then see what was the end of those who were warned.

The verse refers to the flood at the time of the prophet Nuh (a.s.). The scientific mechanism of floods has been discussed in connection with the verse.

٩٢- وَالْيَوْمَ نُنَجِّيكَ بِبَدَنِكَ لِتَكُونَ لِمَنْ خَلَقَكَ آيَةً وَإِنَّ كَثِيرًا مِّنَ  
 النَّاسِ عَنْ آيَاتِنَا لَغَفُلُونَ ○

10 : 92 This day shall We save you in your body, that you may be a Sign to those who come after you. But verily, many among mankind are heedless of our Signs.

When prophet Musa (a. s.) failed to convince the Pharaoh about his prophetic mission, he was advised by Allah to leave Egypt with the Israelites. While doing so, the party of Musa (a.s.) was confronted by a body of water (river or sea), which they crossed through the Mercy of Allah in the form of a pathway through the water. The Pharaoh pursued the Israelites with his army and when he reached the bank of the sea or river, he found the fugitives in the middle of the pathway through the water. Instead of thinking about the miraculous escape of the fugitives, the Pharaoh and his hordes pursued the Israelites. The Israelites reached the other bank, the Pharaoh and his hordes were in the midway, where they were drowned as punishment from Allah. At the time of drowning, the Pharaoh declared his faith on Allah, when Allah said. "What ! now, When hitherto you have rebelled and been of wrong doers ?" (10 : 91), Then the above verse was revealed in which Allah promised to keep the body of Pharaoh preserved for mankind as an example of the fate of the rebellions against Allah.

It is not yet certain which Pharaohs died in the above encounter. In recent decades, some mummies of Pharaohs have been found and identified. There is some controversy among scholars about the identity of the Pharaoh of Musa. According to some scholars, Tuthmoses III's son and successor Amonhotep II of the 18th dynasty (1587-1375 B.C.) is the Pharaoh of Musa (a.s.). But others regard Ramses II of the 19th dynasty (1375-1202 B.C.) was the Pharaoh of oppression and his successor Merneptah was the Pharaoh of Exodus. The mummies of all the three are now identified. Quranic scholars should pursue further study to identify the Pharaoh of Musa (a.s.). We should not depend on the Biblical scholars in this regard. According to the Bible, the Pharaoh of the exodus was not drowned. Since the Quran clearly states that the body of the said Pharaoh will be preserved, his mummy either must have been found and is to be identified or may be found in the future. It is possible that the successor of the drowned Pharaoh preserved the dead body as was the custom of the period. Even now many pyramids are yet to be excavated.

١- وَمَا مِنْ دَابَّةٍ فِي الْأَرْضِ إِلَّا عَلَى اللَّهِ رِزْقُهَا وَيَعْلَمُ مُسْتَقَرَّهَا وَ  
مُسْتَوْدَعَهَا كُلٌّ فِي كِتَابٍ مُبِينٍ ○

11:6 There is no moving creature on earth but its sustenance depends on Allah; He knows the time and place of its definite abode and its temporary deposit. All is in a clear record.

Generally speaking the word دابة which literally means moving creatures implies animals although some plants are not entirely without power of locomotion. There are exceptions in both the animal and plant kingdoms—there are stationary animals like some marine coelenterates, (e. g. *Obelia*) although the phenomenon of locomotion is present at least in one stage of their life cycle. On the other hand, some of the lower plants belonging to microscopic green algae and some bacteria are motile as well as some stages (gametes) in the life cycle of higher plants. Thus the word 'moving creature' largely refers to the animals although the term might also include plants possessing the power of locomotion.

Irrespective of the feeding time of the activity, every species of birds and other animals including the infinite number of microscopic organisms

do obtain their required nutrition through an infinite variety of sources, not only to satiate their hunger but also to feed their young. When food becomes scarce or the environmental factors become adverse, as in extremes of heat and cold, the animals start migrating to newer areas where the food is available in plenty and the weather is not hostile. In fact, more than a third of all the world's species of birds are migratory in varying degrees and their number runs into thousands of millions. The Arctic tern of Greenland flies roughly 10,000 miles to the Antarctic every year. Swallows, robins, cuckoos etc. also migrate to longer or shorter distances in search of food or breeding grounds.

The precise time of leaving the original homes, the actual route to be taken during migration in order to reach the temporary abode and to ultimately return to permanent homes are determined by an inherent instinct in birds which is guided by the barometric pressure and other meteorological and geophysical conditions as ordained by Allah. The 'mutton bird' of Australia wanders in a great loop from S.E. Australia northwards and back again via the west coast of N. America, the whole flock of millions of birds returning to the same tiny islands on the same evening in late November every year<sup>1</sup>. The precise dates of visits of ospreys to the rocky eastern shores of Scotland for breeding and the flocks of water fowl from Siberia and other places to the *haors* and *beels* (large tracts of land under water) of Bangladesh are two further instances. Similar examples may also be found in mammals like antelopes and elephants which move in mass migration in search of food. Detailed information on the mysteries of migration of birds and other animals leading to knowledge of mechanism in following the routes and the precise timing of arrival and departure has come to light only during the current century.

This complex phenomenon of migration and food-web which includes inter-relationships of the food needs of all organisms in a community is yet another manifestation of the grand design of the Sustainer Who is all-knowing and Cherisher of all creation.

## Reference

1. Peterson, R. T. *The Birds* ; Time-Life International (Netherland) N. V. p. 101, 1968.



٤- وَهُوَ الَّذِي خَلَقَ السَّمَوَاتِ وَالْأَرْضَ فِي سِتَّةِ أَيَّامٍ وَكَانَ عَرْشُهُ عَلَى الْمَاءِ  
لِيَبْلُوَكُمْ أَيُّكُمْ أَحْسَنُ عَمَلًا

11:7 He it is Who created the heavens and the earth in six days-and His Throne was over the waters that He might try you which of you is best in conduct.....

The creation of the heavens and the earth in six days has already been discussed under 7 : 54.

٣٠- حَتَّىٰ إِذَا جَاءَ أَمْرُنَا وَفَارَ التَّنَوُّرُ قُلْنَا احْمِلْ فِيهَا

11:40 At length behold! There came Our command and the fountains of the earth gushed forth. We said : embark therein,.....

The verses 36 to 49 of this Sura Hud give a description of the prophet Nuh (a.s.)'s construction of an Ark, the ridicule of the disbelievers on the occasion, deliverance of the believers and two of each species of animals, subsidence of the food, the Ark testing on the mount Judi and thereafter settling of the people on the earth.

Verse 11 : 40 alludes to flooding during the period of Nuh (a.s.). Geologists have classified different types of flood due to different causes as follows : (1) river flood, (2) snow-melt flood, (3) floods due to ice jams, (4) glaciers, (5) earth slides, (6) floods caused by meteorological, disturbances, (7) floods due to non-tropical ocean storms, (8) Isunamia floods due to faulting or some other sudden movement of the ocean floor or a sudden volcanic eruption.

The flood described in this verse was due to water gushing forth from beneath the earth. This shows that one of the causes of this flood was meteorological disturbance which is caused by seismic disturbances such as submarine earthquake, disturbances of the sea bed, etc. Other causes of flooding indicated in the Quran in connection with the flood at the time of

the prophet Nuh (a.s.) in verse 54 : 11 will be discussed in connection with that verse.

٣١- وَقَالَ اِزْكَبُوا فِيهَا بِسْمِ اللّٰهِ نَجْرُهَا وَمُرْسُهَا ۗ اِنَّ رَبِّي لَغَفُوْرٌ رَّحِيْمٌ ۝

11 : 41 So he said : "Embark on the Ark in the name of Allah whether it moves or be at rest. For my lord is, be sure, Oft Forgiving, Most Merciful."

The verse 11 : 41 asks the people of the prophet to embark on the Ark whether it is floating or not. So it seems people were embarking the Ark either even before the beginning of the flood or when there was enough water to float the Ark and again when it was floating to reach it either wading or swimming through the water.

٣٢- وَهِيَ تَجْرِيْ بِهَمِّ فِيْ مَوْجٍ كَالْجِبَالِ ۗ وَنَادٰى نُوْحٌ ابْنَهٗ وَكَانَ فِيْ مَعْزِلٍ يٰبُنٰى ۙ اِزْكَبْ مَعَنَا ۚ وَلَا تَكُنْ مَعَ الْكٰفِرِيْنَ ۝

11 : 42 So the Ark floated with them on the waves like mountains and Nuh (a.s.) called out to his son, who had separated himself : "O my son ! embark with us, and be not with the unbelievers!"

Verse 11: 42 speaks of waves like mountains. There are two main categories of waves. Very small waves with wavelengths (distance from crest to crest) of less than 1 cm and long waves with longer wavelengths, which may be as high as 45 ft. All small waves are propagated by a force arising predominantly from surface tension while long waves owe their properties mainly to the force of gravity. In addition to this principal subdivision, gravity waves occur in two distinct regimes. Waves in deep water are different from those on shallow water and different theories for the two cases have been developed. What is meant by shallow water depends upon the wavelength.

The small gravity waves that occur on reservoirs and lakes will travel as deep water waves over water that is only one or two feet deep. As waves pass into shallower water their speed diminishes. The energy they contain becomes concentrated in a smaller area and as a consequence, the height of the waves increases. A train of waves in shallow water will not be

propagated without change of shape. Crests will travel faster than troughs and will ultimately overtake them ; the front of the waves will steepen and finally the waves will break. The breaking of large waves on a steeply shelving beach provides some of the most destructive effects.

From the description of waves like mountains it seems the flood in Nuh (a.s.)'s place might not have been very deep but these were small gravity waves travelling as deep water waves destroying all that was there.

۴۳- وَقِيلَ يَا أَرْضُ ابْلَعِي مَاءَكِ وَيَسَاءُ أَفْلَحِي وَغِيضَ الْمَاءِ وَقُضِيَ الْأَمْرُ  
وَاسْتَوَتْ عَلَى الْجُودِيِّ وَقِيلَ بُعْدًا لِلْقَوْمِ الظَّالِمِينَ ○

11 : 44 And the word went forth "O earth ! swallow up your water and O sky ! withhold (your rain) and the water abated and the matter was ended. The Ark rested on the mount Judi and the word went forth: Away with those who do wrong."

This verse speaks of the subsidence of the flood, the ark resting thereafter on the mount Judi.

There is some controversy about the place where the Judi is situated. There is a lofty mountain in the Turkish district of Bohtan near the present frontiers of Turkey, Iraq and Syria. The great mountain mass of the Ararat plateau dominates this district. The neighbourhood of Jabal Judi is to this day full of memorials and legends which refer to the flood and to the life of Nuh (a.s.) after leaving the Ark.

The Biblical legend of Mr. Ararat as the resting place of the Ark of Nuh (a.s.) would coincide with the Muslim tradition about one of the lower peaks of Ararat.

۵۲- وَيَقُومِ اسْتَغْفِرُوا رَبَّكُمْ ثُمَّ تُوبُوا إِلَيْهِ يُرْسِلِ السَّمَاءَ عَلَيْكُمْ مِدْرَارًا  
وَيَزِدْكُمْ قُوَّةً إِلَى قُوَّتِكُمْ وَلَا تَتَوَلَّوْا مُجْرِمِينَ ○

11 : 52 "And O my people ! Ask forgiveness of your Lord, and turn to Him (in repentance) : He will send you the sky pouring abundant rain and add strength to your strength : so turn you not back in sin!"

In this verse the word, "sky" may be taken to stand for sky with rain-laden clouds. Some commentators have however interpreted the word سماء as cloud.

The formation of clouds in the sky and the falling of rain drops from above have been discussed under 2 : 164 (d). It has also been explained thereunder how rain showers falling in abundance revive the dead earth and make it produce green vegetation yielding different kinds of vegetables, grains and fruits that supply sustenance for men and animals. As regards the phrase, "add strength to strength" we may discern two layers of meaning ; easy availability of abundant food makes people healthy. i.e., physically strong ; and secondly, it enables the population of the fertile region to multiply, i.e., to increase rapidly in number, thus making them powerful as a community, provided the talents are properly nurtured.

٥١- إِنِّي تَوَكَّلْتُ عَلَى اللَّهِ رَبِّي وَرَبِّكُمْ مَا مِنْ دَابَّةٍ إِلَّا هُوَ آخِذٌ بِنَاصِيَتِهَا  
 إِنَّ رَبِّي عَلَى صِرَاطٍ مُسْتَقِيمٍ ۝

11 : 56 "I put my trust in Allah, my Lord and your Lord. There is not a moving creature but He has grasp of its fore-lock. Verily it is my Lord that is on a straight Path."

The word دَابَّةٌ meaning animals with capacity for locomotion and in the broad sense would imply all animals created by Allah. The word "fore-lock" is used here in an idiomatic sense and the parallelism has been drawn from the phrase horse's fore-lock. Grasp of the fore-lock is an Arabic idiom denoting having full power. The man who grasps this fore-lock is supposed to have complete control over the house.

The great diversity of the animal kingdom whether they are wild beasts on land or birds, aquatic animals or creatures that live inside the earth are all subject to certain laws ordained by Allah for their normal living and well-being. The laws include the way the animals build their habitats, and find out the source of food, defensive methods, living in communities, and following the laws of procreation. Any breach of these Universal laws would be to the detriment of the individual and the community, and severely impairs the beneficial plan of Allah, who has care and complete watch over all his creatures. The loss and diasters that follow from the violation of the laws ordained by Allah also are according to the set rules of Allah.

٦١- وَإِلَى ثَمُودَ أَخَاهُمْ صَالِحًا قَالَ يَا قَوْمِ اعْبُدُوا اللَّهَ مَا لَكُمْ مِنْ إِلَهٍ غَيْرُهُ  
هُوَ أَنشَأَكُمْ مِنَ الْأَرْضِ وَاسْتَعْمَرَكُمْ فِيهَا فَاسْتَغْفِرُوا لَهُ ثُمَّ تَوْبُوا إِلَيْهِ إِنَّ رَبِّي  
قَرِيبٌ مُجِيبٌ ○

11 : 61 To the Thamud people (We sent) Salih, one of their own brethren. He said : O my People ! Worship Allah : you have no other Allah but Him. It is He Who has produced you from the earth and settled you therein: then ask forgiveness of Him, and turn to Him (in repentance) for my Lord is (always) near, ready to answer."

The sense implied in the creation of man from clay was discussed in detail under verse 6 : 2. In the above mentioned verse, the word الارض is used instead of طين which appears in verse 6 : 2. Both words would indicate the organic origin of the life on earth including the creation of man.

Early men, living in small groups sometimes used natural caves and overhanging cliffs as temporary abode. They moved in small bands seeking food by hunting or gathering from plants. The discovery of how to grow crops and domesticate animals; which according to present estimates might have come about 10,000 years ago<sup>1</sup> enabled people to settle down permanently for the first time and to live together in large numbers. The first season's crop was usually a good one, but after two or three seasons, the soil was worn out, compelling the tribes to live a nomadic life letting their fields lie fallow for a number of years until they returned to cultivate them again. This was followed by large scale migrations in search of food and shelter resulting in the settlement of populations and their subsequent development into the various races of the world.

## Reference

1. Went F.W. *The Plants*, Time-life International (Netherland) N. V. Amsterdam, p. 169, 1968.

## ٦٤- وَأَخَذَ الَّذِينَ ظَلَمُوا الصَّيْحَةَ فَأَصْبَحُوا فِي دِيَارِهِمْ جَثْوِينَ ۝

11 : 67 The blast ( صيحة ) overtook the wrong-doers and they lay prostrate in their homes before the morning.

This verse describes the punishment of the Thamud people among whom prophet Salih (a.s.) preached, for disobeying the order not to kill a particular she-camel. The Thamud are mentioned by name in an inscription of the Assyrian King Sargon dated 715 B.C. as a people of Eastern and Central Arabia. According to Assyrian records and classical authors like Ptolemy and Pliny, the Thamuds lived in Northern Arabia particularly northern Hejaz near the Red Sea. This may be identified as the modern Dumat al-Jandal on the Hejaz railway.

The Thamuds are closely connected with the Lihyan of whom they were the predecessors and the decline of Thamud coincided with the end of the Lihyan Kingdom somewhere between 400 and 600 A. C.

The matter of Thamud has been referred to in the Quran in 13 places in the following verses (1) 7:73-79, (2) 11:61-68, (3) 25:38, (4) 26:141-159. (5) 27:45-53, (6) 29:38, (7) 41:13-17, (8) 51: 43-45, (9) 54:23-31, (10) 69 : 4-8 (11), 85 : 17-20, (12) 89 : 9-14, (13) 91 : 11-15.

The modes of punishment are (1) earthquake ( رجفة ) 7 : 78 (2) blast/ loud cry ( صيحة ) 11 : 67 ; 54 : 31, (3) thunderbolt/ lightning ( صعقة ) 41 : 13, 17 ; 51 : 44, (4) lightning and thunder ( طاغية ) 69 : 5. All these taken together suggest there was a terrible earthquake/volcano eruption along with lightning and thunder.

The matter of earthquakes has been discussed in connection with verse 7 : 91.

A volcano is a conical mountain built up around a vent in the crust of the earth. It is formed of lava and fragmental material which has flowed out in a highly heated and liquid state or from matter ejected by explosive eruptions or both. Volcanoes are classified as of 3 types. These are : (1) the explosive type, (2) the effusive type, and (3) the intermediate type. (1) The explosive types are those from which solid fragmental material and gases are erupted. This material may consist of blocky pieces, often ejected in a partly fluid

condition. Lapilli or dust, the latter often called ash. The effusive types are characterised by quiet eruptions of liquid lava with little or no explosive violence (3) The intermediate type may sometimes erupt explosively with accompanying flows of lava.

Typically highly explosive eruptions have been that of Krakatao in the straits of Sanda, Dutch East Indies (Indonesia) which in 1883 blew up about a cubic mile of rock which rose as dust 15 miles in the atmosphere and that of Mt. Pelee on the islands of Martinique, West Indies which occurred in 1902. The latter eruption was without lava and consisted of a great cloud of incandescent gases and dust, which destroyed the city of St. Pierre and almost its entire population of about 20,000 inhabitants.<sup>2</sup>

This verse speaks only of loud sound ( صيحة ) It seems it refers to the sound at the time of earthquake/volcano/thunderstorm.

## References

1. Ali, A. Y., *The Holy Quran*, p. 360, 1975.
2. *Scientific 'Encyclopaedia*, Von Nostrand Company Inc., New York, 1947.

- ٤٢- قَالَتْ يَوْنَيْلَتِي أَيْدِي وَأَنَا عَجُوزٌ وَهَذَا بَعْلِي شَيْخًا إِنَّ هَذَا الشَّيْءُ عَجِيبٌ ○  
 ٤٣- قَالُوا اتَّعَجِبِينَ مِنْ أَمْرِ اللَّهِ رَحِمَتُ اللَّهِ وَبَرَكَتُهُ عَلَيْكُمْ أَهْلَ الْبَيْتِ  
 إِنَّهُ حَبِيدٌ مَحِيدٌ ○

11 : 72-73 She said: Oh, woe is me! Shall I bear a child when I am an old woman, and my husband is an old man ? Lo! This is a strange thing! They said: Do you wonder at the commandment of Allah ? The mercy of Allah and His blessings be upon you, O people of the house! Lo! He is the Owner of Praise, the Owner of glory.

The medical aspect of this incident has already been discussed under verse 3 : 40. The possibility of conception by a menopausal woman after menopause is beyond the present knowledge of science.

- ٤٨- وَجَاءَهُ قَوْمُهُ يُهْرَعُونَ إِلَيْهِ وَمِنْ قَبْلُ كَانُوا يَعْمَلُونَ السَّيِّئَاتِ قَالَ يَغْتَابُونَ  
 هَؤُلَاءِ بَنَاتِي هُنَّ أَطْهَرُ لَكُمْ فَاتَّقُوا اللَّهَ وَلَا تُخْزُونِ فِي ضَيْفِي أَلَيْسَ مِنْكُمْ  
 رَجُلٌ رَشِيدٌ ○

11 : 78 And his people came unto him, running towards him—and before them they used to commit abominations—He said: “O my people! Here are my daughters! They are purer for you. Beware of Allah, and degrade me not in ( the presence of ) my guests. Is there not among you any upright man ?”

The scientific knowledge about the consequences of homosexuality has been discussed under verses 7 : 80, 81 and Appendix III.

- ٨٢- فَلَمَّا جَاءَ أَمْرُنَا جَعَلْنَا عَلَىٰهَا سَاوِلَهَا وَأَمْطَرْنَا عَلَيْهَا حِجَارَةً مِنْ سِجِّيلٍ  
 مُنْضُودٍ ○

11 : 82 When Our decree issued we turned it upside down and rained down on them stones of baked clay, spread layer on layer (one after another).



This verse refers to the occurrence at the time of prophet Lut (a.s.). The occurrence has been discussed in connection with verse 7 : 84. In addition to the showering of stones of baked clay, it is said that the place was turned upside down. It indicates a severe earthquake.

٩٣- وَلَمَّا جَاءَ أَمْرُنَا نَجَّيْنَا شُعَيْبًا ۖ وَالَّذِينَ آمَنُوا مَعَهُ بِرَحْمَةٍ مِنَّا وَأَخَذَتِ  
الَّذِينَ ظَلَمُوا الضَّيْحَةَ فَأَصْبَحُوا فِي دِيَارِهِمْ جُثَيِّمًا ۝

11 : 94 When Our decree issued, We saved Shuaib and those who believed with him by Mercy from Ourselves but the blast ( صيحة ) did seize the wrong doers and they lay prostrate in their home by the morning.

The verse describes the punishment of the people of Madyan where prophet Shuaib (a.s.) preached. The incidents connected with prophet Shuaib (a.s.) and people of Madyan have been referred to in verses 7 : 85-93.

Verse 7 : 91 speaks of an earthquake ( رجفة ) whereas this verse speaks only of a loud sound ( صيحة ). It seems this refers to the sound at the time of the earthquake.

The normal human ear is sensitive to sound within the range of about 20 Hz to 20,000 Hz with some variation from individual to individual. Sound of less than 20 Hz is called infra sonic and that of more than 20,000 Hz ultra sonic.<sup>1</sup>

If the ultra sonic pressure exceeds the ambient ( normal average ) pressure, a process known as cavitation takes place which if they have a suitable radius, will expand as the pressure rises and then if the pressure starts to fall, will become unstable and will collapse rapidly. At the end of the collapse the gas within the cavity will be highly compressed. Measurements indicate pressures of several hundreds of atmosphere. These high pressures will be relieved by the radiation of shock waves, which have tremendous destructive power.

## Reference

1. *Encyclopaedia Britannica*, vol. 17, p. 19.

۱۱۳- وَأَقِمِ الصَّلَاةَ طَرَفِي النَّهَارِ وَزُلْفًا مِّنَ اللَّيْلِ إِنَّ الْحَسَنَاتِ يُذْهِبْنَ  
السَّيِّئَاتِ ذَلِكَ ذِكْرَى لِلذَّكِرِينَ ۝

**11:114** And establish regular prayers at the two ends of the day and at the approaches of the night. Verily, good deeds annul ill deeds. This is a reminder for the mindful.

The two ends of the day mentioned in this verse obviously denote the dusk when the night enters into the day, and the dawn when the day enters into the night, the transition being gradual. The causes of the occurrence of these two ends of the day have been explained in detail under verse 3:27.

The approaches of the night mentioned in the verse may mean late afternoon and the evening upto sunset, but if the phrase زُلْفًا مِنَ اللَّيْلِ is interpreted as 'in some watches of the night' as has been done by Pickthall and some other commentators, it would signify the initial part of the night immediately after sunset ( time for Maghrib prayer ) and a later part prior to midnight ( the time for 'Isha prayer ).

۱۲۳- وَ لِلّٰهِ غَيْبُ السَّمٰوٰتِ وَ الْاَرْضِ وَ اِلَيْهِ يُرْجَعُ الْاَمْرُ كُلُّهُ فَاعْبُدْهُ  
وَ تَوَكَّلْ عَلَيْهِ وَ مَا رَبُّكَ بِغَافِلٍ عَمَّا تَعْمَلُونَ ۝

**11:123** To Allah do belong the unseen ( secrets) of the heavens and the earth, and to Him goes back every affair (for decision); then worship Him and put your trust in Him; and your Lord is not unmindful of what you do.

Allāh has emphasised in this verse that all the unseen (secrets) belong to Him. The point to be noted in this connection is that man naturally tends to concentrate his attention on things visible or things verifiable through direct or indirect means. But there may be a multitude of secrets both within the world of the small (micro) or within the world of the large (macro) which may evade our vision and enquiry. In the course of the human civilization, a lot of phenomena at the macro and the micro levels have been discovered, but a lot more yet remains to be explored. With progress in

science and technology, we are covering newer and newer ground, but only to realise that the last words on any subject can hardly be spoken. We may consider for example, the molecules, atoms, protons, neutrons and electrons and finally quarks and leptons which have been considered to be basic building block of matter at different stages of human enquiry. As one form of elementarity is established another appears at a finer micro level. Thus by looking at the developments in the studies of sub atomic phenomena, it would be erroneous to think that all the secrets of this world have been unveiled or could be unveiled. The history of scientific endeavour has shown that as one mystery is solved, a new mystery appears one step beyond. The same observation may be true of things and phenomena far out in space. There is an indication in the verse that no matter how hard we struggle to understand the intricacies of nature, there could be always some 'unseen' which would remain outside the sphere of current human knowledge. This does not mean, however, that we should refrain from seeking knowledge about Allah's creation. In fact, we have time and again been urged to ponder deeply over His creation. We should continue doing so. But if at the same time, we remember the significance of the present verse, namely, that Allah alone has knowledge of unseen things which man may never exhaust even with his indomitable spirit of enquiry, our reverence for Allah should issue automatically and we should worship Allah-an act which Allah has desired us to do.

٣٤- قَالَ تَزْرَعُونَ سَبْعَ سِنِينَ دَأْبًا فَمَا حَصَدْتُمْ فَذَرُوهُ فِي سُنْبُلِهِ  
إِلَّا قَلِيلًا مِمَّا تَأْكُلُونَ ○

**12:47** He said, "You shall sow seven years as usual, but that which you reap leave it in the ear, all save a little which you eat."

The verse indicates that if the grains are left in the ear they keep better than when stored in heaps after threshing. Nowadays, all authorities agree that *Triticum dicoccum* (cultivated emmer wheat) was grown in ancient Egypt when the ten brothers of Yusuf (a.s.) went to buy grain from Egypt during the famine. The wheat grain, after its detachment from the parent plant passes through a crucial phase as it is during this period that they are most susceptible to injury by a wide range of insect pests and parasitic

fungi. Beetles and weevils are the most common insects that infest the stored grains fungi, e.g., species of *Alternaria* and *Fusarium* also attack the stored cereals causing considerable damage. The insects that breed in stored grain and the fungal organisms that grow on the grains are dependent on moisture requirement to carry on their life processes in a normal manner. Pests cannot survive in whole, sound grains but breed rapidly in damp grain that are full of broken kernels.

If the harvested grains are left in the ear and subsequently hung up, there are definite advantages over the grain stored in after threshing, as far as the keeping qualities are concerned. Firstly, the mature grain which, incidentally, is a one-seeded fruit in case of wheat, is protected from the pests by its fruit wall and seed coat that are fused together and encase the embryo and the food reserves of the seed. This covering of the grain is liable to injury during threshing exposing the kernel which becomes vulnerable to the attacks of various pests. Even if there is no injury caused to the grain during threshing, the mere detachment of the grain itself from its stalk causes an aperture in the fruit wall and makes the kernel liable to the attacks of insect and fungal pests. Secondly, when the grains are left in the ear, the normal practice is to hang up the sheafs of wheat which process aids in aeration and gradual drying up of the surface moisture; thus making the conditions unfavourable for the attack by pests. The grain left in this way can be stored for a number of years. This explains the wisdom of the prophet Yusuf (a.s.) in his advice to the Egyptians while interpreting the dream of the king and foretelling the seven years of famine.

﴿مَوْتُولٍ عَنْهُمْ وَقَالَ يَا سَعْدِي عَلَىٰ يَوْسُفَ وَأَبْيَضَّتْ عَيْنُهُ مِنَ الْحُزْنِ فَهُوَ كَظِيمٌ﴾

**12:84** And he (Yaqub) turned away from them and said, Alas! my grief for Yusuf. And his eyes were whitened with sorrow that he was suppressing.

When the step brothers of Yusuf (a.s.) after returning from Egypt for the second time informed their father Yaqub (a.s.) that his youngest son (Bin-Yamin, younger brother of Yusuf (a.s.) was detained in Egypt for alleged theft, Yaqub (a.s.) was shocked and his earlier grief for the loss of Yusuf was renewed. He turned away from them and had to bear this severe shock and grief as he could do nothing about it in his old age. This suppression of

his sorrow for many years, according to the above verse, led to whitening of the eyes of Yaqub (a.s.)

Now it is accepted in medical science that emotion and anxiety may give rise to temporary physiological dysfunction known as psychosomatic disturbances. It is said that the sorrow which has no vent in tears may make other organs weep. The suppressed grief can easily give rise to anxiety and emotional disturbances. Besides, "psychoneurotic personality disorders arise from an effort to deal with specific, private, internal, psychological problems and stressful situations that the patient is unable to muster without tension or disturbing psychological devices caused by the anxiety aroused. Many psychiatrists, therefore regard anxiety as the common dynamic source of the neuroses". The term psychoneurosis is coined for such phenomena. The sensory symptoms of psychoneurotic disorders like other physical disturbances, (e. g. angina pectoris, hypertension, migraine, peptic ulcer, ulcerative colitis, diabetes mellitus, asthma, anorexia, impotence, frigidity etc.) are usually those of functional incapacity. "Among the more frequent ones are anaesthesias, paresthesias, and disturbances of special sensory organs, such as blindness or deafness."<sup>1</sup> Thus it is possible that suppression of grief might have led to psychoneurotic disorder in the form of impaired vision in prophet Yaqub (a.s.).

The use of the term "whitened" instead of blindness is also interesting. Whitening of eyes usually means keratitis due to corneal ulcer and cataract formation. These conditions are also temporary defects and are amenable to treatment. but none of them can be associated with suppressed grief. That suppressed grief can give rise to temporary blindness has already been discussed before. As whitened eyes are opposed to clear eyes, Allah probably used this term to signify temporary blindness.

## Reference

1. Kolb. L. C. Noyis, *Modern Clinical Psychiatry*, 7th edn. Oxford & IBH Publishing Co. India pp. 413-458. 1970.

۹۶ فَكَانَ إِذَا جَاءَ الْبَشِيرُ الْقَمْهُ عَلَىٰ وَجْهِهِ فَلَا يَرَىٰ بَصِيرًا ۖ قَالَ الْمَرْءُ أَفَلَا لَكُمْ  
 ۞ إِنِّي أَعْلَمُ مِنَ اللَّهِ مَا لَا تَعْلَمُونَ ۝

**12: 96** Then when the bearer of the good news came, he cast the shirt over his face. and he forthwith regained clear sight. He said: "Did I not say to you, 'I know from Allah that which you know not?'"

In verse 12:84 it was mentioned that due to longstanding extreme suppressed grief, the eyes of Yaqub (a. s.) were whitened. That whitening mentioned in verse 12:84 indicates temporary blindness is supported by verse 12:96. When the good news of Yusuf (a. s.) and the shirt sent by him were conveyed to prophet Yaqub (a. s.) his long lasting grief was removed and the sudden happy news of his long lost son gave him a great happiness and the psychoneurotic effect of temporary blindness disappeared and he got back his full vision.

۱۰۰- وَكَأَيِّن مِّن آيَةٍ فِي السَّمٰوٰتِ وَٱلْأَرْضِ يَظُنُّونَ عَلَيْهَا وَهُمْ عَنْهَا مُعْرِضُونَ ۝

**12:105** And how many a Sign is there in the heavens and on earth which they pass by (unthinkingly) and yet they turn (their faces) away from them!

This verse indicates that those who really observe and ponder over the Signs of Allah prevailing between the heavens and the earth cannot but turn to Him. There are, of course, many who see the Signs and are still indifferent. Their indifference arises mostly from the lack of understanding of the Signs (*Ayaat*) of Allah. It is interesting to note that a proper understanding of the Signs requires a sound knowledge of science. Still more interesting is the fact that most of the Signs of Allah mentioned in the Holy Quran in 18 Suras and in 42 verses are of a scientific character<sup>1</sup>. For example, the creation of life from non-living matter is a Sign, the creation of man is a Sign, the creation of mates for living beings is a Sign, the origin of creation is a Sign, the variation in

colours and languages of human beings is a Sign, putting love and mercy in our hearts is a Sign, and the growth of green leaves, the seat of photosynthesis, is a Sign. Numerous such Signs make man reflect only when he understands the Grand Design of the Creator in the organisation of matter, both living and non-living. It is not correct to say that we at the present stage of scientific development have understood all the Signs, But it is certainly true that with the increasing progress of science and technology, it has been possible for man to comprehend some of these Signs. No wonder Allah has mentioned in Sura Baqara (2:269) that only the wise, i. e., people with *Ilm* (*ilm* meaning knowledge in its entirety) will be able to comprehend His Signs. Thus obviously the attainment of knowledge helps man to understand the Signs, Let us take, for example, planetary motion. The inverse-square law which governs this motion was discovered only a little more than three centuries ago and only in the last century did man find out that the same type of inverse square law of a different strength operates behind the motion of electrons around the nucleus in the atom. Thus the organisation of matter of both the macro and the micro level through the operation of a beautiful set of laws is indeed a Sign of Allah. Without the culture of sciences, this Sign could not be comprehended. Next, let us consider another example, namely the formation of rain. It is known that water, so vitally needed for the sustenance of life is not uniformly distributed throughout the earth. How can then one who has no ready access to water have it for agricultural and other purposes. Phase transition of water indeed provides an answer. We know that water exists in three different forms namely solid (ice), liquid (water) and gas (vapour), Phase transition is an interesting topic of solid state physics and were it not for the phase transition of water, it would not be possible for the trillions of molecules of water (weighing millions of kilograms) to evaporate away overcoming gravity and finally fall on far away lands through the formation of cloud and rain. Thus indeed the descending of rain would appear to be a Sign of Allah only to one who knows something about the science of water. Such Signs abound in nature. Yet man is unmindful of them and looks for Divine Miracles. Today, any student of life-sciences knows that the creation of a cell, the unit of life, is itself a miracle, a manifest Sign of Allah. Thus the present verse urges man to study the Signs already existing in His creation. A mere

observation of things is not enough– the wonders of creation would emerge from the scientific analysis of the signs of Allah which are mentioned in the Holy Quran and which man frequently passes by.

### **Reference**

1. Ali. Akbar M., *Science in the Quran*. Malik Library. Dhaka, p. 57. 1976.



١٠٩. وَمَا أَرْسَلْنَا مِنْ قَبْلِكَ إِلَّا رِجَالًا نُوْحِي إِلَيْهِمْ مِنْ أَهْلِ الْقُرَىٰ  
 أَفَلَمْ يَسِيرُوا فِي الْأَرْضِ فَيَنْظُرُوا كَيْفَ كَانَ عَاقِبَةُ الَّذِينَ مِنْ قَبْلِهِمْ  
 وَلَدَارُ الْآخِرَةِ خَيْرٌ لِلَّذِينَ اتَّقَوْا أَفَلَا تَعْقِلُونَ ۝

12:109 We sent not before you (any messengers) save men whom We inspired from among the folk of the townships—Have they not travelled in the land and seen the nature of the consequences for those who were before them ? And verily the abode of the Hereafter, for those who ward off (evil), is best. Have you then no sense ?

This verse asks the non-believers to travel through the earth to see the end of the people who did not believe in the prophets sent to them. Detailed discussion has been made under verse 3:137.

٢- اللَّهُ الَّذِي رَفَعَ السَّمَوَاتِ بِغَيْرِ عَمَدٍ تَرَوْنَهَا ثُمَّ اسْتَوَىٰ عَلَى الْعَرْشِ وَسَخَّرَ  
 الشَّمْسَ وَالْقَمَرَ كُلٌّ يَجْرِي لِأَجَلٍ مُّسَمًّى يُدَبِّرُ الْأَمْرَ يُفَصِّلُ الْآيَاتِ  
 لَعَلَّكُمْ يَلْقَاءَ رَبَّكُمْ تَوْقِنُونَ ۝

13:2 Allah is He Who raised the heavens without any pillars that you can see, is firmly established on the throne (of Authority); He has subjected the sun and the moon (to His laws)! Each one runs (its course) for a term appointed. He regulates affairs, explaining the Signs in details.

The implication of the beginning of this verse that “Allah is He Who raised the heavens without any pillars that you can see” is of very far reaching importance from the scientific point of view. The function of a pillar is to raise a load on the earth’s surface. Heavenly bodies swimming in space outside the atmosphere surrounding the earth appear as the sky to us (2:29). This verse clearly and unambiguously declares the heavenly bodies to be a load which had been suggested by al-Biruni (11th century) and later established by Newton’s law of gravitation about 1200 years after the Quran

was revealed. As we know today, every heavenly body or any material body is attracting each other with a force which is proportional to the product of their masses and inversely proportional to the square of their distance of separation. These heavenly bodies do not collapse and collide with each other due to the effect of a balancing centrifugal force arising from their orbital motions. Obviously the balancing of the gravitational force by centrifugal force constitute the invisible pillars mentioned in this verse. That the sun and the moon are subjected to His laws has been discussed in 7:54.

One should remember that the Quran is not a book of science. At the time when the Holy Book was revealed, human civilization had not made enough progress to receive more explicit information about the theory of gravitation and centrifugal force than has been mentioned in the verse. The discovery of the gravitational and centrifugal force about 1200 years later confirms the existence of the invisible pillars, mentioned in this verse. Indeed understanding these 'Signs' of creation brings ecstasy to the mind of a believer.

ۛ- وَهُوَ الَّذِي مَدَّ الْأَرْضَ وَجَعَلَ فِيهَا رَوَاسِيَ وَأَنْهَارًا وَمِنْ كُلِّ الثَّمَرَاتِ  
 جَعَلَ فِيهَا رُجُومًا لِتُبْعَثَ فِيهَا النَّهَارَ ۚ إِنَّ فِي ذَلِكَ لَآيَاتٍ لِّقَوْمٍ  
 يَتَفَكَّرُونَ ○

13:3 It is He, Who spread out the earth and made in it mountains standing firm and flowing rivers; and of all fruits He placed there in two spouses. He covers the night with the day. Behold, verily in these things these are Signs for those who consider!

### Spreading of the earth

In the past 25 years, there has been a revolution in earth science, which has brought new understanding of our planet. This revolution has resulted in growing understanding of the forces which shape the continents. Our planet's surface is broken into a number of cold, rigid, 100 km thick lithospheric plates. They float on a relatively plastic, partially molten region called asthenosphere. The plates move slowly, at 5 to 10 cm per year, apparently driven by thermal convective motion of the rocks in the mantle,

by gravity and by rotation of the earth. Geologists are of the opinion that quantities of fresh rocks are slowly emerging from the mantle along the length of the ocean ridges and are spreading out laterally forming new crusts that advance toward the continents. This phenomenon, known as the “sea floor spreading” causes the drift of the plates and ultimately the spread of the earth in various ways. Another interpretation of “spreading out” suggesting flatness of the earth has been discussed under verse 2:22.

By this process of plate tectonics, the ancient super continent, Pangea spread out into two super continents, Laurasia and Gondwana and ultimately into the present shape of the earth having five continents (Fig. 5).

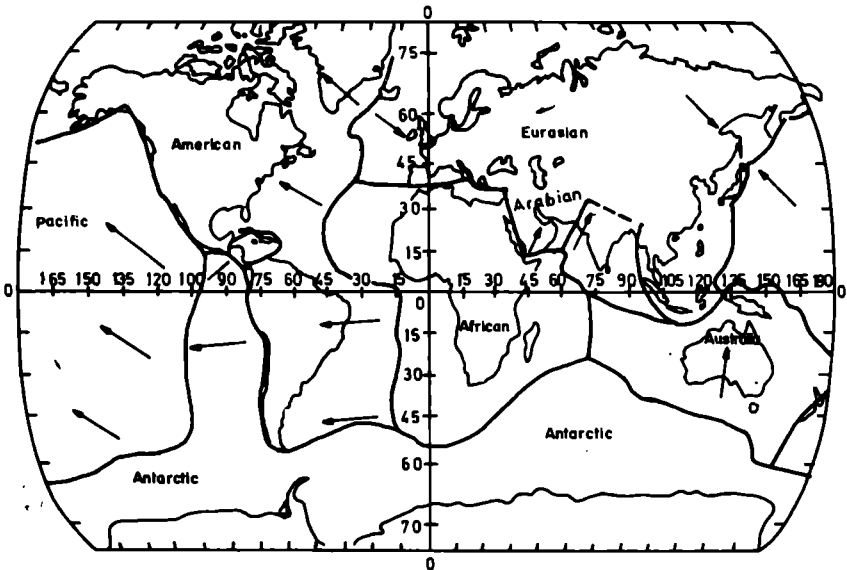


Fig. 5. Plate tectonics—the continental jig-saw puzzle

Most terrestrial and geological actions happen, as plates collide. Mountain formation, along with earthquake, volcanic eruption etc. result from their slow motion collision. When two continental plates collide, earthquakes occur. In severe cases continents crumple and enormous folded ranges of mountain thrust up.

### **Mountains**

The mountains of the world occur chiefly in great systems forming chains or ranges. They border the edges of continents. The ranges are often continued out into the seas and oceans, as a series of islands, suggesting

that part of the system subsides in the ocean. Thus one mountain system passes through the coast of the Mediterranean, Asia Minor, India, Burma and continues as the subsided part of the system, as the islands of the East Indies going north to Aleucian islands, and south to Pacific islands upto New Zealand, which are again connected in the recently discovered ranges across the Antarctica. This can again be connected with the Andes of South America and from there to Coast Range of North America. The depths of the Pacific Ocean are thus bordered by a complete encircling mountain system. Again the Eurasian system from Pyrenees across to Pamir, follows the Mediterranean, Black sea and Persian Gulf Coast lines. Such a scheme may be followed out in detail amongst all the mountains of the world. Thus the earth is encircled by mountains standing firm over it.

Mountain formations occur at the boundary of the plates. The first system, as mentioned above, occurs along the boundary of the plates : Eurasian plates, Arabian plates, Australo-Indian plate, Antarctica plate. Another system follows the boundary of Pacific plate, North American plate and South American plate. Other systems of mountains can also be connected with other plates. (see discussion under verse 7: 91 ).

Mountains stand firm, because they stand on very strong bases. The outer shell or the crust of the earth varies from a fairly uniform 5 km below the oceans to 35 km under flat continental surfaces and as much as 80 km under great mountain ranges. Thus the mountains on firm foundation.

### **Rivers**

Rivers and streams are among the earliest geo-morphological phenomena of the earth.

The genesis of a river is intimately linked with one of the general geological processes, tectonic process, i.e., dynamic forces of the interior of the earth, disturb the equilibrium of running water as do changes in climate. Cataclysmic geological events stand out as critical turning points in the life history of a river.

Water in liquid state was produced for first time some hundreds of millions of years ago, at the transition from primeval ( the archaeozoic era ) to pre-historic times ( the proterozoic era ), when the glowing hot globe of the earth cooled to below critical temperature. The gases in the atmosphere condensed, and steam produced water, which fell upon the earth. In so far as it is possible to imagine this process, it can be pictured as a long period of intense precipitation, with rain pouring down on the bare wild rocks, which

at that time constituted the surface of the earth, the water ran off along channels which had formed during cooling and collected in depressions and hollows. In this way the first rivers and seas were formed and at the same time the endless of water circulation began, in which the rivers are important components.

Streams and rivers look like narrow ribbons across the continents. Their dendric networks direct and regulate one of the most important activities of nature. As drainage channels for surface water, they are critical components of the hydrological cycle.

The hydrological cycle or the circulatory chain of water, consists of a constant alternation between evaporation of sea, lakes and flowing surface water, precipitation and stream flow. The river and streams are channels used by water in flowing across the surface of the earth. The phase transition involving ice, water and vapour connect the mountains and rivers in a very interesting manner. Ice which is formed at the ice-cap of the mountains melts and feeds the rivers ( and their network ) falling finally in the sea. Evaporation of water from the surfaces of the all water bodies of the earth enables the water molecules to escape the forces of gravity and travel in the form of clouds which besides causing rain at places far off from the water sources, also replenish the ice-caps of the mountains through condensation. Thus the phase transition ice, water vapour and back again to water to ice establishes a hydrological cycle between mountains and rivers mentioned in the verse.

If one analyses the nature of a river, in a strictly scientific way, its existence depends upon three factors : the availability of surface water, a channel in the ground and a surface with a gradient.

Ever since water began to circulate on the surface of the earth, water courses have been constantly eroding the continents. Furthermore, from the earliest time rivers have been subject to repeated processes of elevation, subsidence and tilting of part of the earth crust. They have also been subject to the advance and retreat of oceans, to the shift in the position of continents and poles, as well as to alternation between hot and cold periods and wet and dry periods.

Long ago our earliest ancestors were attracted by watercourses, because they provided drinking water and food in the form of fish and because they were useful means of transportation for wandering tribes. Early man was at the mercy of currents, floods, changes in the course of rivers and quite

simply of the sheer breadth, depth and quantity of water, so that rivers more often represented for him an obstacle and danger. The greater the river, the more ominous and the more unpredictable it seemed.

The development of man from a position of powerlessness in the face of nature to increasing dominance, extends over millions of years. Beyond the elementary benefits of quenching his thirst. collecting and fishing, man gradually learned, in course of time, to turn water to various practical uses. The development of the very advanced Oriental civilisation in most cases was intimately associated with rivers and with the use of river water in irrigation and in the construction of dykes against flooding. From the development of major riverine routes for shipment of freight, from the evolution from wooden footbrige to the elegantly curving bridge of prestressed concrete, from the mill-wheel to the high performance turbine, from the use of the industrial water for large scale chemical production, to its use as a cooling agent for nuclear reactors, rivers have always been involved in the general expansion of productive resources. The control, harnessing and increasing utilisation of rivers constitute part of the most important chapters in the history of mankind.

Among the technological advances of river engineering to-day, there are, of course, those, which are more or less specifically designed for a particular purpose. Reservoirs are sometimes built that are intended solely for the generation of hydro electricity. More typical modern river engineering are the so-called multi-purpose projects in which various potentials of the river are developed within one complex. A particularly effective combination is the retention of river water within a reservoir for the purpose of improving navigability, generation of hydro-electric power within arid regions, and an increase in the use of river water for irrigation.

This Allah created rivers for innumerable benefits to mankind.

### **Of all fruits He placed therein two spouses**

The phrase - زوجين اثنين in the verse means both of a pair or spouses thus indicating that the development of fruit in plants is dependent on the existence of male and female sexes. Of all the mysteries of nature, the occurrence of the two sexes in the biological world, and the phenomenon of sexual reproduction to maintain continuity of genetically alike organisms, deserves our deep contemplation. Although in some plants, perpetuation of life is possible by methods other than sexual, the normal process of

regeneration is through reproduction involving male and female gametes or sex cells.

In plants which produce flowers, the fruit is the end product of a highly complex reproductive process. In the case of bisexual flowers each flower has male and female organs known as stamens and carpels.

Alternatively, each flower bears only the stamens or carpels if it is unisexual. The stamens produce pollen which reaches the receptive tip of the carpel known as stigma through a process called pollination aided by the agency of wind, insects, birds, water, etc. The pollen grains germinate on the stigma producing microscopic tubular structures which penetrate the stigma and the tissues beneath and finally one succeeds in reaching the ovule in the ovary. The pollen tube ultimately releases two male nuclei whose union with the two female sexual units in the ovule results in the formation of seed and fruit. Thus, the development of fruit by a normal process called fertilization implies the pre-existence of male and female sexes in plants. But fruits can also be produced without fertilization in some cultivated plants like banana or may be induced by the application of growth hormones. These are but exceptions to the normal phenomenon of fruit production in which the two sexes play a role which has already been explained in the context of the verse. The exceptions remain outside our understanding at the present moment.

Incidentally, in the case of plants bearing unisexual flowers (e. g., palmyra palms and date palms), the male trees provide only the pollen which fecundates the female flowers borne on separate trees resulting in the fruit formation. Out of the total number of apparently identical seeds developed from the fruits of such trees, some will germinate to produce male plants and the others give rise to female ones.

If the phrase زوجين اثنين would mean two pairs, then there is a possibility of another alternative explanation of the verse in a most interesting phenomenon peculiar to the group of plants known as *angiosperms* meaning those in which the seeds are enclosed by a fruit wall. Here, after the pollen tube bursts at the tip inside the ovule liberating the two sperm nuclei, one fuses with the egg to produce the zygote and the other sperm unites with the two polar nuclei of the embryo sac in the ovule to produce triploid endosperm nucleus. The zygote develops into an embryo and the endosperm nucleus forms endosperm which is the store house of nourishment for the embryo. The double fusion involving one sperm nucleus with the egg, and

the other sperm with the two polar nuclei is called double fertilization and represents one of the principal characteristics of the fruit bearing plants to which evidently there is an allusion in the present verse. So, in the production of every fruit (excepting those developed by processes other than sexual) there is always an involvement of two unions by two pairs of sexual units, male and female.

### He covers the night with the day

How day and night occur due to the rotation of the round earth about its own axis has been dealt with under verse 3:27. In this rotation when the sun appears to sink below the horizon night sets in and its darkness gradually engulfs the brightness of the day. It is, as if, the dark veil of the night is being gradually drawn over the bright face of the day.

۴- وَفِي الْأَرْضِ قِطْعٌ مُّتَجَاوِرَاتٌ وَجَنَّاتٌ مِّنْ أَعْنَابٍ وَزُرْعٌ وَنَخِيلٌ صِنَوَانٌ وَعَايِرٌ  
صِنَوَانٍ يُسْقَى بِمَاءٍ وَاحِدٍ وَنُقِضَلُ بَعْضَهَا عَلَى بَعْضٍ فِي الْأَكْلِ إِنَّ فِي  
ذَلِكَ لَآيَاتٍ لِّقَوْمٍ يَعْقِلُونَ ○

13:4 And in the earth are neighbouring tracts, vineyards, sown fields, date palms, similar and not similar, watered with the same water. We make some of them more excellent than others to eat, and verily in these are signs for those who are wise.

### In the earth are neighbouring tracts

The dictionary meaning of the word قطع is "cut into pieces". That the earth is divided into a number of pieces of tectonic plates has been discussed under the verse 7 : 91.

### Vineyards similar, and not similar

The word صنوان in the plural, idiomatically means cousins, sons or uterine brothers, i.e., of the same roots. and it literally conveys the sense of similar kind. Thus غيرصنوان would stand for the opposite meaning, i.e., not from the same root. Under each of the three examples cited in the verse, within the framework of each species of plant, there are some which are similar to the others, yet there are others that differ from the rest.



A clear understanding of the mechanism governing these differences is necessary before we can appreciate the essence of the meaning in the verse. Sourness in fruit indicates the presence of an acid; sweetness is due to cells filled with sugar; and the aroma comes from chemical compounds called esters formed by a combination of acid and an alcohol. On the ripening of fruits, the chemical called protopectin which holds the cellulose walls of cells together is dissolved to give rise to pectin that makes the fruit soft and mealy.<sup>2</sup> These biochemical reasons underlying the differences in the qualities of fruits of each species are due to the differences in the hereditary material which controls these traits, and according to the current theory of gene action, it is precisely the sequence of bases on DNA molecules in the nuclei of cells. These sequences form a code that directs the way in which amino acids are put together to form enzymes that determine the biochemistry of an organism.<sup>3</sup> Enzymes are also necessary to synthesize glucose molecules into larger and more complex molecules of carbohydrates that we obtain from fruits and cereal grains.

In the first example given in the verse, viz., vineyards producing grapes belonging to species, *Vitis vinifera*, a number of cultivated varieties can be seen, each different from others in shape, size, colour, succulence, taste, flavour, and sugar content of fruit. They can be broadly classified as dessert grapes, wine grapes, currants, raisins and sultanas. The second example *عذيق* indicating sown fields would include the major crops used as staple food, like cereals, e.g., wheat, barley, rice, maize each of it within its specific range showing a large number of cultivars each exceling the other in palatability and nutritive value. Thirdly, the date palms, *Phoenix dactylifera* (the Arabian dates, distinct from wild dates. *P. sylvestris*) produce fruits varying in their softness, sugar content, keeping qualities, etc. The different varieties of each of the species in question exhibit their own qualities even if they are grown in adjacent tracts and receive the same water.

## References

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۸- اللهُ يَعْلَمُ مَا تَحْمِلُ كُلُّ أُنْثَىٰ وَمَا تَغِيصُ الْأَرْحَامُ وَمَا تَزْدَادُ  
 وَكُلُّ شَيْءٍ عِنْدَهُ بِمِقْدَارٍ ۝

**13:8 Allah knows that which every female bears and that which in the wombs falls short or does exceed. And everything with Him is measured.**

**Allah knows that which in the wombs fall short or do exceed**

Here Allah declares that He knows all the hidden things including those in the female wombs. He further states that He is aware of any shortfall or excess in the development of the foetus. Besides, in His creation in the wombs there are proper measures.

Pregnancy starts when a mature ovum of the female is fertilized by a spermatozoon to form a zygote. As this zygote or fertilized ovum passes down the uterine tube, cell division continues and by the 5th day a blastocyst is formed. On the 6th day, this blastocyst is attached to the uterine wall (endometrium) by embedding itself at the embryonic pole. This attachment or implantation is complete by the 9th day. At about 2 weeks, the size becomes about 2 mm and it is called embryo. Upto the 6th week the embryo is indistinguishable in shape from that of other animals, after which it begins to show a distinct human form, when it is called foetus<sup>1</sup>.

Normally the pregnancy starts from the time of fertilization of the ovum by a spermatozoon and terminates after about 38 weeks or 266 days of fertilization or about 40 weeks or 280 days of the last menstrual period (LMP)<sup>3</sup>. But in some cases there may be complications either in the form of shortfalls or excesses. (For detailed informations about developmental anomalies, see Appendix IV).

### **Shortfalls in the wombs**

1. At least 15% of zygotes are lost by spontaneous abortion mostly due to chromosomal abnormality. Without such natural screening about 12% infants would be congenitally malformed as against the usual 2-3% only.

**2. Congenital malformations:** About 20% of deaths during the perinatal period (at birth) are due to congenital malformations<sup>3</sup>. Newborn infants show malformations up to 2.7% and another 3.0% congenital defects are detected during infancy (upto one year after birth)<sup>4</sup>.

(a) Examples of malformations for genetic factors are: Turner Syndrome (hypodiploid with less chromosome, usually 45) and Down Syndrome (hyperdiploid with excess chromosome usually 47). Mutant genes may cause gross deformity of short extremities, large head, thoracic kyphosis, lumbar lordosis and protrusion of the abdomen (**achondroplasia**).

(b) Though the human foetus is well protected inside the womb, there are many external agents which may cause malformations. These are called teratogens. These include hormones, alkaloids (Nicotine), alcohol, antibiotics (tetracycline and streptomycin), anticoagulants (Warfarin), anticonvulsants (tridione, paradione), antineoplastic agents (aminoperin), corticosteroids (cortisone), certain chemicals (organic mercury in fish additives and fungicide), tranquilizers (thalidomide, lithium carbonate, diazepam), other drugs like LSD (Lysergic Acid Diethylamide), alicylaties in large dose, potassium iodide, radioactive iodine, infectious agents (Rubella Virus, Herpes Simplex Virus, CMV (cytomegalovirus), *Toxoplasma gondii*, *Treponoma pallidum* (cause syphilis), Radiation (exposure above 10 rads).

The malformations caused by these agents are malformed external genitalia, intrauterine growth retardation (IUGR), mental retardation, microcephaly (small head), joint abnormalities, skeletal defects, cleft palate, cardiovascular defects, phocomelia (seal-like limbs), amelia (no limb), micromelia (small or rudimentary limbs), cleft-lip, optic atrophy, hydrocephaly (large head), micropthalmia (small eyes), cataract, glaucoma, blindness, deafness, congenital heart disease, malformations of urinary and digestive systems, wide gap in palate, saddle nose, Hutchinson's teeth (widely spaced, pegshaped, centrally notched upper incisors), frontal bossing etc.<sup>2</sup>

(c) Malformations due to genetic and external agents combined are called multifactorial inheritance, which show familial defects like cleft-lip with or without cleft palate, neural tube defects like spina bifida cystica (spine divided in two parts at the lower end forming a cyst), anencephaly (no brain), pyloric stenosis, congenital dislocation of the hip etc.<sup>5</sup>.

(d) There may be some rare shortfalls in the development of the embryo and the foetus viz. blighted embryo (no embryo in the chorionic sac),

absence of chest wall, and even total hydropic degeneration of the embryo into hydatidiform moles and its malignant transformation (chorion epithelioma).

(e) Severe maternal malnutrition and faulty food may retard the foetal growth and the infant may be underweight.

### Excess in the wombs

1. Excess may be in duration of pregnancy. In about 8-12% cases duration of pregnancy may be 2-3 week more than normal<sup>2</sup>.

2. Overweight baby. The normal weight range of newborn baby is 2500 to 3400 gms. Diabetic mothers often give birth to overweight babies, even up to 4500 gms. For detailed discussion see Appendix. V.

3. Twins and other multiple pregnancies.

4. Conjoined twins—twins attached to each other, e.g. thoracopagus (joined in thoracic region), cephalo-thoracopagus (joined in head and thorax), Siamese twins (bodily attached but separate personalities) and parasitic foetus (part of a foetus attached to normal infant).

5. Polydactily—excess number of fingers and toes.

Thus there may be many shortfalls and excesses within the womb in terms of time and physical growth, which are all known to Allah, though many of the malformations are caused by human mistakes. As for the prenatal discovery of the major congenital malformations and for knowledge of the foetal sex, man may know some of them at a particular stage and position of the foetus. But this is not possible as yet in the three months of pregnancy. Besides, the special tests needed for this purpose (e.g. amniocentesis, foetoscopy, ultrasonography) are highly sophisticated and costly and these are not recommended for general use.

### Everything with Him is measured

The size of head, chest and limbs of the foetus are all proportional and suitable for its survival. A larger head could not negotiate through the birth canal and a larger body and longer limbs would not be accommodated in the uterus without any impediment. Thus everything created and developed in the wombs are in proper measure which is the normal standard for developing humans.

(1) In the whole of creation the issue of proportion may be of two types: proportion of one systems relative to other systems in its environment (2) proportions of the components within a given systems.

Here the second aspect of proportion is more relevant. It is indeed fascinating to realise that the individual components of the human body in as far their relative placements, sizes, geometry, functions and harmony between the parts are concerned, follow a given proportion. For example the geometrical separations of some of the anatomical positions of the human body are known to follow a pattern ordained by Allah and discovered in the Fibonacci numbers 1, 1, 2, 3, 5, 8,.....<sup>6</sup>. The question of proportion and measure for things has been raised in the Holy Quran in several verses. A somewhat detailed discussion on the subject has been made under verse 25 : 2.

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هُوَ الَّذِي يُرِيكُمْ الْبَرْقَ خَوْفًا وَ طَمَعًا وَيُنشِئُ السَّحَابَ الثِّقَالَ ۝

13:12 It is He Who shows you the lightning, by way of fear and of hope; it is He Who raises up the clouds, heavy with rain.

### The Lightning

As has been explained under verse 2: 19, lightning is a luminous electrical discharge in the atmosphere. Electric charges produced in the cloud continue to accumulate on the water particles of the cloud and eventually the negative and the positive charges get separated producing two differently charged cloud-masses. Such a build up of charges may become so large that the intervening air can no longer insulate them and an enormous spark then discharges across the positive and negative areas. The spark may occur entirely inside one cloud, or it may leap from one cloud to another, or from the cloud to the earth. These sparks are characterised by dazzling flashes of light and violent sounds which we call thunder-clap. The lightning discharge is intensely hot and heats up the surrounding air expanding it very quickly; this sudden expansion of air sends out sound-waves producing a loud explosive noise which we hear as the roar of thunder.

### Lightning as fear

From time immemorial man has looked upon lightning with great awe. Its flashes are fearfully dazzling, almost temporarily blinding his sight (2:19, 20)

Moreover, lightning between a cloud and the earth causes loss of lives and death may be instantaneous; it also causes considerable damage to properties as the intense heat produced by lightning burns up every thing in the immediate vicinity of the lightning passage.

### Lightning as hope

The highly beneficial effects of lightning were unknown to mankind till the later part of the nineteenth century. Scientists have discovered that lightning causes oxygen and nitrogen in the air to combine and form oxides

of nitrogen. The falling rain drops carry these oxides into the soil and supply nitrogen to the plants in the form of soluble nitrogen compounds, which are essential for its growth and nutrition. According to Professor J.H. Wood<sup>1</sup> "The Nitrogen oxide formed during lightning storms dissolves in rain water producing a very dilute solution of nitric acid. In this way a considerable amount of the inactive element nitrogen of the air is converted into nitrogen compound and deposited in the soil for use plants as food. It is estimated that a region with moderate rainfall receives 5-7 pounds of nitrogen as nitric acid per acre per year". The following diagram (Fig. 6) depicts vividly the nitrogen cycle<sup>2</sup>:

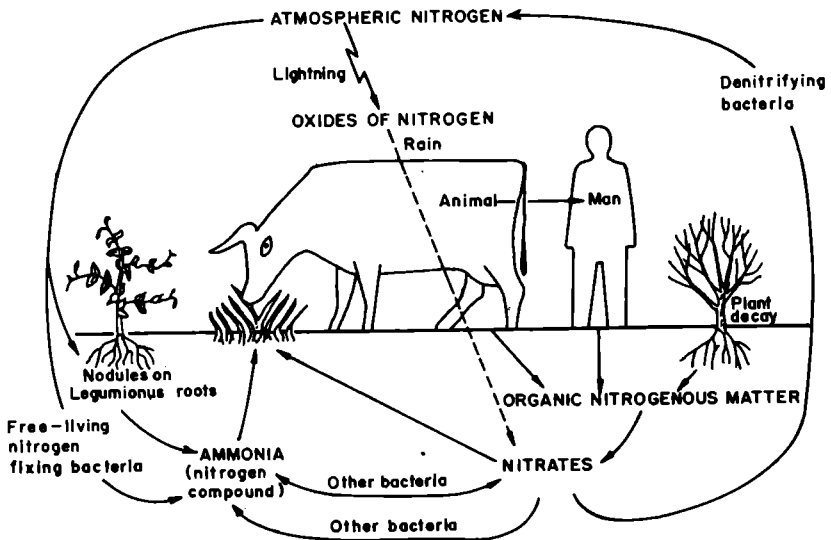


Fig. 6. Nitrogen Cycle

It is thus found that without this vitally beneficial contribution of lightning one of the sources for the nitrogen cycle could not have been maintained and also eventually plant life in the world would have suffered. Considered from this angle fearful lightning emerges as a subtle benefactor and a hope and hence as a great mercy from Allah.

## **The formation of the rain clouds in the sky**

This has been explained in detail under verse 2:10.

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۱۳- وَيَسْتَبِحُّ الرَّعْدُ بِحَمْدِهِ وَالْمَلَائِكَةُ مِنْ خِيفَتِهِ وَيُرْسِلُ الصَّوَاعِقَ  
فَيُصِيبُ بِهَا مَنْ يَشَاءُ وَهُمْ يُجَادِلُونَ فِي اللَّهِ وَهُوَ شَدِيدُ الْحِسَابِ ۝

13: 13 The thunder celebrates His praises and (so do) the angels for awe of Him. He launches the thunderbolts and smites with them whom He wills while they dispute (in doubt) concerning Allah, and He is mighty in wrath.

### The thunder celebrates His praises

The formation of thunder has been explained under verse 2: 19. In the production of thunder three aspects are discernible: (i) heavy electric discharge from the clouds, (ii) production of tremendous heat, and (iii) dazzling flashes of light. The violent sound which is called thunder is produced by sudden expansion followed by compression of air. Each of these aspects is an awe-inspiring wonder. At every stage from the moment the discharge begins till the thunder-roars spread out the various effects are produced as desired by Allah and in strict obedience to the laws ordained by Him; even the slightest deviation cannot be thought of.

Thus we may say that the thunder glorifies Allah and proclaims all along the power and grandeur of His Magnificence.

From verses 12 and 13 of this Sura we find there is a distinction between. برق (lightning) and رعد (thunder); indeed modern science established that destructive effects are associated with the lightning and not with thunder as the violent sound of thunder may cause fear but generally nothing fatal. Further the flashes of lightning and the electricity travel with the tremendous speed of 1,86,000 miles/sec while the roar of thunder travels in the air only at a speed of about 1190ft/sec.

۱۵- وَبَلِّغُوا يُسُبِّحُ مَنْ فِي السَّمَاوَاتِ وَالْأَرْضِ طَوْعًا وَكَرْهًا وَظِلِّلَهُمْ  
بِالْعُدْوِيِّ وَالْإِصْحَالِ ۝

**13: 15** Whatever beings there are in the heavens and the earth do prostrate themselves to Allah (acknowledging subjection)-with good will or in spite of themselves: so do their shadows in the mornings and evenings.

The word "prostrate" (يسجد) literally means to lie with face to the ground especially as a token of submission. The mystic interpretation is beyond the scope of our discussion. 'Prostrate' signifies submission to the Creator willingly or unwillingly through the laws ordained by Him. That such is the case for both material and living worlds has been discussed in detail in verse 7: 54 and Appendix IV. Shadows are produced when light cannot pass through non-transparent objects. There are two parts in a shadow, namely umbra and penumbra. Umbra is the main distinct part and penumbra the outward indistinct part. The shadow formation establishes the reclilinear propagation of light. The shadow of any object is longest in the mornings and evenings obeying the physical laws ordained by the Creator.

مَنْ قُلُوبُهُ مِنْ رَبِّ السَّمَوَاتِ وَالْأَرْضِ قُلِ اللَّهُ قُلْ أَأَتَّخِذُكُمْ مِنْ دُونِهِ أَوْلِيَاءَ لَا يَمْلِكُونَ لِأَنْفُسِهِمْ نَفْعًا وَلَا ضَرًّا قُلْ هَلْ يَسْتَوِي الْأَعْمَى وَالْبَصِيرَةُ أَمْ هَلْ يَسْتَوِي الظُّلُمَاتُ وَالنُّورُ أَمْ جَعَلُوا لِلَّهِ شُرَكَاءَ خَلَقُوا كَخَلْقِهِ فَتَشَابَهَ الْخَلْقُ عَلَيْهِمْ قُلِ اللَّهُ خَالِقُ كُلِّ شَيْءٍ وَهُوَ الْوَاحِدُ الْقَهَّارُ ۝

**13: 16** Say : "Who is the Lord and Sustainer of the heavens and the earth?" Say: "(It is) Allah." "Do you then take (for worship) protectors other than Him, such as have no power either for good or for harm to themselves?" Say: "Are the blind equal with those who see? Or the depth of darkness equal with light?" Or do they assign to Allah partners who have created (anything) as He has created, so that the creation seemed to them similar? Say : "Allah is the Creator of all things : He is the One, the Supreme and Irresistible."

## **Allah as the Lord and Sustainer**

There are two things in this verse that need a scientific explanation; the first one has to deal with Allah being the Lord and Sustainer of the heavens and the earth. This has been explained in some detail in verse 1: 2. The second is the reference to the assigning to Allah of partners whose capability to create anything equal to the creation of Allah has been questioned by Allah Himself. Let us discuss this matter from the point of view of man's scientific achievements. The last half a century has witnessed phenomenal progress in the understanding of the molecular basis of life. The DNA molecule (Deoxy ribonucleic acid) as the blueprint of the heredity of life has been discovered. The use of messenger RNA (Ribonucleic acid) and transfer RNA for the synthesis of different proteins from some 20 amino acids has also been understood. Though man is struggling to synthesise some of these molecules of life, the creation of a cell which is the basic building block of life is still a far cry. Even if we know how to make all the individual components of a cell, putting them together will not produce life. Given these cells however, man has been able to find the right conditions in which these cells can grow; thus although test tube forests (tissue culture) and test tube babies are some of the very fashionable terminologies on the frontiers of biological research today, these achievements of man are not creation as such and are no match for the perfect creation of Allah. Man, through the knowledge imparted to him by Allah, can know many of the secrets hidden in the creation of life and environment; but never for a moment should he betaken as partner to Allah from the point of view of creation of life and matter. Also in the World of the small, man has discovered a lot—compounds, elements, molecules, atoms, nucleus, electrons, protons, neutrons, quarks etc. The more deeply man delves into the heart of matter, the more he has discovered that the actual reality is more subtle and moves one step beyond. Man has known a lot only to realise that what he has learnt is only a tiny part of what he has yet to learn. With the knowledge gained so far, man has been able to create wonderful gadgets starting from micro-chips to space shuttles, but all these should never place him in the role of a creator equal to Allah and should never make him a partner to Allah. The knowledge behind Allah's creation is inexhaustible and man with his limited knowledge and with methodologies of science can have limited access to parts of this knowledge of Allah. Thus the question of assigning a partner to Allah only because he can create a few things, does not arise at all. Allah is the Supreme Creator.

١٤- أَنْزَلَ مِنَ السَّمَاءِ مَاءً فَسَالَتْ أَوْدِيَةٌ بِقَدَرِهَا فَاحْتَمَلَ السَّيْلُ زَبَدًا رَابِيًا  
 وَمِمَّا يُوقِدُونَ عَلَيْهِ فِي النَّارِ ابْتِغَاءَ حُلِيِّهِمْ أَوْ مَتَاعٍ رَبْدٌ مِثْلَهُ كَذَلِكَ يَضْرِبُ  
 اللَّهُ الْحَقَّ وَالْبَاطِلَ ۚ فَأَمَّا الزَّبَدُ فَيَذْهَبُ جُفَاءً ۖ وَأَمَّا مَا يَنْفَعُ النَّاسَ فَيَمْكُتُ  
 فِي الْأَرْضِ كَذَلِكَ يَضْرِبُ اللَّهُ الْأَمْثَالَ ۝

13:17 He sends down water from the sky and the channels flow, each according to its measure, but the torrent bears away the foam that mounts up to the surface. Even so, from that (ore) which they heat in the fire to make ornaments or utensils therewith, there is a scum likewise. Thus Allah (by parables) shows forth truth and vanity. For the scum disappears like froth cast out, while that which is for the good of mankind remains on the earth. Thus does Allah set forth parables.

### Falling of rain drops

The falling of rain drops from the sky has been explained under verse 2:22.

### Flow of channels

When heavy rain-showers continue for a considerable length of time, they fill and ultimately overflow the drains, ponds, lakes, brooks, streams, rivers and other cavities on the surface of the earth. They receive water according to their individual capacity, the measure for each being determined by the volume of its cavity and the discharge depends on the speed of water current flowing through it.

In such a flood situation another phenomenon is noticeable. Froth and foam will gather according to local conditions, but these baser things, being lighter than water, will float on the surface and will be carried away by the torrents leaving the water beneath free from such unwanted impurities or trash materials. In this verse the rain has been compared to Allah's spiritual mercy which is poured down continuously and which all can receive, but the response will be different from different individuals, the quantum depending

upon the capacity of the individual receiver; this flood of mercy also carries away our spiritual scum. The froth of vanity and falsehood, though it may make a great superficial show, will vanish in no time but truth will endure.

### **Extraction of iron, gold and silver from their ores**

In this verse the metaphor of scum has also been extended to metals used for preparing utensils such as iron and to metals used for making ornaments such as gold. The ores of these metals are initially full of a baser admixture which is required to be separated and removed; when the ores are properly treated and appropriately heated, they pass into the molten state and the baser materials form scum on the surface.

In the extraction of iron,<sup>1</sup> the ore is first washed and then mixed with coke and lime stone. The mixture is heated in a blast furnace to 1500°C. At this temperature iron melts and waste materials (calcium silicate and other non-metallic products), called "slag", being lighter, floats on top of molten iron. The slag is then drawn off and iron thus purified is put to use for making utensils and other implements of utility.

As regards extraction of gold<sup>2</sup>, the gold-ore (gold telluride) is mixed with dilute solution of sodium cyanide and the mixture is subjected to continuous agitation and aeration for about 50 hours. Gold cyanide is formed in the dissolved state, which is then separated from the "ore-tailings" by filtration or decantation. This is then passed through a vacuum-chamber and de-aerated. Gold is then precipitated by adding zinc dust and the precipitate containing gold as well as some silver and unremoved zinc is then smelted to eliminate the zinc. The resulting gold-silver alloy (usually containing 70-90%) is further refined by "parting" with nitric acid or hot concentrated sulphuric acid which dissolves silver but not gold (the solution being lighter gathers on the top and is drained off), or by chlorination of the molten metal converting silver to silver chloride which is removed as scum.

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1. *World Book Encyclopaedia*, Vol. 6, England, pp. 555-570, 1966.
2. *McGraw Hill, Encyclopaedia of Science and Technology*, Vol. 6. p. 260, 1971.

۞ أَلَمْ تَرَ أَنَّ اللَّهَ خَلَقَ السَّمَوَاتِ وَالْأَرْضَ بِالْحَقِّ إِنَّ يُشَاقِدُنَا مِنْكُمْ  
وَيَأْتِ بِمَخْلُوقٍ جَدِيدٍ ۝

**14:19** Do you not see that Allah created the heavens and the earth in truth? If He so will, He can remove you and put (in your place) a new creation?

### **Creation in truth**

This verse clearly states that the heavens and the earth have been created by Allah in truth. We can consider this truth to be the foundation of all creation.

It is interesting to note that the purpose of scientific investigations for which there are repeated injunctions in the Holy Quran, is to find out this truth. Obviously *tafakkur*, i.e., the reflection on the laws of nature and their unveiling is an obligation to man. The history of science shows that as man has unfolded the secrets of nature, he has been thrilled by the laws which govern living and inert matter. These laws are nothing but a manifestation of the truth which has been pervading all of Allah's creation. This truth may mean all aspects characterising matter, (e.g., shape, size, internal structure, colour, odour of a given matter and its interaction with others. It may mean laws which are brought into play in the organisation of matter, or the proportions of things necessary for their own existence or the proportion of one thing in relation to some other thing in the context of the ecology of nature. Man with the methodologies of science, developed and exploited so far, has explored only some of the truths inherent in nature. The more he explores these truths, the more he realises the power and grandeur of the Creator and His master-mindedness. The other important observation is that the setting of nature has been such that the existence of man has been made possible. Thus not only has Allah created inert and living matter in truth which is evinced in their organisation, this truth has been to the benefit and advantage of mankind. Thus, no wonder man should bow down to Allah in the ecstasy of discovering the truths of His creation.

۳۲- اللهُ الَّذِي خَلَقَ السَّمَوَاتِ وَالْأَرْضَ وَأَنْزَلَ مِنَ السَّمَاءِ مَاءً فَأَخْرَجَ بِهِ مِنَ الثَّمَرَاتِ رِزْقًا لَكُمْ وَسَخَّرَ لَكُمُ الْفُلَّ لِيَجْرِيَ فِي الْبَحْرِ بِأَمْرِهِ  
 وَسَخَّرَ لَكُمُ الْأَنْهَارَ ۝

**14:32** It is Allah Who has created the heavens and the earth and sends down rain from the skies, and with it brings out fruits wherewith to feed you, it is He Who has made the ships subject to you, that they may sail through the sea by His command; and the rivers (also) He has made of service to you.

### Creation of the heavens and the earth

The creation of the heavens and the earth has been discussed under verse 2: 164 and Appendices I and II.

### Sending down rain from the skies

How rain-laden clouds (cumulo-nimbus clouds) are formed in the sky, how rain-drops come down to the earth as showers, how the rain-water "revives the dead earth" making the barren soil fertile, and how it sustains plant life on earth and produces fruits of different kinds have been explained under verses 2:22 and 2: 164.

### Bringing out fruits as food

The vital role of water in the plant cell activities which ultimately lead to the production of 'fruits' is discussed in detail under verse 2:22.

### Making sailing of ships and rivers of service to man

In this part of the verse it has been said that Allah has made the ship of service to man to sail through the sea and He has also made the rivers of service to man.

Sailing of the ships and boats in seas and rivers has been discussed in connection with verse 2:164.

Rivers are natural streams flowing in channels which they have carved out for themselves and together with their tributaries draining their catchment areas or basins. They result from the fact that water from

the rain and snow that falls on the catchment areas and basins, flows downhill under the influence of gravity. In the course of this journey from the highland to the lower land its channels converge downstream to make progressively larger ones, forming thereby an integrated network of water course carved out by the flowing water itself. If there were no rain and snow, or if the land were all exactly the level of the sea, or if the temperatures were always below freezing point, there would be no rivers.

The amount of water carried by a river depends on how much precipitation falls in its basin into streams. On the average only about 1/5th of the total precipitation is runoff, the remainder is lost through evaporation and the transpiration of plants.

The amount and rapidity of runoff are much affected by topography and geology. Steep slopes and impermeable terrain favour runoff and the stream flow in such areas fluctuates both rapidly and appreciably in response to variations in precipitation. Permeable terrain soaks up precipitation, thereby reducing losses through evaporation. At long last this ground water is delivered to streams via springs.

The discharge of a river is the volume of water flowing past a particular cross section of the channel per unit of time, expressed as cubic ft. per second.

Discharge varies from time to time at any particular place on a stream depending on precipitation and the runoff characteristics on the basin.

Sediment is dropped when the velocity of the current falls below the minimum required to keep the particles of a particular size in motion.

When the river overflows, the sudden increase in width results in a decrease in velocity. As a result, the river drops its load. On the other hand, exceptionally large floods would decrease the value of rich farm land locally because sand is dropped on the flood plain.

A river in which the forces of erosion and deposit are balanced is said to be graded or in equilibrium. The concept of grade implies that any change in the size of the discharge or in the load will result in adjustment of the dimensions of the channel and perhaps also of the slope in order to accommodate the change.

There are two rather different aspects for river channel configuration. (1) the degree of departure from a straight course, and (2) the extent to which the stream consists of a single channel as opposed to multiple channels.



Straight channels are very rare. Instead, most streams follow more or less winding courses. Extremely sinuous courses are described as meandering, and the individual bends are called meanders, after the type example, the Meander River in Turkey. The wavelength and amplitude of meanders vary according to the size of the discharge of the river when its banks are full.

It is not known exactly why streams meander, but once started, the tendency does seem to continue. The coalescence of adjacent meanders results in cut offs, with consequent shortening of the channel and the formation of oxbow lakes.

Rivers are extremely useful as avenues of commerce. Most of the inland commerce was done through the rivers till the other day. River valleys generally hold dense populations as they have fertile soil, a smooth terrain and an inherent capacity for transportation.

A sizeable portion of man's domestic and industrial water supply is taken from rivers. Harnessing rivers to develop electric power has profoundly changed the economy of large areas. River flood-plains are the most productive of all agricultural lands. In many developed countries the bulk of necessary electricity is generated by water power. Although navigation and electrical power are more tangible aspects of rivers, the use of water for domestic and industrial purposes should probably head the list of economic benefits derived from rivers. Rivers contain a large number of aquatic animals such as fish, shellfish, lobster, shrimps which are a major food source especially valuable for the protein they provide and also a source of industrial production.

In recent times, the demands on water resources like rivers, caused by expanding population and economics increased the need to build dams for water storage. Dams are constructed over rivers to store and control vast quantities of water so that it can be used for irrigation, electric power generation, flood control, navigation, public water supplies, industrial water supplies and recreation. Some dams serve only one of few of these purposes but most dams serve several (multipurpose).

Rivers also generally serve as sewers. Recently it has been found that many industrial countries are abusing the rivers by discharging into them industrial waste thus creating tremendous ecological problems.

Rivers contain flora and fauna composed of organisms which merely float and drift and whose active locomotion is not directive. These are generally known as planktons. The plankton includes many of the smaller

invertebrates, such as protozoans, coelenterates, worms and lower chordates, many algae and some higher plants. The minute floating plants are important as food for small animals which are in turn are food for fishes. Some forms of these algae are gathered and used as fertilizer. Some algae are used as food.

Rivers have very considerable influence on many phases of human activity, as can be demonstrated by citing geographical and historical facts and also by reference to literature, music and religion.<sup>1</sup>

### **Reference**

1. *Encyclopaedia Britannica*, Vol. 15, pp. 867-891, 1978.

۳۳- وَسَخَّرْ لَكُمُ الشَّمْسَ وَالْقَمَرَ دَائِبَيْنِ ۗ وَسَخَّرْ لَكُمُ اللَّيْلَ وَالنَّهَارَ ۚ

14: 33 He made the sun and the moon to serve you by pursuing their courses diligently; He (also) made night and day to serve you.

It is stated in this verse, that Allah forced the sun, the moon, night and day, to obey the laws ordained by Him and thus be of service to man. This point has been discussed in detail in verse 7: 54. Some commentators have translated this verse as "He hath made the sun, the moon, night and day subject to you." In the present context this is not quite acceptable. Heavenly bodies like the sun and the moon, or natural phenomenon like night and day are never subject to human beings; they are subject to the Almighty Allah only. They pursue their courses according to laws ordained by Allah and thus render service to man, as planned by Him.

۳۸- يَوْمَ تَبْدُلُ الْأَرْضَ غَيْرَ الْأَرْضِ وَالسَّمَوَاتِ وَبَرَزُوا لِلَّهِ الْوَاحِدِ الْقَهَّارِ ۝

14: 48 One day the earth will be change into a different earth and so will be the heavens, and (men) will be marshalled forth, before Allah, the One, the Irresistible.

The changes of the earth and the heaven mentioned in this verse refer to conditions prior to the day of *hashr* (the Day of Judgement). From present scientific knowledge we can anticipate three possible changes of the earth and the heaven as discussed below.

The earth was not the same, nor it will remain the same, as it is today. It has been changing continuously throughout the ages. So is the case with the heaven i.e., the universe.

Ten or may be twenty billion years ago, there was no earth, no moon, no sun, no stars, no galaxies. There was just one ultra small, ultra dense, ultra hot primeval fire ball that contained all the matter and energy of the universe. The fire ball exploded with a big bang, into a rapidly expanding and cooling gas of protons, electrons and neutrons. In time, the gas formed clumps or galaxies. These galaxies continued to fly apart from each other; at

the same time matter in the individual galaxies tended to contract because of the force of gravitation. After some time turbulent motion within a contracting galaxy disrupted in into small blobs, which ultimately became stellar nebulae. One such smaller object was the solar nebula. As it contracted gravitationally, it began to spin faster and faster. Thus the contracting nebula continued to contract further and spin faster and let behind blobs of matter that eventually became planets, one of which is our earth. Thus the earth was born.

The earth, at its birth, was a hot spherical blob of gas. As it began to cool, a crust formed on the surface. Thus at that time, the earth consisted of only one huge continent, which has now been termed Pangaea and one huge ocean, now termed Panthalossa. After some time, this huge continent broke into two super continents, now termed Laurasia and Gondwanaland. Due to plate tectonics, these two super continents broke into a number of plates, which by continental drift, has formed the present geography of the earth. As the process of plate tectonics and continental drift continues, the present feature of the earth will change and a new feature will erupt. Thus the earth will, geographically, change into a new earth.

The earth will change astronomically also. In about 6 billion years, the sun will evolve into a red giant star and the earth will be uninhabitable. The probable length of the sun's red giant stage is thought to be several hundred million years. At the greatest extent the sun's surface will engulf the orbit of Mercury and Venus and may even reach the orbit of the earth. If the earth remains upto that stage, it will be charred into cinder.

There will also be change in the biosphere of the earth. Biosphere, the home for life on earth, constitutes the crust, the oceans and atmosphere. From the birth of the earth, upto about 3500 million years ago, there was no life on the earth. After that period first unicellular life originated. Gradually, primitive marine plants, and invertebrates originated. Then developed vertebrates and amphibians. Reptiles like huge dinosaurs reigned on the surface of the earth for more than 150 million years. Ultimately *Homo sapiens* appeared and they are still reigning supreme on the surface of the earth. When the sun reaches the red giant stage, the biosphere of the earth will vanish. Thus the earth will change into a new one.

Now let us consider the change of the heavens. It is widely accepted that two opposing forces are acting in the universe, one of expansion due to radiation pressure and the other of contraction due to gravitation. So the balance of the two forces determines the condition of the universe, whether the universe will continue to expand indefinitely, as at present. The rate of expansion may decrease or tend to zero but the universe will remain 'open' (i.e. ever expanding). Or, alternately expansion will cease, contraction will get the upper hand and the universe will collapse upon itself to another state of high density. If there is insufficient matter in the universe to counteract expansion, galaxies will move farther and farther from one another and the energy per unit vol. of the universe will be available in lesser and lesser quantities; the final state will be that of cold death, with temperature of all matters approaching zero. On the contrary, if the density of the universe is sufficiently large, then the expansion will reach a maximum at some future epoch and universe will then contract to another singular condition of high density (for details see appendix III). The astronomical change as discussed above fits in better with the indications available in the Quran.

۱۶- وَلَقَدْ جَعَلْنَا فِي السَّمَاءِ بُرُوجًا وَزَكَّيْنَهَا لِلنَّظِيرِينَ ۝

**15: 16** It is He Who have set out the zodiacal signs in the heavens and made them fair-seeming to (all) beholders.

Due to the annual motion of the earth round the sun, the sun appears to make a complete revolution in the sky in course of a year. This apparent annual path of the sun around the earth is a great circle, known as the ecliptic.

A band passing round the celestial sphere, extending about 9 degrees on either side of the ecliptic is called the zodiac. It thus includes the apparent annual path of the sun, the moon and of the planets. In all ancient civilisations this band divided into 12 parts, each 30 degree wide. The stars in each part, when ground together were imagined to form pictures, known as signs of the zodiac.

The 12 zodiacal signs are:

	Greek	Bengali	Arabic		Greek	Bengali	Arabic
1.	Aries	Mesh	Hamal	7.	Libra	Tula	Mizan
2.	Taurus	Brisha	Thaur	8.	Scorpio	Brishchic	Akrab
3.	Gemini	Mithun	Jauza	9.	Sagittarius	Dhanu	Kaus
4.	Cancer	Karkat	Sartan	10.	Capricornus	Makar	Jeddi
5.	Leo	Shingha	Asad	11.	Aquarius	Kumbha	Dalwa
6.	Virgo	Kanya	Azra	12.	Pisces	Meen	Hut

In the verse, *zayyanna* has been translated as "fair seeming" *Zayyanna* is derived from *tazyin* whose dictionary meaning is "to adorn, to decorate". Hence *Zayyanna ha linnazerin* means "we have decorated it (the sky) for the on-lookers". The sky has been decorated with luminous bodies which are visible only at night. Ordinary decoration on festive occasions draws huge numbers of on-lookers on earth. The magnificence of the night sky would have been properly appreciated by those who can comprehend it, if it was occasional and not the affair of every night.

۱۵- وَالْأَرْضَ مَدَدْنَاهَا وَأَلْقَيْنَا فِيهَا رَوَاسِيَ وَأَنْبَتْنَا فِيهَا مِنْ كُلِّ شَيْءٍ مَوْزُونٍ

15: 19 And the earth We have spread out (like a carpet); set thereon mountains firm and immovable; and produced therein all kinds of things in due balance.

**Spreading out of earth**

This has been discussed in detail under verses 2:22 and 13:3.

**Setting up of mountains**

This has been discussed under verse 13: 3.

**Creation of things in due balance**

This has been discussed under verse 13:8.

۲۱- وَإِنْ مِنْ شَيْءٍ وَالْأَعْيُنُ نَا حَرَّآئِنُهُ وَمَا نُنزِلُ إِلَّا بِقَدَرٍ مَعْلُومٍ

15: 21 And there is not a thing but its (sources and) treasures (inexhaustible) are with Us; but We only send down thereof in due and ascertainable measures.

There are three important aspects of this verse, namely, (1) the store-houses of every treasure that we see around are with Allah, (2) that He sends down these treasures to us according to the needs, and (3) that He sends these down according to rule and plan. The meaning of these assertions is not apparent to us at first. But deeper reflection reveals their far reaching significance.

The first question one may ask is what are the things that should be considered as treasures in this world. Gold, silver and precious jewels may fetch a high price, but these cannot be considered as the treasures that are essential to our continuity and for us to be alive. From this point of view, water, food and energy are the real treasures essential for life to thrive and continue. With this background, it now becomes much easier to appreciate and realize the significance of this verse. All vegetable food that we see around is due to photosynthesis,—a process in which the green pigment called chlorophyl in plants synthesizes carbohydrate from water and CO<sub>2</sub> in the atmosphere with the help of sun light. Sheep, goat, cow, camel and all other animals which are the sources of our protein food, thrive on the vegetable kingdom. The heat of the sun rays evaporates huge amounts of sea water into the sky and these are carried on the land mass as cloud by wind which again is caused by the difference in temperature for differential heating of land and sea by the sun. Showers from the clouds and melting of ice caps on mountain heads become the source of sweet water. Ice caps on high mountain heads are formed by condensation of water vapour carried by wind there. So we see that it is the huge amount of energy radiated from the sun which is at the root of all life sustaining processes.

The sun sends down a tremendous amount of heat energy produced by thermonuclear process. About 4,280,000 metric tons of solar matter is being converted into energy each second and at this rate of mass loss, the sun should continue to shine for over 100 billion years. For further details and to know the law and master plan governing the solar activities refer to verse 7:54.

The amount of solar energy that the earth receives, keeps a wonderful balance in maintaining all the life sustaining processes. If there were less heat radiated, the planet would have been colder making it very difficult for us to live. Similarly, radiation of too much energy would have converted the entire planet into a mass of sand.

All fossil and hydrocarbon (oil and gas) energies trapped beneath the soil were produced by the action of solar energy. Lightning produces nitrides from nitrogen in the atmosphere and rain water brings these to the soil in solution form usable for plants as manure.

Our knowledge about the activities in nature as understood through modern scientific investigations indeed brings us to a complete appreciation of this verse.

۲۲- وَأَرْسَلْنَا الرِّيحَ لَوَاقِحَ فَأَنْزَلْنَا مِنَ السَّمَاءِ مَاءً فَأَسْقَيْنَاكُمُوهُ  
وَمَا أَنْتُمْ لَهُ بِمُحْرِمِينَ ۝

15: 22 And We send the fecundating wind, then cause the rain to descend from the sky therewith providing water to you, though you are not guardians to its stores.

The function of the wind as the fecundating agent has been explained under verse 7: 57. The blowing wind helps cross pollination by carrying the pollen grains from the anther of the male flowers to the stigma of female flowers.

How the rain showers come down from the sky has been explained under verse 2:164.

۲۶- وَلَقَدْ خَلَقْنَا الْإِنْسَانَ مِنْ صَلْصَالٍ مِنْ حَبِآءٍ مَسْنُونٍ ۝

15: 26 We created man from sounding clay, from mud moulded into shape.

۲۸- وَإِذْ قَالَ رَبُّكَ لِلْمَلٰٓئِكَةِ إِنِّي خَالِقٌ بَشَرًا مِنْ صَلْصَالٍ مِنْ حَبِآءٍ مَسْنُونٍ

15: 28 Behold! your Lord said to the angels: "I Am about to create man, from sounding clay, from mud moulded into shape.

The role played by clay-and mud moulded into shape in the creation of man has been discussed under verse 6:2.



۲۹-وَلَمَّا سَوَّيْتَهُ وَنَفَخْتُ فِيهِ مِنْ رُوحِي فَقَعُوا لَهُ سَاجِدِينَ ۝

15: 29 When I have fashioned him (in due proportion) and breathed into him My spirit, fall you down in obeisance unto him.

This has been discussed under verse 13:8.

۵۳-قَالُوا لَا تَوْجَلْ إِنَّا نُبَشِّرُكَ بِغُلَامٍ عَلِيمٍ ۝

۵۴-قَالَ أَبَشِّرُنِي عَلَىٰ أَن تَمْسِيَ الْكَبِيرُ قِيمَ ثَبِيرُونَ ۝

۵۵-قَالُوا بَشِّرْكَ بِالْحَقِّ فَلَا تَكُن مِّنَ الْقَاطِنِينَ ۝

15: 53-55 They (angels) said, Be not afraid! We bring you the good news of a boy possessing wisdom. He said : "Bring you for me good tidings (of a son), when old age has overtaken me? Of what then is your good news? They said : "We bring you good tidings in truth, so be not you of the despairing.

In these verses, the birth of a son to Prophet Ibrahim (a.s.) in his old age is being referred to. When the angels gave him the good news, Prophet Ibrahim (a.s.) was astonished. He wondered how it would be possible when he was very old. The angels replied that their news was from Allah and hence a truth; then Prophet Ibrahim believed it.

The subject of procreation by males in old age has already been discussed in connection with the birth of Yahya (a.s.) to Prophet Zakaria (a.s.) in his old age (3: 39-40). There is scientific evidence of procreation by males in old age above 100 years. The present knowledge of biology confirms the possibility of procreation in very old age.

۷۲-فَاخَذَتْهُمْ الصَّيْحَةُ مُشْرِقِينَ ۝

۷۴-فَجَعَلْنَا عَلَيْهِمُ سَاقِيًا وَأَمْطَرْنَا عَلَيْهِمْ حِجَابًا مِّن سَاقِيًا ۝

٥٠- إِنَّ فِي ذَلِكَ لَآيَاتٍ لِّلْمُتَوَكِّلِينَ ۝

٤٩- وَإِنَّهَا لَآسِيْنِيلٌ مُّقْبِلَةٌ ۝

٤٨- إِنَّ فِي ذَلِكَ لَآيَةً لِّلْمُؤْمِنِينَ ۝

15:73-77 The blast overtook them before morning; We turned (the cities) upside down and rained down hard baked clay. Behold ! in this are the Signs who by tokens do understand. And (the cities were) right on the high-road. Behold ! in this is a Sign for those who believe.

The verses 73 and 74 described the happenings at the time of the prophet Lut (a.s.) to his people for their unnatural sexual behaviour, when as a punishment there were blasts, earthquake and raining of hard baked clay. The matters about 'blast' and 'earthquake' have been discussed in connection with verses 7:84 and 7:91.

Verse 15:76 gives a hint about the place. This has been discussed in connection with verse 7:4.

٥٥- وَمَا خَلَقْنَا السَّمَوَاتِ وَالْأَرْضَ وَمَا بَيْنَهُمَا إِلَّا بِالْحَقِّ وَإِنَّ السَّاعَةَ لَآتِيَةٌ ۝  
فَاصْفُرِ الصَّفْرَةَ الْجَمِيلَةَ ۝

15:85 We created not the heavens, the earth and all between them, but for just purpose. And the hour is surely coming (when this will be manifest).

The scientific explanations about the creation of the heavens, the earth and all between them have been discussed in verses 2:117, 164 and appendix II. That All creation has a role to play in maintaining the balance in nature has been elaborated in verse 3: 191. Many interpreters thought that the last part of this verse where it is asserted "And the hour is surely coming" means the day of destruction of this creation. However, another far-reaching consequence of this may be the assertion that a time would come when people would understand the various ecological balances that exist in nature and also the just purpose of each individual creation.

Today with the growth of population a tremendous pressure is exerted on the various resources present in nature. Man is cutting down trees to meet his fuel and other domestic needs in an unprecedented manner. As a result floods are causing more harm in the delta regions and the weather pattern has become quite erratic. Fauna and flora is being destroyed indiscriminately. Rapid industrialization is producing huge amounts of poisonous chemicals posing a serious threat and in many cases destroying the marine life in many industrialized countries. The black forest in Germany is on the verge of being totally destroyed by industrial chemicals. Recently scientists have discovered that huge amounts of CFC gases produced by industries have become a threat to the ozone layer in the Arctic regions. The ozone layer protects life on earth from harmful exposure to ultra violet rays. In the West, movements are gaining momentum to learn to live with nature. Nuclear explosions in the name of testing have become a serious threat to the environment: Accidents in nuclear reactors that occurred in several places in the USSR and in the USA created a serious alarm and threat to life. With the advancement of knowledge we are learning the beneficial effects of various living beings and organisms and their delicate interdependence (for details see verse 3: 191). Indeed the Quranic assertion manifests itself when the hour arrives.

۸۶- إِنَّ رَبَّكَ هُوَ الْخَلْقُ الْعَلِيمُ ۝

**15:86 For verily it is your Lord Who is the Master-Creator knowing all things.**

This verse states clearly that Allah is the Master-Creator Who knows all things. That Allah is the Master-Creator has been explained earlier with reference to other verses. For example, the Master-Mindedness of Allah as the Lord and Sustainer of the worlds has been explained in verse 1:2. That nothing has been created for nothing has been discussed with reference to 3:191. While explaining verse 14:19, it has been pointed out that although man can create a few things, his creation is no match for the grand creation of Allah which has been based on truth. And the creation of Allah is without the slightest flaw. No wonder. Allah is the Master-Creator.

٣- خَلَقَ السَّمَوَاتِ وَالْأَرْضَ بِالْحَقِّ تَعْلَى عَمَّا يُشْرِكُونَ ○

16:3 He has created the heavens and the earth for just ends : Far is He above having the partners they ascribe to Him.

This verse states that Allah has created the heavens and the earth for just ends. If we interpret the word just as 'not for sport' or 'not without purpose', then the meaning of this verse is similar to that of 3:191 wherein Allah wants man to reflect on His creation and find out that Allah has created nothing for nothing. The latter verse has been discussed with reference to the organisation of living and inert matter, emphasizing the unity of the laws and the ecological implications of the existence of the observed living forms. It is found that with the frontiers of knowledge expanding rapidly, the scientists have been discovering a grand design of creation. Life and matter could not exist in the way we know them if the forces of nature were not organised by a Master-Mind. Thus it is not at all difficult to comprehend that Allah created the heavens and the earth for just ends.

٣- خَلَقَ الْإِنْسَانَ مِنْ نُطْفَةٍ فَإِذَا هُوَ خَصِيمٌ مُبِينٌ ○

16: 4 He has created man from a drop of fluid, and behold! he is an open disputer.

According to the Quran, man is created from a drop of fluid. The word in - نطفة this verse is commonly taken to mean semen, but it may also mean the mature ovum which is mostly fluid and floats in the haemorrhagic fluid which is expelled from the ovary. From the saying of the Holy Prophet Muhammad (s.m.), we come to know that there are two types of - نطفة , one of the male and the other of the female.

In reply to the question of a Jew, 'O Muhammad, what is man created from?' the Prophet replied, 'O Jew, he is created from both: from the man's *nutfah* and from the woman's *nutfah*' (al-Musnad by al-Imam Ahmed). So it is clearly established that the *nutfah* in the Quran means both semen and ovum.

It is highly significant that the 7th century Quran and Hadis provide scientific truth which came to our knowledge many centuries later. For details vide Appendix VII.

هـ- وَالْأَنْعَامَ خَلَقَهَا لَكُمْ فِيهَا دِفْءٌ وَمَنَافِعُ وَمِنْهَا تَأْكُلُونَ ۝

16: 5 And the cattle has He created, whence you have warm clothing and benefits and whereof you eat.

In this verse Allah points out certain benefits that are derived from the cattle. The word *انعام* (plural of *نعم*) means all the bovine animals collectively. The word *انعام* in the Quran includes all the quadruped domestic animals. Thus camels, cows buffaloes, sheep and goats are included in this category. Among the benefits we derive from them Allah specifically mentions here two, the benefits from their skin and meat. The word *دِفْء* means warm clothing made of camel's hair, though the food, milk and raiment derived from camels are all classed under the head *دِفْء*. Besides camel's hair, wool of sheep is used for clothing and blankets all over the world.

The felting property which provides warmth in the fleecy coats of domesticated sheep and other animals is due to the curly hair which chiefly for making twisted woolen yarn called wool. This goes into the manufacture of various kinds of apparel which keep us warm, e.g., pullovers, jumpers, socks, mufflers, gloves, and all other woolen material. In some cases the entire processed skin of the animal along with the fleece is used as a warm coat.

Besides these, leather has manifold uses for all the ages including making covers for books and in certain musical instruments. Leather dress is very useful in cold countries. Meat of cattle, goat, sheep and camel is the best source of high quality protein.

Among other benefits which we derive from these animals the following are noteworthy:

- i. Cows and buffaloes have been used for tilling the ground by the farmers from time immemorial. Even in this era of scientific progress a large part of the world still uses cows, bulls buffaloes, horses and camels for tilling the agricultural lands.

- ii. Bulls and camels are often used to carry good and passengers in carts and the bullock cart is a familiar scene in all the developing countries specially the subcontinent of India, Bangladesh and Pakistan.
- iii. Bulls are also used to draw water from the well and crush oil-seeds to produce oil.
- iv. In the countries of the subcontinent of India, cattle are often used to thrash the grains-paddy and wheat from the ears.
  - v. Refuge of cattle specially the cowdung is extensively used as manure all over the world. Cowdung is a common fuel for the poor in many S. E. Asian countries.
- vi. Calves were used to produce cow-vaccine as a prophylactic against small pox.
- vii. The horns of cattle are used to make combs, handles and decorative pieces.

ۛ وَتَحْمِلُ أَثْقَالَكُمْ إِلَىٰ بَلَدٍ لَّمْ تَكُونُوا بِلَيْعِيهِ إِلَّا شِقَاقَ ٱلنَّفْسِ ۚ  
 إِنَّ رَبَّكُمْ لَرَءُوفٌ رَّحِيمٌ ۝

16: 7 And they carry your heavy loads to lands that you could not reach except with great trouble to yourselves; for your Lord is indeed Most Kind and Most Merciful.

This verse is a continuation of verse 5 which explains the usefulness of cattle to human beings. Ever since man learnt to domesticate animals, he put these to his best use in carrying loads from one land to another. The domesticated animals, thus, were the only means of transport when no modern modes of conveyance were available. Even today the camels fulfil the needs of desert people as beasts of burden. The Bactrian camel of centr. Asia, and the Arabian camel of the Middle East and Africa are still trusted means of communication in the deserts by virtue of their admirable adaptability to the conditions in which they live. They are aptly called ships of the desert. The horses, donkeys, mules, and elephants are utilized for the same purpose in the rough terrain and hilly places. Lapdogs and reindeer are also the most suitable beasts of burden and travel in the harsh environment of the cold polar regions. The yaks of Tibet and the alpacas of the Andes in south America are two more examples of domesticated animals that serve as

a means of transport. Without these, and many more domesticated beasts, man's life would have been miserable in the field of transport where modern means of conveyance are not available. It is only through Allah's infinite kindness and mercy that man is enjoying this gift to the betterment of his life.

٨- وَالْخَيْلَ وَالْبِغَالَ وَالْحَمِيرَ لِتَرْكَبُوهَا وَزِينَةً ۗ وَيَخْلُقُ مَا لَا تَعْلَمُونَ ۝

**16:8** And (He has created) horses, mules, and donkeys for you to ride and use for show, and He has created things of which you have no knowledge.

In verse 16:7, the domesticated animals in general are exemplified as beasts of burden. In the present verse the special reference is to horses, mules, and donkeys which are not only created for riding but some pedigreed horses, on account of their grace, elegance, and speed form a predominant feature in shows and pageantry. From the time that animals were the only means of transport, there have been some spectacular changes in the mechanical contrivances devised by man in the field of conveyance on land, water, and in air. Electric trains, atomically powered ships, and supersonic aircraft are only a few examples of modern transport which were unknown about half a century ago. In the present space age, there is a vast scope for further improvements for safe, speedy, and comfortable travel not only on earth but to destinations beyond in space. The developments to come in the future through the ingenuity of man will be actually creations of the All-knowing and the All-wise Allah, and at present we have no knowledge of these.

هُوَ الَّذِي أَنْزَلَ مِنَ السَّمَاءِ مَاءً لَكُمْ مِنْهُ شَرَابٌ ۖ وَمِنْهُ نَجِيَ الْوَيْلُ مِنَ الْمَرْءِ ۚ إِنَّ اللَّهَ كَانَ عَلِيمًا ۝

**16: 10** It is He Who sends down rain from the sky; from it you drink, and out of it (grows) the vegetation on which you feed your cattle.

The fall of rain from the sky has been discussed under verses 2: 22 and 2: 164.

The beneficial effects of rain water on the growth of general vegetation were mentioned in the discussion on verse 6:99. In the present verse, the

emphasis is on the pasture land which is dominated by herbs which colonize bare areas and produce large numbers of seeds. Certain grasses are well endowed with this quality and some of them also multiply rapidly by vegetative means. All grazing animals-sheep, goats, camels, and cattle have their likes and dislikes, and their effect upon grassland is to eliminate the more palatable and nutritious forms of fodder. In such cases, the herdsmen drive their animals to areas where supplies are present, e.g., alpine regions in Europe, and *yaylas* (mountain pasture) in Turkey. The fodder for the domestic animals is found in a variety of habitats like moist plains, desert areas, coasts, and hills. The large tracts of natural grass lands are distributed throughout the world, e.g., prairies of North America, savannahs in south Africa etc. All these grass lands depend for their luxuriant growth on the rainfall.

۱۱-يُؤْتِيكُم بِهِ الرَّزْعَ وَالنَّخِيلَ وَالْأَعْنَابَ وَمِنْ كُلِّ الثَّمَرَاتِ  
 إِنَّ فِي ذَلِكَ لَآيَةً لِّقَوْمٍ يَعْقِلُونَ ۝

16:11 With it He produces for you grain, olives, date palms, grapes, and every kind of fruit. Verily in this is a Sign for those who give thought.

The verse is a continuation of the theme in the previous one in which the beneficial effects of rain in providing us water and the growth of vegetation have been alluded to. Further consequences of rain resulting in the production of every kind of fruit including cereal grains, olives, date palms and grapes have been explained in detail under verse 6: 99.

۱۲-وَسَخَّرَ لَكُمُ اللَّيْلَ وَالنَّهَارَ وَالشَّمْسَ وَالْقَمَرَ وَالنُّجُومَ مُسَخَّرَاتٍ بِأَمْرِهِ  
 إِنَّ فِي ذَلِكَ لَآيَاتٍ لِّقَوْمٍ يَعْقِلُونَ ۝

16: 12 He has made subject to you the night and the day; the sun and the moon; and the stars are in subjection by His command; verily in this are Signs for men who are wise.

The various benefits that men derive from the day and the night, the sun, the moon and the stars are described under verses 6:97, 7:54, 10: 67 and 14: 33. The laws governing these and the services these render as



ordained by Allah do verily lead wise men to ponder and these are indeed 'Signs' for them.

۱۳- وَمَا ذَرَأْنَا فِي الْأَرْضِ مُخْتَلِفًا أَلْوَانُهُ ۗ إِنَّ فِي ذَلِكَ لآيَةً  
لِّعُقُومٍ يُذَكِّرُونَ ○

**16: 13** And whatsoever He has created for you on this earth in varying colours verily in this is a sign for men who celebrate the praises of Allah.

The panoramic vistas of nature displayed by dazzling colours is a delight to the viewer. Apart from this aesthetic pleasure, the physical understanding of colour is indeed 'a sign for men who celebrate the praises of Allah. It was Newton who first made a scientific approach to this understanding around the latter part of the 17th century. With the help of a glass prism Newton dispersed white light into its seven constituent colours known as violet, indigo, blue, green, yellow, orange and red (VIBGYOR). Newton was also the first scientist to suggest qualitatively the causes of colours of natural bodies as due to selective reflection and absorption. These qualitative observations were confirmed later after spectrophotometers were developed for measuring reflection of a surface by all colours.

Now we know that due to selective reflection metallic bodies show surface colour. As the same bodies possess selective absorption they show different colours in the transmitted light. Thus, the colour of an object depends on the nature of the incident light. A white lily which reflects all colours looks white when placed in white light, red when placed in red light, blue when placed in blue light and green when placed in green light. A blue object looks blue when placed in blue or white light as it reflects blue colour. A black object does not reflect any colour; rather it absorbs all colours and so looks black.

The optical mechanism or the production of body colour in opaque non-metallic substances is more complex than that in metallic materials. Most opaque non-metallic substances owe their colour to a combination of scattering and absorption within the body of the material. The scattering is similar to that in the sky. Submicroscopic particles in the atmosphere scatter selectively. This is known as Rayleigh scattering according to which scattering varies inversely as the fourth power of wavelength. The

wavelength of blue colour is much shorter than that of red colour and so as the blue is scattered more than the red, the sky looks blue. At sunrise or sunset, the light from the sun loses its short wavelength components by selective sideways scattering during its passage from the sun to us through a long column of the atmosphere and so the sky close to the sun appears red. Colour of opaque and non-metallic bodies is due to such selective scattering and absorption.

The earth's minerals also show the variety of their natural colours. The sparkling colours exhibited by the gems range across the entire visible spectrum from violet to deep red. The body colours of gem stones like emerald and ruby are created by a combination of selective scattering and absorption of some of the wavelengths of white light as it passes through the minerals. The colour comes from the wavelength that is scattered selectively. Some pure alkali halide crystals e.g., NaCl, KCl etc. are transparent throughout the visible region of the spectrum. These crystals may be coloured by creating colour centres which are impurities or vacancies in the crystal that absorb visible light. The colours displayed by the biological world is a subject at once of considerable aesthetic appeal and of high scientific interest. On the scientific side, there are questions of the physical and chemical basis of animal colouration and of its importance to the organism. Whiteness of feathers or hair is due to the total internal reflection arising from the separation of finely divided structural materials by air spaces in the way that whiteness is imparted to snow. Secretions or deposits may cause total scattering giving whiteness as in fishes, scales, calcium carbonates in the skeletons of numerous molluscs, corals, crustaceans, echinoderms, protozoans etc. Breaking of white light into its spectral components occurs in animal structures chiefly when incident light penetrates and is reflected back through successive thin layered films giving rise to interference e.g., in the wing scales of many butterflies, in the feathers of humming birds, peacocks, pheasants etc., in the outer skin of reptiles, nacreous surfaces of pearls and in molluscan shells etc. The brilliant lustre of human or other mammalian hair in direct sunlight is again due to interference colours, the light being reflected in its broken components by minute transparent scales which surround each individual hair. The display of blue colour in the animal kingdom (e.g., blue colour of eye) in many instances is due to scattering of reflected light by finely dispersed colloidal systems. There are various pigments, present in animals,

which produce various colours by selective absorption of a part of the light and reflection or transmission of the unaffected fraction. The important biochromes of animals may be grouped into non-nitrogenous pigments (e.g. carotenoids, anthraquinones, chromolipoids etc.) and nitrogenous pigments (e.g. terrapyrolic pigment in blood, dark melanins in skin, hair etc.).

The variety of colours displayed by the animals are mostly connected with the method of concealment known as mimicry which helps them to hide from their enemies or prey. In the tropical forests, the trunk of each kind of tree has its own spectral colour from brown and red to white. The insects which take shelter on these have developed colours of their abode to conceal themselves from their enemies. Pigments protect the retina and central nervous system from the rays of the sun. White plumage or in humans is of value in retardaing the radiation of heat which is essential for heat conservation in cold climates. Similarly, black complexion in humans in the tropics helps to protect the body from extreme heat outside. Some birds of the male sex like the peacock use their brighter colours to woo their mates.

Chlorophyll is basically the pigment that lends its green colour to the majority of plants and is the dominant colour in nature. The role of other plant pigments like carotenoids, in giving colours from yellow to red, and anthocyanins which produce varying shades of red and blue are already mentioned under verse 6:99. The bright colours of flowers attract the pollinating insects or birds which bring about cross pollination. The various hues of ripe fruits attract birds which help in their dispersal <sup>1,2,3</sup>.

It is a wonder to observe the variation in colours within the various species and particularly among the humans and even among twin children. The secret for such colour variation lies in the genes present in the deoxyribonucleic acid (DNA), the blueprint of life.

In the understanding of the origins of various colours found in the things created by Allah and in finding the services each renders, are indeed 'Signs for men who celebrate the praises of Allah.'

## References

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2. *Encyclopaedia Britannica*. pp. 52-74.
3. G.B. Deodhar, *Introduction to Optics*, Indian Press Private Ltd., 1957.
4. C. Kittel, *Introduction to Solid State Physics*, 5th edition, Wily Eastern Ltd. New Delhi, 1977.

۱۳- وَهُوَ الَّذِي سَخَّرَ الْبَحْرَ لِتَأْكُلُوا مِنْهُ لَحْمًا طَرِيًّا وَتَسْتَخْرِجُوا مِنْهُ حِلْيَةً  
تَلْبَسُونَهَا وَتَرَى الْفُلْكَ مَوَازِرَ فِيهِ وَلِتَبْتَغُوا مِنْ فَضْلِهِ  
وَلَعَلَّكُمْ تَشْكُرُونَ ○

**16:14** It is He Who has made the sea of service to you, that you may eat thereof fresh fish meat and may extract therefrom ornaments you wear and you see the ships ploughing through the waves that you may seek of His bounty and that you may be grateful.

The verse speaks of 3 distinct aspects relating to the sea which are of benefit to mankind. (1) It provides fresh meat for man, (2) ornaments, made from substances like pearl, coral formed in the sea, and (3) ships plying through the sea with the benefit acquired therefrom.

The third part has been discussed in connection with verse 2: 164.

The oceans and seas cover about 71% of the earth's surface and constitute its most conspicuous feature. These waters, together with the relatively small amount that occurs in the forms of rivers, lakes, ice and ground-water, are called the earth's hydrosphere.<sup>1</sup>

The sea provides at present about 60,000,000 tons of food annually extracted by fishing. According to the scientists, the food producing potential of the sea, however, is several hundred times the present rate of production. The methods by which food is taken from the sea are inefficient and the fact that only certain choice species of fish are used by men as food makes fishing in the ocean doubly inefficient. The development of a process to extract protein concentrates from all types of fish might rectify this shortcoming. This protein concentrate could be stored, transported and utilized very efficiently. It has been estimated that the daily protein requirements of human being can be produced from fish for less than a penny, and that by efficient harvesting of all the fish of the sea, the ocean could produce a sustained yield of about 2,000,000,000 tons of food annually.<sup>1</sup>

According to the scientists the food chain of the marine environment is as follows:

All life in the sea is dependent upon sunlight, which is directly converted into food by microscopic floating organisms (phytoplankton). Phytoplankton in turn is eaten by primary consumers which are microscopic animals. The plankton supports a succession of actively swimming predators. Organic debris rains down and provides food for animals at lower depths. Near-shore organisms are supported by land drainage. Coastal upwelling provides the phytoplankton with nutrients released by decomposition of organic matter on the bottom.<sup>1</sup>

Besides various types of fish, oysters are the most important of the edible invertebrates in the sea. They have been cultivated since the days of the Roman Empire and are now gathered from the oyster beds of various countries.

Ornaments referred to in the verse are made from pearls and corals extracted from seas. The pearl is a gem formed by bivalve molluscs, particularly by several marine species known as pearl oysters. Pearl oysters are species of different families found only in warmer oceans, while the edible oysters are found in colder oceans. Pearls are formed as a protection against the irritation caused by foreign objects, either parasites or bits of gravel, which lodge inside the shell. A fold of soft tissue envelops the foreign particle and deposits layer after layer of nacre on it, similar to the mother of pearl lining the shell. Pearl oysters occur in all of the tropical seas but the ancient centre of pearl fishing is at Sri Lanka. Pearls of considerable value are also taken from the fresh-water mussels caught for the button industry in the Mississippi River System. A large majority of fresh-water pearls, however, are poorly shaped or of undesirable colour and many are too small to be of much value.

For countless generations, sailors have been baffled by the mystery of the formation of corals which are scattered across the oceans. These are formed in the warmer waters of the world by the skeletal remains of myriads of tiny creatures called coral. Some of these are spectacularly coloured and ornaments can be made from their hard calcareous skeletons. One of the most favoured of the corals is the red coral, *Corallium rubrum*, which is found in the Pacific ocean from which ornaments are made.

A number of marine shells are also well known for their high value and unusual beauty. The high priced shells are found among the showy genera like the conchs, volutes murex shells, scallops, and cowries.<sup>2</sup> The shells of the cowrie are well known for their highly glossed finish, smooth and rounded contours, and brightly hued colour patterns. All these have been very widely used as ornaments.

## **References**

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١٥- وَالْقَى فِي الْأَرْضِ رَوَاسِيَ أَنْ تَمِيدَ بِكُمْ وَأَنْهَارًا وَسُبُلًا لَكُمْ تَهْتَدُونَ ۝

16:15 And He has set upon the earth mountains standing firm lest it should shake with you, and rivers and roads; that you may guide yourselves.

This has been discussed under verse 13:3.

١٦- وَعَلَمَاتٍ وَبِالنَّجْمِ هُمْ يَهْتَدُونَ ۝

16:16 And marks and sign-posts; and the stars (men) guide themselves.

This has been discussed under verse 6:97.

١٨- وَإِنْ تَعَدُّوا نِعْمَةَ اللَّهِ الَّتِي أَخَذْتُمْ مِنْهَا لَنْ تَحْصُوهَا ۗ إِنَّ اللَّهَ لَغَفُورٌ رَحِيمٌ ۝

16: 18 If you would count up the favours of Allah, never would you be able to number them: for Allah is Oft-Forgiving, Most Merciful.

This has been discussed under verse 1:1.

٣- إِنَّمَا قَوْلُنَا لِشَيْءٍ إِذَا أَرَدْنَاهُ أَنْ نَقُولَ لَهُ كُنْ فَيَكُونُ ۝

16: 40 For to anything which We have willed, We but say the word, "Be", and it is.

The creation of the universe after a 'Big bang' from an ultra dense, ultra hot, infinitely small, primeval bundle of energy establishes the Quranic assertion of "Be and it is" Indeed present day science appears to establish this. For details refer to appendix II. It should be mentioned that whatever is being created and is happening is the outcome of His command 'Be'.

٣٨- أَوَلَمْ يَرَوْا إِلَى مَا خَلَقَ اللَّهُ مِنْ شَيْءٍ يَتَّبِعُونَ ظِلَّهُ عَنِ الْيَمِينِ وَالشَّمَائِلِ  
سُجَّدًا لِلَّهِ وَهُمْ دَاخِرُونَ ۝

16: 48 Do they not look at Allah's creation, (even) among (inanimate) things, how their (very) shadows turn round, from the right and the left, prostrating themselves to Allah, and that in the humblest manner ?

That even the shadows of animate and inanimate things follow the laws ordained by Allah has been described under verse 13:15. The changing of direction of shadows in the opposite direction is due to the apparent motion of the sun. This also follows a definite pattern which has been tactfully utilised in determining the time and season in sun-dials. Thus, even shadows are subject to the laws of the Creator and this submission of the shadows implies prostration to the Creator.

٣٩- وَلِلَّهِ يَسْجُدُ مَا فِي السَّمَوَاتِ وَمَا فِي الْأَرْضِ مِنْ دَابَّةٍ وَالْمَلَائِكَةِ  
وَهُمْ لَا يَسْتَكْبِرُونَ ۝

٥٠- يَخَافُونَ رَبَّهُمْ مِنْ فَوْقِهِمْ وَيَفْعَلُونَ مَا يُؤْمَرُونَ ۝

16: 49-50 And to Allah does obeisance all that is in the heavens and on earth, whether moving (living) creatures or the angels; for none are arrogant (before their Lord). They all revere their Lord, high above them, and they do all that they are commanded.

That all animate and inanimate objects are subject to the laws ordained by the Creator were discussed under verse 7:54, and appendix IV. All things living or non-living revere their Creator by obeying the laws most meticulously.

٥٢- وَلَهُ مَا فِي السَّمَوَاتِ وَالْأَرْضِ وَلَهُ الدِّينُ وَاصِبًا أَقْبَلِ اللَّهُ تَعْفُونَ ۝



**16 : 52** To Him belongs whatever is in the heavens and on earth, and to Him is duty due always: then will you fear other than Allah?

This has been discussed under verse 5: 19.

٦٥- وَاللَّهُ أَنْزَلَ مِنَ السَّمَاءِ مَاءً وَأَحْيَا بِهِ الْأَرْضَ بَعْدَ مَوْتِهَا إِنَّ فِي ذَلِكَ لَآيَةً لِقَوْمٍ يُسْمِعُونَ ۝

**16 : 65** And Allah sends down rain from the sky, and gives life to the earth after its death; verily in this is a Sign for those who listen.

The sending down of rain from the sky and the revival of the earth after its 'death' through rain from the sky have already been explained under verse 2:164.

٦٦- وَإِنَّ لِكُلِّ نَوْعٍ مِنَ الْبَهِيمِ شَرِبًا مِنْ بَيْنِ أَيْدِيهِمْ وَمِنْ خَلْفِهِمْ وَأَنْعَامٍ لَكُمْ لَعَلَّكُمْ تَرْجِعُونَ ۝

**16 : 66** And in the cattle there is a lesson for you. We give you to drink of that which is in their bellies, from between the refuse and the blood, pure milk palatable to the drinkers.

In this verse Allah speaks of His mercy in providing us with milk from cattle. During infancy all babies draw their nourishment mainly from their mother's milk. Later they obtain nourishment from cattle's milk.

Milk is the natural food of all mammals for a considerable period after birth. Milk is an important diet for human nutrition as it contains high quality animal protein, calcium (essential for bone and teeth) and important vitamins, e.g., vitamin A, thiamine, riboflavine, vitamins C and D. Raw milk provides 67 calories per 100 ml which usually contains about 87 % water, 3.3 % protein, 36% fat, 4.7% carbohydrate and 0.12 % calcium. Heat destroys only vitamin C and thiamine, but other vitamins are not affected.<sup>1</sup>

Milk is produced in the mammalian breast which consists of glandular tissue, fibrous tissue connecting its lobes and adipose (fatty) tissue in between the lobes. The glandular part of the breast (udder) consists of many lobes, and these are composed of lobules connected together by areolar tissue, blood vessels and ducts. Each lobule is composed of a cluster of rounded alveoli which open into smallest branches of lactiferous ducts. These branches unite to form a lactiferous duct which drains a lobe of the gland. It is through these ducts several in number, that milk is passed to nipple.

The development of the female breast varies with age. At birth the mammary gland consists of lactiferous ducts but no alveoli. At puberty, under the influence of oestrogenic hormones of the ovary the ducts develop branches and their ends form small, solid, spheroidal masses of granular polyhedral cells, which are potential alveoli. During pregnancy, the ducts branch markedly and alveoli and lumen from alveoli to the ducts are developed under the influence of oestrogen and progesterone from placenta. There is an increase of fatty tissue and blood supply to the breast. The secretory activity of the cells of the lining of the alveoli increases in the later stages of pregnancy. The first secretion after delivery is called colostrum. True milk secretion commences a few days after parturition due to a reduced level of oestrogen and progesterone, which triggers off the production of prolactin by the anterior lobe of the hypophysis (pituitary), which controls the lactation.

The mammary glands of all mammals including cattle produce milk which is secreted by the alveolar cells whose nutrition comes from the blood supply through the thoracic branches of the axillary artery, internal thoracic and inter costal arteries. The components of the milk are obtained from the blood supply to the breast. Thus the milk of cattle is composed of substances derived from their fodder (food). After ingestion of food, and its digestion, the unused remnants are excreted as dung (refuse). The absorbed constituents enter the blood which ultimately reach the heart. From the left ventricle of the heart, oxygenated blood with the absorbed nutrients is carried to different parts of the body. Thus the nutrients are carried to mammary glands where the alveolar cells retain the important components necessary to produce milk. The blood flows on to the venous system and return to the heart. Thus the milk is produced from between the refuse and the blood as stated in the Holy Quran. The milk that is produced by mammary glands is

miraculous. It is exactly tailored to meet the needs of the infant, whatever may be the species producing it. For example, cow's milk contains twice the protein, four times the calcium, and five times the phosphorus contained in human milk<sup>2</sup>.

The production of milk is a wonderful chemical process, the flow sheet of which represents one of the most complex chemical factories man has ever known. It is estimated that 400 ounces of blood must circulate through breasts to make a single ounce of milk<sup>2</sup>. However, the components of blood are totally unlike those of milk. e.g., the amino acids in blood are quite different in composition from the complex protein in milk; glucose in blood is distantly related to lactose in milk, and the fatty acids in blood are quite unlike the fats in milk.

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٦٠- وَمِنْ ثَمَرَاتِ النَّخِيلِ وَالْأَعْنَابِ تَتَّخِذُونَ مِنْهُ سَكَرًا وَرْمًا حَسَنًا  
 إِنَّ فِي ذَلِكَ لَآيَةً لِّقَوْمٍ يَعْقِلُونَ ۝

16 : 67 And from the fruits of the date palm and the vine you get out wholesome drink and food : behold, in this also is a Sign for those who are wise.

The two fruits, date and grapes mentioned here were used to provide good nourishment for the Arabs.

The date-palm (*Phoenix dactylifera*) which belongs to the palm family is widely grown in hot arid climates for its fruit. This tree is considered second only to the coconut tree among palms for its usefulness.<sup>1</sup>

The date-palm is native to south Africa and Arabia, where it has been grown for about four thousand years. The fruits hang in long thick clusters and have sweet and nutritious pulp surrounding a grooved stony seed. Young trees come into full bearing at 10-15 years and may continue to bear fruit for as long as 100 to 200 years. Dates are an extremely important food for parts of western Asia and north Africa. It was a staple food for the Arabs during the time of the Prophet Muhammad (sm). The Spaniards introduced the date-palm in the new world. The nutritive value of dates has been discussed under verse 6 : 99.

In Bangladesh and some parts of our subcontinent, there are Indian date palms which do not yield good pulpy food, but from which clear juice is extracted by cutting deep at the top of the tree. The juice comes out in drops, collected overnight in pots held up by ropes. This juice is sweet and a refreshing drink. It is concentrated by heat into thick viscid liquid.

The Vine (*Vitis vinifera*) is a climbing plant and yields grapes which are grown over a wide range of the whole north temperate zone and are grown in Arabian oases as well. Vineyards were among the earliest plantations made by man. The use of grapes as dessert fruits, raisins and for wine has been known from an early period of history<sup>2</sup>.

In the above verse Allah mentions that the fruits of the date palm and vine are good sources of nourishing food and drink. The word سكر used in this verse means intoxicating drink and such drinks are prepared by fermentation

of the juice of the date palm and grapes. However the Arabs used to prepare a non-alcoholic drink called *nabeez* ( نبيذ ) from the dates soaked in water for a few days. The grapes were used as food in the form of ripe grapes, dried raisins etc.

This verse was revealed before the prohibition of intoxicating drinks which was revealed after Hijrat to Medina. However, Allah states the facts about these two fruits. The grape juice contains glucose which is absorbed directly into the blood without further digestion. So it can provide a potent source of nutrition. Similarly *nabeez* may provide a nourishing drink. But the grapes are the best source for the production of alcohol. The harmful effects of alcohol have been discussed in connection with verse 2 : 219.

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٦٨- وَأَوْحَىٰ رَبُّكَ إِلَى النَّحْلِ أَنِ اتَّخِذِي مِنَ الْجِبَالِ بُيُوتًا وَمِنَ الشَّجَرِ وَمِمَّا يَعْرِشُونَ

٦٩- ثُمَّ كُلِي مِن كُلِّ الثَّمَرَاتِ فَاسْلُكِي سُبُلَ رَبِّكِ ذُلُلًا

بِمَخْرَجٍ مِّنْ بُطُونِهَا شَرَابٌ مُّخْتَلِفٌ أَلْوَانُهُ فِيهِ شِفَاءٌ لِلنَّاسِ

إِنَّ فِي ذَلِكَ لَآيَةً لِّقَوْمٍ يَتَفَكَّرُونَ

16:68-69 And your Lord inspired the bee to build its cells in the hills, on trees, and in (men's) habitations; Then to eat of all the produce (of the earth), and follow the ways of your lord made tractable (for you); there issues from their bellies a drink of varying colours, wherein is healing for mankind; verily in this is a Sign for people who reflect.

These two verses embody information of the most exalted kind about honey bees in a few words. Firstly, we are told about the instinct which help the bees to build their hives in the appropriate habitats. Then are explained the sources of nectar for bees and the ways they seek the nectar source for foraging. Finally is revealed nature's wonder in the production, from the bellies of the bees, of honey of varying colours, which is a great healer for mankind.

### Building of hives

The social structure of a bee colony is remarkably well organized. In every bee hive, there is one queen and there are the males or drones, and the undeveloped females or workers. The nests vary greatly in location, being suspended from overhanging rocks and branches of trees or built in hollows in tree trunks or in similar spaces between walls of buildings, in ruins, etc. The rock bees (*Apis dorsata*) make enormous single combs often a square yard (0.8 sq. m) in area<sup>1</sup> while the other species like the European *Apis mellifica* and the Asian *Apis cerana* build comparatively smaller hives. The nest in which a colony of bees lives is formed of parallel combs suspended from the top. The hive is composed of vertical combs of horizontal cells, each comb doubled by cells projecting in both directions from a central wax

sheet, the wax being generated by the glands situated on the ventral side of the bee's body. The wax is chewed and mixed with saliva before it is spread in thin bands shaping the cells of the comb. It is interesting for any student of geometry to note that the hexagonal cells in nature are wonderfully suitable for maximum packing with minimum loss of space (Fig.7). The cells which are of a regular hexagonal shape are of two sizes — smaller cells used for rearing workers and for storing honey and pollen, and larger cells for rearing drones. At certain seasons or when living conditions within the hive become crowded, the bees begin building special queen cells preparatory to swarming. These cells are vertical instead of horizontal, and they have openings at the bottom. One pound (0.5 kg) of wax will build 35,000 cells in which about 22 pounds (9.9 kgs) of honey can be stored. The walls of the cells are protected by a resinous secretion of various plants collected by workers to cover rough surfaces in the cavity to make it water proof 2. Within the comb, the usual arrangement is that there is a broad rearing section or a brood chamber in the lower parts with pollen storage nearby, and an upper food chamber for storage of honey farthest from the entrance which is at the bottom.

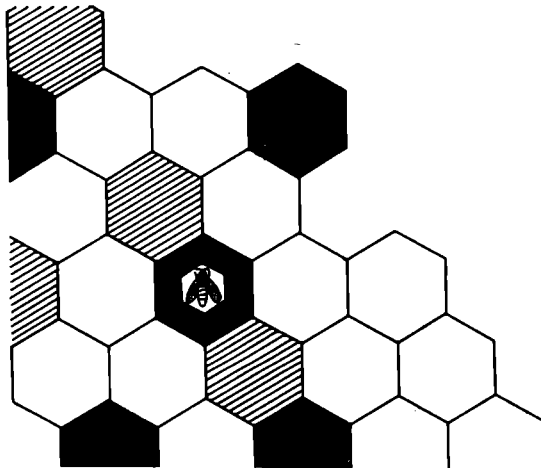


Fig. 7. A part of honey comb showing the hexagonal cells. The hatched cells are for storing honey and pollen; the shaded ones for rearing workers; others are blank.

#### **The sources of nectar and the ways the bees seek these sources**

To produce a single pound (0.5 kg.) of honey, more than 550 bees have to visit at least 2.5 million flowers in approximately 80,000 filed trips <sup>3</sup>. The

food of the honey bee is nectar and pollen which it collects from a variety of flowers. When flowers are not available, they depend on fruit juices wherever available but their mandibles are not strong enough to pierce the skin of even soft fruit. So the bees can get juice from the fruit only if it has been previously damaged<sup>4</sup>.

In an average hive there are from 30,000 to 60,000 worker bees which become field bees on the twenty first day of their lives, and eventually may become scouts who go out and seek new sources of pollen and nectar, and report this information back to the other field bees. It is practicable for the bees to search an area of 100 m in radius for food to find the rich supply<sup>5</sup>. The method used by scout bees to inform their sisters about the location of the nectar source is the so called honey dance.' A language of their communication and the implication of the geometry of dances has been fully discussed in the explanation to verse 6 : 38. This is what is obviously meant in the Quranic verse in the instruction to the bees to "find the paths of your Lord."

### **Production of honey of varying colours a great healer of mankind**

"Honey, a sweet, viscid material, essentially a solution of various sugars. ranging in colour from dark brown to golden yellow, is elaborated by honey bees from the nectar they collect from flowers and is stored in their hives for later use as food<sup>6</sup>." Honey is the oldest and almost the only natural sweet. It varies in flavour, colour and composition according to the type of floral nectar from which it is derived.

Both the flavour and the colour of honey depend on the types of flowers used as a source of nectar. The tannic acid is supposed to be responsible for dark colour, and stringent taste. The yellow colour is due to carotin or xanthophyll and is characteristic of honey obtained from mustard flowers. Anthocyanin is thought to be responsible for the rose-red colour of white clover honey<sup>7</sup>. In the beehive, there is evaporation of excess water and inversion of sucrose to monosaccharides levulose and dextrose. Average constituents of honey show 40.5 % levulose, 34% dextrose, 1.9 % sucrose, 17.7% water, 1.9% dextrans and gums and 0.18% ash. Besides, honey also contains from 1.5-6% other substances like various vitamins (C and members of B complex), enzymes (diastase, inulase, catalase and invertase (inverts sucrose) plant colouring materials, suspended solids (pollens and bees wax), minerals (copper, calcium, iron), traces of silica, manganese, chlorine, potassium, sodium, phosphorus, sulphur, aluminium, and



magnesium. Some yeasts may be carried over from the nectar which on storage may cause fermentation. All honey is hygroscopic and does not freeze. Excessive heat destroys its flavour and food value <sup>6</sup>.

Honey is often used as medicine by the Unani and Ayurvedic physicians. Al-Quran says that it has medicinal value for mankind. Modern medicine has not studied its medicinal value in great detail. The following uses are however noteworthy :

1. Some medical authorities recommend it as a suitable food for infants with a beneficial influence on the retention of calcium and almost no problem of indigestion, as honey contains mostly mono saccharides or simple sugars<sup>4</sup>.

2. The enzymes, vitamins, minerals and other chemicals are all useful for human beings and honey may be a good source for the supply of these essential components of human nutrition.

3. It is believed that the Holy Prophet (sm) used to prescribe honey for different ailments specially for the alcoholics. In modern medicine, Larsen<sup>8</sup> recommends repeated doses of 125 gms of honey for the treatment of chronic alcoholics. The rich content of thiamine, and other B-complex vitamins and various sugars is beneficial for the diseased liver in chronic alcoholics. Digir<sup>9</sup> stated in his study on bee honey : "Its great value in the treatment of chronic alcoholics is being rediscovered today". He quoted from many scientific journals of Britain, the USA, France, Italy and Germany to show that honey has been used with great success in helping chronic alcoholics restore their vitamin deficiency and ease the process of their detoxification.<sup>10</sup>

4. Honey has been used in the treatment of burns and lacerations due to its mild antiseptic properties.<sup>7</sup>

More studies are needed to find out all the medicinal values bee honey can provide.

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٤٢- وَاللَّهُ جَعَلَ لَكُمْ مِنْ أَنْفُسِكُمْ أَزْوَاجًا ۖ وَجَعَلَ لَكُمْ مِنْ أَزْوَاجِكُمْ بَنِينَ وَحَفَدًا ۗ وَرَزَقَكُمْ مِنَ الطَّيِّبَاتِ ۗ أَفَبَالْبَاطِلِ يُؤْمِنُونَ وَبِنِعْمَتِ اللَّهِ هُمْ يَكْفُرُونَ ۚ

16 : 72 And Allah has made for you wives of your own kind, and made for you, out of your wives, children and grand children and provided for you sustenance of the best : will they then believe in vain things and be ungrateful for Allah's favours ?

The literal meaning of the word **نفس** is soul or self and has been interpreted to mean 'nature' by Yousuf Ali<sup>1</sup> and as "own kind by Pickthall" in the context of this Quranic verse. In accepting the meaning as 'nature' or 'own kind' applied to wives of men, a biologically significant fact emerges about the nature of species in general and of human beings in particular.

All members of the species are recognizably distinct from the members of all other species. Man belongs to the species *Homo sapiens*. Individuals of a species including man, however, show a certain amount of variation which is often associated with geographic distribution and is the basis of the various major ethnic groups or races. The members of different human races are fully interfertile, but are not likely to produce offspring through interbreeding with individuals of any other species. This means that there exist biological barriers which prevent interbreeding. These barriers are genetically controlled and result in the reproductive separation or isolation of species from one another. This can be due to differences in the genes from different parents which might give conflicting biochemical 'instructions' for development resulting in the failure of the zygotes to develop, or if a zygote develops, the resulting individual is usually weak and fails to reach reproductive maturity. Some times the sperm of one species fails to survive in the reproductive tract of the female of another species. In such cases the gene flow between populations is impossible.

This reproductive barrier is of great biological importance and will maintain the distinctiveness of species. Without this barrier, a species would end up with a mass of intermediate hybrids, and the two original species would no longer be recognizable. If a viable hybrid does result by interbreeding two different species, further interbreeding may still be

prevented by sterility of the hybrid. A familiar example can be given by the mule which is a vigorous hybrid between horse and ass but is sterile : its parents thus continue to exist as distinct species and the mule itself remains as a series of isolated hybrid individuals which cannot form a breeding population of their own.

A species is master-minded by Allah not only to maintain its specific status through reproductive isolation, but also to keep up the continuity of its kind from one generation to the next. The science of genetics has shown that this is made possible by the transmission of genetic material from one generation to the next. This is what the Quranic verse appears to refer to in mentioning children and grand children made for men out of their wives.

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٤٤- وَ لِلّٰهِ غَيْبُ السَّمٰوٰتِ وَالْاَرْضِ ۗ وَمَا اَمْرُ السَّاعَةِ اِلَّا كَلَمْحِ الْبَصَرِ  
 اَوْ هُوَ اَقْرَبُ ۗ اِنَّ اللّٰهَ عَلٰى كُلِّ شَيْءٍ قَدِيْرٌ ۝

16 : 77 To Allah belongs the mystery of the heavens and the earth. And the decision of the Hour (Of Judgment) is as the twinkling of an eye, or even quicker ; for Allah has power over all things.

The modern theory of the creation of the universe from an ultra hot, infinitely small and ultra dense primeval fireball has been explained in verse 2 : 117 and under appendices I and II. At the beginning there was a 'Big-Bang' and there was gradual development of atoms, molecules nebulae, galaxies, stars and the solar system from the primeval fireball. The creation of the universe with a big-bang as is universally accepted today is indeed the greatest mystery. At the beginning of the creation all matter received a rotational motion which exists even today and this is at the crux in balancing the gravitational attraction between celestial bodies by centrifugal force ; indeed even today the origin of this rotational motion originating from the beginning remains an unsolved mystery of creation. The rotational motion of electrons around the nucleus is even today a mystery about its origin. The development of organic material from inorganic matter is another mystery of creation. At every stage of creation there is a definite direction, purpose and planning and scientific theories make this more evident. Advancement of knowlwdge has made man appreciate many mysteries of heavens and earth, but there are many other mysteries which remain to be understood.

The hour referred to here has been discussed under verse 7 : 187.

٤٨- وَاللّٰهُ اَخْرَجَكُمْ مِّنْ بُطُوْنِ اُمَّهَاتِكُمْ لَا تَعْلَمُوْنَ شَيْئًا ۗ وَجَعَلَ لَكُمُ السَّمْعَ  
 وَالْاَبْصَارَ وَالْاَفْئِدَةَ ۗ لَعَلَّكُمْ تَشْكُرُوْنَ ۝

16 : 78 And Allah has brought you forth from the wombs of your mothers when you knew nothing; and He gave you senses of

## **hearing and sight and hearts so that you may give thanks (to Allah).**

It is a fact that a human infant is born of its mother's womb when it knows nothing and is completely helpless. Then the infant is looked after by its parents, relatives and nursing attendants and its requirements of food, clothing and hygiene are provided. Here Allah says that the baby is provided with the faculty of hearing, sight and functioning of the heart by Allah after its birth.

Hearing is the function of the ears. A child is born normally with the ears so far as its functional units are concerned. The ear is composed of three major parts internal, middle and external. The development of the internal ear begins in the 4th week of gestation and is completed by the 20th week. The middle ear is the derivative of the first two branchial arches which appear by the 24th and 28th day of gestation respectively and is completed in the late foetal life. Mastoid air cells begin to develop in foetal life but most of them form after birth. The mastoid process is absent at birth but it appears as distinct prominence by the end of the first year and continues to grow up to puberty<sup>1</sup>. The air cells in the mastoid process are connected with the tympanic cavity where the three small bones essential for hearing (malleus, incus and stapes) develop and so the normal hearing faculty develops after birth. The external ear begins to develop in the upper part of the future neck at the 6th week but as the mandible develops, the auricle (external ear) moves to the side of the head and ascends to the level of the eyes by the 32nd week.

The eyes also begin to develop in the 4th week at about the 22nd day, and by 32nd day the optic cup is formed. The optic nerve is formed by the 6th to the 8th week. Myelination (coating) of the optic nerve fibres is incomplete at birth. After the eyes have been exposed to light for about ten weeks myelination is complete<sup>2</sup>. The eyelids from two sides, meet and adhere by about the 10th week and remain adherent till the 26th week when the lids are separated<sup>3</sup>. The size of the eyes of a new born is about two thirds that of adult eyes. They grow rapidly in the first year and then slowly until puberty, after which the growth is negligible<sup>1</sup>.

Infants do not see well for the first few weeks ; they have a vacant stare due to incomplete development of *macula lutea* (a yellow spot at the back of

the eye on the middle of the retina) and *fovea centralis* (the central depression in the *macula lutea*). Here the retina is very thin and consists entirely of cones. Rods and cones stand closely side by side over the whole retina except over the area where the optic nerve enters. Since there is none of the rods or cones at that area, no light is perceived and it is known as blind spot. One can see only when the refracted rays entering the eyeball converge on the *fovea* hence responsible for visual acuity. The *macula* and *fovea* develop completely by about a month after birth<sup>2</sup>.

As for the heart \* and blood circulation in the foetus, well-oxygenated (80%) blood returns from the placenta in the umbilical vein of the foetus. About half the blood passes the liver sinusoids through portal sinus and the remainder bypasses the liver through ductus venosus and reaches the inferior vena cava (Fig. 8). This blood flow is regulated by a sphincter in the ductus venosus<sup>4</sup>. Blood both from liver and ductus venosus ultimately enters the inferior vena cava (IVC). This blood is mixed with the venous blood coming from the lower limbs, abdomen and pelvis.

So the blood which enters the right atrium is mixed with deoxygenated blood, but still fairly well oxygenated. Venous blood from the upper part of the body enters the right atrium through superior vena cava (SVC). Blood from inferior vena cava mostly passes to the left atrium through the foramen ovale (oval opening in the inter atrial septum). In the left atrium, more blood (though small in amounts) from lungs in deoxygenated form mixes here. The foetal lungs extract oxygen from the blood as there is no respiration in the womb. Blood then passes to the left ventricle and from there to the whole body through the arterial system. A small amount of oxygenated blood from the IVC remains in the right atrium, mixes with venous blood of SVC and passes to the right ventricle from where it goes to the pulmonary trunk. But most of this blood enters the aorta through the ductus arteriosus. The blood flow in the lungs is very low, about 5-10% of the cardiac output, because the lungs are not functioning and this amount is adequate. Blood passing through the descending aorta is about 58% saturated with oxygen. Half of this blood goes to the lower half of the body and the other half goes to the placenta through umbilical arteries for reoxygenation.

\* The explanation of this verse is based on **أفئدة** being interpreted as medical sense. However some translate this word in the conventional sense meaning centres of passion and affection.

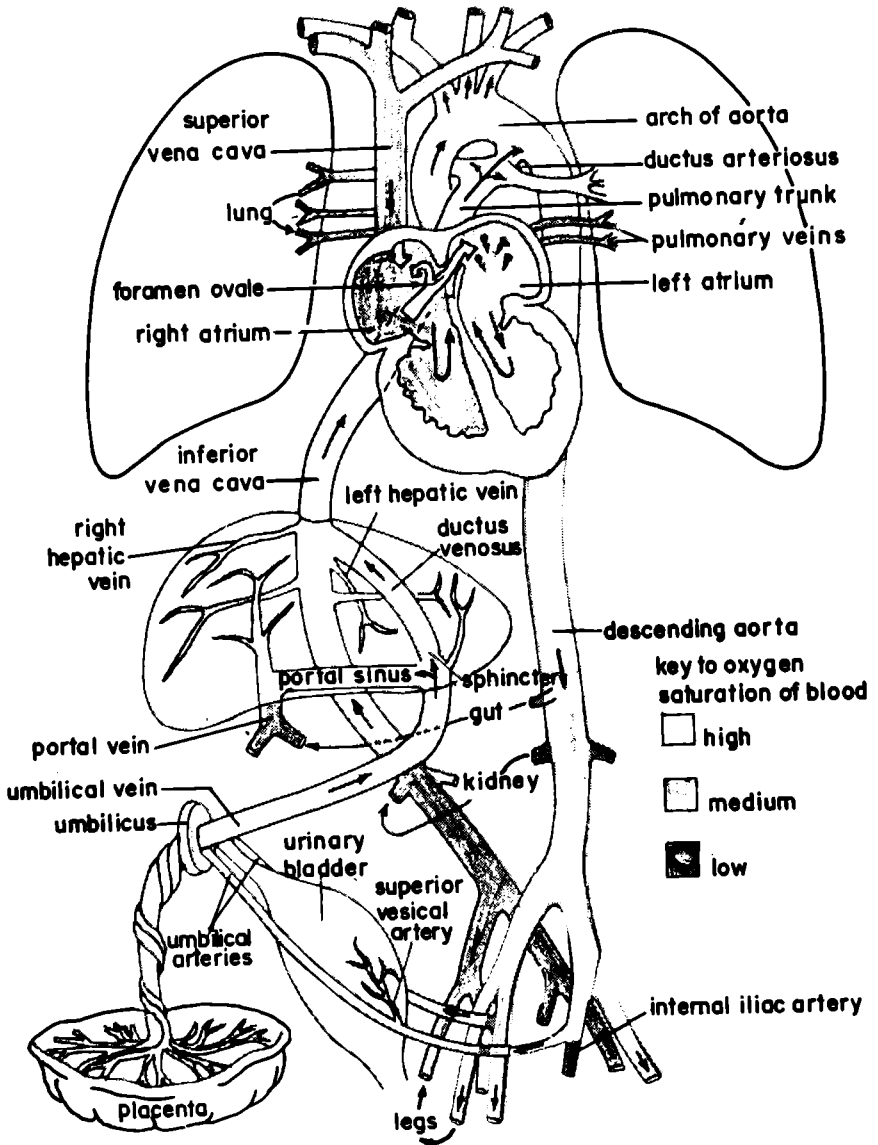


Fig. 8. A simplified diagram of blood circulation in placenta through the umbilical arteries (after *The Developing Human* by Keith L. Moore, published by W.B. Saunders Co.)



Immediately after birth important adjustments occur in the circulatory system of the infant. Placental circulation ceases and the respiration begins. The three shunts, foramen ovale, ductus venosus and ductus arteriosus are no longer needed as blood no longer needs to bypass the liver and the lungs. The right ventricular wall of the newborn is thicker than that of the left ventricle due to more work. By the end of the first month, the left ventricular wall becomes thicker (normal for human beings) than the right ventricular wall which becomes thinner due to atrophy associated with lighter workload. After the first few breaths, pulmonary blood flow increases leading to increased pressure in the left atrium which closes the *foramen ovale* by pressing its valve. The *ductus arteriosus* becomes functionally closed within 10-15 hours after birth. Closure of the *ductus arteriosus* is probably mediated by *bradykinin*, a substance released by lungs during initial inflation<sup>5</sup>. With the cessation of the blood flow through the umbilical vein, the *ductus venosus* gradually becomes atrophied while the *portal vein* becomes more functioning. The change from foetal pattern to adult pattern of circulation takes several days and weeks.

Thus it is evident that the ears, eyes and hearts are not fully functional at birth. Soon after the birth these organs become normally functioning. It is interesting to note that the newborn infant knows nothing but later his organs of the body function normally when the heart resumes its normal post natal functions. The child learns with his age and for this learning the functions of ears and eyes, hearing and sight are most essential. One learns only when one can listen and see things. So the spirit of the above verse is that a child when born is ignorant and then Allah provides him with the normal functioning of the ears, eyes and hearts by which he soon begins to learn.

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٤٩- أَلَمْ يَرَوْا إِلَى الطَّيْرِ مُسْعِرَاتٍ فِي جَوِّ السَّمَاءِ مَا يُمْسِكُهُنَّ إِلَّا اللَّهُ  
 إِنَّ فِي ذَلِكَ لَآيَاتٍ لِّقَوْمٍ يُؤْمِنُونَ ○

16 : 79 Have they not seen the birds obedient in mid-air ? None holds them save Allah. Lo ! herein, verily, are portents for a people who believe.

The flight of the birds with wings outspread in the air has always fascinated man. We can explain this from the law of resolution of forces and Newton's third law of motion. In flapping flight both lift and thrust gravitational pull are provided by the flapping of a pair of wings. During downstroke of the wings, air is pushed in the AB direction and from Newton's third law of motion the forces of reaction acting on the wings are in the AB direction (Fig. 9). The wing force acting in the AB direction can be resolved into AC and AD components providing lift against gravitational pull and thrust for forward motion respectively. For forward flight along a level path, the wings are brought downward and forward relative to the body. This produces a forward thrust during the inclined down stroke of the wings. During upstroke the wings are inverted so that the wings strike the air in such a manner as to produce a lift force and the wings are moved backward rapidly to produce forward motion. Thus lift and forward thrust are produced on both the downstroke and upstroke. Flapping flight is the most useful flight for birds.

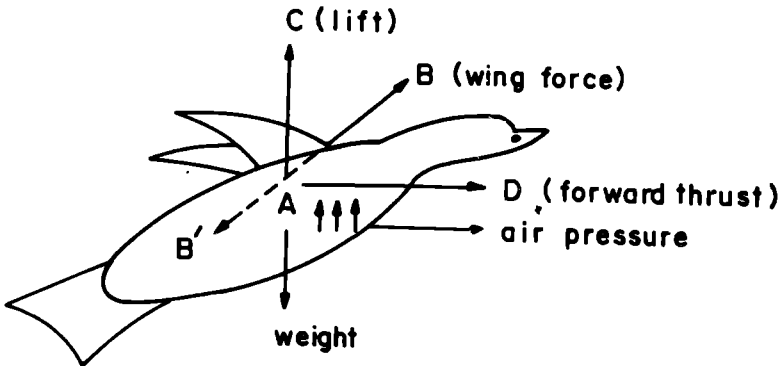


Fig. 9. The physical mechanism of a bird's flight.

There are other two types of flight mechanism, namely, gliding flight and soaring flight. In gliding flight the birds descend from higher to lower altitude and thus gravity provides the thrust for glide. In soaring flight the bird takes advantage of the air current moving upward and hence it does not require flapping of the wings. Many birds use the changes with time or attitude in horizontal wind speed and soar up using the horizontal momentum to drive itself into the wind. The Albatross uses such soaring flight and it picks up a great deal of speed and energy from the wind. This bird then uses gliding flight to cover a great distance in search of food over the sea surface. When its momentum decreases appreciably it soars up again to repeat the energy extraction process for further glide. By this technique the albatross can soar for thousands of miles over the ocean without any need for flapping their wings. Some birds like humming birds can fly straight up and even backwards. Their most remarkable feat, however, is hovering motionless in the air like a helicopter, while sipping nectar from a flower. The secret of this ability is in its wing which is attached to the shoulder by a swivel joint.

The skeletons of birds are natural marvels of light, engineering and structure. They combine lightness with strength. In all birds that fly, the breast bone, though extremely thin and light, has a deep keel which provides a large surface for attachment of the powerful flight muscles. As lightness is essential to flight, the birds have a marvellous system of air sacs that extend in a most intricate way into almost every part of the body including even the hollow bones. These delicate air sacs with the texture of bubbles enable a bird to use the air it breathes into its small lungs much more efficiently than even a mammal with larger lungs. The airsacs also act as a thermostatic device for birds which have rapid metabolism, and high body temperatures but no cooling sweat glands.

The feather of birds is unique and has enabled birds to become unquestionably the most efficient aeronauts of all. The feather is extremely light and structurally strong. The stiff shaft of the quill provides rigidity and yet is flexible towards its tip for aerial manoeuvring. The intricacy of the design of a feather can be appreciated by a microscopic examination. It will be seen that each parallel barb, slanting diagonally from the shaft, has numerous smaller side branches (barbules) that overlap those of the neighbouring barbs in a herring-bone pattern, and these in turn have tiny projections called barbicels many of which are equipped with minute hooks

that neatly hold every thing in place. Thus, it is obvious that the feather is a gift of flight to birds by Allah.

The greater size of the bird, the greater is the problem in accomplishing a flight. Weight of a bird increases as the cube of liner dimensions, while the surface area increases as the square of its size. Capacity for better flight depends on higher surface area. Because of oxygen limitations, low temperature and thinning air, birds normally rise upto 10,000 to 15,000 ft. Flights of 300-400 miles in 24 hrs are apparently common and flights of over 700 miles in some birds have been recorded. Some birds make high flights and cover a large area in search of food. Seasonal birds, e.g., birds from Siberia, make high and incredibly long distance flights most regularly and accurately.

Man's attempts to fly were not successful until the late 19th century when Wright brothers made their historic flight by using the principle of gliding flight. Man studied the complex flight mechanism of birds and gradually developed the modern aircraft where the lift and forward thrust are produced by the propulsive system, e. g., engine or turbine-driven propeller or turbine generated jet, by airflow on the wings<sup>1,2</sup>.

Verily understanding these laws of nature or 'Signs' as ordained by the Creator is an appreciation in the real sense.

## References

1. *Encyclopaedia Americana*.
2. *Encyclopaedia of Science and Technology*, McGraw Hill, Vol. 5, 1977.

٨٠- وَاللّٰهُ جَعَلَ لَكُمْ مِنْ بُيُوتِكُمْ سَكَنًا وَجَعَلَ لَكُمْ مِنْ جُلُودِ الْاَنْعَامِ  
 بُيُوتًا تَسْتَخِفُّونَهَا يَوْمَ ظَعْنِكُمْ وَيَوْمَ اِقَامَتِكُمْ وَمِنْ اَصْوَابِهَا وَاَوْبَاهَا  
 وَاَشْعَارَهَا اَنْتَا وَمَتَاعًا اِلَى حِينٍ ۝

16 : 80 It is Allah Who made you habitations homes of rest and quiet for you and made for you, out of the skins of animals, dwellings which you find so light when you travel and when you stop; and out of their wool and their soft fibres and their hair rich stuff and articles of convenience for a time.

Allah, in His mercy, endowed man with superior intelligence and capacity to acquire newer knowledge and to benefit from experience. This has enabled man to become increasingly more powerful and change the environment to his advantage. In course of time he was able to build well-shaded, well protected dwelling houses, where he could live with his family and rest and sleep with security, peace and comfort. In this onward march he devised the technique for treating and preserving skins of animals for various uses. This was of special significance to nomadic desert tribes, who lived in tents. Dried skins provide them with a good material for tents. In their travel from place to place such tents, which are quite light, could easily be dismantled, packed, carried to a new site and repitched there without difficulty.

Further, man has learnt to use the luxuriant wool of the sheep, the coarse hair of goats and the soft hair of camels; he discovered methods for weaving them into beautiful fibres to prepare therewith various articles of comfort and convenience such as blankets and warm clothing to protect him from the cold, and also to prepare costly articles of fine quality. In the ultimate analysis all these items and their raw materials are actually gracious gifts from Allah; these worldly gifts, it should be borne in mind, last only for a limited period of time.

۸۱- وَاللّٰهُ جَعَلَ لَكُمْ مِمَّا خَلَقَ ظِلًّا وَجَعَلَ لَكُمْ مِنَ الْجِبَالِ الْكُنَاةَ وَجَعَلَ  
لَكُمْ سَرَابِيلَ تَقِيكُمُ الْحَرَّ وَسَرَابِيلَ تَقِيكُمُ الْبَأْسَ كَذٰلِكَ يُتَذَرُ نِعْمَتَهُ  
عَلَيْكُمْ لَعَلَّكُمْ تُسْلِمُونَ ۝

16 : 81 It is Allah Who made out of things He created something to give you shade, of the hills He made some for your shelter; He made your garments to protect you from heat and coats of mails to protect you from (mutual) violence. Thus He completes His favours upon you so that you may bow to His will (in Islam).

In this verse, four types of protective favours of Allah have been alluded to, namely: (i) things providing us with shades, (ii) hills providing us with shelters, (iii) garments to protect us from heat and (iv) coats of mails to resist attack by enemies. The structure of shadows has been discussed under verse 25:45.

It is our common experience in hot countries to seek the refuge of shades of trees, high objects on the ground, ledge in the hills, and roofed hoods against the scorching sun; even the shadows cast by clouds provide comfort in desert areas. The shade of the cloud has been touched under verse 7:160. Man also put shadows to another use: in early days man succeeded in devising sun-dials to reckon time by observing and measuring lengths of shadows of erected structures (gnomon) at different hours of the day.

As regards hills, from time immemorial, man has found out that caves of hills standing at convenient locations provide good dwelling places secure from wild animals and from extreme heat and cold. Hill caves are mostly formed by erosion ; water trickles through cracks and dissolves and wears away stones<sup>1</sup>. The incised caves are generally well ventilated and in most cases they maintain a constant inside temperature which is just a little below the average annual temperature of the region<sup>2</sup>. The earliest cave-dwellers lived in China about 3,60,000 years ago; in Europe, people probably first lived in caves from about 70,000 to 1,00,000 years ago. Some primitive people like the Vedda of Sri Lanka lived in caves until recent times. In some caves in France and Spain, prehistoric men printed

and incised decorations on the stone-walls ; poor people still live in caves in parts of Jordan, Iraq and other countries. During world war II some caves were used as air-raid shelter and as storage-vaults. Further, high hills or mountain-ranges serve as effective barriers against the onslaught of outside invaders.

As regards garments, in course of time, man by dint of the intellect and ingenuity given to him by Allah, devised fibres of different kinds and learnt to weave fabric to save him not only from cold but also from heat, cloth being a good non-conductor of heat and containing minute pockets of air between and within the fibres. The textile garments we wear do not allow excessive heat from outside to reach the skin of our body and to cause discomfort or heat sores.

As regards coats of mail, with the advancement of knowledge man discovered iron ores and devised the technique of extracting iron and moulding it into many useful implements, specially coats of arms; the latter have been used with great success in wars.

## References

1. The World Book Encyclopaedia, Field Enterprises Educational Corporation, Vol. III, London, 1966.
2. *Collier's Encyclopaedia*, Colliers and Sons Limited, Vol. V, USA, 1980.

۱۱۳- فَكُلُوا مِمَّا رَزَقَكُمُ اللَّهُ حَلَالًا طَيِّبًا ۚ وَاشْكُرُوا لِيَغْفَرَ لَكُمْ اللَّهُ

إِنْ كُنْتُمْ رَائِيَةً تَعْبُدُونَ ۝

16 : 114 So eat of lawful and pure food which Allah has provided for you and thank for the bounty of your Lord if it is Him you serve.

The subjects of lawful and pure foods have already been discussed under verse 2 : 168 and 2 : 172.

۱۱۵- إِنَّمَا حَرَّمَ عَلَيْكُمُ الْمَيْتَةَ وَالدَّمَ وَحُمَّ الْخِنْزِيرِ وَمَا أَهَلَ لِغَيْرِ اللَّهِ بِهِ ۚ

فَمَنْ اضْطُرَّ غَيْرَ بَاغٍ وَلَا عَادٍ فَلْيَأْكُلْ إِنَّ اللَّهَ غَفُورٌ رَحِيمٌ ۝

16 : 115 He has forbidden for you only carrion and blood and swine flesh and that which has been immolated in the name of any other than Allah. But he who is driven thereto, neither craving nor transgressing, Lo ! then Allah is Forgiving Merciful.

This subject has already been discussed under verse 2 : 173.

ۚ وَجَعَلْنَا اللَّيْلَ وَالنَّهَارَ آيَاتَيْنِ فَمَنْ مَنَّا بِاللَّيْلِ وَالنَّهَارِ مُبْصِرًا ۚ

لِتَبْتَغُوا فَضْلًا مِّن رَّبِّكُمْ وَلِتَعْلَمُوا عَدَدَ السِّنِينَ وَالْحِسَابَ ۚ

وَكُلَّ شَيْءٍ فَضَّلْنَاهُ تَفْصِيلًا ۝

17 : 12 We have made the Night and the Day as two (of Our) Signs. The Sign of the Night have We obscured, while the Sign of the Day We have made to enlighten you ; that you may seek bounty from your Lord, and that you may know the number and count of the years : all things have We explained in detail.

The part of the verse referring to the Night and the Day as being two of the Signs of Allah has been explained under verse 2 : 164.



۱۷- وَكَمْ أَهْلَكْنَا مِنَ الْقُرُونِ مِنْ بَعْدِ نُوحٍ وَكَفَىٰ بِرَبِّكَ بِذُنُوبِ عِبَادِهِ  
 عَهِدًا ۝ بَصِيرًا

17 : 17 How many generations have We destroyed after Nuh ? And enough is your Lord to note and see the sins of His servants.

The verse speaks of the destruction of generations after prophet Nuh (a.s). No mention has been made of the generations nor of the offence for which they were destroyed. The matter of destruction of various towns rather generations has been discussed in connection with verse 7 : 4.

۲۴- تَسْبِيحُ لَهُ السَّمَوَاتُ السَّبْعُ وَالْأَرْضُ وَمَنْ فِيهِنَّ ۗ  
 وَإِنْ مِنْ شَيْءٍ إِلَّا يُسَبِّحُ بِحَمْدِهِ ۗ وَلَكِنْ لَا تَفْقَهُونَ تَسْبِيحَهُمْ  
 إِنَّهُ كَانَ حَلِيمًا غَفُورًا ۝

17 : 44 The seven heavens and the earth and all things therein declare His glory : there is not a thing but celebrates His Praise : and yet you understand not how they declare His glory. Verily He is Oft-Forbearing, Most Forgiving !

The subject of the seven heavens and the earth has been explained under verse 2 : 29. That all created things in the seven heavens and the earth do celebrate the praises of Allah means that they glorify Allah by obeying strictly the laws ordained for them by Allah. This point has been explained under verse 13 : 15.

۶۶- رَبُّكُمْ الَّذِي يُرْسِدُ لَكُمْ الْفُلَاكَ فِي الْبَحْرِ لِتَبْتَغُوا مِنْ فَضْلِهِ ۗ  
 إِنَّهُ كَانَ بِكُمْ رَحِيمًا ۝

17 : 66 Your Lord is He Who makes the ship go smoothly for you through the sea, in order that you may seek of His bounty. For He is unto you Most Merciful.

The matter of building ship and of their sailing has been discussed under verse 2 : 164.

٦٨- اِنَّا مَوْتُكُمْ اَنْ يَخْشِفَ بِكُمْ جَانِبَ الْبَرِّ اَوْ يُرْسِلَ عَلَيْكُمْ حَاصِبًا  
 ثُمَّ لَا يَجِدُ ؕ اَلَكُمْ وَاِكِيْلًا ۝

**17 : 68** Do you then feel secure that He will not cause you to be swallowed up beneath the earth when you are on Land or that He will not send against you a violent storm so that you shall find no one to carry out your affairs for you ?

In this verse people are warned that they should not feel secure on land. It is pointed out that land is also subject to earthquake and storms both of which can create havoc destroying a large number of people.

1. The matter of earthquake has been discussed under verse 7 : 91.

2. The matter of gales and stormy wind has been referred to in the Quran in various verses.

According to scientists, of all the elements of weather, wind is probably the most baffling. It is basically just air in motion. But for the great variety in wind strength and direction in the course of even a single season, the causes are many and complex. As winds cross from land to sea and vice versa, the form that they take and the strength at which they blow are affected all the time by constantly changing temperature patterns and by mountains and other topographic features as well as the spinning of the earth on its axis<sup>1</sup>.

Wind speeds are graded now according to the Beaufort scale. This shows the scene in the land and sea on the basis of speed of the wind.

Beaufort No.	Titles	Limit of speed (33 ft) in the open m.p.h.	General scene in land	General scene at the sea
0.	Calm	Less than 1	Calm	No ripples
1.	Light air	1.3	Direction of wind shown by smoke drift	Small scale-like ripples
2.	Light breeze	4-7	Leaves rustle	Small wave-lets
3.	Gentle breeze	8-12	Leaves and small twigs in constant motion	Large wave-lets
4.	Moderate	13-18	Raises dust and loose paper small branches are moved	Waves become longer
5.	Fresh breeze	19-24	Small trees an leaves begin to sway.	Moderate waves with pronounced length
6.	Strong breeze	25-31	Large branches in motion extensive	Large waves with foaming crests
7.	Moderate gale	32-38	Whole trees in motion	Sea heaps up
8.	Fresh gale	39-46	Breaks twigs off trees	Moderately high waves with high foam
9.	Strong gale	47-54	Slight structural damage occurs	High waves with dense foams
10.	Whole gale	55-63	Trees uprooted, Considerable structural damage occurs	Very high waves
11.	Storm	64-75	Wide-spread damage	Waves so high that ships in troughs can not be seen.
12.	Hurricane	above 75	-	Air filled with foam and spray

### Reference

1. B. David Bowen, *Britain's Weather*, pp. 29-32.

٤٠- وَلَقَدْ كَرَّمْنَا بَنِي آدَمَ وَحَمَلْنَاهُمْ فِي الْبَرِّ وَالْبَحْرِ وَرَزَقْنَاهُمْ مِنَ الطَّيِّبَاتِ  
وَفَضَّلْنَاهُمْ عَلَى كَثِيرٍ مِمَّنْ خَلَقْنَا تَفْضِيلًا ۝

17 : 70 We have honoured the sons of Adam; provided them with transport on land and sea; given them for sustenance things good and pure; and conferred on them special favours, above a great part of Our Creation.

Men are, by this verse, reminded of the distinction that has been conferred on them by Allah. He has been given the creative intelligence as against Allah's other creations. By dint of this creative intelligence, he has been able to make machinery by which he can transport himself from place to place by land, sea and now by air. Allah has provided various things from which men are to procure their sustenance and they have been doing that from the very day of their existence in this world. This creative intelligence of man is a special favour to human beings and they are expected to remember this with gratitude.

١٠١- وَلَقَدْ آتَيْنَا مُوسَى تِسْعَ آيَاتٍ بَيِّنَاتٍ فَمَنْ أَتَىٰ بِسُلْطَانٍ إِذْ جَاءَهُمْ  
فَقَالَ لَهُ فِرْعَوْنُ إِنِّي لَأَظُنُّكَ يُمُوسَىٰ مَسْحُورًا ۝

17 : 101 To Musa We did give nine clear Signs; ask the children of Israel. When he came to them, Pharaoh said to him : O Musa ! I consider you, indeed, to have been worked upon by sorcery !

Among the nine clear Signs given to Musa (a.s), the three are عصا the rod (verse 7 : 107) and نقص من الثمرات والسنين the years of drought and short crops (verse 7 : 130 ). The rod and its miraculous qualities are beyond the scope of our discussion here. The years of drought could be a consequence of lack of rainfall and continuous dry weather adversely affecting the crops. This may happen if Allah wills even in a region with a record of adequate annual rainfall like the fertile valley of the Nile due to prolonged periods of absence of rain resulting in the drying up of the vital water supplies in the river.

\*The short crops could be a result of various causes including drought viz. (i) the sowing of unhealthy seed resulting from the pest attack in storage, (ii) lack of proper drainage of water during cultivation, (iii) lack of soil nutrients essential for the healthy growth and seed production, (iv) uncongenial physical properties of soil, and (v) pestilence on account of fungi and insects. Some of these factors can prevail in spite of the best efforts of Man.

Amongst the rest of the six clear Signs to the people of Pharaoh, five namely, الطوفان (deluge) الجراد (locusts) قمل (vermin), الضفادع (frogs), الدم (blood) sent against them by Allah as a chastisement for their arrogance in spite of repeated warnings by the prophet Musa (a.s) have already been discussed under verse 7 : 133.

The remaining divine ninth Sign given to prophet Musa (a.s) by Allah is اليد البيضاء (the radiant hand) which constitutes the well-known miracle and does not fall under the purview of scientific discussion.

١٤- وَتَرَى الشَّمْسَ إِذَا طَلَعَتْ تَزُورُ عَنْ كَهْفِهِمْ ذَاتَ الْيَمِينِ وَإِذَا غَرَبَتْ تَقْرِضُهُمْ ذَاتَ الشِّمَالِ وَهُمْ فِي فَجْوَةٍ مِنْهُ ۗ ذَلِكَ مِنْ آيَاتِ اللَّهِ

18 : 17 You would 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 the open space in the midst of the cave. Such are the Signs of Allah.....

The verse refers to the position of the cave in which the *ashabul Kahf* (the companions of the cave) or the seven sleepers slept for 309 years. Seven believing youths for fear of being persecuted for their belief in Allah, took shelter in a cave and fell asleep and awoke after 309 years, when the position had changed. It is generally taken to be the story of 7 Christian youths of Ephesus who left the town for fear of persecution by the Roman emperor, as stated in Gibbon's 'Decline and Fall of the Roman Empire.'

The present verse states that the sun is in such a position that its rays do not enter the cave directly throughout the year. The sun rises on the right side of the cave and sets on the left. The daily orbits of the sun lie between

\*The control of drought is an extremely difficult problem as its solutions involves a many body system with a large number of parameters. Thus the full control of drought rests with Allah and can be regarded as a Sign.

the Tropic of Cancer to the north and the Tropic of Capricorn to the south. As the sun rises on the right of the cave and sets on the left, it is evident that the mouth of the cave is towards the north and a man standing at the mouth of the cave sees the sun rise on the right and set on the left. Thus the cave must be to the north of the Tropic of Cancer.

The Quran does not mention the actual location of the cave. According to the Christian story, the cave at Ephesus was situated in the lat. 38<sup>0</sup> North. A cave at such a place with its mouth to the north would never have the rays of the sun within it. Thus the location of the cave at Ephesus is consistent with the Quranic description of the cave.

۳۷- قَالَ لَهُ صَاحِبُهُ وَهُوَ يُحَاوِرُهُ أَكَفَرْتَ بِالَّذِي خَلَقَكَ مِنْ تُرَابٍ ثُمَّ مِنْ  
نُطْفَةٍ ثُمَّ سَوَّكَ رَجُلًا

18:37 And his companion, while he disputed with him, exclaimed : Do you disbelieve in Him Who created you from dust, then from a drop of germinal fluid and then fashioned you into a man?

The disbelievers always tried to dispute the existence of Allah and His creation. But if one carefully examines the scientific basis of the creation of Allah, an unbiased person is bound to believe. Here Allah puts forward the basic question about the creation of man. That man is created from dust, has partly been discussed in connection with verse 2 : 28. The word تراب means dust or earth. So the main idea of the verse is that man is created from the elements present in the earth. Ther basic elements present in the human body are all derived from food which is obtained primarily from the soil. Thus man is created (in fact all animals) from the extract of the soil, which has also been stated in the Quran in verse 23 : 12: ولقد خلقنا الانسان من . نطفة . i.e. verily We created man from an extract of the earth (soil).

The creation of Man from نطفة has been discussed in connection with verse 16 : 4.

The development of the human foetus in the mother's womb from the zygote—a combination of the male and female نطفة is also caused by Allah.

Man has no control over the development of the zygote into an embryo and then into a foetus. The sex of the foetus is also decided by Allah and man has no control over it. So Allah refers to those men who opposed the

Messenger of Allah and points out that their creation as men is also His decision and yet now in their adulthood they dare disbelieve Allah.

م- فَعَسَىٰ رَبِّي أَنْ يُؤْتِيَنِي خَيْرًا مِّنْ جَنَّتِكَ وَيُرْسِلَ عَلَيْنَا حُمْبَانًا  
مِّنَ السَّمَاءِ فَتُصْبِحُ صَوِيفًا ذَلْقًا ۝

18 : 40 It may be that my Lord will give me something better than your garden, and that He will send on your garden thunderbolts (by way of reckoning) from heaven, making it (but) slippery sand!

The word **حُمْبَانًا** (Husbanan) literally means 'by way of reckoning'. This could imply calamities from the sky. In the present context, this calamity is usually taken to be a thunderbolt.

Thunderbolts are always associated with lightning ; lightning between a cloud and the earth can cause considerable damage to properties besides loss of lives. The intense heat produced by lightning burns up everything in the immediate vicinity of the lightning passage unless there are protective arrangements of lightning arrestors having connections with the earth. The extent of damage caused by lightning in the USA alone every year has been estimated as approximately 150 deaths, \$ 20 million worth of property damage, and 10,000 forest fires destroying \$ 30 million worth of marketable timber<sup>1</sup>. Even a beautiful garden with luxuriant vegetation, when struck by lightning and thunder within a short span of time lies waste ; the soil that was once highly fertile, becomes totally barren and is gradually reduced to "slippery sands". The whole area turns, so to say, into a piece of dreary desert.

The destructive effects of lightning and thunder have been described in some detail under verse 13 : 12.

Hail-storms, hurricanes or fairly big-sized blazing meteors striking the ground and getting embedded in the cavities created by their tremendous impact may also destroy a beautiful garden.

## Reference

1. *Encyclopaedia Britannica*, Vol. 10, 15th edition, p. 966, 1980.

۴۱- أَوْ يُصْبِحَ مَاؤُهَا غَوْرًا فَلَنْ تَسْتَطِيعَ لَهُ طَلْبًا ۝

18 : 41 Or the water of the garden will run off underground so that you will never be able to find it.

The garden may also be destroyed by the disappearance of available water from beneath the ground rendering it desert-like. Such disappearance of water may be caused in a number of ways :

(1) The water-current may dry up due to its source being exhausted, (ii) the water-level may go further deeper beyond reach because of a link being established with the lower level and (iii) the water channel may be diverted away from the garden by ground upheavals caused by earthquakes.

۴۵- وَأَضْرِبْ لَهُمْ مَثَلًا الْحَيَاةَ الدُّنْيَا كَمَاءٍ أَنْزَلْنَاهُ مِنَ السَّمَاءِ فَاخْتَلَطَ بِهِ نَبَاتُ الْأَرْضِ فَأَصْبَحَ هَشِيمًا تَذْرُوهُ الرِّيْحُ ۚ وَكَانَ اللَّهُ عَلَىٰ كُلِّ شَيْءٍ مُّقْتَدِرًا ۝

18 : 45 Set forth to them the similitude of the life of this world, it is like the rain We send down from the sky, the earth's vegetation absorbs it, but soon it becomes dry stubble, which the winds do scatter. It is only Allah Who prevails over all things.

The falling of raindrops from the sky and the growth of vegetation there-with have been explained under verse 2 : 22 and verse 2 : 164.

The vegetaion grows rich and beautiful and presents a brave show of luxuriance ; but it is destined to be transient, it stays only for a limited period of time after which it decays and gradually turns into dry stubble blown about by winds. Ultimately no trace of it remains. The scientific interpretation of the similitude helps us understand the nature of our transitory existence on earth.

۴۶- وَيَوْمَ نَسِفُ الْجِبَالَ وَنَرَى الْأَرْضَ بَارِزَةً ۗ  
وَحَكَّرْنَاهُمْ فَلَئِمَّا تَعَاوَزَ مِنْهُمُ أَحَدًا ۝



**18 : 47** One day We shall remove the mountains and you will see the earth as a level stretch.....

In about five billion years the sun will presumably be converted into a red giant, when its diameter will increase to one hundred times its present diameter. In such a position the sun will engulf Mercury and Venus and will almost touch the orbit of the earth. The oceans of the earth will be evaporated, metals will melt in the intensity of the sun's light. The earth will become a cauldron unable to sustain life ; mountains will be uprooted and converted into dusts, spread over the surface of the earth. So the land portion of the earth which we see would look like a level stretch.

٥٩- وَتِلْكَ الْقُرَىٰ أَهْلَكْنَاهُمْ لَمَّا ظَلَمُوا وَجَعَلْنَا لِمَهْلِكِهِم مَّوْعِدًا ۝

**18 : 59** Such were the populations We destroyed when they committed iniquities but We fixed an appointed time for their destruction.

The verse speaks of the destruction of people who did wrong but who themselves were destroyed at an appointed time. Examples can be found in the cases of Nuh (a.s.) 11 : 40, Lut (a.s.) 7 : 84 and Ad and Thamud who have been discussed in verses 7 : 78 and 91.

٩٣- حَتَّىٰ إِذَا بَلَغَ بَيْنَ السَّدَّيْنِ وَجَدَ مِنْ دُونِهِمَا قَوْمًا  
لَا يَكَادُونَ يَفْقَهُونَ قَوْلًا ۝

**18 : 93** Until, when he reached (a tract) between two mountains, he found, beneath them, a people who scarcely understood a word.

٩٣- قَالُوا يَا زُلْقَرْنَيْنُ إِنَّكَ لِطَبَّاقٌ مُّغْسِدُونَ فِي الْأَرْضِ قَهْلًا تَجْعَلُ لَكَ  
خَرْجًا عَلَيَّ أَنْ تَجْعَلَ بَيْنَنَا وَبَيْنَهُمْ سَدًّا ۝

**18 : 94** They said : "O Zulqarnain ! The Gog and Magog (people) do great mischief on earth : shall we then render you tribute in order that you might erect a barrier between us and them?"

Ibn Khaldun in his *Muqaddimah* gives an idea of the lands of Yajuj and Majuj (Gog and Magog). According to him : "The cultivated part of the earth extends more toward the north. In the shape of a circular plane it extends in the south to the equator and in the north to a circular line, behind which there are mountains separating the cultivated part of the earth from the elemental water. Enclosed between (these mountains) is the Dam of Gog and Magog. These mountains extend towards the east."<sup>1</sup> These mountains are called the Qufays mountains which surround Yajuj and Majuj (Gog and Magog). All these nations are Turkish people<sup>2</sup>. There in the middle of (the mountains) is the Dam built by Alexander<sup>2</sup>. According to the geographer Sadiq Isfahani of the 17th century the position of Gog and Magog is Long. 139<sup>0</sup> 30. Lat 48<sup>0</sup> reckoning the degrees of longitude from the Fortunate Islands and of latitude from the equinox Lat. line<sup>3</sup>. (The Geographical Works of Sadik Isfahani Tr. J.C. John Murray London. 1832 p. 146. & p. 60).

According to one modern commentator the Iron Gate which corresponds exactly to the Quranic description is near Derbend in Central Asian, Hissar district about 150 miles south-east of Bukhara. A very narrow defile, with overhanging rocks occurs on the main route between Turkestan and India, lat. 38<sup>0</sup>N : long. 67<sup>0</sup>E. It is now called in Turkish Buzghol-Khana (goat house), but was formerly known as the Iron Gate (*Babul Hadid*) ; Per. (*Dar-i-ahani*) There is no iron gate there now, but there was one in the 7th C.A.C. when the Chinese traveller Hiouen Tsiang saw it on his journey to India. He saw two folding gates cased with iron and hung with bells. According to Muqaddasi, the Arab traveller and geographer who wrote about 375/985 (A.C.), the Abbasi Khalifa Wathiq (842-846 A.C.) sent out a mission to Central Asia to report on the Iron Gate. They found the defile 150 yards wide : on two jambs made with bricks of iron welded together with molten lead, were hung two huge gates, which were kept closed. According to this commentator the barrier served its purpose for some time and later it crumbled to dust.

## References

1. Khaldun, Ibn. *Muqa*, Vol. 1, p. 96.
2. *Ibid*, pp. 162-166.
3. Ali, A. Yusuf, *The Holy Quran*, p. 762, 1975.

٩٦- اَتُونِي زُبَرَ الْحَدِيدِ حَتَّىٰ اِذَا سَاوَىٰ بَيْنَ الصَّدَفَيْنِ قَالَ اُنْفُثُوا  
حَتَّىٰ اِذَا جَعَلَهُ نَارًا قَالَ اَتُونِي اُفْرِغْ عَلَيْهِ قَطْرًا ۗ

18 : 96 "Bring me blocks of iron" At length, when he had filled up the space between the two steep mountain sides, he said, "Blow (with your bellows)" Then, when he had made it (red) as fire, he said : "Bring me, that I may pour over it, molten copper."

This verse refers to Zul-qarnain's attempt to contain Yajuj and Majuj (Gog and Magog) two invading tribes by erecting an iron wall \* by mixing of two metals, namely red hot iron with molten copper. The result of such mixing of a metal with another metal/metals or with other elements is known as alloy. Alloys are produced during the melting of the base element which is a metal. These are usually far superior to elemental metals in mechanical properties. Alloying sometimes impairs and sometimes improves the corrosion resistance and gives better appearance and ductility.

Commercially produced pig iron or cast iron contains about 2-4.5% carbon, 0.5% manganese, 1-2.5% silicon. 0.1-0.3% sulphur and 0.01% phosphorus<sup>1</sup>. Iron develops rusting when it comes into contact with air and moisture. Rusting is prevented by galvanizing, by alloying or by painting. Galvanizing is a process in which well cleansed iron is immersed in molten zinc or copper.

Pure iron melts at 1533<sup>0</sup>C, but iron containing about 4.6% carbon by weight has a lower melting point of 1147<sup>0</sup>C.<sup>2</sup> Copper melts at 1083<sup>0</sup>C. That iron when heated looks as red as fire suggests a lower temperature as substances look white when they reach the highest temperature before melting. Iron blocks heated much below the melting point of iron make joints with adjacent blocks and this was facilitated by pouring molten copper over these. Molten copper forms an alloy with cast iron by

\* Some commentators have translated the word قَطْر as brass which is an alloy of copper and zinc; A.Y.A. (pp. 756) has translated this as lead, but we rule out as it does not form any strong alloy with iron.

According to M. Pickthall the word قَطْر means copper.

penetration upto a certain depth from the surface and galvanizing is accomplished giving the surface extra strength and life. It was unlikely that steel, which is a form of iron alloy containing extremely pure iron as the base metal and a small (fractional) percentage of chromium or titanium and carbon to harden the product, was used. Steel has a very high melting temperature and it is very difficult to join steel blocks or pieces. Cast iron alloys have higher properties of strength, wear resistance, machinability, susceptibility to heat treatment and corrosion resistance.

## References

1. *Encyclopadia Americana*, Vol. 1. p. 606, 1979.
2. P. Max Hasan, *Constitution of Biranay Alloys*, 2nd, Ed. McGraw Hill Co., London, pp. 353, 580, 1950.

هـ- وَإِنِّي خِفْتُ الْمَوَالِيَ مِنْ وَرَائِي وَكَانَتِ امْرَأَتِي عَاقِرًا فَهَبْ لِي مِنْ لَدُنْكَ وَلِيًّا ۝

19 : 5 Now I fear (what) my relatives (and colleagues) will do after me. But my wife is barren, so give me an heir as from yourself,-

هـ- يٰزَكَرِيَّا إِنَّا نُبَشِّرُكَ بِغُلَامٍ اسْمُهُ يَحْيَىٰ لَمْ نَجْعَلْ لَهُ مِنْ قَبْلُ سَمِيًّا ۝

19 : 7 (It was said unto him) : O Zakariah ! verily We bring you good news of a son whose name is Yahya, We have given the same name to none before him.

قَالَ رَبِّ أَنَّىٰ يَكُونُ لِي غُلَامٌ وَعَاقِرًا وَقَدْ بَلَغْتُ مِنَ الْكِبَرِ عِتِيًّا ۝

19 : 8 He said : My Lord : how can I have a son when my wife is barren and I have reached infirm old age ?

هـ- قَالَ كَذٰلِكَ ؕ قَالَ رَبُّكَ هُوَ عَلَيَّ هَيِّنٌ وَقَدْ خَلَقْتُكَ مِنْ قَبْلُ وَلَمْ تَكُ شَيْئًا ۝

19 : 9 He (angel) said : So it will be. Your Lord says : It is easy for Me even as I created you before when you were nothing.

Prophet Zakariah (a.s.) in his old age was worried for his progeny as indicated in 19 : 5. So he prayed to Allah for a successor. In response to his prayer Allah sent an angel to inform him about the good news that he will have a son. Prophet Zakariah (a.s.) was astonished on hearing the good news because he was old and his wife barren. To this the angel replied that it would be so as it was the will of Allah.

This subject of procreation in old age of the male and in the barrenness of the female have already been discussed in connection with verse 3 : 39, 40.

In verse 19 : 9 Allah reminds Prophet Zakariah (a.s.) that the creation of a son in his old age through his barren wife was very easy for Him. Before live birth no person has any identity and the creation of a new child is always a wonderful phenomenon.

٢٠- قَالَتْ أَنَّى يَكُونُ لِي غُلَامٌ وَلَمْ يَمْسَسْنِي بَشَرٌ وَلَمْ أَكُ بَغِيًّا ۝

19 : 20 She said : How shall I have a son when no man has touched me, neither have I been unchaste ?

٢١- قَالَ كَذَلِكَ قَالَ رَبُّكَ هُوَ عَلَنٌ هَيْهَاتَ وَ لِنَجْعَلَهُ آيَةً لِلنَّاسِ وَرَحْمَةً مِنَّا ۝  
وَكَانَ أَمْرًا مَقْضِيًّا ۝

19 : 21 He said : So it will be. Your Lord says : It is easy for Me. And (it will be) that We may make him a Sign for mankind and a Mercy from Us, and it is a thing ordained.

The virgin birth of Prophet Isa (a.s.) as a possible example of parthenogenesis has already been discussed under verse 3 : 47. Here Allah further says that the birth of Prophet Isa (a.s.) will be a Sign for mankind and he was a mercy to mankind as he brought the message of peace. The birth of Isa (a.s.) is the only one of its kind in human history and as such it is no doubt a great Sign from Allah.

٢٥- وَهَزِيءَ إِلَيْكَ بِجِذْعِ النَّخْلَةِ تُسْقِطُ عَلَيْكَ رَطْبًا جَنِيًّا ۝

19 : 25 And shake towards your self the trunk of the palm-tree : it will let fall fresh ripe dates upon you.

This Quranic verse follows the three verses which enunciate the conception of the virgin Marium (a.s.) and her retirement to a secluded corner under a date palm at Bethelhem not far from Jerusalem. At the onset of acute pangs of birth, she cried in anguish when a divine voice consoled her not to grieve as there was a rivulet near to quench her thirst and to perform ablutions. She is also asked to shake the trunk of palm tree close by so that some fresh ripe dates may fall near her. This providential command has two points of great significance which proved of immense and timely help to Marium (a.s.) who was undergoing acute labour pains.

1. During labour, there are sudden contractions of the uterus and abdominal muscles which continue after intervals and with a quickening tempo which naturally unnerves the woman especially when there is no company to console her. The general advice given to a woman in labour by the obstetrician is to clutch the nearest stationery object firmly in order to feel some relief and also to assist the process of the passage of the baby through the birth canal. Clutching at the trunk of the palm tree would admirably fulfil this objective and the shaking of the trunk would result in the ripe dates.

2. Immediately after labour, the mother needs instant nourishment to recoup the energy lost during the acute uterine contractions. Dates are very important articles of diet in the Middle East, the chief nutritional value being their high sugar content which varies from 60 to 70 per cent, and the presence of some quantity of vitamins A, B, B<sub>2</sub> and nicotinic acid. The need for instant energy to Marium (a. s.) came in the form of nutritious dates provided by Allah.

٦٥- رَبُّ السَّمَوَاتِ وَالْأَرْضِ وَمَا بَيْنَهُمَا فَاعْبُدْهُ وَاصْطَبِرْ لِعِبَادَتِهِ  
هَلْ تَعْلَمُ لَهُ سَمِيًّا ۝

19: 65 "Lord of the heavens and of the earth and of all that is between them: so worship Him, and be constant and patient in His worship; do you know of any who is worthy of the same name as He?"

This has been discussed under verse 5:19.

٤٢- وَكَمْ أَهْلَكْنَا قَبْلَهُمْ مِنْ قَرْنٍ هُمْ أَحْسَنُ أَثَاثًا وَرِئَاسًا ۝

19: 74 How many generations before them have we destroyed who were even better in equipment and in outward show.

The verse speaks of the annihilation of many earlier generations who were more imposing in respect of gear and outward seeming. The matter of destruction of the people of some earlier generations had been discussed in connection with verse 7:4, 64.

Of the annihilated people referred to in the Quran, modern archaeological investigations show that Ad and Thamud were much more prosperous than the people who have been referred to through this verse.

٩٨- وَكَمْ أَهْلَكْنَا قَبْلَهُمْ مِنْ قَرْنٍ هَلْ تُحِشُّ مِنْهُمْ مِنْ أَحَدٍ  
أَوْ تَسْمَعُ لَهُمْ رِكْزًا ۝

19 : 98 How many generations before them have We destroyed? Can't you find a single one of them or hear a whisper of them.

The verse speaks of the total annihilation of some earlier generations. The destructions of generations of people have been discussed in connection with verse 7:4, 64.

Of the people so destroyed, there is no trace and nobody speaks of them any more. They are now only a historical memory.

That generations of different sorts mentioned in verses 19: 74, 19:98 and also in other such verses existed, is now scientifically proved by archaeological excavations.

٢- تَنْزِيلًا مِمَّنْ خَلَقَ الْأَرْضَ وَالسَّمَوَاتِ الْعُلَى ۝

20 : 4 A revelation from Him Who Created the earth and the heavens on high.

This has been discussed in 2: 117 and in appendix II.

٦- لَهُ مَا فِي السَّمَوَاتِ وَمَا فِي الْأَرْضِ وَمَا بَيْنَهُمَا وَمَا تَحْتَ الثَّرَى ۝

20 : 6 To Him belongs what is in the heavens and the earth and all between them and all beneath the soil.

Parts of the verse, except the last part, have been discussed in 5: 19. The last portion, "all beneath the soil", i. e., whatever lies under the surface of the earth, will be discussed here.

The earth is a "rocky ball", with an average radius of 6371 km., slightly flattened at the poles. The earth is made up of three main layers, which are



divided into several sub-layers. The first layer, the skin, is known as the crust. Then a layer of partly molten semi-liquid, "porridge like" substance, is known as the mantle. The innermost region of the earth is known as the core.

The crust makes up only 0.6% of the volume of the earth. Its thickness varies from a fairly uniform 5km below the ocean to 35 km under the flat continental surface and as much as 80 km under great mountain ranges like the Himalayas. This crust contains many resources, namely, various minerals, fossil fuels, underground water which is available in pure form, many useful underground parts of plants and microbes helping the nitrogen cycle. The continental crust consists of mainly silicon and aluminium mixed with oxygen. The name given to the material of the continental crust is 'sial' from the first two letters of silicon and aluminium. Similarly, the name given to the material of the ocean crust is 'sima' from its main components, silicon and magnesium.

Below the crust, there is a layer of semi-solid material, about 70 km thick. This is known as lithosphere. Our planet's main feature lies in the fact, that its surface together with the lithosphere, is broken up into a number of cold, rigid lithospheric plates.

Below the lithosphere, there is a very pronounced change in structure, marked by boundaries, known as Moho discontinuity. Below this line, lies the mantle, which goes down to a depth of 2900km and makes up more than 82% of the volume of the earth. From 75 km to 250 km, there is a region, where the mantle is warm, relatively plastic, partially molten, like thick porridge. This layer is termed asthenosphere. This treacly layer, allows the solid lithospheric plates to move about, shifting the continents around the globe. The plates move slowly at the rate of 5 cm to 10 cm per year. This motion is apparently caused by the thermal convective motion of rock in the mantle and by gravity and rotation of the earth. The asthenosphere is also the source of new crustal material in the form of magma which rises to the surface from the interior.

The rest of the mantle of semi-liquid nature is known as mesosphere.

Deeper still, there is the core, divided into two layers; the outer core and the inner core. The outer core is 2100 km thick and the inner core is 1370 km in radius at the centre of the earth. The outer core is made up of liquid iron with a slight amount of sulfur mixed with it. The inner core is probably solid, having iron and other heavy elements in it.

One most important result of the existence of the rotating core of molten iron, is that it produces the magnetic field of the earth called the magnetosphere.

As far as present human knowledge goes, these are the substances that lie beneath the surface of the earth and all these belong to Allah. Thus from the scientific investigations of the interior of the earth it is evident that quite a number of products and processes lie hidden beneath the surface of the earth. Full knowledge of all this is with Allah to whom indeed belongs whatever is above or below the surface of the earth.<sup>1,2,3</sup>

### References

1. J.C. Brandt, and Maran S.P., *New Horizon in Astronomy*, W. H. Freeman and Company, San Francisco,.
2. J. Gribbin, *Genesis*, Oxford University Press, Oxford.
3. B. M. Cordell, *Venus Astronomy*, September 1982.

٣٩- أُنْقِذْنِيهِ فِي الثَّابُوتِ فَأَقْدِفْنِيهِ فِي الْيَمِّ فَلْيُلْقِهِ الْيَمُّ بِالسَّاحِلِ  
يَأْخُذُهُ عَدُوٌّ لِي وَعَدُوٌّ لَكَ وَالْقَيْتُ عَلَيْكَ مَحَبَّةٌ مِنِّي ۖ وَبُخْصَنَةٌ عَلَى عَيْنِي ۚ

20:39 Throw (the child) into the chest, and throw (the chest) into the river. The river will cast him up on the bank, and he will be taken up by one who is an enemy to Me and an enemy to him; But I cast (the garment of) love over you from Me: and (this) in order that you may be reared under Mine eye.

Prophet Musa (a. s.) was born at a time when the Pharaoh of Egypt, out of his hatred towards the Israelites, ordered all their male children to be killed when they were born. The mother of Musa (a. s.) hid the child until further concealment was impossible. In this verse we are told of a divine inspiration which she got, to put the child in a chest and float it down the river, Nile which passed through the Pharaoh's garden. The chest floated down through the Pharaoh's garden, settled among the reeds growing by the bank and was finally picked up by the Pharaoh's people to be adopted by the wife of the Pharaoh.

The point of scientific discussion under this verse is the possible nature of the chest in which the child was floated down the river. A reed by *Cyperus papyrus* was very dominant along the Nile during that period as is evident by the many paintings discovered in the Pyramids. The stems of this reed were extensively used at that time for the construction of sea going vessels, and also for various articles like baskets, chests, and other similar household articles. The strength and buoyancy of this reed and the possibility of its use in use in the fabrication of boats by the ancient Egyptians was proved in recent years by the successful sea voyage made across the Atlantic in a boat entirely made of papyrus stems. That a small chest strong enough to beat the weight of an infant while floating down the river could have been well possible. The biblical commentators specifically mention the name of papyrus in the narration of this story.

٥- قَالَ رَبُّنَا الَّذِي أَعْطَى كُلَّ شَيْءٍ حَلْقًا وَخَلَقَهُ ثُمَّ هَدَى ۙ

**20: 50 He said: "Our Lord is He Who gave each (created) thing its form and nature and further, gave (it) guidance."**

This verse can be interpreted both in terms of the microscopic and macroscopic structure of all living and non-living matter. The form and nature of elements for example is basically determined by their atomic structure. Man has not created these structures. He has understood them and utilised them for various purposes (production of Xray, generation of electricity from nuclear reactors etc.). The atomic and nuclear structures are in turn determined by the nature of the forces. For example, the motion of the electrons in atoms is governed by the electromagnetic interaction while the motion of the nucleons (protons and neutrons) in the nucleus is determined by the strong nuclear force. Also operative in the nucleus is the weak nuclear force. Incidentally the weak nuclear force and the electromagnetic force have been unified and are known as different manifestations of the electro-weak force. It is interesting to note that the addition of one or two electrons (and hence of one or two protons in the nucleus to make the atom electrically neutral) drastically alters the properties of things. Lithium 6 which is the lightest metal has 3 electrons and 3 protons in its atom. If we add one more proton to this, we get Beryllium which is unstable and decays into two Helium nuclei. Why Beryllium is not stable is a question of great significance and has been dealt with under verse 3: 191. In fact, it was shown that if Beryllium were stable, our universe would not presumably have existed. Thus the structure of Beryllium is not an accident but rather is part of a Grand Design. A further interesting example can be had in the structure of helium 4. An atom of helium has 2 protons and 2 neutrons in the nucleus and 2 electrons in the atomic orbit. As a result of this structure, helium which is an inert gas is exceedingly stable. It is interesting to note that liquid helium can never be solidified under any pressure whatsoever. Thus properties of things, their appearance, colour, odour, hardness etc. are determined by their atomic structure and each structure has its own utility. On the macroscopic scale, the gravitational force is operative between large bodies and it is this force which keeps the planets in their orbits and is also responsible for the structure and motion of other heavenly bodies. Thus every created thing has been given a specific property, Allah as Creator of all the worlds has given things properties which in the final analysis are the results of operations of certain force-laws. In the biological world, the structure of the cell, the basic building block of

life is an enigma. The cell which works like a factory has number of constituents which have definite forms and nature and have specific roles to play\*. Thus through the universe, all things big or small, living or non-living, have been subjected to some laws ordained by Allah and hence have been imbued with specific form and nature.

٥٣-الَّذِي جَعَلَ لَكُمُ الْأَرْضَ مَهْدًا ۖ وَسَاكًا لَكُمْ فِيهَا سُبُلًا ۚ وَأَنْزَلَ مِنَ السَّمَاءِ مَاءً ۖ فَخَرَجْنَا بِهَا أَزْوَاجًا مِنْ تَحْتِهَا شَيْءٍ ۝

20: 53 “He Who has made for you the earth like a carpet spread out; has enabled you to go about therein by roads (and channels); and has sent down water from the sky.” With it have We produced diverse pairs of plants each separate from others.

### Spreading of earth as carpet and provision of roads

The part of this verse dealing with the earth being spread out like a carpet, has been explained under verse 2:22; the part dealing with communication can be explained as follows:

Communication plays a vital role in trade and commerce influencing, controlling and directing human activities. In ancient times roads developed through regions. Examples are the old trading routes, namely the famous silk route connecting China with India, Grand Trunk Road etc. Mountain ranges form formidable barriers between plateaus and plains, Mountain ranges originating from the Pamir knot enclose the plateaus of Tibet, Persia and Yunnan and Indus and Gangetic plains in Asia from each other (Fig. 10). The young fold mountains of the Alps in south Europe, formed of many mountain loops, enclose plains and plateaus. Rocky mountains in the northern America and the folded ranges of the Andes in southern America enclose plains, and plateaus in the western sides of the Americas. Generally speaking some passes act as doors between plains and plateaus separated from each other by these folded mountain ranges. For example, the Bolan pass connects Iran with Quetta in Pakistan, the Khyber pass connects

- \* Even the physical attributes of man and other living things are wholly determined by the arrangements of genes in their respective DNA molecules, which have been identified as the hereditary blue-prints of life.

Afganistan with Peshwar in Pakistan, and the Gomal pass connects Ghazni in Afganistan with Dera Esmail Khan in Pakistan. There are two difficult roads leading from the town of Srinagar in Kashmir across the Zojila pass and Karakoram pass. From Indian Punjab to Tibet is the Shipki pass. Across the mountains between India and Burma there are four rarely used routes—the Tuzu gap, the Manipur route, the An and Taungup passes. In Canada the great barrier formed by the Rocky Mountains has been surmounted by railways at the Kicking Horse and the Yellow Head passes.

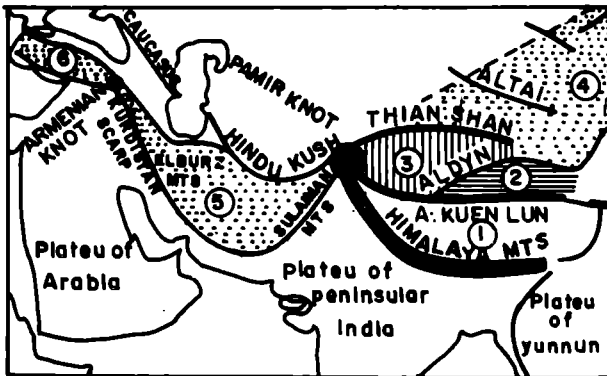


Fig. 10. A simplified map of mountain ranges and plateaus in Asia. Here, number (1) represents the plateau of Tibet, (2) a swamp, (3) the Tarim basin, (4) the desert of Gobi, (5) the plateau of Iran, and (6) the plateau of Asia Minor.

The importance of trade and commerce between different countries and geographical areas prompted man to look for superior means of transport. Technology ushered in a revolution in the land communication system by introducing railways. Rapid development of automobiles in the mid twentieth century necessitated the construction of many metalled roads and bridges in the developed countries. Even developing countries are progressing rapidly towards better and better road communication system.

Waterways play the second important role in communication. In Canada the Great Lakes and St. Lawrence river, in the U.S.A. the Mississippi and Warrior rivers, the Rhine river in the central Europe, the Nile, Niger and Congo in Africa, the Yangtze in China, the Mekong in Indo-China, the Irrawaddy in Burma and the lower courses of the Ganges and Brahmaputra form a navigation system comparable to highways.

It should be noted that the bulk of the world's trade passes along well marked ocean highways. These highways not only run from one well

equipped port to another, but there are facilities for fuelling and servicing stations *en route*. These routes are surveyed and well charted, the dangerous spots marked by light houses and lightships. The Suez Canal forms the converging point for numerous sea routes. Similarly, the Panama canal facilitates navigation in the West Indian routes. The digging of canals at Suez and Panama was facilitated by the special geographical advantage provided by a narrow strip of land connecting large masses.

This discussion establishes the Quranic assertion that by spreading the earth like a carpet, Allah enabled man to travel by various types of communication routes bringing immense benefit to him.<sup>1,2</sup>

### **Falling of raindrop from the sky**

This part of the verse referring to the falling of raindrops from the sky has been explained under verse 2:22.

### **Pairs of diverse kinds of vegetation**

ازواج meaning pairs here evidently refers to phenomenon of sex in plants. sexual reproduction through two parents (a pair in which one is male and the other is female) takes place when two separate reproductive units originating from two different plants, male and female, results in a new combination of chromosomes in the offspring. Thus, sexual reproduction permits an almost endless number of combinations of characters and has a tremendous advantage in increasing the chance of a species to adjust to changing conditions in the environment.

The next point of emphasis in the verse is on the diversity of plants. An estimated number of 350,000 species of plants are adapted to widely different environmental conditions—from arctic to tropic, terrestrial to aquatic, and aerobic to anaerobic—and show great diversity of shapes and forms. The flowering plants alone range in size from trees weighing many tons to tiny water plants about the size of a rice grain. In spite of this diversity, they show an extra-ordinary unity of pattern at all levels of organization and in both structure and function. One example of unity of pattern is the phenomenon of sex, which, excepting in a few primitive groups like bacteria and blue green algae, is almost universally present in plants. The consequences of sexual reproduction affect heredity, the mechanism of evolution and much of the behaviour of organisms. This again results in the tremendous diversity in plants that we observe today.

There is also an allusion to sex but with a slightly different explanation in verse 13: 3 where the phrase نَدَجِين was used. A detailed discussion on this was given as a possible interpretation of the verse there.

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٥٢- كُلُوا وَارْعَوْا أَنْعَامَكُمْ إِنَّ فِي ذَلِكَ لَآيَاتٍ لِأُولِي النُّهَىٰ

20 : 54 Eat (for yourself) and pasture your cattle; Verily, in this are Signs for men endued with understanding.

In this verse is the continuation of the theme started in the previous one exemplifying, the train of events following rainfall eventually leading to the production plants exhibiting different sexes and biological diversity. In the present verse, the emphasis is placed on the bounty of Allah in the form of food which we derive from the greenery not only for ourselves but also for our cattle. Our staple food from cereals, pulses, and rootcrops, and all the edible fruits of varying degrees of palatability are the produce of green plants some of which are domesticated by man. The remaining part of vegetation consisting mostly of grasses and other weeds which by their chemical constitution are unfit for human stomachs, nevertheless form a rich pasture for cattle and other domestic herbivorous animals whose digestive tracts are admirably suited to such food.

A man endued with understanding will at once see the great wisdom and beneficence of Allah in providing nourishment for the survival of man and his cattle from the plant kingdom which, incidentally, is a link in the food cycle, the herbivorous animals consuming green plants, the omnivorous man partaking of both vegetable food and meat of the cattle which thus indirectly comes from greenery, thus confirming the saying, 'All flesh is grass'. The dead and decomposed remains of man and cattle add to the productivity of the soil in the form of essential elements which are so important for the luxuriant growth of greenery. These are indeed portents for men of thought and understanding.

٥٥- مِنْهَا خَلَقْنَاكُمْ وَفِيهَا نُعِيدُكُمْ وَمِنْهَا نُخْرِجُكُمْ تَارَةً أُخْرَىٰ

20 : 55 Thereof (earth) we created you, and thereunto We return you, and thence We bring you forth a second time.

That man is created from the elements of the earth has already been discussed in verse 18 : 37.

That all men will return to earth needs some explanation. The same idea is expressed in the Bible-Dust thou art, to dust thou returned. Different nations have different modes of disposal of the dead body. The Jews, the Christians and the Muslims have the practice of burying the dead bodies in the grave, where they decompose and directly mix with the soil. In the case of Muslims, the shroud of cloth offers little obstruction against the decomposing processes. The use of wooden coffins by the Jews and Christians only delays the process of mixing the decomposed body with the soil. The coffin will take a long time to disintegrate. If the dead body is interned in stony or concrete vaults then the body will decompose as usual by the saprophytic organism present in the dead body but it will take a long time to mix with the soil. The ancient Egyptians used to embalm the dead body and wrap it with linen and intern it in concrete graves or pyramids. Many such dead bodies are still preserved. So these bodies take more time to mix with the soil.

Another method of disposal of the dead bodies is cremation. The Hindus cremate their dead on a wooden pyre usually on the banks of river or sea, the remains of the bodies as ashes are often thrown in the river or sea. The part that is released into the atmosphere in gaseous form returns to earth through raindrops. The ultimate result is the return of the constituents of the dead bodies into the soil.

The Parsees put their dead bodies at the top of a high tower where vultures eat the flesh, the bones are allowed to drop below through an opening which ultimately mix with the soil. The vultures will produce their droppings out of the flesh they devour which falls on the soil and they themselves will ultimately die and mix with the soil.

Similarly if one is drowned in river or sea and if the dead body is not found for burial, its remains will ultimately meet the soil through the fishes, sharks etc. or by decomposing in the sea or river bed.

It is therefore true that all human beings after their death will return to the soil.

The third part of the verse refers to reviving the dead on the day of Judgement and this subject is beyond the scope of our present discussion.

٤٠- قَالَ آمَنْتُمْ لَهُ قَبْلَ أَنْ أَدْنِ لَكُمْ إِلَهُهُ لِكَيْ يُرْكَمَ الَّذِي عَلَّمَكُمْ السِّحْرَ فَلَا وَقَطَعَنَّ  
 أَيْدِيَكُمْ وَأَرْجُلَكُمْ مِنْ خِلَافٍ وَلَا وَصَلْنَاكُمْ فِي جُذُوعِ النَّخْلِ  
 وَتَعْلَمُونَ إِنَّمَا أَشَدُّ عَذَابًا وَأَبْقَى ۝

20: 71 (Pharaoh) said : you put faith in him before I give you permission. Indeed he is your chief who taught you magic so I shall cut off your hands and feet alternately, and I shall crucify you on the trunks of palm trees and you shall know for certain which of us has sterner and more lasting punishment.

The punishment mentioned here was typical of that period. If the hand and foot are cut off on one side then the man is unable to stand or move. If alternate limbs are cut one may still manage to stand and move with some aid because man maintains the balance by opposite limbs. The idea was to make the punishment more public. So the Pharaoh ordered the cutting off of the alternate limbs. He also extended the threat of crucifixion which is the severest possible punishment. The method of killing by crucifixion is time consuming suffering entailing continued suffering for a long time. On a cross the accused used to be nailed or fastened. The cross was a wooden column of the trunk of a palm tree. The accused would be left on the cross to die of bleeding, shock and exhaustion.

٨٠- يَبْنَؤُا إِسْرَائِيلَ قَدْ أَنْجَيْنَاكُمْ مِنْ عَدُوِّكُمْ وَوَعَدْنَاكُمْ جَانِبَ الطُّورِ الْأَيْمَنِ  
 وَنَزَّلْنَا عَلَيْكُمُ الْمَنَّاءَ وَالسَّلْوَى ۝

20 : 80 O Children of Israel ! We delivered you from your enemy, and We made a covenant with you on the holy mountain's side and sent down on you the manna and quails;

Only the third part of the verse which refers to *manna* and *salwa* is relevant for discussion. This has been discussed under verse 2 : 57.

۞۞۞ كُلُوا مِنْ طَيِّبَاتِ مَا رَزَقْنَاكُمْ وَلَا تَطْغَوْا فِيهِ فَيَحِلَّ عَلَيْكُمْ غَضَبِي ۖ  
 وَمَنْ يَحِلَّ عَلَيْهِ غَضَبِي فَقَدْ هَوِيَ ۝

20: 81 (Saying) : “Eat of the good things wherewith We have provided you, and transgress not lest My wrath come upon you, and he on whom My wrath comes, he is lost indeed.”

Here Allah refers to His mercy on the children of Israel when they were delivered from captivity in Egypt by Hazrat Musa (a.s.) and provided with ‘*manna*’ and ‘*salwa*’ (quails) as their food. Manna provided the carbohydrate and the quails provided the protein and fat, the three essential ingredients of food. Since these are nourishing and wholesome, Allah mentions them as good food for men. These are discussed under verses 2 : 57, 7 : 160 and 22 : 80.

۞۞۞ وَيَسْأَلُونَكَ عَنِ الْجِبَالِ فَقُلْ يَنْسِفُهَا رَبِّي نَسْفًا ۝

20: 105 They ask you concerning the Mountains. Say “My Lord will uproot them and scatter them as dust.”

The uprooting of the mountains and their scattering as dust has been discussed under verse 18 : 47.

۞۞۞ أَلَمْ يَهْدِ لَهُمْ كَمْ أَهْلَكْنَا قَبْلَهُمْ مِنَ الْقُرُونِ يَسْتُنُونَ فِي مَسْكِنِهِمْ ۚ

20: 128 Is it not a warning to such men (to call to mind) how many generations before them We destroyed, in whose haunts they (now) move ? Verily, in this are Signs for men endowed with understanding.

The verse is a general statement as a warning to the people who were being addressed through the Prophet about the annihilation of many generations which have been discussed under verses 7 : 4 and 7 : 64.

۱۳- فَأَصْبِرْ عَلَىٰ مَا يَقُولُونَ وَسَبِّحْ بِحَمْدِ رَبِّكَ قَبْلَ طُلُوعِ الشَّمْسِ وَقَبْلَ غُرُوبِهَا ۖ  
 وَمِنْ أَنَاةِ اللَّيْلِ فَسَبِّحْهُ وَأَطْرَافَ النَّهَارِ لَعَلَّكَ تَرْضَىٰ ۝

20 : 130 Therefore, (O Muhammad), bear with what they say, and celebrate the praise of your Lord before the rising of the sun and before the going down thereof and glorify Him some hours of the night and at the ends of the days, that you may find acceptance.

In our daily life we experience only two ends of the day one at the time of sunrise called the dawn and the other at the time of sunset called the dusk. There is mention of two ends of the day in verse 11 : 114.

But in this verse the word used is اطراف (plural of طرف) which obviously signifies more than two ends. How can we conceive more than two ends of a day ?

The normal phenomenon of two ends of the day will be experienced by an observer localised at a particular region, but if he happens to move east or westward with considerable speed the situation will change. Let us consider a person boarding a high-speed aeroplane, moving, say, at a speed of 2,000 miles per hour in the western direction from a particular place immediately after sunset. If the plane lands at a place 2,000 miles away, he will find to his amazement, the sun shining appreciably above the horizon and he will experience another sunset within 15-20 minutes time, and if he continues the onward journey and stops again after one-hour long flight, his experience of yet another sunset will be repeated. Thus we find that for a moving observer it is possible to come across more than two ends of the day. In the ultimate analysis the rotundity of the earth coupled with its diurnal revolution about its axis is responsible for such occurrences. Likewise if one travels to the west at a similar speed immediately after observing sun rise at a particular place, one would observe a number of sunrises thus experiencing more than two beginnings of the day, much to one's amazement; this would naturally make one utter the praises of Allah.

بِمَا أَمَدْتُمْ قَبْلَهُمْ مِنْ قَرْيَةٍ أَهْلَكْنَاهَا أَفَلَهُمْ يُؤْمِنُونَ ○

21 : 6 (As to those) before them not one of the populations which We destroyed believed. Will they believe?

This verse is in reference to the previous verse 21 : 5 wherein the people who were being addressed through the Prophet wanted to see miracles as shown by other previous Prophets. That the people wanted to see miracles performed by the prophets has been referred in verses 17:90-93. Many performances of Prophet Ibrahim (a.s.), Daud (a.s.), Sulaiman (a.s.) and Isa (a.s.) are believed to be miracles.

The present verse states that though miracles were performed by the prophets before this, the people did not believe in them and for that many populations were destroyed. Neither any particular prophet nor any particular people has been mentioned. The matter of destruction of some people has been discussed in verses 7: 4, and 7 :64.

○ وَكَمْ قَصَمْنَا مِنْ قَرْيَةٍ كَانَتْ ظَالِمَةً وَأَنْشَأْنَا بَعْدَهَا قَوْمًا آخَرِينَ ○

21: 11 How many were the populations We utterly destroyed because of their iniquities, setting up in their places other peoples?

The verse refers in general to the destruction of populations for their iniquities and setting up other people in their places. No particular people and place has been mentioned. The matter of destruction of various generations has been discussed in connection with verse 7:4 and 7:64 and the matter of other people living in the place of these destroyed people has been discussed in connection with verse 20: 128.

○ وَمَا خَلَقْنَا السَّمَاءَ وَالْأَرْضَ وَمَا بَيْنَهُمَا مَهْزِينَ ○

21: 16 Not for (idle) sport did We create the heavens and the earth and all that is between!

The content of this verse is similar to that of 3:191 which has been explained earlier.

٣٠- أَوَلَمْ يَرِ الَّذِينَ كَفَرُوا أَنَّ السَّمَوَاتِ وَالْأَرْضَ كَانَتَا رَتْقًا فَفَتَقْنَاهُمَا  
 وَجَعَلْنَا مِنَ الْمَاءِ كُلَّ شَيْءٍ حَيٍّ أَفَلَا يُؤْمِنُونَ ○

21 : 30 Do not the unbelievers see that the heaven and the earth were joined together (as one unit of creation) before We clove them asunder? We made from water every living thing. Will they not then believe?

### Cleaving asunder of the heaven and the earth

It is accepted by the scientists that everything in the heavens and earth, i. e., all matter, were joined together and contained in an ultra small, ultra dense and ultra hot blob at a singular point. At zero time which can be marked as the cleaving asunder of this blob with a big bang, creation started. Physics can not account for the condition of the blob at the singularity, at time zero and at infinite density. At  $10^{-43}$  seconds after the Big Bang, gravity broke free from the single unified force, presumed to exist then. The universe is, at this instant  $10^{-28}$  cm in diameter and temperature is  $10^{-32}$  K. At  $10^{-32}$  seconds after the Big Bang energy begins to congeal in particles of matter, such as quarks, electrons and their mirror images, called antimatter. The universe inflates to the size of a soft ball. At  $10^{-6}$  seconds after the Big Bang the universe grew to the size of our solar system with temperature  $10^{13}$  K. At this lower temperature quarks bind into protons and neutrons. Three minutes after the Big Bang protons and neutrons fuse into atomic nuclei; electrons are still too energetic to be bound in atoms. At this stage the temperature of the universe is  $10^9$ .  $10^5$  years after the Big Bang electrons join with nuclei to make atoms. Radiation separates from matter and light travels through space. At this stage temperature was 3000 K. After  $10^9$  years of the Big Bang, temperature came down to 15K. Quasars formed and the universe assumed its familiar appearance with galaxies receding from one another at tremendous speed. Thus although we see matter organized at different levels, initially all forms of matter were joined together and then they were cleft asunder to become what they are now.

## Creation of every living thing from water

The life process comprises a series of chemical reactions using carbon based molecules, by which matter is taken into a system and used to assist the system's growth and reproduction with waste products being expelled. Organisms are composed of one or more cells containing an infinite array of organic and inorganic molecules. Codes for reproduction and multiplication are contained in the deoxyribonucleic acid (DNA) located in a central nucleus. Chemical reactions in primitive environment that surrounded the earth during its early history could give rise to the first speck of life. In 1950, chemist S. L. Miller put a gaseous mixture of hydrogen, ammonia, methane and water vapours over a pool of water and passed electric sparks over it. After a few days the water in the pool contained a solution of amino acids, various combinations of which make proteins. Scientists speculate that this kind of chemical activity in the "primary broth" led to the first living cells.<sup>1</sup>

Very soon objections were raised to this "primary broth" hypothesis. The molecular structure of DNA, the code or master blueprint of life, was known by this time. It was found so complicated that many disbelieved that DNA was produced in water where the possibility of the various constituents of DNA being joined together was impossible. The DNA looks like a twisted ladder, a double helix as it is called by the scientists. The rungs in the ladder are made up from the joining of various pairs of four molecules, namely, adenine (A), thymine (T), guanine (G) and cytosine (C). Each rung of the ladder is always formed by pairing molecules like AT or TA, GC or CG. The order of AT, CG, GC, and TA varies from gene to gene ensuring hereditary traits being passed over to the offspring. The rungs of the DNA molecule are the same in all living things. The differences among all living things result from the way the rungs are arranged, as well as from the ratio of the number of AT (or TA) to GC (or CG). This order and ratio makes all the differences between a flea and a dog, a rose and a cactus, a man and a monkey.<sup>2</sup>

J. D. Bernal has spoken of the role of sun baked clay in the beaches in bringing the various constituents of DNA together.<sup>3</sup> This has been discussed in detail under verse 6 : 2. Chemically clay consists of stacks of sheets of silicate, with just enough clearance between individual sheets to allow air or water to circulate. The baking and wetting of clay by the sun and sea water supplies the electrical energy for combining molecules. Clay's



electrical fields would have imposed certain orientations on any compounds passing through them. Scientists today believe that the first speck of life was evolved when complex molecules in the primary broth passed through the layered structure of clays. The most dramatic event of all was the primordial advance from non-life to life, which apparently took place in the sun baked clays of ocean beaches.

However, all the scientific views as discussed above about the origin of life from the 'primary broth' is an oversimplification of the reality. All the molecules that constitute life when put together in a jar would not make life. The beginning of life must be from a DNA. The complex molecular structure of DNA poses an overwhelming problem as to its beginning by chance. For example, the DNA of a virus contains about two hundred thousand rungs and a DNA molecule within a human chromosome is made of at least six billion rungs. If a rung is misplaced a mutation occurs. Thus from various combinations of the rungs only one combination has been suitable for human beings. If in the primary broth each of the various possibilities took place only a few days, the probability of the simplest DNA evolving by chance would be well nigh impossible, and the possibility of human DNA evolving by chance is almost impossible when we consider that there are 2 six billion possibilities of the rungs being rearranged.

## References

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۳۱- وَجَعَلْنَا فِي الْأَرْضِ رَوَاسِيَ أَنْ تُكِيدَ بِهِمْ ۖ وَجَعَلْنَا فِيهَا فِجَاجًا سُبُلًا  
لَعَلَّهُمْ يَهْتَدُونَ ○

21 : 31 And We have set on the earth mountains standing firm, lest it should shake with them; and We have made therein broad highways (between the mountains) for them to pass through ; that they may receive guidance.

It has been discussed in verse 20 : 105 how mountain ranges are produced by plate tectonics, when continental plates collide against each other. As the pressure of collision is not uniform, mountains are produced separately of different heights, forming valleys and passes. Mountains stand on firm bases, as the depth of the earth's crust is about 80 km under mountains, whereas in other places, about 35 km under the continents and about 5 km under oceans. When two plates collide against each other a tremendous elastic field is produced resulting in tremours. At the initial stage of mountain formation, there are vigorous earthquake activities arising from this factor. The formation of mountain relieves the elastic field and thus reduces the magnitude of tremor. Passes are usually narrow paths between mountains, affording passage from one slope to the other and sometimes between barriers. A pass may have great strategic importance. The course of the history of nations has often been determined by the success or failure in defending its passes. Land trade routes must necessarily cross passes. Some of the important passes of the world are Khyber and other passes of the Himalayas, Thermopylae of Greece. St. Bernard in the Alps, Daryal in the Caucasus etc. Thus it is evident that Allah has created passes between mountains to facilitate journeys from one place to another separated by mountains.

۳۲- وَهُوَ الَّذِي خَلَقَ اللَّيْلَ وَالنَّهَارَ وَالشَّمْسَ وَالْقَمَرَ ۗ كُلٌّ فِي فَلَكٍ يَسْبَحُونَ ○

21: 33 It is He Who created the night and day and the sun and the moon; all (celestial bodies) swim along (each in its rounded course).

The creation of night and day and of the sun and the moon has been discussed in verses 2:164; 7: 54 and appendices I and II. Previously it was assumed that except the sun, moon and the planets, all other celestial bodies are fixed on the celestial sphere. They appear to have no motion of their own, but seem to move due to the rotation of the celestial sphere. Now it is established that every celestial body has a definite motion of its own. Thus, the earth has the motion of revolution round the sun, making a complete revolution in 365.24 days. Similarly, the period of revolution of the moon is 27.3 days, that of Mercury 88 days, of Venus 225 days, of Mars 1.88 years, of Jupiter 11.9 years, of Saturn 29.5 years, of Uranus 84 years, of Neptune 165 years and of Pluto 248 years. The sun, along with other stars of the Milky Way galaxy moves at the rate of 250 km/s. Other galaxies are also moving with tremendous speed ranging from about 2000 km/s to 50,000 km/s. The most distant celestial bodies, the Quasars move with still higher velocities, some with velocity up to 90% the velocity of light. Thus the real significance of this verse may be comprehended through a knowledge of astrophysics.

٢٣- وَمَا جَعَلْنَا الْبَشَرَ مِنْ قَبْلِكَ الْخَالِدِينَ أَفَأَنْتُمْ مِمَّنْ فَهَمُّ الْخَالِدِينَ ○

٢٥- كُلُّ نَفْسٍ ذَائِقَةُ الْمَوْتِ وَنَبْلُوكُمْ بِالْأَشْرِّ وَالْخَيْرِ فِتْنَةً وَإِلَيْنَا تُرْجَعُونَ ○

21: 34-35 We appointed immortality for no human being before you. What! If you die, can they be immortal?

Every person must have a taste of death; We try you with evil and with good for ordeal. And unto us you will be returned.

That no human being is granted eternal life on earth is obvious. Longevity varies among various nations but few live for more than a hundred years of age. Improved diet and public health, effective control of preventable diseases and improved methods of early diagnosis, treatment and even transplantation of certain organs have increased average longevity to a certain extent but still few survive beyond 100 years. In the developed countries, improved living conditions have led to fewer infant deaths, and increased the number of old people.

That all living beings on earth must die is also obvious. This is an eternal truth. The only certain sign of death is stoppage of the heart, heart which is confirmed by the stethoscope when no heart sound is heard. Other important signs of death are stoppage of breathing confirmed by observing that a mirror held before the mouth shows no haze or a feather placed on the upper lip does not flutter or that the reflection on the ceiling from a cup of water placed on the chest of the dead person shows no movement. Another important sign of death is absence of bleeding on cutting the skin or a blood vessel. Other apparent signs are relaxation of the facial muscles leading to staring eyes and gapping mouth (Hippocratic), loss of the curves of the back, discoloration of the skin, absence of blistering and redness of skin on burning (Christisons sign).

The introduction of organ transplantation and mechanical means of resuscitation, such as respirators by which and individual's heart can be kept almost indefinitely have created difficulties in determining death in some cases. To avoid this problem, the concept of "brain death" (cellular death) has been introduced. If there is no evidence of brain activity as shown by the absence of reflexes electroencephalogram, death is assumed to have occurred even though breathing and the beating of the heart can be maintained by artificial methods.

So far as our life is concerned all the living cells are ordained to the senile decay. The decay may be artificially delayed but not indefinitely.

٩٠- وَأَسْتَجِبْنَا لَهُ، وَوَهَبْنَا لَهُ، يَحْيَىٰ وَأَصْلَفْنَا لَهُ زَوْجَهُ، إِنَّهُمْ كَانُوا يُسْأَلُونَ  
 فِي الْخَيْرَاتِ وَيَدْعُونَنَا رَغَبًا وَرَهَبًا، وَكَانُوا لَنَا خِشوعِينَ ○

21: 90 So We listened to him and We granted him Yahya : We cured his wife's (barrenness) for him. these (three) were even quick in emulation in good works: they used to call on Us with love and reverence, and humble themselves before Us.

Here Allah refers to the birth of Yahya (a.s.) to his apparently barren mother in response to the prayer of his father Prophet Zakariya (a.s). This subject has already been discussed in verses 19: 8, 19:9.

٩١- وَالرَّبِّي أَحْصَيْتْ فَرْجَهَا فَتَلَفْنَا فِيهَا مِنْ لُجُونَا وَجَعَلْنَاهَا وَابْنَهَا آيَةً  
لِّلْعَالَمِينَ ۝

21:91 And she who was chaste, then We breathed into her of Our Spirit, and We made her and her son a Sign for all peoples.

Here Allah refers to the virgin birth of Isa (a.s. to Mariueu (a. s.)). The miraculous birth has already been discussed as a probable example of parthenogenesis; during the discussion of verses 19: 20, 19:21.

١٠٢- يَوْمَ نَطْوِي السَّمَاءَ كَطَيِّبِ التَّيْلِ لِنُكْتِبُ كَمَا بَدَأْنَا أَوَّلَ خَلْقٍ نُعِيدُهُ  
وَعَدًّا عَلَيْنَا إِنَّا كُنَّا فَاعِلِينَ ۝

21:104 The day that We roll up the heavens like a scroll up for books (completed), even as We produced the first creation, so shall We produce a new one: a promise We have undertaken, truly shall We fulfil it.

Here Allah gives a hint about the final state of the universe—the universe which was created with a big explosion, the big bang. The velocity of expansion, following the explosion that accompanied the Big Bang, is still effective. Galaxies and clusters of galaxies are receding from one another with tremendous velocities; the greater the distance, the greater is the velocity of recession.

A question which arises is: will the universe continue to expand for ever? To counteract this force of expansion, there acts the force of attraction due to gravity. Due to this force, clusters of galaxies and individual galaxies are attracted to one another. Thus the force of gravitation slackens the rate of expansion. Two opposite forces, gravitation and expansion, are acting on the universe. Till now, the force of expansion has dominated over that of gravitation; so the galaxies are still receding from one another. If the force of expansion continues to dominate the universe will continue to expand. Its

rate may decrease, may even tend to zero, but the universe will continue to expand and will remain open. If, on the other hand, the force of gravitation gets the upper hand; a time will come, when the rate of expansion will begin to decrease and ultimately become zero. But the force of gravitation still continues to act. As a result, the universe will begin to contract and finally collapse with a big crunch into a ultra small, ultra dense blob of matter.

The result of the tug of war between the force of expansion and that of contraction due to gravity, depends on the average density of matter present in the universe. If the average density is less than a critical value, the force of expansion gets the upper hand; the universe continues to expand and remains open for ever. If on the other hand, the average density of the universe exceeds the critical value, the force of contraction gets the upper hand, the universe closes on itself and begins to contract till it collapses with a big crunch.

This critical value of the average density of matter in the universe, is equal to the mass of the moon per cubic lightyear. Considering the mass of all the known matter in the universe, the average density becomes only 30% of the critical value. In such a position the universe will continue to expand and remain open. But there is evidence of a huge amount of dark, unseen matter within the galaxies. This dark matter consists of black holes, dim and burnt out stars, a great many Jupiter-sized objects that were not massive enough to ignite into stars. The most fascinating cases are those of tiny neutrinos that were created early in the Big Bang and are still being created in stars. Neutrinos were supposed to be chargeless, massless points of energy. In 1980, Soviet and American experiments indicated that neutrinos might have a very small mass.<sup>1</sup> Big bang neutrinos are nearly as numerous as photons of light. They are so huge in number, that ordinary matter may be like caps of snow on top of mountains of neutrinos. In that case, however small the mass of neutrinos may be, taking into account all possible invisible matter, the average density of matter in the universe will be greater than the critical value; hence a time will come when the universe will begin to contract until it collapses with a big crunch.

That the universe will be rolled up like a scroll is indicated in the programme of the final state of the universe, as envisaged by the American scientist Freeman Dyson.<sup>2</sup> He postulates that about 1 billion years before the big crunch, empty space between clusters of galaxies will begin to

shrink. 100 million years before the big crunch space within individual galaxies will be reduced. The universe will be full of stars only, and the stars will be coming nearer to one another. About 100,000 years before the big crunch galaxies will coalesce and the stars will be so near to one another. About 100,000 years before the big crunch galaxies will coalesce and the stars will be so near to one another that they will shine like one huge sun. About 1000 years before the big crunch there will be collision between the stars and a huge number of black holes will be created. Ultimately these black holes, attracting each other, will coalesce together to form only a single ultra small, ultra hot, ultra dense blob of matter. This is the big crunch.

Some scientists believe that after the big crunch there will be another big bang and a new universe will be created just like the present one. This view appears to be in line with the present verse.

## References

1. G. Philips, *Restless Universe*, Nigel Henbest and Heather Couper. 1980.
2. *Ibid.*

هـ-يَا أَيُّهَا النَّاسُ إِن كُنْتُمْ فِي رَيْبٍ مِّنَ الْبَعْثِ فَإِنَّا خَلَقْنَاكُمْ مِّن نُّرَابٍ ثُمَّ مِنْ تُفْطَةٍ  
 ثُمَّ مِنْ عَلَقَةٍ ثُمَّ مِنْ مُّضْغَةٍ مُّخَلَّقَةٍ وَغَيْرِ مُّخَلَّقَةٍ لِّنُبَيِّنَ لَكُمْ  
 وَتُعَرِّفُنَا فِي الْأَرْحَامِ مَا نَشَاءُ إِلَىٰ أَجَلٍ مُّسَمًّى ثُمَّ نُخْرِجُكُمْ طِفْلًا ثُمَّ لِتَبْلُغُوا أَشَدَّكُمْ  
 وَمِنْكُمْ مَّن يُتَوَقَّىٰ وَمِنْكُمْ مَّن يُرَدُّ إِلَىٰ أَرْذَلِ الْعُمُرِ لِكَيْلَا يَعْلَمَ مِن بَعْدِ  
 عِلْمٍ شَيْئًا وَتَرَى الْأَرْضَ هَامِدَةً فَإِذَا أَنزَلْنَا عَلَيْهَا الْمَاءَ اهْتَزَّتْ وَرَبَتْ  
 وَأَبْتَتْ مِنْ كُلِّ زَوْجٍ بَهِيجٍ

22:5 O mankind! If you are in doubt concerning the resurrection, (consider) that We created you from dust, then out of a drop of seed, then from a leech-like clot, then from a little lump of flesh—partly formed and partly unformed (shapely and shapeless) so that We make clear for you. And We cause whom We will to rest in the wombs for an appointed time, then We bring you out as infants, then give you growth that you attain your full strength. And among you some are called to die and some are brought back to the feeblest old age, so that they know nothing after having known (much). And (further) you see the earth barren and lifeless, but when We pour down rain on it, it is stirred (to life), it swells, and puts forth every kind of beautiful growth (in pairs).

### Creation of man from dust and his embryological development in the mothers womb

In this verse some of the stages of human development in the womb are mentioned. That mankind is created from dust or earth has already been discussed under verses 2:28 and 18:37. From the elements derived from earth through the nutrition of the parents the germ seeds or nutfah نطفة are created. The creation of man from nutfah has also been discussed under verse 16:4. After fertilization of the female ovum



by male sperm, the fertilized ovum (zygote) is anchored in the inner wall of the uterus. There, it starts to grow. The first stage of the growing zygote is called *alāqah* علقه in the Quran. Alaqah in Arabic means a leech-like substance or a suspended thing or a blood clot<sup>1</sup>. The early stage at about 3-4 weeks (24 to 25 days) the developing embryo has a leech-like appearance (Fig. 11) with its swollen proximal part of forebrains as its head. At this stage the cardiovascular system has started appearing and the embryo is now dependent on the maternal blood for its nutrition like a leech.<sup>2</sup> The alaqah stage continues from 15-24 days.

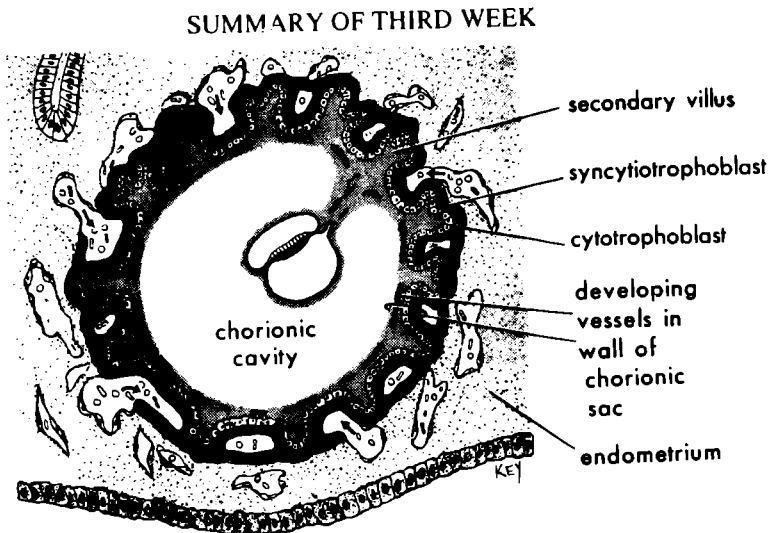


Fig. 11 This figure shows the embryo (alāqah) suspended in the chorionic cavity by the body stalk and is surrounded by fluid of the amnion and yolk sac (after K. L. Moore).

Besides, if the conception at this stage aborts spontaneously or removed by curettage, it will resemble a clot or a rounded mass<sup>3, 4</sup>. Again at about the 15th to 16th day the embryo will look like a mass hanging from the uterine wall into the chorionic cavity<sup>5</sup>. Thus all the three meanings of alaqah are scientifically acceptable.

The next stage of development is *Mudghah* مضغه or a lump of flesh or chewed like substance. This stage continues from 23 to 42 days. The appearance of the embryo at this stage really looks like a chewed

substance with 13 somites resembling teeth prints on a substance which is chewed<sup>6</sup>. (Fig. 12) The somites are paired, block like masses of mesoderm arranged segmentally alongside the neural tube of the embryo, forming the vertebral column and segmental musculature, also called mesodermal segments.

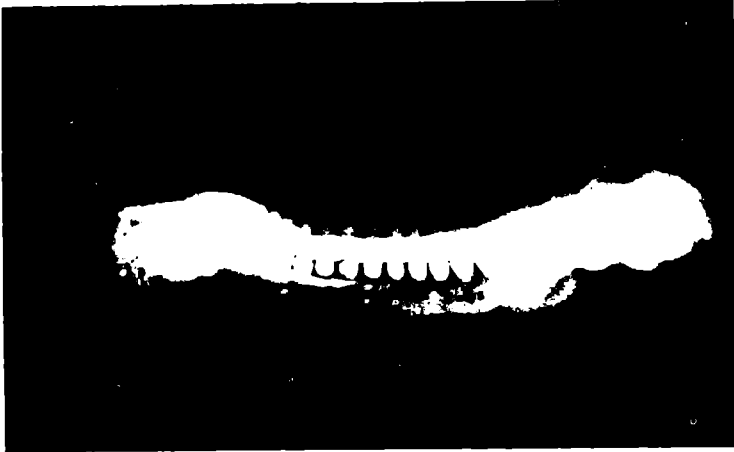


Fig. 12. The stage when the embryo looks like a lump of flesh or chewed like substance (mudghah, after K.L. Moore)

At this stage though the analogues of all organ systems have been formed, their function has yet to appear. The organs and systems are partly differentiated and partly undifferentiated. So the Quranic description of the 'mudghah' as partly formed and partly unformed is scientifically true. Further detail about the development of the embryo is given in verses 23:12-15 which will be discussed later on.

The period of gestation is approximately 266 days or 38 weeks after fertilization or 280 days or 40 weeks after the last menstrual period (LUM). But the actual duration varies widely from a few days to a few weeks before or after the expected date. The period is decided by Allah which is mentioned here as an appointed time according to the Will of Allah. The birth of the infant is also a miraculous event. Then the growth of the infant to childhood and adulthood is all known to us. Here Allah specifically mentions the state of very old age of some persons. The human being becomes strong in adulthood and weak again. in old age. But a small number of people get so

old that they become childlike and forget all that they knew. Such a clinical picture is found in Alzheimer's dementia due to sclerotic change in the brain. It is interesting to note that Allah created us from a zygote in different stages and that all the stages of human reproduction that we know today from our knowledge of modern embryology conform exactly to the stages mentioned in the Holy Quran revealed as early as the seventh century, when the science of embryology was yet to be born.

### **Rain water thrills the barren soil**

The earth without a supply of water for a long time will appear barren due to lack of vegetation although it may contain myriads of seeds of diverse plants. No plant can live without water, and the land dwelling plants depend primarily upon rainfall for this vital water supply. As we look at the greenery with which most of the earth is covered, we can at once appreciate this intimate relationship of plants with water. The seeds that lie in the soil remain inert with no sign of life, and can withstand extremes of temperature. This seemingly sterile land would come to life after rain as dormant seeds germinate in presence of water. The mechanism of sprouting of seeds has been explained in detail under verse 6:95.

The Quranic expressions **اهتزاز** and **ربت** are specially noteworthy. According to Steingass<sup>7</sup>, the former word means becoming agitated, wavering, tottering, exulting or rejoicing, and is translated by Pickthall<sup>8</sup> as thrilling — all the terms that can be used in allusion to the reaction of earth to rain water. It is well known that the physical and chemical change in soil are initiated by the addition of water. The rain drops falling from a great height help in breaking down the clods of earth into smaller fragments, swelling of smaller particles by imbibition and preparing them to a texture congenial to seed germination. The reaction of the parched earth to the downpour of rain, thus, can be very appropriately regarded as 'thrilling' or 'rejoicing'. The word **ربت** meaning 'to feed', 'nourish' or 'bring up', expression explaining aptly the function of the earth which provides nourishment to the developing seedling through the liquid medium **ندج بهيج** literally meaning 'beautiful pairs' can, according to Pickthall, be also interpreted as 'lovely kinds'. The swelling of soil fragments as a consequence of rain, and the

presence of water forming a thin film over the fine soil particles the growth of the diverse kinds of plants forming the beautiful greenery of the earth.

## References

1. K.L., Moore and A.M.A., Azzindani, *The Developing Human with Islamic Additions*, 3rd edn. Dur al-Qiblah for Islamic Literature, Jeddah, p. 73, 1982.
2. *Ibid*, pp. 56-82.
3. M.G. Muazzam, *History of the Discovery of the Mechanism of Reproduction and the Revelation in the Holy Quran*, Pak. J. Science. Vol. 14, No. 6, pp. 281-298, 1982.
4. K.L. Moore and A.M.A. Azzindani, *The developing Human with Islamic Additions*, 3rd edn. Dar al-Qiblah for Islamic Literature, Jeddah, 1982, p. 56a.
5. *Ibid*, p. 67
6. *Ibid*, p. 80.
7. Steingass, *Arabic-English Dictionary*. Cosmo Publications, New Delhi, India, 1982.
8. M. Pickthall, *The Meaning of the Glorious Qur'an*. Kutub Khana Ishayat-Ul-Islam (Regd), Delhi. 1979.

١- ذَلِكَ بِأَنَّ اللَّهَ هُوَ الْحَقُّ وَأَنَّهُ يُحْيِي الْمَوْتَى وَأَنَّهُ عَلَى كُلِّ شَيْءٍ قَدِيرٌ ۝

22: 6 This is so, because Allah is the Reality, it is He Who gives life to the dead, and it is He Who has power over all things.

The part of the verse dealing with the giving of life by Allah to the dead has been explained under verse 2:28.

١٨- أَلَمْ تَرَ أَنَّ اللَّهَ يَسْجُدُ لَهُ مَن فِي السَّمَاوَاتِ وَمَن فِي الْأَرْضِ وَالشَّمْسُ وَالْقَمَرُ  
وَالنُّجُومُ وَالْجِبَالُ وَالشَّجَرُ وَالدَّوَابُّ وَكَثِيرٌ مِّنَ النَّاسِ ۗ وَكَفَىٰ حَقًّا عَلَيْهِ الْعَذَابُ ۗ  
وَمَن يُلَهِينَ اللَّهُ فَمَا لَهُ مِن مُّكْرِمٍ ۗ إِنَّ اللَّهَ يَفْعَلُ مَا يَشَاءُ ۝

22:18 Do you not see that to Allah bow down in worship all things that are in the heavens and on earth, the sun, the moon, the stars, the hills, the trees, the animals; and a great number among mankind? And there are many unto whom the doom is justly due. He whom Allah scorns, there is none to give him honour. Lo! Allah does what He wills.

That everything in the heavens and the earth animate and inanimate objects, are subject to the laws ordained by Allah has been discussed under the verses 5:19, 7:185 and appendix III.

٣٤- وَيَسْتَعْجِلُونَكَ بِالْعَذَابِ وَلَنْ يُخْلِفَ اللَّهُ وَعْدَهُ ۗ وَإِنَّ يَوْمًا عِنْدَ رَبِّكَ  
كَأَنفِ سَنَةٍ مِّمَّا تَعُدُّونَ ۝

22:47 Yet they ask you to hasten on the punishment! But Allah will not fail in His promise. Verily a day in the sight of your Lord is like a thousand years of your reckoning.

We reckon a day as the period of rotation of the earth on its own axis with reference to some specified point in the sky; whereas a year is reckoned as the period of the earth's revolution around the sun measured relative to a

given point of reference. The choice of reference point determines the exact length of the year. Thus when the reference point is the equinox, the period of revolution from one equinox to the same equinox again, is a tropical year of 365.242 days ; when the point of reference is a fixed star, the period of revolution from one fixed star to the same star again is a sidereal year of 365.256 days.

The period of rotation of any other celestial body about its axis, may similarly be called a day, as reckoned by that celestial body. Such 'day' as reckoned by different celestial bodies, will be of different length, as reckoned from the earth. Thus the period of rotation of the moon on its axis, i.e., 1 'day' by the moon's reckoning, is 29 days by our reckoning. Similarly, the average period of rotation of the sun, about its axis, i. e., 1 day by the sun's reckoning, is 27 days by our reckoning. The period of rotation of the Milky Way galaxy i.e., '1 day' by the Milky Way is 220 million years of our reckoning. Thus different 'days' by the reckoning of different celestial bodies are of different length by our reckoning.

One has to note that the word **يَوْم** has also the meaning of 'Period of time' Although we have attempted here to explain the meaning of 'day' in terms of the accepted reckoning of time, Allah, mentions that a 'day' in His sight is like a 1000 years of our reckoning. It signifies a long period of our time corresponding to one day of His. This interpretation is compatible with verse 7:54 wherein the creation of the heavens and the earth in six days can be interpreted as creation in six periods of time.

٥٣- لِيَجْعَلَ مَا يُلْقِي الشَّيْطَانُ فِتْنَةً لِّلَّذِينَ فِي قُلُوبِهِم مَّرَضٌ وَالْقَاسِيَةِ  
 قُلُوبُهُمْ وَإِنَّ الظَّالِمِينَ لَفِي شِقَاقٍ بَعِيدٍ ۝

22: 53 That He may make the suggestions thrown in by Satan, but a trial for those in whose hearts is a disease and who are hardened of heart ; verily the wrong doers are in a schism far (from the truth).

The disease in the heart or mental disease has already been discussed under verse 9:125.

Here hardening of the heart is not literal stiffness of the heart muscle but a mental condition when one ignores the message of Allah.

٦١- ذَلِكَ بِأَنَّ اللَّهَ يُوَلِّجُ اللَّيْلَ فِي النَّهَارِ وَيُوَلِّجُ النَّهَارَ فِي اللَّيْلِ وَأَنَّ اللَّهَ سَمِيعٌ  
بَصِيرٌ ۝

22: 61 That is because Allah merges the night into the day and He merges the day into the night, and verily it is Allah who hears and sees (all things).

This has been explained under verses 3: 27.

٦٢- أَلَمْ تَرَ أَنَّ اللَّهَ أَنْزَلَ مِنَ السَّمَاءِ مَاءً فَتُصْبِحُ الْأَرْضُ مُخْضَرَةً ۗ  
إِنَّ اللَّهَ لَطِيفٌ خَبِيرٌ ۝

22: 63 Do you not see that Allah sends down rain from the sky, and forthwith the earth becomes clothed with green? For Allah is He Who understands the finest mysteries, and is well-acquainted (with them).

The formation of clouds in the sky and the coming down of the raindrops have been explained under verses 2:19 and 2:22.

The earth becoming clothed with green obviously refers to the luxuriant growth of vegetation. The rain drops fall upon the dry earth, make the barren soil fertile then brings forth green plants in abundance. The growth of vegetation has been explained under verses 2:164, 6:99 and 20:53.

٦٣- لَهُ مَا فِي السَّمَوَاتِ وَمَا فِي الْأَرْضِ وَلِلَّهِ اللَّهُ الْعَزِيزُ الْحَكِيمُ ۝

22:64 To Him belongs all that is in the heavens and on earth: for verily Allah-He is free of all wants, worthy of all praise.

The word 'belonging' can be interpreted in a sense different from the normal one of 'possessing', as Allah is not in need of anything. However, since Allah creates things (living and non-living), sustains things and also governs things in accordance with laws ordained by Him—all things may be regarded as belonging to Him.

That Allah has created everything has been discussed under verse 2:164 and in appendices I and II; that Allah is the Sustainer of all things has been dealt with in verse 1:2; that Allah controls all things as a law-giver has been discussed in 7:54. The discussion made earlier under verse 5:19 is also relevant here.

٢٥- أَلَمْ تَرَ أَنَّ اللَّهَ سَخَّرَ لَكُمْ فَا فِي الْأَرْضِ وَالْفُلْكَ تَجْرِي فِي الْبَحْرِ بِأَمْرِهِ وَيُنسِكُ  
السَّمَاءَ أَنْ تَقَعَ عَلَى الْأَرْضِ إِلَّا بِإِذْنِهِ ۗ إِنَّ اللَّهَ بِالنَّاسِ لَرؤُوفٌ رَحِيمٌ ۝

22:65 Do you not see that Allah has made subject to you all that is on the earth, and the ships that sail through the sea by His command? He withholds the sky from falling on the earth except by His leave; for Allah is Most Kind and Most Merciful to man.

That Allah has made subject to man all that is on the earth is amply demonstrated by man's continued success in harnessing and controlling nature. This has been possible by the application of science and technology. Man has established his supremacy over almost everything on earth and has truly asserted himself as the vice-gerent of Allah. More detailed discussion is made under verse 2:29. The plying of ships in the seas and rivers at Allah's command has been discussed under verse 2:164.

Withholding the sky from failing on the earth as mentioned in this verse needs special attention. "Allah is He Who raised the heavens without any pillars that you can see" as announced under verse 13:2 has been discussed in detail. The same scientific explanation holds here in that in this verse Allah unambiguously speaks of a forces that keeps everything in place in the sky and heavens and this force is known as the force of gravity today.

٢٦- وَهُوَ الَّذِي أَحْيَاكُمْ ثُمَّ يُمِيتُكُمْ ثُمَّ يُحْيِيكُمْ ۗ إِنَّ الْإِنْسَانَ لَكَفُورٌ ۝

22:66 It is He Who gave you life, will cause you to die, and will again give you life; truly man is a most ungrateful creature.

That Allah gave us life has been discussed under verse 2:28. That Allah would cause us to die has been discussed under verse 9:116




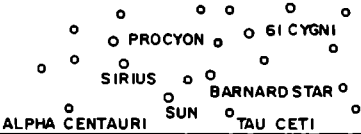
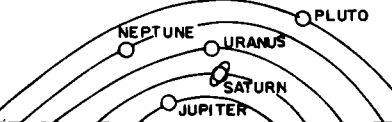
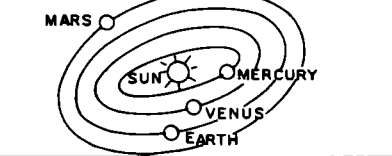
<p>VII UNIVERSE</p>	<p>PHL957 †                  A665 ☼                  COMA ♀</p> <p>INDUS ♄                  HERCULES ♄                  A2232 ♀</p>	<p>20,000,000,000                  LIGHT YEARS</p>
<p>VI LOCAL SUPER-CLUSTER OF GALAXIES</p>	<p>SCULPTOR ♄                  NGC 5128 ♄                  M96 ♄</p> <p>VIRGO ♄                  URSA MAJOR ♄                  NGC 3245 ♄</p>	<p>75,000,000                  LIGHT YEARS</p>
<p>V LOCAL GROUP OF GALAXIES</p>	<p>ARGO ♄                  URSA MINOR ♄                  ANDROMEDA ♄</p> <p>LEO I ♄                  LEO II ♄                  NGC 205 ♄</p> <p>SMALL MAGELLANIC CLOUD ♄                  LARGE MAGELLANIC CLOUD ♄                  MILKYWAY ♄</p>	<p>2,000,000                  LIGHT YEARS</p>
<p>IV MILKY WAY</p>	 <p>MILKY WAY</p>	<p>50,000                  LIGHT YEARS</p>
<p>III LOCAL GROUP OF STARS</p>	 <p>PROCYON                  SIRIUS                  ALPHA CENTAURI                  SUN                  BARNARD STAR                  61 CYGNI                  TAU CETI</p>	<p>20 LIGHT YEARS</p>
<p>II SOLAR SYSTEM</p>	 <p>NEPTUNE                  URANUS                  SATURN                  JUPITER                  PLUTO</p>	<p>5 LIGHT HOURS</p>
<p>MINOR PLANETS</p> <p>I INTERIOR PLANETS</p>	 <p>MARS                  SUN                  MERCURY                  VENUS                  EARTH</p>	<p>13 LIGHT MINUTES</p>

PLATE : SEVEN FIRMANENTS

۱۲- وَلَقَدْ خَلَقْنَا الْإِنْسَانَ مِنْ سُلْطَةٍ مِنْ طِينٍ ۝  
 ۱۳- ثُمَّ جَعَلْنَاهُ نُطْفَةً فِي قَرَارٍ مَكِينٍ ۝  
 ۱۴- ثُمَّ خَلَقْنَا النُّطْفَةَ عَلَقَةً فَخَلَقْنَا الْعَلَقَةَ مُضْغَةً فَخَلَقْنَا الْمُضْغَةَ  
 عِظْمًا فَلَكَسْنَا الْعِظْمَ لَحْمًا ۝ ثُمَّ أَنفَخْنَا فِيهِ رُوحًا آخَرَ ۝  
 فَتَبَارَكَ اللَّهُ أَحْسَنُ الْخَالِقِينَ ۝  
 ۱۵- ثُمَّ إِنَّكُمْ بَعْدَ ذَلِكَ لَمَيِّتُونَ ۝

23:12-15 Man We did create from a quintessence (of clay); then We placed him as a drop of seed in a place of rest firmly fixed.

Then We made the drop of seed into suspended substance or clot of blood (or into a leech like substance); then of that suspended substance We made a chewed-like lump, then We made out of that lump bones and clothed the bones with flesh; then We developed out of it another creature. So blessed be Allah the best to create.

**After that, at length you will die**

In these verses more elaborate mention of developmental stages of the embryo and foetus is made. This may be regarded as a short summary of human embryology. For details see appendix VI.

The creation of man from the extract or elements of clay (dust plus water) has already been discussed under verse 18:37.

The creation of the human embryo from germ seed or *nutfah* has already been discussed under verse 22:5. The sperm enters the mature ovum and forms a zygote and the process is known as fertilization. Out of millions of sperms only one is needed for the formation of a zygote.

The zygote formed by the fertilization of the female ovum by male sperm passes to the uterine cavity where it is fixed or anchored on the wall of the uterus. The word *قَرَارٍ* means a fixed or secure place or place of abode (repository). So if by *nutfah* we mean sperm then when it enters the ovum

it gets a secure place or repository. But if the zygote is taken to be *nutfah* here then when it enters the uterine cavity it reaches a fixed place of abode. The word **مكين** no doubt means the fixation or anchorage of the zygote on the uterine wall. So if **قرارمكين** will mean the coming of the zygote inside the uterus and its embedding on the wall of the womb. We may have another interpretation of the term **قرارمكين**. If we consider that the sperms are restless, then when a sperm enters the ovum, it becomes restful as it has obtained a secure place or place of abode<sup>1</sup>. The word **مكين** is best explained by the embedding of the fertilized ovum on the uterine wall. The uterus is the place of abode for the zygote and it is firmly placed on its wall.

The stages of **علقة** and **مضغة** have already been discussed under verse 22:5. The *mudghah* stage continues up to the 40th day of conception.<sup>2</sup>

The next stage is the formation of bone. The first bones to appear are those of upper limb buds. During the early 6th week the mesenchymal tissue of the limb buds undergoes chondrification (cartilage formation) to form hyaline cartilage models of the future bones. By the later part of the 6th week the upper limbs show complete cartilaginous models of the bones. By the 12th week a complete miniature skeleton of the foetus is formed.

The word **ثم** has been used after the stages of beginning of creation from clay up to **علقة** stage. This conjunction (**ثم** = then) in Arabic indicates time lag indicating that, there was a time gap between the formation of *nutfah* to the *alaqah* stage. The *mudghah* stage is prefixed with conjunction **ف** which indicates a rapidly occurring process. So the use of **ف** before *mudghah*, bone formation and later muscle formation (the stage of **لحم**) means that these processes are relatively rapid. But during these stages of development all the processes continue even after birth up to a certain age which varies for different organs and systems.

The next stage of development of the foetus is the formation of muscles. During the 7th week the skeleton begins to spread through the body and the bones take the familiar shape. The embryo then takes the human appearance. At the end of the 7th week and during the 8th week the muscles take their positions around the bones. Though muscle formation begins with that of bone, muscles do not take their position until later. So the word clothing of bone is quite significant.

At the end of the 8th week definitive muscles of trunk, limbs and head are well represented and the foetus is capable of some movement.<sup>3</sup>

After this the foetus continues to grow up to a period of time as mentioned in verse 22:5. This is obviously what is meant by the term *خلقاً اخر* i.e. , another creature. After the end of the full term the infant is born and a new individual comes into existence.

The term *احسن الخالقين* or the best of the creators for Allah is most appropriate. Human beings can create many things but whatever they create, they must use materials created by Allah. Besides, the creation of human beings is the best among the creations for which mankind is called *اشرف المخلوقات* or the best of creation. For the historical account of knowledge of human reproduction, see appendix VI.

### References

1. M.G. Muazzam, *History of the Discovery of the Mechanism of Reproduction and the Revelation in the Holy Quran* : Pak J. Sc., vol. 14, No. 6, pp. 281- 298, 1962.
2. K.L. Moore, and A.M.A. Azzindani, *The developing Human with Islamic Additions*, 3rd edn. Dar-al Qiblah for Islamic Literatures, Jeddah P. 31, 1982.
3. Ibid, p. 364.

١٤- وَلَقَدْ خَلَقْنَا فَوْقَكُمْ سَبْعَ طَرَائِقَ ۗ وَمَا كُنَّا عَنْ الْخَلْقِ غَافِلِينَ ۝

23 : 17 And We have made above you seven tracts ; and We are never unmindful of (Our) creation.

Above us is the celestial sphere and in it are the creations of Allah. The earth, a creation, also lies in the celestial sphere.

In verse 2 : 29 it has been observed that there are seven different types of celestial bodies, each type having its characteristic motion and tract. The following are the seven types of celestial bodies :

- 1) *Stars* : single, double, multiple, star clusters, brown dwarf, main sequence stars, red giants, pulsating, white dwarf, nova super nova, pulsars of neutron stars and black holes. Each has its motion of rotation, radial and proper motion. They move in definite orbits.
- 2) *Planets* : of the solar and may be of other stellar systems each planet has tow motions of its own ; motions of revolution round the sun or the star concerned and motions of rotation about its axis. Each planet moves in an elliptic orbit with the sun or the star concerned at one of the foci.
- 3) *Satellites* : of the planets, revolve round the planet concerned, and also they rotate about their own axis.
- 4) *Comets* : are different types of objects belonging to the solar or stellar system, that travel round the sun or the star concerned, in an orbit that generally is much more eccentric than the orbit of planets.
- 5) *Nebulae* : Nebula is a cloud of interstellar gas, that can be observed either as a luminous patch of light, known as bright nebula, or as a dark hole of band, known as dark nebula. A nebula is in motion due to the motion of the galaxy in which it is situated and due to its own motion.
- 6) *Galaxies* : are giant assemblies of stars and their system, gas and dust into which most of the visible matter in the universe is concentrated. Galaxies may be elliptical, spiral, barred spiral or irregular. Galaxies move wit tremendous speed. The greater the

distance of a galaxy, the greater is its speed of recession. Each galaxy moves in a separate orbit.

- 7) *Quasars* : A quasar is a compact extragalactic object that looks like a point of light but emits more energy than a hundred super giant galaxies. They move with inconceivable speed. Some quasars have velocities amounting to about 90% of the velocity of light.

Thus it is now established that all the celestial bodies are in motion and each travels in a distinct separate orbit. Allah is so mindful of His creation, that though the number of celestial bodies is innumerable, they do not move haphazardly colliding with and destroying each other; but they are ordained to move in distinct and definite orbits in such a way that they do not come in contact with one another.

١٨- وَأَنْزَلْنَا مِنَ السَّمَاءِ مَاءً بِقَدَرٍ فَأَسْكَنْتَهُ فِي الْأَرْضِ  
وَرَأَى عَلَى ذَهَابٍ بِهِ لِقَدَرُونَ ۝

23:18 And We send down water from the sky according to measure; and We cause it to soak in the soil ; and We certainly are able to withdraw it.

How rain-drops are formed in the sky has been explained under verses 2 : 19 and 2 : 22. The rain-drops come down to the ground as showers. Most of them are absorbed by the dry soil to produce therewith green vegetation.

It is only the cumulo-nimbus clouds which are rain-laden and which yield showers and that also in a limited measure. The quantity of rainfall depends on the size of the rain cloud and its height from the ground, the temperature and the humidity of the place, and the force of the air currents prevailing at the time. In accordance with the laws ordained by Allah when all the factors assume favourable proportions, the rain will come down. Otherwise the hovering cloud will be carried away by the wind and the region will go dry.

Rain-drops accumulate in cavities on the surface of the earth and also accumulate underneath as subsoil deposit of water one is inclined to look upon as safe underground reservoir ; these accumulations may run out if Allah so wills. Such withdrawal may take place in a number of ways : it may drain off through seepage to distant pits and gorges, and to canals, rivers and lakes with much lower water levels, or the water may disappear

beyond reach, deeper into the soil. Loss of water may also occur through rapid surface evaporation or through quick transpiration from the leaves of plants having very high transpiration rate. It has now been established that one of the major causes of present acute water-scarcity in Ethiopia is wide spread plantation of Eucalyptus trees in the region.

Thus, all the factors responsible for the sending down of water from the sky in due measure and for the withdrawal of water from the ground are, indeed, controlled by Allah.

۲۱- وَإِنَّ لَكُمْ فِي الْأَنْعَامِ لَعِبْرَةً ۖ نُسْقِيكُمْ مِمَّا فِي بُطُونِهَا  
وَلَكُمْ فِيهَا مَنَافِعُ كَثِيرَةٌ ۖ وَمِنْهَا تَأْكُلُونَ ۝

23 : 21 And lo ! in the cattle there is verily a lesson for you. We give you to drink of that which is in their bellies, and many uses have you in them, and of them do you eat.

This verse refers to one of the most important foods namely, cow's milk and to many uses of cattle including their meat. These subjects have been discussed under verses 16 : 5 and 16 : 66.

۲۴- فَأَوْحَيْنَا إِلَيْهِ أَنْ اصْنَعِ الْفُلَكَ بِأَعْيُنِنَا ۖ وَوَحِّينَا فَإِذَا جَاءَ أَمْرُنَا وَفَارَ التَّنُّورُ  
فَأَسْلَفَ فِيهَا مِنْ كُلِّ زَوْجَيْنِ اثْنَيْنِ وَأَهْلَكَ إِلَّا مَنْ سَبَقَ عَلَيْهِ الْقَوْلُ مِنْهُمْ ۗ  
وَلَا تَحْطَبْنِي فِي الَّذِينَ ظَلَمُوا ۗ إِنَّهُمْ مُغْرَقُونَ ۝

23 : 27 So We inspired him : "Construct the Ark within our sight and under Our guidance : the when comes Our command, and the fountains of the earth gush forth, take you on board pairs of every species, male and female, and your family—except those of them against whom the Word has already gone forth: and address Me not in favour of wrong doers ; for they shall be drowned (in the flood)."

The verse refers to the flood at the time of prophet Nuh (a.s.) when he was asked to construct an ark and to sail in it as the flood came with his family and a pair of every species of animals.

This subject has been discussed in connection with verses 11 : 40-42.

٤٨- وَهُوَ الَّذِي أَنْشَأَ لَكُمُ السَّمْعَ وَالْأَبْصَارَ وَالْأَفْئِدَةَ ۗ قَلِيلًا مَّا تَشْكُرُونَ ۝

23 : 78 It is He Who has created for you ears, eyes and hearts, little thanks you give.

These subjects have been discussed under verse 16 : 78.

٨٠- وَهُوَ الَّذِي يُحْيِي وَيُمِيتُ وَلَهُ اخْتِلَافُ اللَّيْلِ وَالنَّهَارِ ۗ أَفَلَا تَعْقِلُونَ ۝

23: 80 And He it is Who gives life and causes death, and to Him is due the alternation of night and day. Have you then no sense ?

The alternation of night and day has been explained under verse 10 : 6.

٨٦- قُلْ مَنْ رَبُّ السَّمَوَاتِ السَّبْعِ وَرَبُّ الْعَرْشِ الْعَظِيمِ ۝

23 : 86 Say : "Who is the Lord of seven heavens, and Lord of the Tremendous Throne ?"

Seven heavens have been discussed under verse 2 : 29.

٨٨- قُلْ مَنْ مَن بِيَدِهِ مَلَكُوتُ كُلِّ شَيْءٍ وَهُوَ يُجِيرُ وَلَا يُجَارُ عَلَيْهِ إِنْ كُنْتُمْ تَعْلَمُونَ ۝

23 : 88 Say : "Who is it in Whose hands is the governance of all things.- Who protects (all), but is not protected (of any) ? (Say) if you know."

The governance of all things has been discussed under verses 7 : 54, 7 : 185. and appendix III.

٣٩- وَالَّذِينَ كَفَرُوا أَعْمَالُهُمْ كَسَرَابٍ بِقِيَعَةٍ يُحْسِبُهُ الظَّنَّ أَن مَاءً  
حَتَّى إِذَا جَاءَهُ لَمْ يَجِدْهُ شَيْئًا وَوَجَدَ اللَّهَ عِنْدَهُ فَوَفَّاهُ حِسَابَهُ  
وَاللَّهُ سَرِيعُ الْحِسَابِ ۝



**24 : 39** As for those who disbelieve, their deeds are as a mirage in a desert ; the thirsty one supposes it to be water till he comes unto it and finds that it is nothing, and finds, in the place thereof, Allah, Who pays him his due; and Allah is swift at reckoning.

A mirage is a kind of optical illusion by which reflected images of distant objects are seen, often inverted, as a result of the bending of the light rays in the atmosphere during vertical distribution of air-density.

During the day time, the sands of the desert get extremely hot and heat up the air close to the ground and make it appreciably less dense than the air layers above. When light rays from the sky and/or from tree tops proceed downwards through these layers, they get refracted and ultimately bend upwards entering the observer's eyes below the line of sight. The observer then sees the reflection of the sky and also of the trees upside down just as they look when reflected from a pool of water; thus the impression of a distant lake is produced, which disappears upon closer viewing. Some mirages are extremely striking which exhibit apparently even ripples; this is because the layers of hot air vary in position.

Although the phenomenon of mirages was known to ancient man, the scientific explanation of it was first offered by Tobias Gruber in the 1780's.

٣٠- أَوْ كَظُلُمَاتٍ فِي بَحْرٍ مَّجِيٍّ يَغْشَاهُ مَوْجٌ مِّنْ فَوْقِهِ مَوْجٌ مِّنْ فَوْقِهِ سَحَابٌ  
ظُلُمَاتٌ بَعْضُهَا فَوْقَ بَعْضٍ إِذَا أَخْرَجَ يَدَهُ لَمْ يَكُنْ يَرَاهَا وَمَنْ لَّمْ يُجْعَلِ  
اللَّهُ لَهُ نُورًا فَمَا لَهُ مِن نُّورٍ ۝

**24 : 40** Or (the unbeliever's state) is like depths of darkness in a vast deep ocean, overwhelmed with billow topped by billow, topped by (dark) clouds : depths of darkness, one above another; if a man stretches out his hand, he can hardly see it! For any to whom Allah gives not light, there is no light !

An exhaustive explanation of the similitude used here will be found in "Light upon Light".<sup>1</sup>

In this verse there is mention of increase in the depths of darkness in a vast deep ocean under normal and disturbed climatic conditions. The bottom

of a deep sea is quite dark even when the sea is calm and the sky is clear. This is because the sea-water strongly absorbs electro-magnetic waves including visible light. As one goes deeper into the sea, the intensity of light diminishes rapidly and at the bottom of the sea this intensity is very low indeed. This is the first kind of darkness.

If the surface of the sea, instead of being calm, is violently agitated with "billow topped by billow", most of the sunlight is reflected away by the slanting sides of the waves and the amount of light ultimately reaching the bottom of the sea through refraction is drastically reduced; the darkness of the sea-bed considerably deepens and this is the second kind of darkness.

The cloud, we know, is a mass of condensed water-vapour in the form of tiny drops and minute ice particles that float in the air. The rain-cloud, called, cumulo nimbus is a huge mountain like cloud mass of great vertical height and is associated with darkness. Its depth may extend upto 25,000 to 35,000 feet. The sunlight from above, while penetrating it, is reflected away by the ice particles and water droplets comprising the cloud. Thus, when the sky above the surging waves is overcast with thick cloud, most of the solar rays will be obstructed by the cloud, and the faint light that may fall upon the waves can hardly pass through the depth of water. Consequently the bottom of the sea is bereft of all light making it pitch-dark. In this third kind of darkness one cannot see even one's own hand when it is brought forth before one's eyes. So dense is the darkness.

## Reference

1. M.F. Khan. *Light upon Light*, Dhaka Ahsania Mission, Dhaka, Bangladesh, pp. 33-35. 1986.

٣١- أَلَمْ تَرَ أَنَّ اللَّهَ يُسَبِّحُ لَهُ مَنْ فِي السَّمَاوَاتِ وَالْأَرْضِ وَالطَّيْرِ صَفًى  
 كُلٌّ قَدْ عَلِمَ صَلَاتَهُ وَتَسْبِيحَهُ وَاللَّهُ عَلِيمٌ بِمَا يَفْعَلُونَ ○

24 : 41 Do you not see that it is Allah Whose praises all beings in the heavens and on earth do celebrate, and the birds (of the air) with wings outspread ? Each one knows its own (mode of) prayer and praise. And Allah Knows well all that they do.

All living objects starting from the minutest organism to the large beings in the heavens and on the earth are subject to the laws ordained by Allah. These laws are discussed under verses 7 : 54, 7 : 185 and in appendices I, II and III.

The scientific explanation of the flight of birds has been given under verse 16 : 79. Indeed even the flight of birds is governed laws ordained by the Creator. Thus the very fact that all living things are meticulously following the laws set up by Allah and thus submitting to His will can also be interpreted as their prayer for which they may have their own distinctive mode of expression. They also celebrate the praises of Allah in their own characteristic ways for the immense benefits they derive out of this submission.

٣٣- يُقَلِّبُ اللَّهُ اللَّيْلَ وَالنَّهَارَ إِنَّ فِي ذَلِكَ لَعِبْرَةً لَأُولِي الْأَبْصَارِ ○

24 : 44 It is Allah Who alternates the night and the day ; verily in these things is an instructive example for those who have vision.

The night and day alternate due to the rotation of the earth about its axis (vide, 10 : 6). Where does this axial rotation as found in most of the planets come from ? It is most interesting to note the spinning motion of many atomic particles. In the process of stellar evolution all elements evolved from the fusion of hydrogen and other light elemental nuclei. As the primeval fire-ball (see appendix II) cooled down, these captured spinning electrons formed various elements. Scientists have tried to connect the

spinning of sub atomic particles in the microscopic world with the spinning of massive planets. However, many fundamental questions remain to be explained. Namely, when the spins of the constituent atoms are compounded vectorially, the resultant spin should be very small or almost negligible if the process was random. Knowledge of axial rotation of planets suggests the contrary. Then why have the different planets different rates of axial rotation ?

In nature we have never come across any massive or macroscopic body which shows spinning motion being unaided by any external agency. This is because the resultant angular momentum arising from sub atomic particles is not large enough to rotate the body. However, this approach fails to explain why all the planets except Venus rotate or spin in the same manner, but Venus rotates in the opposite direction to other planets. In another approach scientists speculate that the planets revolve in their orbits and rotate around their axis due to the formation of the sun and the planets from a spinning cloud of gas called nebula. This hypothesis was put forward by Laplace in 1796 according to which the spinning gas supposedly threw off rings that eventually condensed to become planets. Laplace's hypothesis went through different phases of acceptance and rejection followed by acceptance to some extent recently. It is assumed now that the primeval solar nebula probably would have had a small net spin from the very beginning. The spinning angular momentum in the primeval stage has been explained earlier. As it contracted, it would have begun to spin faster because of the conservation of angular momentum which principle of physics is best illustrated by a spinning ice skater. When a skater wants to skate faster, she draws her arms in closer to her which brings the distribution of her mass effectively closer to the axis of rotation and this is compensated for by a faster spin so that the angular momentum (distance from the axis velocity mass) remains the same. However, this theory fails to explain many details as observed in the solar system, e.g., why did the outer planets fail to retain thick atmospheres of hydrogen and helium in spite of their high gravity as this theory predicts that inner planets should consist of denser elements than outer planets which are large and made of light elements? This approach also fails to explain why so much of angular momentum of the solar system should be in the orbital motion of the planets and so little in the rotation of the sun itself. Perhaps the strong solar flares

rid the inner planets of their light gases and carried away most of the original solar angular momentum.<sup>1</sup>

The various beneficial aspects of the alternation of night and day are discussed under verses 28 : 71, 72 and 73.

### Reference

1. Jay M. Pasachoff, *Contemporary Astronomy*, W.B. Saunders Co., Lond, p. 284, 1976.

٢٥- وَاللَّهُ خَلَقَ كُلَّ دَابَّةٍ مِنْ مَاءٍ ۚ فَمِنْهُمْ مَنْ يَمْشِي عَلَى بَطْنِهِ ۚ وَمِنْهُمْ مَنْ يَمْشِي عَلَى رِجْلَيْنِ ۚ وَمِنْهُمْ مَنْ يَمْشِي عَلَى أَرْبَعٍ يَخْلُقُ اللَّهُ مَا يَشَاءُ ۗ إِنَّ اللَّهَ عَلَىٰ كُلِّ شَيْءٍ قَدِيرٌ ۝

24 : 45 And Allah has created every animal from water : of them there are some that creep on their bellies, some that walk on two legs; and some that walk on four. Allah creates what He wills; for verily Allah has power over all things.

The creation of every animal from water has been discussed under verse 21 : 30.

٥- أَلَمْ يَأْتِ قُلُوبَهُمْ طَرَضٌ إِذِ اتَّابُوا أَمْرًا يُخَافُونَ أَنَّ يَحِيفَ اللَّهُ عَلَيْهِمْ وَرَسُولَهُ ۗ بَلْ أُولَٰئِكَ هُمُ الظَّالِمُونَ ۝

24 : 50 Is there in their hearts a disease or have they doubts, or fear they lest Allah and His messenger should wrong them in judgement ? Nay, but such are evil-doers.

The subject of disease in heart has already been discussed under verse 2 : 10.

٢- الَّذِي لَهُ مُلْكُ السَّمٰوٰتِ وَٱلْاَرْضِ ۗ وَكَمۡ يَتَخَذُ وِلْدًا ۗ اَوْ لَمْ يَكُنۡ لَهُ شَرِيۡكٌ فِى الْمُلۡكِ ۗ وَخَلَقَ كُلَّ شَيْءٍ فَقَدَرَهُ تَقْدِيرًا ۝

25 : 2 He to Whom belongs the dominion of the heavens and the earth; no son has He begotten, nor has He a partner in His dominion, it is He Who Created all things, and ordered them in due proportions.

That to Allah belongs the dominion of the heavens and the earth has been discussed under verse 7 : 54 and in appendices I and II.

The last part of the verse clearly states that Allah has meted out a measure for all things that He has created. In order to appreciate the science inherent

in this statement, let us first consider the size of man. This size ranging normally between 1 to 2 metres is perfectly commensurate with the gravitational forces of the earth that man has been experiencing ever since his appearance on this planet. One might ask, what would happen if man were 2-3 times larger than he presently is ? In that case, it can be shown that a walk in the earth's gravitational force could be very dangerous. If man were 3 times taller and had the same bodily proportions, he would weigh  $3 \times 3 \times 3 = 27$  times as much. Tripping and falling would involve a person, 27 times as heavy, falling 3 times as far ; the impact created in the fall would be 81 times ( $27 \times 3$ ) as much. His bones would be 9 times stronger since their strength depend on their cross-sectional area. Therefore the fall would be 9 times as damaging. One might now ask a question in the reverse direction : what would happen to man if he were considerably smaller than what he is now. Again, it can be shown that in the latter case also, man would have encountered tremendous difficulties. It is known that the amount of heat energy lost from a body depends on the surface area of the body. \*If man were very very small, his surface area would be considerably larger compared to his volume. So his body would lose a lot of heat energy and would become cold. In order to stay warm, he would have to eat a tremendous amount of food. In fact, such is the case with the shrew the smallest warm blooded animal which eats prodigiously to stay warm, the amount it eats being a number of times its own body weight. Thus, if man were several times smaller than his present size, not only would an acute food problem arise, but his brain size would be drastically diminished and he could not presumably boast of being the most intelligent of all of Allah's creation. All this would lead one to the conclusion that the "measure" meted out to man by Allah is indeed the wisest one.

Incidentally, a physical measure of any living organism is also shown to be related to the environment in which Allah has permitted it to live. The thermodynamic considerations of heat exchange between living organisms and their environment as discussed above also explains why a polar bear which has to retain its heat energy is large, thereby having a smaller surface area compared to the sun-bear which has to lose energy in order to remain cool and is thus small in size with a proportionally large surface area.

- \* The proportion of surface to volume of an object can be more readily quantified for a spherical-shaped object for which this proportion is  $4\pi r^2/4\pi r^3 = 1/r$ , where r is the radius of the spherical object. As r is diminished i.e., as the object gets smaller and smaller, the surface to volume ratio becomes larger.

Let us now consider and altogether different aspect of a thing — namely its beauty. We all appreciate beauty which is manifested throughout Allah's creation. It is now known that the beauty of an object is related to the symmetry principles it demonstrates. This symmetry (whether it be of a reflection type or rotational type etc) would be meaningless if the component parts of an object were not of a definite measure in relation to one another. For example, the reflection symmetry of man's face about a median plane through the nose could be lost if there was more on the left than on the right in the constitution of the human face.

The existence of measure has been delightfully discussed by mathematicians who note that the florets of a sunflower which appear to be so beautiful are arranged in increasing distances from the centre in the ratios of 1, 1, 2, 3, 5, 8, 13, 21, which are the so called Fi-bonacci numbers (see Fig. 13) Thus, while mathematically modelling a sunflower, it is gratifying to note that Allah has set up a measure in its formation. No wonder, nature is governed by a mathematical scheme set up by Allah.

The above are only a few examples to show that all things have been structured so appropriately by Allah according to a definite measure. The understanding of this measure aspect of things has given rise to new

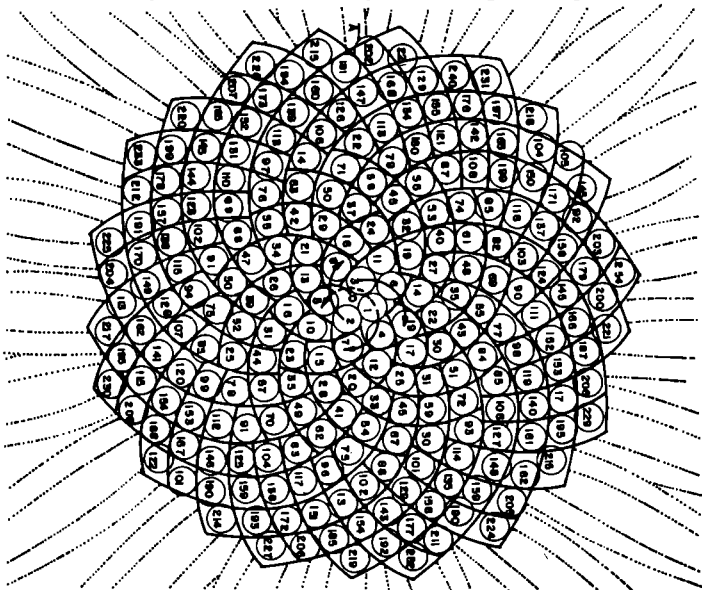


Fig..13. A reconstructed head of a sunflower



branches of physics and mathematics including Group theory, Crystallography, topology etc. which deal with arrangement of things in space and their symmetries.

In conclusion, it could be pointed out that it is obvious from verse 25 : 2 is that the measures of things which Allah has ordained is beautifully commensurate with the physical or biological functions determined for these things and also with the roles that they have been set out to play in the over-all ecosystem of the universe.

۱۱- بَلْ كَذَّبُوا بِالسَّاعَةِ ۖ وَاعْتَدُوا لِلْحَمِيمِ ۚ كَذَّبَ بِالسَّاعَةِ سَعِيرًا ۚ

25 : 11 Nay, they deny the Hour (of the Judgement to come), but We have prepared a Blazing Fire for such as deny the Hour:

This has been discussed under verse 7 : 187.

۲۵- وَيَوْمَ تَشَقُّ السَّمَاوُ بِالْغَمَامِ وَتُزَلُّ الْمَلَائِكَةُ تَزِيلًا ۚ

25 : 25 The day the heaven shall be rent asunder with clouds, and angels shall be sent down, descending.

Scientifically it is established that a time will come when the sun with the solar system will be rent asunder with clouds of gas flowing away. Two opposing forces are acting in the sun : force of expansion due to the release of fusion energy caused by burning of hydrogen into helium and force of contraction due to gravity. So long as the two forces balance each other, the sun remains in stable condition in the main sequence. As time passes on, more and more hydrogen is converted into helium which being heavier falls into the central region. Gradually the interior is divided into two regions : a central core of helium created with a surrounding shell of burning hydrogen and an outer region, which is composed primarily of hydrogen which because of lower temperature cannot fuse and produce nuclear reactions. The sun, then, becomes very inhomogenous, as the nucleus in the core has about four times the mass of the nucleus in the outer region. The larger the core grows, the more important the inhomogeneity becomes for the stability of the sun. When approximately the inner ten per cent of the sun's mass of hydrogen has been burnt, the sun is no longer stable. Calculations show

that when the sun reaches this stage, the outer layer rapidly expands because of net outward pressure so that the radius of the photosphere (visible surface) of the sun reaches ten times its original radius and thus engulfs the orbits of the inner planets, viz, Mercury, Venus, Earth as well as Mars.<sup>1</sup> At this stage sometimes the force of contraction (attraction) becomes greater and at some other times, the force of expansion predominates ; and thus the sun pulsates for thousands of years. Finally the inner helium core collapses and fuses into carbon, a stable state. The outer layer splits asunder and drifts away as cloud.<sup>2</sup> When this happens, that perhaps is the day referred to in this verse.

### **References**

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2. *National Geographic*, June 1983.

۴۵- اَلَمْ تَرَ اِلَى رَبِّكَ كَيْفَ مَدَّ الظِّلَّ وَلَوْ هَآءُ جَعَلَهُ سَاكِنًا  
 ثُمَّ جَعَلْنَا الشَّمْسُ عَلَيْهِ دَلِيلًا ۝  
 ۴۶- ثُمَّ قَبَضْنَاهُ اِلَيْنَا قَبْضًا يَسِيرًا ۝

25:45-46 Have you not turned your vision to your Lord ? How He does prolong the shadow ! If He willed He could make it stationary! Then do we make the sun its guide. Then We draw it in towards ourselves, a contraction by easy stages.

Shadow is caused by the interception of light by an opaque body and is produced in the direction opposite to the source of light. If the source, like the sun, is not stationary, length and position of the shadow are also not stationary. but are guided by the position of the sun, the source of light. The length of the shadow is inversely proportional to the tangent of the angle of incidence. So the smaller the angle of incidence, the larger the length of shadow. Thus in the morning the altitude of the sun is small and the shadow is large. As the altitude of the sun becomes higher, shadow gets smaller by stages. Again the shadow becomes larger by stages as the altitude of the sun gets smaller.

These changes in the shadow produced by the sun, are caused according to laws ordained by Allah.

The last part of this verse "if He willed He could make it stationary" is of great significance. This could have happened only when the rotational motion was so slow that the earth made only one complete rotation around its axis by the time it completed one cycle in the orbit around the sun. In that case, one face of the earth would have been permanently exposed to the sun where shadows would have been stationary and the other side would have been permanently dark. Such a situation would have been catastrophic as the side permanently exposed to the sun would have been a burning desert and the dark side very freezing making it impossible for life to thrive on this planet earth under the extreme environmental conditions. Allah by his infinite mercy has endowed the earth with its spinning motion

around its axis making the shadows grow and diminish in size. Thus no side of the earth is exposed to or away from the sun for a long period of time thus making the earth's atmosphere very mild and congenial for life to thrive.

٣٤- وَهُوَ الَّذِي جَعَلَ لَكُمُ اللَّيْلَ لِبَاسًا وَالنَّوْمَ سُبَاتًا وَجَعَلَ النَّهَارَ نُشُورًا ۝

25 : 47 And He it is Who makes the night a covering for you and sleep as repose and makes the day (as it were) a resurrection.

At the approach of night a veil is drawn over the day (vide 13:3), darkness sets in and gradually engulfs all things ; we are wrapped up in darkness and lulled to sleep.

Sleep as rest and repose has been discussed under verse 10:67 and in appendix VII from the scientific point of view.

At night our senses are sealed in sleep which is akin to temporary death in sleep. In the morning we rise i.e., come to life, so to say, again.

٣٨- وَهُوَ الَّذِي أَرْسَلَ الرِّيحَ بُشْرًا بَيْنَ يَدَيْ رَحْمَتِهِ ۗ وَأَنْزَلْنَا مِنَ السَّمَاءِ مَاءً طَهُورًا ۝

25 : 48 And He it is Who sends the winds as heralds of glad tidings going before His mercy and We send down pure water from the sky.

The part of the verse namely 'winds heralding glad tidings' has been explained under verse 7 : 57, and the falling of rain-drops from the sky has been explained under verse 2 : 22.

Rain-water formed in a natural environment not tampered with, is pure in the sense that it is not contaminated by any harmful substance (or by germs of diseases); rains from thunder-clouds often carry with them dissolved nitrous oxide which is an essential nutrient for the plant kingdom but in no way injurious to animals.

٣٩- لَنُحْيِيَنَّ بِهِ بَلَدًا مَّتَّى تَشَاءُ ۗ وَنَمُوتُ بِهَا خَلْقًا آتَامًا ۗ وَأَنَّا لَكُنَّا بِهَا مُبْدِرًا ۝

**25 : 49** That with it We may give life to a dead land and slake the thirst of things We have created-cattle and men in great numbers.

"The revival of dead earth by rain water" has been explained under verse 2:164.

All living beings, plants and animals including men need water for quenching their thirst thus enabling them to continue to exist. Rains constitute a major source of water.

٥- وَالَّذِينَ صَرَّفْنَاهُ بَيْنَهُمْ لِيَذَّكَّرُوا فَأَبَى أَكْثَرُ النَّاسِ إِلَّا كْفُورًا ۝

**25 : 50** And We have distributed the (water) amongst them, in order that they may celebrate (Our) praises but most men are averse (to aught) but (rank) ingratitude.

The distribution implied in this verse may be taken to refer to that of water. The availability of water through the hydrological cycle, namely, ice-water-vapour and vapour-water-ice is usually taken for granted and we do not appreciate the full significance of this cycle for the existence of life. How many of us do actually realise how difficult it would be to carry a ton of water from a source namely a river or a sea or a pond to a place far away from it and yet needing it ! But because of the existence of the above mentioned phase transition of water, trillions of molecules of water are being evaporated from the water-sources against the pull of gravity and forming clouds in the upper atmosphere. These clouds are then carried by the winds, and raindrops from these may fall at certain places. Thus the phase transition of water in nature together with the formation of clouds and the action of winds provides for the distribution of water from its source to far-away places.

Also the clouds carrying water add to the ice caps which act as perennial water reservoirs. The melting of these caps feeds water to the rivers, lakes and oceans, Water falling from the clouds besides further feeding these water systems also penetrates the ground. This water together with that seeping through the river banks provides a source of underground water which can be conveniently tapped whenever needed.

These phenomena responsible for the distribution of water should make any keen observer of nature express gratefulness to Allah.

٥٣- وَهُوَ الَّذِي مَرَجَ الْبَحْرَيْنِ هَذَا عَذْبٌ فُرَاتٌ وَهَذَا مِلْحٌ أُجَاجٌ ۚ  
 وَجَعَلَ بَيْنَهُمَا بَرْزَخًا وَحِجْرًا مَحْجُورًا ۝

25 : 53 · It is He Who has let free two bodies of flowing water : one palatable and sweet, and the other saltish and bitter ; yet has He made a barrier between them, a partition that is forbidden to be passed.

Water flows from places of higher to lower altitudes due to gravity of the earth. In this process two bodies of flowing water have been produced, one in the land mass of higher altitude and the other in the depressed part of the earth forming the seas. Water normally flows from the land to the sea. During high tide and abnormal climatic conditions such as hurricane and tidal bore, sea water rushes to the land mass and retreats when normal climatic conditions are restored.

Water covers about 70% of the surface of the globe and seas contain most of the water. The ocean is salty, containing 3½ per cent by weight of dissolved solids, and it is likely that all the natural chemical elements are present in the solution. All biologically important elements including carbon, nitrogen, phosphorus and major charge carrying ions, sodium, calcium and potassium are present in sea water. The group of minor elements includes the most important nutrients and elements such as silicon, barium, strontium and fluorides that are used in forming the hard parts of marine organism.

Scientists believe that the overall composition of sea water is controlled by geological processes. The concentration of a particular element in sea water is dependent on its abundance in the earth's crust and on the ease with which it can be dissolved or carried by rain water as sedimentary material. The process of evaporation brings out sweet water from the seas leaving behind various salts, organic and inorganic matter behind. Clouds are formed and these come down, as shower and snow becoming the source of water on the land mass. Mountain streams, streamlets and rivulets originating from lakes and the melting of snow caps combine together downstream forming rivers which bring down to the seas huge amounts of water dissolving

various salts and minerals and carrying huge amounts of sedimentary material while these cross the mountain and the basin. Life is believed to have originated in the oceans, and sea water today still provides all nutrients essential for the growth of phytoplankton (microscopic plant) that forms the basis of the marine food web and the evolving marine biota could use elements that were in plentiful supply. Thus incidentally to an enquiring mind, the salinity of sea-water and also its composition cannot appear as a mere accident ; the whole thing emerges as a design of the Creator<sup>1</sup>.

Saline water is denser than sweet water and when kept at the same level these intermingle with each other. The barrier between them mentioned in this verse is due to the effects of gravity on the two water bodies situated at different altitudes. At the boundary between saline and sweet water, a layer of intermediate density is formed. In spite of the natural tendency for intermixing of saline with sweet water through diffusion, gravity keeps them separated at this intermediate layer. The position of this barrier may change but its identity remains.

### Reference

1. Michael, Whitefield. *The salt sea—accident or design?* New scientist 1, P. 14, April 1982.

٥٨- وَهُوَ الَّذِي خَلَقَ مِنَ الْمَاءِ بَشَرًا فَجَعَلَهُ نَسَبًا  
 وَصِهْرًا ۗ وَكَانَ رَبُّكَ قَدِيرًا ۝

25 : 54 And He it is Who has created man from water and has appointed for him kindred by blood and kindred by marriage, for your Lord has power (over all things).

The human body contains about 80% water and that being so water is the main constituent.

If we look at the procreation of human beings we find that sperm in the seminal fluid and the ovum in the extruded fluid of the ovary are the source of the zygote which develops into an infant. In the Quran, the seminal fluid and the germinal fluid of man and woman are also mentioned as water (see 86 : 6). Allah says : 'So let man consider from what he is created. He is created from a gushing fluid.'

Thus the meaning of ماء in Arabic also means fluid or even germinal fluid. So the statement that man is created from water is indeed true.

The reproduction through sexual union gives rise to blood relations — parents, children, grand parents and grand children etc. Now-a-days improved knowledge of blood grouping and genetics helps determines paternity and blood relations in case of disputes.

The divine system of marriage is universal in all religions or the normal procedure for human procreation. Though in the so-called advanced countries this time honoured system is ignored in the name of liberty in different forms of pre-marital and extra-marital sea, the end-result is not satisfactory. The so-called liberated societies are now burdened with illegitimacy, sexually transmitted diseases including the new disease AIDS and broken family life. According to the Quran, the marriage bond is the only acceptable bond of the sexes.

٥٩- الَّذِي خَلَقَ السَّمَوَاتِ وَالْأَرْضَ وَمَا بَيْنَهُمَا فِي سِتَّةِ أَيَّامٍ ثُمَّ اسْتَوَىٰ عَلَى الْعَرْشِ  
 الرَّحْمَنُ فَسَلِّمْ عَلَيْهِ وَخَيِّرًا ۝



**25 : 59** He Who created the heavens and the earth and all that is between in six days, and is firmly established on the Throne (of authority). Allah most gracious. Ask you then about Him of any acquainted with such things.

This has been discussed under verse 7 : 54.

٦١- تَبَارَكَ الَّذِي جَعَلَ فِي السَّمَاءِ بُرُوجًا وَجَعَلَ فِيهَا سِرَاجًا وَقَمَرًا مُنِيرًا ○

**25 : 61** Blessed is He Who made constellations in the skies, and placed therein a lamp and a moon giving light.

This has been discussed under verse 10 : 5.

١٢- وَهُوَ الَّذِي جَعَلَ اللَّيْلَ وَالنَّهَارَ خِلْفَةً لِمَنْ أَرَادَ أَنْ يَذَّكَّرَ أَوْ أَرَادَ شُكُورًا ○

**25 : 62** And it is He Who made the night and the day to follow each other for such as have the will to celebrate His praises or to show their gratitude.

It has been explained under verse 10 : 6 how night and day follow each other and how the alternation regulates the pattern of our activities and imparts a "rhythm" to our daily life.

Normally most people tend to consider this phenomenon as a matter of fact occurrence. But those who ponder deeply on the causes of this phenomenon of the merging of night into day and vice-versa are bound to realise the significance of the phenomenon and their hearts will be filled with joy and wonder and they cannot but bow down in admiration and exclaim "all praises be to Allah, the Almighty Creator."

٢٨- تَالِ رَبِّ الشَّرْقِ وَالْمَغْرِبِ وَمَا بَيْنَهُمَا إِنْ كُنْتُمْ تَعْقِلُونَ ○

**26 : 28** (Moses) said "Lord of the east and the west and all between! If you only had sense."

The verse states that Allah is the Lord of all lying in the east and the west and all in between them.

East is the direction in which the sun appears to rise above the horizon and West is the direction in which the sun appears to see below the horizon.

We know that the earth has two periodic motions ; one , a periodic motion of rotation about its axis with a period of one day. Due to this motion of rotation of the earth, all the heavenly bodies, including the sun, appear to move in circles parallel to the celestial equator. Each such circle intersects the horizon at two points, one in the eastern direction and the other in the western direction. The earth has got another periodic motion of revolution about the sun. This motion has got a period of one year. Due to this motion the sun appears to occupy different positions on different days. Each day, due to different positions, the sun appears to move in different circles, intersecting the horizon at different points; thus the sun appears to rise and set at different points; i.e., each day has a separate east point and west point.

The apparent annual path of the sun, the ecliptic and the celestial equator intersect at two points at an angle of  $23^{\circ}28'$ . The day, on which the sun appears to occupy one such point, the daily circular path of the sun coincides with the equator. Incidentally, the points of intersection of the celestial equator with the horizon are called the east point and the west point.

Thus from the point of view of the earth, one can talk scientifically of the region lying between east and west. No wonder, Allah, the Creator of the Universe, owns everything that lies in between east and west.

٢٦- فَأَوْحَيْنَا إِلَىٰ مُوسَىٰ أَنْ اضْرِبْ بِعَصَاكَ الْبَحْرَ ۖ فَانفَلَقَ فَكَانَ كُلُّ فِرْقٍ كَالْعُلُقُودِ الْعَظِيمِ ۝

26 : 64 Then We told Moses by inspiration ; "Strike the sea with your rod" and so it divided and each separate part became, like the huge firm mass of a mountain.

This verse refers to prophet Musa's (a.s.) exodus from Egypt. When he reached the sea, he struck the sea with his rod and the sea parted.

A full scientific explanation of the miraculous event is yet to emerge. However the observation of a recent phenomenon in Korea suggests that such an event can occur.

A natural wonder similar to Moses' miracle occurs twice a year in the sea-channel between a village of Hoedongni on Chinde island and the nearby islet or Meda in South Korea, baring a dry path that is 2.8 km. long. 40

meters wide. The place is 350 km south of Seoul. The spectacle first came to the notice of international public attention in the mid 1970's. The French ambassador to Korea, Pierre Landy happened to witness the phenomenon in 1973. After his return to France, Landy contributed an article to a French newspaper in which he described the Korean version of Moses' Miracle.

The parting of this Korean sea is caused by unique tidal conditions. In the year 1973 it occurred at 5 P.M. on the 24th April when the tides began to fall. 5 minutes later the sea had parted completely dry at a place which only an hour before had been the middle of the sea. The water slowly began to reclaim its bed. By 10 past 6, the rising had completely covered the path.

This is a very rare natural phenomenon and may be called a miracle so long unknown to the world. It is not known since when it has been taking place and how long it will continue to happen.

It is likely that a situation like this might have happened in the sea between Egypt and Palestine in those remote days but nobody noticed it Musa (a.s.), through divine direction got at that particular spot on his way in flight and this phenomenon happened at the very moment he struck the sea with his rod.

١٦٥- أَتَاتُونَ الذِّكْرَانَ مِنَ الْعَالَمِينَ ۝

١٦٦- وَتَذُرُونَ مَا خَلَقَ لَكُمْ رَبُّكُمْ مِنْ أَزْوَاجِكُمْ بَلْ أَنْتُمْ قَوْمٌ عَادُونَ ۝

26 : 165-66 "Of all the creatures in the world, will you approach males."

" And leave those whom your Lord has created for you to be your mates? Nay, you are a people transgressing."

The above verse indicates the sexual perversion of the people of Lut (a.s.). They indulged in sodomy with males instead of having sex with their wives. This habit has been declared a clear transgression.

A detailed scientific discussion on the subject has already been made under verses 7 : 80-81.

١٤٣- وَأَمْطَرْنَا عَلَيْهِمْ مَطَرًا ۖ فَسَاءَ مَطَرُ الْمُنْذَرِينَ ۝

**26 : 173 We rained down on them a shower (of brimstone) and evil was the shower on those who were admonished (but heeded) not.**

This refers to the occurrence at the time of prophet Lut (a.s.). This has been discussed in connection with verse 7 : 84.

۱۲- وَأَدْخِلْ يَدَكَ فِي جَيْبِكَ تَخْرُجَ بَيْضًا مِنْ غَيْرِ سُوءٍ ۗ فِي تِسْعِ آيَاتٍ إِلَىٰ  
فِرْعَوْنَ وَقَوْمِهِ ۚ إِنَّهُمْ كَانُوا قَوْمًا فَسِقِينَ ۝

**27 : 12 "Now put your hand into your bosom and it will come forth white without stain : (these are) among the nine Signs (thou will take) to Pharaoh and his people : for they are people rebellious in transgression."**

The radiant hand of the prophet Musa (a.s.) is the well-known miracle and constituted one of the nine divine signs bestowed to him by Allah in the former's mission to Pharaoh's Egypt. The five clear signs to the people of Pharaoh namely الطوفان (deluge), الجراد (locusts), نمل (vermin) الضفادع (frogs) and الدم (blood) sent against them by Allah as a chastisement for their arrogance in spite of repeated warnings by the prophet Musa (a.s.) have already been discussed under verse 7:133. The remaining three signs out of the nine referred to here are the rod (cf verse 7 : 107), the years of drought (cf verse 7 : 130), and short crops (also 7 : 130).

The rod and its miraculous qualities are beyond the scope of scientific explanation.

The years of drought could be a consequence of lack of rainfall adversely affecting the crops. This may happen even in a region with a record of adequate annual rainfall like the fertile Nile valley, due to prolonged dry weather resulting in the drying up of the vital water supplies in the river. The short crops are usually due to drought. But the following factors may also be responsible:

1. unhealthy seeds affected by pests in storage.
2. lack of proper drainage of water during cultivation resulting in waterlogging or inadequate supply.

3. lack of soil nutrients essential for the healthy growth and seed production.
4. uncongenial physical properties of soil, and
5. pestilence of crops on account of fungi and insects.

٥٥- أَرَأَيْتُمْ لَتَاتُونَ الرِّجَالَ شَهْوَةً مِّنْ دُونِ النِّسَاءِ بَلْ أَنْتُمْ قَوْمٌ تَجْهَلُونَ ۝

27 : 55 Would you really approach men in your lusts rather than women ? Nay, you are a people (grossly) ignorant !

This subject has been discussed in detail under verses 7: 80 and 7 : 81.

٥٨- وَأَمْطَرْنَا عَلَيْهِمْ مَطَرًا ۖ فَسَاءَ مَطَرُ الْمُنذَرِينَ ۝

27 : 58 And We rained down on them a shower (of brimston) : and evil was the shower on those who were admonished.

This refers to the occurrence at the time of prophet Lut (a.s.). This has been discussed under verse 7 : 84.

٦٠- أَمَّنْ خَلَقَ السَّمَوَاتِ وَالْأَرْضَ وَأَنْزَلَ لَكُمْ مِنَ السَّمَاءِ مَاءً فَأَنْبَتْنَا بِهِ حَدَائِقَ ذَاتَ بَهْجَةٍ ۗ مَا كَانَ لَكُمْ أَنْ تُنْبِتُوا شَجَرَهَا ۗ أَلَيْسَ اللَّهُ بِأَعْلَمَ بِمَا كَانُوا يَفْعَلُونَ ۝

27 : 60 Or, Who has created the heavens and the earth, and Who sends you down rain from the sky? Yes, with it We cause to grow well-planted orchards full of beauty and delight. It is not in your power to cause the growth of the trees in them. (Can there be another) god besides Allah ? Nay , they are a people who swerve from justice.

The creation of the heavens and the earth has been explained under verse 2 : 117.

The falling of raindrops from the sky has been explained under verses 2 : 22 and 2 : 164.

The growth of vegetation as a result of rain has been discussed under verse 2:164.

٦١- أَمَّنْ جَعَلَ الْأَرْضَ قَرَارًا وَجَعَلَ خِلَالَهَا أَنْهَارًا وَجَعَلَ لَهَا تَضَامِيًا وَجَعَلَ بَيْنَ  
الْبَحْرَيْنِ حَاجِزًا ؕ إِلَٰهٌ مَّعَ اللَّهِ ؕ بَلْ أَكْثَرُهُمْ لَا يَعْلَمُونَ ۝

27:61 Or, Who has made the earth firm to live in; made rivers in its midst; set thereon mountains immovable and made a separating bar between the two bodies of flowing water? (Can there be another) god besides Allah? Nay, most of them know not.

This has been discussed under verse 25:53.

٦٣- أَمَّنْ يَهْدِيكُمْ فِي ظُلُمَاتِ الْبَرِّ وَالْبَحْرِ وَمَنْ يُرْسِلُ الرِّيْحَ بُشْرًا بَيْنَ يَدَيْ رَحْمَتِهِ  
إِلَٰهٌ مَّعَ اللَّهِ ؕ تَعَالَى اللَّهُ عَمَّا يُشْرِكُونَ ۝

27 : 63 Or, Who guides through the depths of darkness on land and sea, and Who sends the winds as heralds of glad tidings going before His mercy. (Can there be another) god besides Allah? High is Allah above what they associate with Him!

Darkness on land and sea has been explained under verse 6:63, and the statement 'Winds as heralds of glad tidings going before His mercy' has been explained under verse 7:57.

٦٤- أَمَّنْ يَبْدَأُ الْخَلْقَ ثُمَّ يُعِيدُهُ وَمَنْ يَرْزُقُكُمْ مِنَ السَّمَاءِ وَالْأَرْضِ  
إِلَٰهٌ مَّعَ اللَّهِ ؕ قُلْ هَاتُوا بُرْهَانَكُمْ إِنْ كُنْتُمْ صَادِقِينَ ۝

27 : 64 Or, Who originates creation, then repeats it, and Who gives you sustenance from heaven and earth? (Can there be another) god besides Allah ? Say, " Bring forth your argument if you are telling the truth !"

The origin of creation and its repetition has been discussed under verses 2: 117 and 21 : 104.

۸۱- وَمَا أَنْتَ بِهَادِي الْعُمْيِ عَنْ ضَلَالَتِهِمْ إِنْ تُشْعِرُونَ إِلَّا  
مَنْ يُؤْمِنُ بِآيَاتِنَا فَهُمْ مُسْلِمُونَ ○

27 : 81 Nor can't you be a guide to the blind, ( to prevent them) from straying ; only those will you get to listen who believe in Our Signs, and they will bow in Islam.

### Signs of Allah

The scientific explanation of some of the Signs of Allah as mentioned in verses 2 : 164, 3 : 190, 6 : 97, 6 : 98, 6 : 99, 7 : 58, 10 : 5, 10 : 6, 10 : 67, 13 : 2, 13 : 3, 13 : 4, 16 : 12, 16 : 13, 16 : 65, 16 : 66, 16 : 67, 16 : 69, 16 : 79, 21 : 91 has been rendered earlier.

۸۶- أَلَمْ يَرَوْا أَنَّا جَعَلْنَا اللَّيْلَ لِيَسْكُنُوا فِيهِ وَالنَّهَارَ مُبْصِرًا  
إِنَّ فِي ذَلِكَ لَآيَاتٍ لِقَوْمٍ يُؤْمِنُونَ ○

27 : 86 See they not that We have made the night for them to rest in and the day to give them light. Verily in this are signs for any that believe.

Night for rest and day for giving light have been explained under verse 10 : 67.

۸۸- وَتَرَى الْجِبَالَ تَحْسَبُهَا جَامِدًا وَهِيَ كَالْعُثْمُرِ الْكَاسِبِ  
صَلَّمَ اللَّهُ الَّذِي أَنْعَمَ كُلَّ شَيْءٍ إِنَّهُ خَبِيرٌ بِمَا تَفْعَلُونَ ○

27 : 88 You see the mountains and think them firmly fixed : but they shall pass away as the clouds pass away. (Such) is the artistry of Allah. Who disposes of all things in perfect order, for He is well acquainted with all that you do.

### Creation of all things by Allah in perfect order

The creation of all things by Allah in definite proportions, order and harmony have been discussed earlier at several places. See, for example, the discussions under verses 1 : 1, 7 : 54, 13 : 16, 25 : 2.

٤- وَأَوْحَيْنَا إِلَىٰ أُمِّ مُوسَىٰ أَنْ أَرْضِعِيهِ ۖ إِذَا وَجِئْتِ عَلَيْهِ فَأَلْقِيهِ فِي الْيَمِّ وَلَا  
تَخَافِي وَلَا تَحْزَنِي ۗ إِنَّا مَرَّادُوهُ إِلَيْكَ وَجَاعِلُوهُ مِنَ الْمُرْسَلِينَ ○

28 : 7 We sent this inspiration to the mother of Moses : 'Suckle (your child), but when you have fears about him, cast him into the river, but fear not nor grieve, for , We shall restore him to you, and We shall make him one of Our apostles.'

How the child (baby Musa a.s.) was cast into the river is explained in detail under verse 20 : 39.

٤١- قُلْ أَرَأَيْتُمْ إِنْ جَعَلَ اللَّهُ عَلَيْكُمُ اللَّيْلَ سَرْمَدًا إِلَىٰ يَوْمِ الْقِيَامَةِ  
مَنْ إِلَهٌ غَيْرُ اللَّهِ يَأْتِيكُمْ بِضِيَاءٍ ۗ أَفَلَا تَسْمَعُونَ ○

28 : 71 Say : do you see ? If Allah were to make the Night perpetual over you to the Day of Judgment what god is there other than Allah who can give you light ? will you not then hearken.

٤٢- قُلْ أَرَأَيْتُمْ إِنْ جَعَلَ اللَّهُ عَلَيْكُمُ النَّهَارَ سَرْمَدًا إِلَىٰ يَوْمِ الْقِيَامَةِ  
مَنْ إِلَهٌ غَيْرُ اللَّهِ يَأْتِيكُمْ بِاللَّيْلِ تَسْكُونُونَ فِيهِ ۗ أَفَلَا تُبْصِرُونَ ○

28 : 72 Say : do you see ? If Allah were to make the Day perpetual over you to the Day of Judgement, what god is there other than Allah who can give you a night in which you can rest? will you not then see ?

٤٣- وَمِنْ رَحْمَتِهِ جَعَلَ لَكُمْ اللَّيْلَ وَالنَّهَارَ لِتَسْكُنُوا فِيهِ وَلِتَبْتَغُوا مِنْ فَضْلِهِ  
وَلَعَلَّكُمْ تَشْكُرُونَ ○

28 : 73 It is out of this Mercy that He has made for you night and day, that you may rest therein, and that you may seek of His Grace ; and in order that you may be grateful.



These 3 verses need to be considered together in order to appreciate the message conveyed therein. Allah, the Most Beneficent and Merciful has endowed the earth with rotational motion around its axis which causes night and day. The beneficial effects of night and day have been discussed under verse 10 : 67.

If the period of axial rotation of the earth was equal to the period of a complete revolution around the sun, then there would have been perpetual day in one hemisphere and perpetual night in the other hemisphere. The side permanently exposed to the sun would have very high temperature making life processes almost impossible to continue mainly due to shortage of water and of green vegetation. Similarly, life could not thrive on the side having perpetual night due to absence of photosynthesis.

If Allah wished, the earth could have quite a different type of rotation about its axis from it is endowed with. There are some quite interesting examples of axial rotation in our solar system dissimilar to that of the earth. The moon rotates about its axis in such a way that by the time it completes one axial rotation it also completes one revolution around the earth so that any place on the moon has a day or a night corresponding to 15 earth days or 15 earth nights respectively and one face of the moon is permanently exposed to the earth. The axial rotation of the planet Uranus is more fascinating. Its axis of rotation lies almost on its plane of revolution resulting in exposure of one pole to the sun during its half period of revolution about the sun while the other pole is away from the sun during that period (about 42 earth years).

During the mid day the temperature of the moon shoots up to 120°C while at night this falls to as low as 100°C.

The planet Venus rotates in the opposite direction with reference to any other planet and the period of axial rotation is longer than the period of revolution. The period of axial rotation is 243 earth-days and that of revolution about the sun is 225 earth-days.

Perpetual day or night would have made conditions for life to thrive too difficult and perhaps impossible. In these verses Allah draws our attention to His Mercy and invites us to 'seek of His grace' by giving night and day in measured condition in the planet earth.

۸۱- فَخَسَفْنَا بِهِ وَبَدَارِهِ الْأَرْضَ فَمَا كَانَ لَهُ مِنْ فِئَةٍ يُنصُرُونَهُ مِنْ دُونِ  
 اللَّهِ وَمَا كَانَ مِنَ الْمُنتَجِرِينَ ○

28:81 Then We caused the earth to swallow up him and his house; and he had not (the least little) party to help him against Allah, nor could he defend himself.

This refers to the punishment inflicted on Quran one of the Israels who accompanied prophet Musa (a.s.) in his exodus from Egypt. He was enormously rich and this made him insolent against the Prophet and his people.

According to the Bible he along with his followers numbering 250 rebelled against Musa (a.s.) and for this he was punished along with two of his companions- the ground under them split open and they were swallowed.

An easy example of swallowing by the earth is the quicksand .In appearance quicksand does not differ from adjacent sand, thus making it dangerous for travellers. This is a bed of loose moving sand, saturated with water to such an extent that it readily yields to pressure and cannot support the weight of people or animals. When anybody steps on a bed of quicksand, the ground under feet cannot support the weight of the body, it gives way and the body gradually sinks. The earth swallows the body up. Small tracts of quicksand occur fairly frequently at river mouths, specially of Iceland, and on flat shores, underlain by shift clay or other impervious materials.

Severe earthquakes also cause such effects of swallowing i. e., burying alive from among the casualties that occur. During great earthquakes, buildings are cracked, large fissures appear in the earth, sometimes with the advent of huge sea waves coming with the large masses of water and mud from the shore making great havoc and disaster to people and property. Among the earthquakes of the past with disastrous effects, the following may be mentioned: due to earthquake 30,000 to 40,000 people lost their lives in Lisbon in 1755; the greater portion of the city was wrecked; fire burst out, tidal waves swept over the quays. In 1783, 60,000 lost their lives in Calabria in Italy due to an earthquake. On September 1, 1923, Japan

suffered the worst disaster, when an earthquake followed by tidal waves and fire, destroyed the capital city Tokyo and the chief port Yokohama. There were 246, 540 casualties. In 1935, Quetta was destroyed by an earthquake. Many people died in Bihar due to an earthquake in 1934. Heavy casualties in lives and property occurred in the northern part of Iran and Azerbaijan.

People and property are also swallowed up by the earth by devices like canyons and gorges, caused by the action of water, such as erosion. In Colorado, the grand canyon is such a wide opening and is a perfect example; It is about 1 mile deep, and 4 to 12 miles wide. There are other canyons and gorges with mouth wide open.

١٩- أَوَلَمْ يَرَوْا كَيْفَ يُبْدِئُ اللَّهُ الْخَلْقَ ثُمَّ يُعِيدُهُ إِنَّ ذَلِكَ عَلَى اللَّهِ يَسِيرٌ ۝

29 : 19 See they not how Allah originates creation, then repeats it; truly that is easy for Allah.

It has been discussed in detail in appendix II how creation originated.

It has also been discussed that two opposing forces are acting in the universe, one of attraction due to gravity and the other of expansion caused by the big bang. One theory states that ultimately the force of attraction due to gravity will prevail and the universe will collapse with a big crunch into an ultra small, ultra dense and ultra hot blob, from which a new universe will be again created with another big bang. See also the discussion under verses 2 : 117 and 21 : 104.

٢٠- قُلْ سِيرُوا فِي الْأَرْضِ فَانظُرُوا كَيْفَ بَدَأَ الْخَلْقَ ثُمَّ اللَّهُ يُنشِئُ النَّشْأَةَ الْآخِرَةَ إِنَّ اللَّهَ عَلَىٰ كُلِّ شَيْءٍ قَدِيرٌ ۝

29:20 Say : Travel through the earth and see how Allah did originate creation ; so will Allah produce a later creation ; for Allah has power over all things.

In this verse, we are asked to contemplate Allah's creation and origin by travelling through the earth. The best example of acquisition of knowledge and insight into the mysteries of creation through this process is

illustrated by the journeys of the famous British, biologist Charles Darwin. At the age of 22, he was offered the job of a naturalist on the British Royal Navy Ship H. M. S. Beagle which sailed in the year 1831 on a voyage to survey little known areas of the world<sup>1</sup>. It enabled him to study vast numbers of creatures, the pattern of life and rocks in many countries. His interests covered every kind of living creature, Darwin's most influential work was his theory of evolution which brought new ideas into the study of religion and science. He first began to formulate these ideas when he visited the Galapagos islands in the Pacific ocean.

A deep study into nature by travelling through the world would convince any one about the grand design of every thing that Allah did create, and bring back home the truth about the conviction that Allah the Almighty will, likewise, produce a later creation.

### Reference

1. *The Wonders of Life on Earth*. Editors of Life and Lincoln Barnett. Prentice-Hall International, London, p. 9, 1963.

٢٨- وَلَوْ طَآءُ إِذْ قَالَ لِقَوْمِهِ إِنَّمَا كُنَّا تَوَآءَمُونَ الْعَارِضَةُ  
مَا سَبَقَكُمْ بِهَا مِنْ أَحَدٍ مِنَ الْعَالَمِينَ

29 : 28 And (remember) Lut who said to his people : "you commit lewdness such as no people in creation ever committed before you."

This subject has already been discussed under verses 7 : 80-81.

٢٩- أَوَيْتُمْ كِتَابَتُونَ الرِّجَالَ وَتَقَاطَعُونَ السَّبِيلَ ؕ وَتَأْتُونَ فِي نَادِيكُمُ الْمُنْكَرَ  
فَمَا كَانَ جَوَابَ قَوْمِهِ إِلَّا أَنْ قَالُوا ائْتِنَا بِعَذَابِ اللَّهِ إِنْ كُنْتُمْ مِنَ الصَّادِقِينَ

29 : 29 "Do you indeed approach men, and cut off the high way and practise wickedness (even) in your councils ? But his people gave no answer but this ; "Bring us the wrath of Allah if you tell us the truth."

Here it is evident that the people of Lut (a. s.) not only indulged in male homosexuality in secrecy but they also practised this wickedness in public in highways and assemblies ! This proves that they had no shame or feeling of guilt for committing such abnormal sexual acts. It is for such people that the messenger of Allah, prophet Muhammad (sm.) warned about the appearance of a disease which would be new and unknown to their forefathers (Ibn Majah). The modern AIDS probably is such a disease among the sexual perverts.

The subject of AIDS has been discussed in connection with verse 7 : 80-81.

٣٨- وَعَادُوا وَتَأْتُوا وَقَدْ تَبَيَّنَ لَكُمْ مِنْ مَسْجِدِهِمْ ؕ وَزَيْنَ لَهُمُ الشَّيْطَانُ أَعْمَالَهُمْ  
فَصَلِّ لَهُمْ عَنِ السَّبِيلِ وَكَانُوا مُسْتَبْصِرِينَ

**29 : 36 (Remember also) the Ad and the Thamud (people) ; clearly will appear to you from (the traces) of their buildings (their fate); the evil one made their deeds alluring to them, and kept them back from the path, though they were gifted with intelligence and skill.**

This verse speaks of the peoples of prophet Saleh (a.s.) and prophet Hud (a.s.). These peoples were punished by Allah for their sins.

This matter has been discussed in connection with verses . 11 : 58 and 11 : 67 respectively.

۴۰- نَكَلًا أَخَذْنَا بِذَنبِهِمْ ۖ فَمِنْهُمْ مَنْ أَرْسَلْنَا عَلَيْهِ حَاصِبًا ۖ  
 وَمِنْهُمْ مَنْ أَخَذَتْهُ الطَّيْفَةُ ۖ وَمِنْهُمْ مَنْ حَسَفْنَا بِهِ الْأَرْضَ ۖ  
 وَمِنْهُمْ مَنْ أَعْرَفْنَا ۖ وَمَا كَانَ اللَّهُ لِيُظْلِمَهُمْ وَلَكِنْ كَانُوا أَنْفُسَهُمْ يَظْلِمُونَ ۝

**29 : 40** Each one of them We seized for his sin. Of them against some We sent a violent tornado, some were caught by a blast, and some We caused the earth to swallow up, and some we drowned. It was not Allah Who wronged them but they wronged themselves.

The verse speaks of various kinds of punishment inflicted on different people referred to in the earlier verses 29 : 31-39.

Punishments referred to are on the people of Lut (a.s.), to Qarun, a companion of prophet Musa (a.s.) : and to Pharaoh. These have been discussed under verse 7 : 84.

### Formation of tornado

Some thunderstorms particularly the squall type, occasionally develop a violent whirl of air which extends down from the base of the cloud and touches the earth. It often draws up into the cloud again and may strike some distance away or never reappear. Very low pressure prevails inside a tornado because of its great velocity. When a tornado passes over a building, the building virtually blows up because of the low pressure surrounding it. Tornadoes are most common in the south and middle West. (Van Nostrand's

Scientific Encyclopaedia, 2nd edition, 1947 , p. 1432). The matter of blast on the people of Lut (a.s.) has been discussed under verse 15 : 73.

The matter of Qarun has been discussed under verse 28 : 81.

٦١- وَلَئِنْ سَأَلْتَهُمْ مَنْ خَلَقَ السَّمَوَاتِ وَالْأَرْضَ وَسَخَّرَ الشَّمْسَ وَالْقَمَرَ  
لَيَقُولنَّ اللَّهُ ۗ فَأَنَّى يُؤْفَكُونَ ۝

29 : 61 If indeed you ask them who has created the heavens and the earth and subjected the sun and the moon (to His law), they will certainly reply, "Allah". How are they then deluded away (from the truth) ?

The scientific theories about the creation of the heavens and the earth have been described under verses 2 : 117, 2 : 164 and appendices I and II. The laws governing the sun and the moon have been discussed under verse 7 : 54.

٣٣- وَلَئِنْ سَأَلْتَهُمْ مَنْ نَزَّلَ مِنَ السَّمَاءِ مَاءً فَأَحْيَا بِهِ الْأَرْضَ مِنْ بَعْدِ مَوْتِهَا  
لَيَقُولنَّ اللَّهُ ۗ فلي الْحَمْدُ لِلَّهِ ۗ بَلْ أَكْثَرُهُمْ لَا يَعْقِلُونَ ۝

29 : 63 And if indeed you ask them who it is that sends down rain from the sky and gives life therewith to the earth after its death they will certainly reply, "Allah", Say "Praise be to Allah". But most of them understand not.

Falling of rain drops from the sky and the revival of dead earth by rain water has been explained under verse 2 : 164.

٩- أَوَلَمْ يَسِيرُوا فِي الْأَرْضِ فَيَنْظُرُوا كَيْفَ كَانَ عَاقِبَةُ الَّذِينَ مِنْ قَبْلِهِمْ  
كَانُوا أَشَدَّ مِنْهُمْ قُوَّةً وَأَكَارُوا الْأَرْضَ وَعَمَرُوهَا أَكْثَرُ مِنَّا عَمْرُوهَا  
وَجَاءَتْهُمْ رُسُلُهُم بِالْبَيِّنَاتِ فَمَا كَانَ اللَّهُ لِيَظْلِمَهُمْ  
وَلَكِنْ كَانُوا أَنْفُسَهُمْ يَظْلِمُونَ ۝

30 : 9 Do they not travel through the earth and see what was the end of those before them ?....

This has been discussed under verses 3 : 137 and 6 : 11.

۱۱-اللَّهُ يَبْدَأُ الْخَلْقَ ثُمَّ يُعِيدُهُ ثُمَّ إِلَيْهِ تُرْجَعُونَ ۝

30: 11 It is Allah who begins creation, then repeats it; then shall you be brought back to Him.

This has been discussed under verse 29:19.

۱۹-يُخْرِجُ الْحَيَّ مِنَ الْمَيِّتِ وَيُخْرِجُ الْمَيِّتَ مِنَ الْحَيِّ وَيُحْيِي الْأَرْضَ بَعْدَ مَوْتِهَا ۚ وَكَذَلِكَ تُخْرَجُونَ ۝

30:19 It is He Who brings out the living from the dead and brings out the dead from the living and who gives life to the earth after it is dead. And thus shall you be brought out.

The subjects of bringing out the living from the dead and of the dead from the living have already been discussed under verses 3:27 and 6 :95.

The matter of giving life to the earth after it is dead has been discussed under verse 2:164.

۲۰-وَمِنْ آيَاتِهِ أَنْ خَلَقَكُمْ مِنْ تُرَابٍ ثُمَّ إِذَا أَنْتُمْ بَشَرٌ تَشْتَرُونَ ۝

30:20 Among His Signs is this that he created you from dust and then behold, you are men scattered (far and wide).

This subject of creation of man has already been discussed under verses 2:28 and 18:37.

As for the scattering of mankind all over the world, there are many factors which spread the human race far and wide. The most important factor was the migration of people. Migrations or movements of people have occurred throughout human history. Primitive migrations were tribal and usually were made in search of food, water and pasture. Physical change of the earth



surface like advance of glacial mass, continental drifting, earthquake etc. also led to migration. The discovery of new lands played a great role in recent centuries in mass scale migration.

It is interesting to note that human beings were found in the new world, Australia, Pacific and Atlantic island and even in Arctic zones when these places were discovered. So it is evident that Allah scattered mankind to different parts of the world.

۲۲- وَمِنْ آيَاتِهِ خَلْقُ السَّمَوَاتِ وَالْأَرْضِ وَاخْتِلَافُ اللِّسَانِ وَأَلْوَانِكُمْ  
إِنَّ فِي ذَلِكَ لآيَاتٍ لِّلْعَالَمِينَ ○

30: 22 And among His Signs is the creation of the heavens and the earth, and the variations in your languages and your colours : verily in that are Signs for those who know.

The creation of the heaven and the earth has been discussed under verses 2:117, and 2:164.

Though human beings are believed to be of the same origin, the diverse colours of different peoples and races need some explanation. The colour is limited to skin only.

The colour of the skin depends upon the quantity of melanin present in the pigment layer of the epidermis. There are five layers of the outer skin layer or epidermis. The melanin pigment is present as granules in the melanocytes situated in the fifth or the basal layer. On exposure to ultraviolet light which is common in the tropical countries, those pigment granules are released and pass into the superficial layers where they produce the brown colour or sun-tan which protects the skin against the harmful effects of continued exposure to the ultraviolet rays of the sun. As a result the people in cold countries have little or no melanin in the superficial layer and hence are white or light skinned. In the tropical countries the pigment is permanently present in the superficial layers.

Genetic factors play an important role in determining the distribution of melanin in the skin and hence its colour. Thus due to marriage between races of different colours, the children of various shades of colours are produced. Among the genetically brown or black skin as well as sun-tanned white skinned people, there is a wide spread distribution of melanin in the

more superficial layers of the skin. This is more due to activity of the melanocytes to an actual increase in their number. In dark people, in granular layer (third layer) contains a large number of melanin containing cells called melanophores. Due to the climatic influence to thousands of years mankind is now having different distinct colours of skin.

۲۳- وَمِنْ آيَاتِهِ مَنَامُكُمْ بِاللَّيْلِ وَالنَّهَارِ وَابْتِغَاؤُكُمْ مِنْ فَضْلِهِ  
إِنَّ فِي ذَلِكَ لَآيَاتٍ لِّقَوْمٍ يَسْمَعُونَ ۝

30:23 And among His Signs is the sleep that you take by night and by day and the quest that you (make for livelihood) out of His bounty. Verily in that are Signs for those who heed.

Sleep is a resting condition of the body that recuperates and restores the brain, the nervous system, the muscles and the whole system. For details see appendix VIII.

۲۴- وَمِنْ آيَاتِهِ يُرِيكُمْ الْبَرْقَ خَوْفًا وَطَمَعًا وَيُنزِلُ مِنَ السَّمَاءِ مَاءً فَيُحْيِي بِهِ  
الْأَرْضَ بَعْدَ مَوْتِهَا إِنَّ فِي ذَلِكَ لَآيَاتٍ لِّقَوْمٍ يَعْقِلُونَ ۝

30: 24 And among His Signs He shows you the lightning by way both of fear and of hope and He sends down rain from the sky and with it gives life to the earth after it is dead. Verily in that are Signs for those who are wise.

Lightning by way both of fear and hope has been explained under verse 13:12. The falling of rain from the sky reviving the dead earth therewith has been explained under verses 2:22, 164.

۲۵- وَمِنْ آيَاتِهِ أَنْ تَقُومَ السَّمَاءُ وَالْأَرْضُ بِأَمْرِهِ ثُمَّ إِذَا دَعَاكُمْ دَعْوَةً مِنَ الْأَرْضِ  
إِذْ أَنْتُمْ تَخْرُجُونَ ۝

30: 25 And among His Signs is this that heaven and earth stand by His command: then when He calls you, by a single

call, from the earth, behold, you (straight way) come forth.

Everything in the heaven, such as stars, planets, satellites, galaxies etc. and all living and non-living bodies on the earth exist by obeying the laws of nature. These laws are ordained by Allah and so is His command. Thus heaven and earth stand by His command. This has been discussed in verses 7:54, 185, and appendices I, II and IV.

٢٦- وَ لَهُ مِنْ فِي السَّمَوَاتِ وَالْأَرْضِ كُلُّ لَهٗ قَنُوتٌ ۝

30 : 26 To Him belongs every being that is in the heaven and on the earth. All are devoutly obedient to Him.

This point has been discussed under verse 5 : 19.

٢٧- وَمِنْ آيَاتِهِ أَنْ يُرْسِلَ الرِّيحَ مُبَشِّرَاتٍ ۖ وَلِيُنذِرَكُمْ مِنْ رَحْمَتِهِ ۖ وَلِتَجْرِيَ الْفُلُكُ بِأَمْرِهِ ۖ وَلِتَبْتَغُوا مِنْ فَضْلِهِ ۖ وَلَعَلَّكُمْ تَشْكُرُونَ ۝

30 : 46 Among His Signs is this that He sends the winds as heralds of Glad Tidings giving you taste of His (Grace and) Mercy that the ships may sail (majestically) by His command and that you may seek of His Bounty in order that you may be grateful.

Winds as heralds of glad tidings of His mercy have been explained under verse 7 : 57.

The sailing of ships has been explained under verse 2 : 164

٢٨- اللَّهُ الَّذِي يُرْسِلُ الرِّيحَ فَتُثِيرُ سَحَابًا ۖ يَبْسُطُ فِي السَّمَاءِ كَيْفَ يَشَاءُ ۖ وَيَجْعَلُهُ كِسْفًا فَتَرَى الْوَدْقَ يَخْرُجُ مِنْ خِلَالِهِ ۖ فَإِذَا أَصَابَ بِهِ مَنْ يَشَاءُ مِنْ عِبَادِهِ إِذَا هُمْ يَسْتَبِشِرُونَ ۝

30 : 48 It is Allah Who sends the winds and they raise the clouds, then does He spread them in the sky as He wills and break them into fragments, until you see rain-drops issue from

**their midst; then when He has made them reach such of His servants as He wills, behold, they do rejoice.**

The wind as herald of glad tidings has been explained under verse 7:57.

How a cloud is formed, how it is raised in the sky by the wind, how it gets spread over a wide area at a higher altitude and how water particles within the cloud coalesce together to form droplets which gradually grow in size and ultimately become too heavy for the air to sustain them, thereby causing rain-drops to come down have been explained under verse 2:164.

The huge cloud mass which remains suspended in the air does not have a uniform temperature, air-pressure and win-speed throughout; when these variations exceed certain limits different portions of the cloud will have different relative motions and ultimately get detached from the main cloud, thus breaking it up into fragments.

It is not possible to foretell exactly at which spots on the surface of the earth the clouds fragments will deliver their welcome shower. Rain fall at a particular place depends on a favourable combination of the effects of a number of factors: (i) the nature and size of the cloud and its altitude, (ii) wind-velocity, (iii) temperature and humidity of the air, (iv) existence of forests on the ground, and (v) the presence of massive obstacles (high mountains) to the wind-flow. It is not within the capabilities of man to gain full control of these factors; it is Allah who regulates them as He pleases through myriads of forces working in the atmosphere.

٥٤- اللَّهُ الَّذِي خَلَقَكُمْ مِنْ ضَعْفٍ ثُمَّ جَعَلَ مِنْ بَعْدِ ضَعْفٍ قُوَّةً  
ثُمَّ جَعَلَ مِنْ بَعْدِ قُوَّةٍ ضَعْفًا وَشَيْبَةً يَخْلُقُ مَا يَشَاءُ وَهُوَ الْعَلِيمُ الْقَدِيرُ ۝

30:54 It is Allah Who created you in a state of weakness, then gave you strength after weakness, then after strength gave (you) weakness and a hoary head. He creates as he wills and it is He Who has all knowledge and power.

The human infant is the most helpless creature in the world which needs the constant attention of parents, relations and attendants for several years before it is able to stand on its own. From the helplessness of the infancy

the child gradually learns to crawl, walk, talk and finally by adulthood (15-18 years) he is strong enough to look after himself. This lengthy process of development provides a great opportunity to learn about the world and his environment which is essential for his survival.

The adulthood is characterised by strength and activity up to 50 to 60 years when gradually the strength gets less and in ripe old age one becomes again very weak and helpless like children and infants. This is a normal sequence without any known illness and is known as senile decay or senile debility. In man the usual age of senility is 70 years and above. The hoary head means white head or gray hair of old age.

The varying colour of hair is due to pigment (melanin) scattered in varying amount throughout the hair. The white hair is due to the absence to melanin and the presence of numerous air spaces throughout the cells composing it. Though gray hair is a sign of old age, the age of graying varies widely. The graying usually starts after 30 years but complete graying has no definite age.

١- خَلَقَ السَّمَوَاتِ بِغَيْرِ عَمَدٍ تَرَوْنَهَا وَالْأَرْضَ فِي الْأَرْضِ رَوَاسِيَ أَنْ تَمِيدَ بِكُمْ  
وَبَثَّ فِيهَا مِنْ كُلِّ دَابَّةٍ وَأَنْزَلْنَا مِنَ السَّمَاءِ مَاءً فَأَنْبَتْنَا  
فِيهَا مِنْ كُلِّ ثَمَرٍ ذَكَرِيهِ ۝

31:10 He created the heavens without any pillars that you can see; He set on the earth mountains standing firm, lest it should shake with you. And He scattered through it beasts of all kinds. We send down rain from the sky and produce on the earth every kind of noble creature, in pairs.

**Creation of the heavens without any pillars**

This has been discussed under the first part of verse 13:2.

**Setting on the earth mountains standing firm**

This has explained under verse 13:3.

**Production of every kind of noble creature, in pairs**

This part of the verse points to the production of plants in pairs, with the help of the rain scattered from the sky by Allah and has been discussed under verse 13:3.

۱۱- هَذَا خَلْقُ اللَّهِ فَأَرُونِي مَاذَا خَلَقَ الَّذِينَ مِنْ دُونِهِ  
بَلِ الظَّالِمُونَ فِي ضَلَالٍ مُّبِينٍ ۝

**31:11** Such is the Creation of Allah; now show Me what is there that others besides Him have created; nay but the transgressors are in manifest error.

#### Creations of things by others besides Allah

That the creation of things by man is no match for the perfect creation by Allah has been scientifically discussed under verse 13:16.

۲۰- أَلَمْ تَرَوْا أَنَّ اللَّهَ سَخَّرَ لَكُمْ فِي السَّمَوَاتِ وَمَا فِي الْأَرْضِ مَا سَبَغَ عَلَيْكُمْ نِعْمَهُ ظَاهِرَةً وَبَاطِنَةً وَمِنَ النَّاسِ مَنْ يُجَادِلُ فِي اللَّهِ بِغَيْرِ عِلْمٍ وَلَا هُدًى وَلَا كِتَابٍ مُنِيرٍ ۝

**31:20** Do you not see that Allah has subjected to your (use) all things in the heavens and on earth and has made His bounties flow to you in exceeding measure (both) seen and unseen? Yet there are among men those who dispute about Allah without knowledge and without guidance, and without a Book to enlighten them.

This has been discussed under verse 16:12.

۲۹- أَلَمْ تَرَ أَنَّ اللَّهَ يُولِجُ اللَّيْلَ فِي النَّهَارِ وَيُولِجُ النَّهَارَ فِي اللَّيْلِ وَسَخَّرَ الشَّمْسَ وَالْقَمَرَ كُلٌّ يَجْرِي إِلَىٰ أَجَلٍ مُّسَمًّى وَأَنَّ اللَّهَ بِمَا تَعْمَلُونَ خَبِيرٌ ۝

**31:29** Do you not see that Allah merges night into day and He merges day into night; that he has subjected the sun and the moon (to His law), each running its course for a term appointed; and that Allah is well acquainted with all that you do.

### Merging of night into day and day into night

This has been explained under verse 3:27.

### Subjecting the sun and the moon to laws

The point that the sun, the moon and other heavenly bodies are subject to the laws ordained by Allah has been discussed under verse 7:54. Every celestial body has two motions, one of rotation about its axis and the other of revolution. Due to the motion of revolution, each celestial body follows a definite path or orbit. For a single object moving freely in the gravitational field, the orbit is a conic section i.e., either circular, elliptical, parabolic or hyperbolic. Most orbits are elliptical; most planetary orbits are nearly circular. A parabolic or hyperbolic orbits results in the object escaping the vicinity of a massive body with a velocity equal to or greater than its escape velocity. Each celestial runs its course for an appointed term i.e., till the time when each evolves into another form of heavenly body (e.g., the sun is likely to evolve into a red giant) presumably with a different time period or till the time when it meets its end.

٣١- أَلَمْ تَرَ أَنَّ الْفُلُوكَ تَجْرِي فِي الْبَحْرِ بِنِعْمَتِ اللَّهِ لِيُرِيكُمْ مِنْ آيَاتِهِ

إِنَّ فِي ذَلِكَ لآيَاتٍ لِكُلِّ صَبَّارٍ شَكُورٍ ○

- 31: 31 See you not that the ships sail through the ocean by the grace of Allah that He may show you of His Signs? Verily in this are Signs for all who constantly persevere and give thanks.

The sailing of the ships has been discussed under verse 2:164. Some of the Signs mentioned herein have been explained earlier, see 27:81.

٣٢- وَإِذَا غَشِيَهُمْ مَوَجٌ كَالظُّلْمِ دَعَوْا اللَّهَ مُخْلِصِينَ لَهُ الدِّينَ هُ فَلَمَّا بَلَغَهُمُ

إِلَى الْبَرِّ فَمِنْهُمْ مُقْتَصِدٌ وَمَا يَجْحَدُ بِآيَاتِنَا إِلَّا كُلُّ خَتَّارٍ كَفُورٍ ○

- 31: 32 When a wave covers them like the canopy of clouds, they call to Allah offering him sincere devotion, but when He has delivered them safely to land, there are among them those that halt (between right and wrong). But

**none reject our Signs except only a perfidious ungrateful (wretch).**

See the note under verse 27:81.

۳۳- إِنْ اللَّهُ عِنْدَهُ عِلْمُ السَّاعَةِ وَيُرْسِلُ الْغَيْثَ وَيَعْلَمُ مَا فِي الْأَرْحَامِ  
وَمَا تَدْرِي نَفْسٌ مَّاذَا تَكْسِبُ غَدًا وَمَا تَدْرِي نَفْسٌ بِأَيِّ أَرْضٍ تَكُونُ  
إِنَّ اللَّهَ عَلِيمٌ خَبِيرٌ ۝

**31:34 Verily, the knowledge of the Hour (hour of Qiamat or Doomsday) is with Allah (alone) and it is He Who sends down rain and He Who knows what is in the wombs. Nor does any one know what is it that he will earn on the morrow, nor does any one know in what land he is to die. Verily with Allah is full knowledge and He is acquainted (with all things).**

### Knowing what is in the wombs

So far as the product of conception inside the wombs is concerned, man has little knowledge about the formation of the zygote which settles inside the womb till it is already formed and anchored after about one week of the fertilization and the next menstrual period is missed. The pregnancy test is done usually after missing a menstrual period and thus almost 2 weeks after the ovulation. But Allah knows when fertilization occurs long before man can suspect it.

In modern times man can confirm the pregnancy positively by biochemical tests based on the increased production and excretion of pregnandiol (the excretory product of progesterone produced by the corpus luteum in the ovary).

Though pregnancy may be confirmed fairly early, the sex of the foetus remains unknown for a long time. During the advanced stage of pregnancy, some modern genetic study and biological tests are helpful to know about the sex of the foetus but confirmation is difficult unless the foetus is in a suitable position in ultrasonographic study.



However, this verse does not claim that man will not be able to know what is in the womb but only states that the correct knowledge is with Allah. Besides, in some complications of pregnancy like mole formation and development of chorion epithelioma, the pregnancy test remains positive and this observation may misguide the patient about the correct situation.

٣- اللهُ الَّذِي خَلَقَ السَّمَوَاتِ وَالْأَرْضَ وَمَا بَيْنَهُمَا فِي سِتَّةِ أَيَّامٍ ثُمَّ اسْتَوَىٰ عَلَى الْعَرْشِ ۗ مَا لَكُمْ مِنْ دُونِهِ مِنْ وَكِيلٍ ۚ وَلَا شَفِيعٌ إِلَّا مَنْ أَسَاءَ ۚ وَمَنْ أَضَلُّ مِمَّنْ يَسْتَعِذُّ بِالْحُوتِ وَأَنْوَاعِ الْغُلَامِ ۗ كَذَّبُوا بِآيَاتِنَا كَذَّابُونَ ۝

32:4 It is Allah Who has created the heavens and the earth, and all between them in six days and is firmly established on the throne; you have none besides Him to protect or intercede (for you). Will you not then receive admonition?

The creation of the heavens and the earth in six days has been discussed under verse 7:54.

٥-يُدَبِّرُ الْأُمْرَ مِنَ السَّمَاءِ إِلَى الْأَرْضِ ثُمَّ يَعْرُجُ إِلَيْهِ فِي يَوْمٍ كَانَ مِقْدَارُهُ أَلْفَ سَنَةٍ وَمَنْ تَعَدُّونَ ۝

32:5 He rules (all) affairs from the heavens to the earth; in the end will (all affairs) go up to Him, in a Day, the space whereof will be (as) a thousand years of your reckoning.

That Allah rules all affairs from the heavens to the earth has been discussed under verses 7:54 and 7: 158. The end of the universe has been discussed in appendices I and II. That a day would be equivalent to a thousand years of our reckoning has been discussed under 22:47.

### Reckoning of a day

A day of our reckoning i.e., an earth-day, is the period of rotation of the earth about its axis. If the same definition is applied to the day of other heavenly bodies, then there are heavenly bodies whose days are shorter than earth-day<sup>1</sup> and other heavenly bodies whose days are longer than earth-days.

Thus a Jupiter day i.e., the period of rotation of the planet Jupiter about its axis is 9.96 hours of our reckoning i.e., less than half of the earth-day. On the other hand by similar definition, 1 Moon day is equivalent to 27 earth days; 1 day of the sun at its equatorial region is equivalent to 31 earth days; 1 Mercury day is equivalent to 58 earth days; 1 Venus day to 243 earth-days. In the case of our galaxy, the Milky-Way, the period of rotation is 250 million earth years. So it is quite plausible that there may be heavenly bodies, whose period of rotation, i.e., 1 day (of that heavenly body or bodies) is equivalent to 1000 years of our reckoning i.e., 1000 earth years. Thus, it is not at all difficult to comprehend literally a thousand year long day as mentioned in the present verse. The long day mentioned here may also be taken to mean a very long period of time. This latter interpretation has been suggested by many.

### Reference

1. J.C., Brandt, and S.P., Maran., *New Horizon in Astronomy*, W.H. Freeman and Company, San Francisco, p. 235, 1972.

٤-الَّذِي أَحْسَنَ كُلَّ شَيْءٍ خَلَقَهُ وَبَدَأَ خَلْقَ الْإِنْسَانِ مِنْ طِينٍ ۝  
 ٨-ثُمَّ جَعَلَ نَسْلَهُ مِنْ سُلَالَةٍ مِّنْ مَّاءٍ مَّهِينٍ ۝  
 ٩-ثُمَّ سَوَّاهُ وَنَفَخَ فِيهِ مِن رُّوحِهِ وَجَعَلَ لَكُمُ السَّمْعَ وَالْأَبْصَارَ وَالْأَفْئِدَةَ  
 قَلِيلًا مَّا تَشْكُرُونَ ۝

32:7-9 He Who has created everything good and began the creation of man with clay.

Then created his progeny from the extract of a fluid despised.

Then He fashioned him (in due proportion) and breathed into him from His spirit. And He provided you with the faculties of hearing, sight and feeling but little thanks do you give.

The creation of the first man from clay has already been discussed under verse 6:2.

The creation of human progeny through sex is mentioned here. It has already been discussed under verse 16:4. The fluids concerned in reproduction are semen from males and ovum from female present in the fluid of the ovarian follicle which is expelled during its rupture on maturation. Both these fluids are regarded as unclean and thus despised in Islam. The purpose of the statement here seems to point out that men are created from lowly objects and that they should not be arrogant and rebellious to their Creator.

The words 'fashioned him' mean the gradual development in the womb, a subject that has already been discussed under verses 23:12-14.

It is not possible to explain the breathing of Allah's spirit into man by our present day knowledge. The development of the faculties of hearing, sight and thinking has already been discussed under verse 16:78.

٢٤- أَوَلَمْ يَرَوْا أَنَّا نَسُوقُ الْمَاءَ إِلَى الْأَرْضِ الْجُرُزِ فَنَخْرِجُ بِهِ نَرْعًا تَأْكُلُ مِنْهُ  
 أَنْعَامُهُمْ وَأَنْفُسُهُمْ أَفَلَا يُبْصِرُونَ ○

**32:27** And do they not see that We drive rain to parched soil, and produce therewith crops, providing food for their cattle and themselves? Have they not the vision?

The processes of the formation of clouds and the falling of rain have been discussed in detail under verse 2:22.

The growth of every kind of crop as a consequence of rain is explained under verses 6:99 and 16:11. The growth of herbage or cattle, also as a beneficial effect of rain, is given under the discussion of verse 20:54.

١- الْحَمْدُ لِلَّهِ الَّذِي لَهُ مَا فِي السَّمَوَاتِ وَمَا فِي الْأَرْضِ وَلَهُ الْحَمْدُ فِي الْآخِرَةِ  
 وَهُوَ الْحَكِيمُ الْخَبِيرُ ○

**34:1** Praise be to Allah to Whom belong all things in the heavens and on earth; to Him be praise in the hereafter; And He is full of wisdom, acquainted with all things.

This point has been discussed under verse 20:6.

٢- يَعْلَمُ مَا يَلْبِغُ فِي الْأَرْضِ وَمَا يَخْرُجُ مِنْهَا وَمَا يَنْزِلُ مِنَ السَّمَاءِ وَمَا يَعْرُجُ فِيهَا  
 وَهُوَ الرَّحِيمُ الْغَفُورُ ○

**34:2** He knows that which goes down into the earth and that which comes forth from it and that which descends from the sky and that which ascends into it. He is Merciful the Forgiving.

In this verse quite a number of things have been alluded to.

That which goes down into the earth may refer to (i) water seeping through the soil and forming an underground reservoir, (ii) the roots of

plants penetrating the earth, for sucking nutrition and for helping plants to stand firm, and (iii) the plant and animal bodies that decompose and finally mix with the earth; (iv) the organisms that enter into the earth, for their habitat.

That which comes forth from the earth may include (i) germination of seeds below the soil and sprouting of plants above the ground, (ii) springs of water that gush forth, (iii) gases and mineral oils that issue out and (iv) volcanic eruptions throwing up smoke, mud, rocks and molten lava from inside.

Things which descend from the sky could include (i) rain-drops, hail storms and thunder bolts, (ii) solar and stellar radiation, (ii) meteors etc.

Things that ascend to the sky are (i) water vapour that vaporizes from the water surface on the ground by the heat of the sun, (ii) smoke and gases produced on the earth and (iii) minute dust particles that go up in the air and float in the atmosphere (iv) communications signals of electromagnetic nature etc.

All the phenomena mentioned above are known, in their minutest detail to Allah Who has set up definite mechanisms for the causing of these phenomena. It is interesting to note that without these phenomena each of which is of a scientific nature, the formation and sustenance of living matter would not have been possible. These phenomena, if explained in full, speak of Infinite Mercy of the Creator although some of these may cause punishment to man. These verse should make man ponder deeply over the taken-for-granted phenomena which surround his life.

۳- وَقَالَ الَّذِينَ كَفَرُوا لَا تَأْتِينَا السَّاعَةُ قُلْ بَلَىٰ وَرَبِّي لَتَأْتِيَنَّكُمْ عَلَىٰ الْغَيْبِ  
لَا يُعْرَبُ عَنْهُ مُثْقَلٌ ذَرَّةٍ فِي السَّمَوَاتِ وَلَا فِي الْأَرْضِ وَلَا أَصْغَرُ مِنْ ذَلِكَ وَلَا  
أَكْبَرُ إِلَّا فِي كِتَابٍ مُّبِينٍ ۝

34:3 The unbelievers say, "Never to us will come the Hour". Say, "Nay! But most surely by my Lord, it will come upon you—by Him Who knows the unseen,—from Whom is not hidden the least little atom in the heavens or on earth: nor is there anything less than that, or greater, but is in the Record Perspicuous"

This subject has been discussed under verse 10:61.

٩- أَفَلَمْ يَرَوْا إِلَى مَا بَيْنَ أَيْدِيهِمْ وَمَا خَلْفَهُمْ مِنَ السَّمَاءِ وَالْأَرْضِ إِنَّ تَشَاءُ نَحْنَفِ  
بِهِمُ الْأَرْضَ أَوْ نَسْقِطْ عَلَيْهِمْ كِسْفًا مِنَ السَّمَاءِ إِنَّ فِي ذَلِكَ لَآيَةً لِّكُلِّ عَبْدٍ مُنِيبٍ ۝

**34:9** See they not what is before them and behind them of the sky and the earth? If We wished We could cause the earth to swallow them up, or cause a piece of the sky to fall upon them. Verily in this is a Sign for every devotee that turns to Allah.

Allah here says that people do not ponder over what happened to the earth and the sky in the past and what may happen in future.

Many aspects of our understanding of the universe, comprising earth and sky, can be summarised in a sequence of events. It begins with the explosion of the primeval fireball. In this expanding medium the galaxies and oldest stars formed 10 to 15 billion years ago. The sun condensed from a cloud of gas and dust after the galaxy had flattened into a dislike configuration. About 4.5 billion years ago, the bodies of the solar system, including the earth were formed.

The period from about 4.5 billion years to 600 million years ago, constitutes the Pre-Cambrian era. During this era life originated on the surface of the earth. At first one-celled organisms developed. Then developed invertebrates and primitive marine plants. The period from about 600 million years to 200 million years ago constitutes the Paleozoic era. In this era first vertebrate fish appeared; then appeared amphibians and reptiles. The next era (Mesozoic era) began about 200 million years ago and ended 65 million years ago. In this era the earth was dominated by the gigantic reptiles, the dinosaurs. During the last part of the era, mammals, like horses, appeared and dinosaurs became extinct. The next era is the present Cenozoic era. It began 65 million years ago. In this era, man, Homo sapiens, appeared on the earth about 100,000 years ago only.

The geography of the earth was not the same nor it will remain the same as it is today. Some 500 million years ago, all the plates comprising the

earth clinged together, forming only one continent now termed Pangaea. Due to plate tectonics, the geography of the earth has been continuously changing, and ultimately the present configuration arrived. Plate tectonics are still working and in 50 million years time, the configuration will be different. South America will be separated from North, the Atlantic ocean will widen up, Australia will approach the mainland of Asia, and many other changes will take place.

It is known that the earth's magnetic field is not constant. Magnetic reversal happens quickly in terms of the earth's life time. Once the magnetic field has established in one way or other, it may stay that way for as little as 100,000 year or for as long as 50 million years. At present the earth's magnetic field is slowly weakening at a rate which would make it disappear in only 2000 years. One side effect of this magnetic activity may be relevant to the story of life on the earth. It has been suggested that when the magnetic field is weak or absent, then the increased flood of charged particles from space, cosmic rays, which reach the surface of the earth, could be damaging to life. Normally these charged particles are deflected by the earth's magnetic field. If without the protective magnetic field, they reached the ground or lower atmosphere they may prove harmful to life or they may disrupt the climate which in turn would make life on land difficult.

The future of the earth is also linked with the future of the sun. The sun has been in the main sequence for about 6 billion years and it will remain in that position for a similar period further. After that it will grow into a red giant. Its surface will engulf the planets Mercury and Venus and ultimately reach the orbit of the earth. Oceans will boil off; everything on the surface of the earth will be charred. (see appendix II).

The future of the earth depends on the future of the universe as a whole. Two opposite forces are acting in the universe; force of expansion due to the initial explosion of the primeval fireball, the big bang, and force of attraction due to gravity. At present, the force of expansion is dominant; so the universe is expanding. If in future the force of gravitation dominates, expansion will stop and contraction will come into play. The universe will collapse with a big crunch. If on the other hand the force of expansion wins over, the galaxies will recede still further from one another.

## **If We wished We could cause the earth to swallow them up**

This has been discussed under verse 28:81.

### **Cause a piece of sky to fall upon them**

A piece of sky falling upon them may be interpreted as an object lying in the sky falling upon the surface of the earth. The sky is extra-terrestrial space. The outermost layer of the earth is the atmosphere. This is again divided into several layers. The layer furthest from the surface of the earth is the exosphere, which begins at a height of 500 kilometers (300 miles). The atmospheric pressure there is  $10^{13}$  of that at the surface of the earth. Above that height the atmospheric constituents lose collision contact with each other because of their rarity and breakaway in space. So it may be assumed that the sky begins at a height of 300 miles above the surface of the earth. Hence an object lying at a height more than 300 miles may be called a piece of the sky. That being so hailstones are not pieces of the sky.

Objects in the sky are the planets, satellites, stars, galaxies etc. In a board zone between the orbits of the planets Mars and Jupiter, lie thousands of small bodies perpetually revolving round the sun. These pieces of the sky are known as asteroids or minor Planets.

Also throughout interplanetary space there are countless pieces of stone and iron, most of them whirling about the sun and some apparently sweeping into the solar system from the depth of interstellar space. More than 100,000,000 of these pieces bombard the earth everyday, pouring down on the atmosphere in a constant stream. Were it not for the surrounding blanket of air, they would pepper the ground ceaselessly, and the surface of the earth would be like that of the moon. These are the meteors. They are mostly vapourised or burnt into fine ash by heat resulting from friction with air. We see only a few, perhaps a half dozen per hour, on any ordinary night watched by a single person. The rest are never known, because they occur on oceans, deserts, uninhabited areas; or because they come in the day time or are hidden by clouds.

Billions of these meteors appear to travel together in space along orbits, so that in a number of cases, they have been identified with those of certain comets. When the earth cuts, as it frequently does, into the orbit of one of these meteor swarms, thousands of tiny objects are pulled down into the atmosphere within a short space of time, resulting in a meteor shower. The



most famous example in modern times is the shower, which in November 1833, shot so many meteors through the heaven that 250,000 were counted in one station between midnight and dawn. Shower meteors all seem to radiate from a point. This point is known as the radiant point. Meteor showers are known by the name of the constellation, in which the radiant point seems to lie. Some of the meteor showers are Leonids, Geminids, Orionids and so on.

Occasionally very large meteoroids strike the earth with spectacular effect; the retarding effect of the atmosphere is too insignificant for such massive bodies. So they impact the earth with great force producing meteor craters. The most famous of these craters is the one in Arizona. This crater is 1.2 kilometers across, 170 meters deep, with a rim that rises about 50 meters above the surrounding countryside. About 30 proven meteorite craters are known on the earth, including the crater as large as 60 kilometer wide Manuagouan crater in Quebec. Thus meteors, which are pieces of the sky, fall on the earth.

Comets can also be regarded as pieces of the sky. These minor members of the solar system appear periodically, travelling round the sun in orbits, generally more eccentric than those of the planets. Comets 'jaywalk' (travel carelessly) across the paths of the planets and inevitably some of them impact with planets from time to time. Earlier in this century a comet struck the earth. The comet blazed into the atmosphere over Siberia, exploding with 1000 times the energy of the bomb that flattened Hiroshima, The Tunguska event, as it is called, was perhaps the greatest natural disaster known to mankind. It happened, without waring, in the bright morning of June 30, 1908 at about 7-15 A.M. The Tunguska blast was seen and heard over an area greater than France and Germany combined. For several nights after the event, the skies of Europe glowed so brightly that it was possible to read long after midnight. It is now generally accepted that the event was caused by the impact of a small comet on the earth.<sup>1</sup>

Thus a piece of the sky, a comet falls on the earth.

Asteroids are pieces of the sky. It is now accepted that at least one asteroid fell on the earth in the past. About 65 million years ago dinosaurs, together with other mesozoic animals vanished from the surface of the earth, and were replaced by mammals. In 1980, a group of scientists, with a Nobel

laureate among them at the university of California Berkley, published a paper in which they announced the conclusion that mass extinction event was caused by the impact of an asteroid, about 10 km in diameter, on the earth.<sup>2</sup> The impact provoked an enormous expulsion of dust, which effectively blotted out sunlight for several years. Because of the drastic suppression of photosynthesis during this time, the whole biosphere was catastrophically affected. As a result of the breakdown of the food chain, widespread extinction ensued.

Thus, as Allah wished, pieces of the sky fell on the earth in various forms, in the past and, if He wills, such events shall occur in future.

### **References**

1. *New Scientist*, Halley's comet Issue.
2. *Ibid* : Death of Dinosaurs.

١٠- وَ لَقَدْ آتَيْنَا دَاوُدَ مِنَّا فَضْلًا يُجِبَالُ أَوْبَىٰ مَعَهُ وَالطَّيْرُ ۗ وَقَالَ لَهُ الْحَدِيدُ ۝

١١- اِنْ اَعْمَلْ سَبِيحَتٍ وَّ قَدْرٍ فِي الشَّرِّ وَاَعْمَلُوا صَالِحًا لِّئِي هٰمَاتَعْمَلُوْنَ بِوَسِيءٍ ۝

34:10-11 We bestowed Grace aforetime on Dawood from Ourselves.

"O you Mountains ! Sing you back the praises of Allah with him ! And you birds (also) ! And We made the iron soft for him;

Commanding "make you coats of mail, balancing well the rings of chain armour. And work you righteousness. For be sure I see (clearly) all that you do."

Through Allah's grace Dawood (a.s.) learned the technique of using iron for making armour.

According to the Encyclopaedia Britannica the iron age begins from about 1200 B.C. The chief ores of iron are its oxides hematite,  $Fe_2O_3$ , and magnetite,  $Fe_3O_4$ , carbonate, siderite  $FeCO_3$  and hydrated ferric oxides. The ores of iron are usually first roasted for removing water, and decomposing carbonates. Then these are reduced with coke in a special stove called a blast furnace. The mixture of ores, limestone used as flux, and coke is introduced at the top of the blast furnace and preheated air is blown in the bottom through nozzles. As the solid material slowly descends, they are converted into gases and two liquids, molten iron and slag. The heated exhaust gas is used for heating air for the blast furnace. The molten iron and slag are tapped off at the bottom of the furnace.

The molten iron contains usually 3 to 4% of dissolved carbon, together with silicon, manganese, phosphorus and sulphur in smaller amounts. When such impure molten iron is cast by sudden cooling, white cast iron is obtained and when cooled slowly gray cast iron is obtained. Both types of cast iron are brittle. Malleable cast iron is obtained by heat treatment of gray cast iron of suitable composition and it is tougher and less brittle than either white or gray cast iron. The verse

refers to the malleable cast iron which is suitable for making different protective shields for warfare. This aspect has been discussed under verse 16 : 81.

### **References**

1. Linus Pauling, *College Chemistry*, Vakil, Feffer and Simons Private Ltd., Bombay, 4th edition, p. 647-650, 1969.
2. *Encyclopaedia Britannica*. p. 894, 1978.

١٢- وَإِسْلَمِينَ الرِّيحَ عُدُّهَا شَهْرٌ وَرَوَاحُهَا شَهْرٌ وَأَسَلْنَا لَهُ عَيْنَ الْقَظِيرِ  
 وَمِنَ الْجِبِّ مَنْ يَعْمَلُ بَيْنَ يَدَيْهِ بِإِذْنِ رَبِّهِ وَمَنْ يَزِغْ مِنْهُمْ عَنْ أَمْرِنَا  
 نُبَذْهُ مِنْ عَذَابِ السَّعِيرِ ○

١٣- يَعْملُونَ لَهُ مَا يَشَاءُونَ مِنْ مَحَارِبٍ وَأَنْبِئِيلَ وَجِفَّانٍ كَالْجَوَابِ وَدُدُورٍ  
 زُسْبَاتٍ إِعْمَلُوا آلَ دَاوُدَ شُكْرًا وَقَلِيلٌ مِّنْ عِبَادِيَ الشَّاكِرِينَ ○

34:12-13 And to Sulaiman (We gave) the wind, whereof its morning course was a month's journey and the evening course a month's journey. We made a font of molten brass (copper) to flow for him....

They (the Jinns) worked for him as he desired making arches, statues, basins as large as reservoirs, and cauldrons fixed : "Work you, sons of David, with thanks ! But few of My servants are grateful !"

These two verses give an idea of economic development at the time of Prophet-king Sulaiman (a.s.).

The first part of the verse speaks of the prophet's command over wind. This is practically a repetition of verse 21 : 81. According to the classical exegetes like Baidawi Ibn al-Kathir, the prophet would ride a big throne which would be carried by wind according to his order.<sup>1</sup> According to modern commentators this refers to the prophet's naval power on the Mediterranean and through the gulf of Aqaba on the Red sea and therefore he figuratively commanded the wind.<sup>2</sup> This corresponds to the Biblical statement about the prophet (I Kings 9 : 26, 28).

As appears from verse 34 : 13, at the time of prophet Sulaiman (a.s.) statues, big basins, boilers etc. were made by melting iron. These show that much work of metallurgy was going on at that time. According to the archaeologists some mines of iron and other metals were being worked at that time in the region of Aqaba, the ancient Ezion Geber at the head of the Red Sea. Copper and iron ores are to be found in the neighbouring hills and a smelting plant had been excavated, it is assumed, so as to catch the full

blasts of the violent winds blowing down from the north and thus obtaining a forced draught without the need for a bellow system. The whole thing, it appears, was a proper up-to-date blast furnace built in accordance with a principle that celebrated its revival in modern industry ago as the Bessemer system. Nowhere in the Fertile Crescent neither in Babylon nor in Egypt was such a great furnace to be found.

According to Prof. Nelson Glueck of the American School of Oriental Research, who made extensive investigation in this part, Sulaiman (a.s.) was the "great copper king", most probably to be reckoned among the greatest exporters of copper in the ancient world. One thing is clear that under Sulaiman (a.s.) the iron and copper deposits were mined on a large scale and smelted. Any way, there is no doubt that some mechanical devices were made at this times for smelting iron and copper producing very hot air which could be controlled. This hot air could be used by an ingenious mechanism to make a balloon.

Historically the hot air balloon was first devised by the Montgolfier brothers in 1783. At present helium is the principal lifting gas. There are now two types of balloons, free or captive. The captive balloons are used for military purposes or fire control. Free balloons are now used for flights to stratosphere to study the cosmic rays and atmospheric condition in the stratosphere. This kind of balloon would ascend over 70,000 ft. The balloons drift with the wind and may be sent aloft by releasing ballast or brought down by valving off the gas from the balloon. Happy combinations of skill and weather condition have enabled flight of more than 1000 miles to be made. It is not unlikely that some such balloon was devised at the time of prophet Sulaiman (a.s.) which would glide in the air to a long distance.

## References

1. Muhammad, Shafi, *Mariful Quran*, Vol, p. 254, 1983.
2. A. Yusuf Ali, *The Holy Quran-text, Translation and Commentary*, Sheikh Mohammad Ashraf, Lahore, 2nd Edition, p. 1137, 1977.

۱۶- فَأَعْرَضُوا فَأَرْسَلْنَا عَلَيْهِمْ سَيْلَ الْعَرِمِ وَبَدَّلْنَاهُمْ بِجَنَّتَيْهِمْ جَنَّتَيْنِ  
 ذَوَاتِنِ أَكْثَرُ خَمْطٍ وَأَنْثَىٰ وَتَرْتِجٍ وَمِنْ سِدْرٍ قَلِيلٍ ۝

34 : 16 But they turned away (from Allah), and We sent against them the flood from the dams and We converted their two gardens into gardens producing bitter fruit, and tamarisks, and some few lote trees.

In the verse preceding this, there is a reference to the city of Saba in Yemen where the irrigation from the famous dam of Maarib made the country prosperous with gardens producing fruit, spices, and frankincense during the period of Sulaiman (a.s.) and queen Bilqis.<sup>1</sup> The prosperous period continued even after the death of Sulaiman (a.s.), but the people of Saba, instead of being grateful to Allah for this bounty, turned away from Him for which divine wrath was sent against them in the form of floods due to bursting of the dam. The destruction of the dam thus resulted in the cessation of the regular irrigation leading to drought conditions. The lush gardens which were once abundant with delicious fruits and other useful produce gradually gave place to a vegetation characteristic of typical deserts. The two examples of trees growing under such conditions mentioned in this verse are tamarisks and lote trees. Tamarisks produce small, dry, inedible fruits, and lote trees which belong to the genus *Zizyphus* are notorious for their thorny bushes providing no shade and producing only bitter fruits unfit for human consumption.

#### Reference

1. A.Y. Ali, *The Holy Quran—Text, Translation and Commentary*. Shaikh Mohammad Ashraf, Lahore, p. 1138 (1938).

١- اَلْحَمْدُ لِلّٰهِ فَاطِرِ السَّمٰوٰتِ وَالْاَرْضِ جَاعِلِ الْمَلٰٓئِكَةَ رُسُلًا اَوْۤىٰٓ اَجْنِحٰتٍ  
مَّثْنٰى وَثَلٰثَ وَرُبْعٍ يَّزِيْدُ فِى الْخَلْقِ مَا يَشَآءُ اِنَّ اللّٰهَ عَلٰى كُلِّ شَيْءٍ قَدِيْرٌ ۝

35 : 1 Praise to be Allah who created (out of nothing) the heavens and the earth, Who made the angels messengers with wings- two or three or four (pairs) ; He adds to creation as He pleases : for Allah has power over all things.

The creation of the heavens and the earth has been discussed in detail in appendix II.

٢- يٰۤاَيُّهَا النَّاسُ اذْكُرُوْا نِعْمَتَ اللّٰهِ عَلَيْكُمْ هَلْ مِنْ خَالِقِ غَيْرِ اللّٰهِ يَرْزُقُكُمْ مِّنَ السَّمٰوٰتِ  
وَالْاَرْضِ لَاۤ اِلٰهَ اِلَّا هُوَ ۗ فَاَنۢتُمْ تَكْفُرُوْنَ ۝

35 : 3 O men ! call to mind the grace of Allah unto you ! Is there a creator, other than Allah, to give you sustenance from heaven or earth ? There in no god but He : how then are you deluded away from the Truth ?

Giving of sustenance from heaven or earth been discussed under verse 15 : 21.

٣- وَاللّٰهُ الَّذِىۤ اَرْسَلَ الرِّیۡحَ فَتُحْمَرُّ سَحَابًاۢ فَسُقٰنَهٗۤ اِلٰى بَلَدٍ مَّيْتٍ فَاَحْيٰنَاۤ بِهٖ الْاَرْضَ  
بَعْدَ مَوْتِهَاۗ كَذٰلِكَ النُّشُوْرُ ۝

35 : 9 It is Allah Who sends the winds and they raise a cloud and then We lead it into a dead land revive therewith the earth after its death ; even so (will be) the resurrection !

The falling of rain-drops from the sky has been explained under verse 2 : 22.



How winds carry clouds to different regions and revive the dead earth has been explained under verse 2 : 164.

۱۱- وَاللَّهُ خَلَقَكُمْ مِنْ تُرَابٍ ثُمَّ مِنْ نُطْفَةٍ ثُمَّ جَعَلَكُمْ أَزْوَاجًا وَمَا تَحْسِبُ مِنْ  
أَنْثَى وَلَا نَضَمٍ إِلَّا بِعِلْمِهِ وَمَا يُعْتَرُّ مِنْ مَّعْتَرٍ وَلَا يُنْقَصُ مِنْ عُمْرِهِ إِلَّا فِي كِتَابٍ  
إِنْ ذَلِكَ عَلَى اللَّهِ يَسِيرٌ ۝

35 : 11 And Allah created you from dust, then from the drop of fluid, then He made you in pairs. No female bears or brings forth save with His knowledge. And no one grows old who grows old nor is aught lessened of his life, but it is recorded in a book . Lo ! that is easy for Allah.

The creation of man from dust and a drop of fluid (*nutfah*) has already been discussed under verses 16 : 4 and 18 : 37.

The creation of pairs or male and female is beyond human control. Modern techniques help one know the sex of the foetus before birth but man has as yet no control over the creation of male or female sex. The females may bear a foetus which is normal or one with congenital defects, they may give birth to a viable infant or defective infant or even may abort. All these are known to Allah and we come to know about them much later. This has been discussed in detail in appendix V.

Allah also decides the length of life and it will not be altered.

۱۲- وَمَا يَسْتَوِي الْبَحْرَانِ هَذَا عَذْبٌ فُرَاتٌ سَائِغٌ شَرَابُهُ وَهَذَا مِلْحٌ أُجَاجٌ  
وَمِنْ كُلِّ تَاكُلُونَ لَحْمًا طَرِيًّا وَتَسْتَخْرُجُونَ حِلْيَةً تَلْبَسُونَهَا وَتَرَى الْفُلْكَ  
فِيهِ مَوَاحِرَ يُتْبَعُونَ مِنْ فَضْلِهِ وَلَعَلَّكُمْ تَشْكُرُونَ ۝

35 : 12 Nor are the two bodies of flowing water alike,—the one palatable, sweet, and pleasant to drink, and the other, salt and bitter. Yet from each (kind of water) do you eat flesh fresh and tender, and you extract ornaments to wear ; and you see the ships therein that plough the waves, that you

may seek (thus) of the Bounty of Allah that you may be grateful.

### Two bodies of flowing water

This has been discussed under verse 25 : 53.

### Flesh, fresh and tender and the sailing of ships

This has been explained under verse 16 : 14.

۱۳- يُؤَلِّجُ اللَّيْلَ فِي النَّهَارِ وَيُؤَلِّجُ النَّهَارَ فِي اللَّيْلِ وَسَخَّرَ الشَّمْسَ وَالْقَمَرَ  
كُلٌّ يَجْرِي لِأَجَلٍ مُّسَمًّى ذَلِكُمُ اللَّهُ رَبُّكُمُ لَهُ الْمُلْكُ وَالَّذِينَ تَدْعُونَ مِنْ  
دُونِهِ مَا يَمْلِكُونَ مِنْ قِطْمِيرٍ

35 : 13 He merges night into day, and He merges day into night, and He has subjected the sun and the moon (to His laws): each one runs its course for a term appointed. Such is Allah your Lord. To Him belongs all dominion. And those whom you invoke besides Him have not the least power.

### Merging of night into day and day into night

This has been discussed under verse 3 : 27.

### Subjecting the sun and the moon to laws

This has been discussed under verse 7 : 54.

### His dominion

This has been discussed under verse 5 : 19.

۲۴- أَلَمْ تَرَ أَنَّ اللَّهَ أَنْزَلَ مِنَ السَّمَاءِ مَاءً فَآخَرَجْنَا بِهِ شَجَرَاتٍ كَثِيرًا مَّخْتَلِفًا أَلْوَانُهَا  
وَمِنَ الْجِبَالِ جُدَدٌ بَيْضٌ وَحُمْرٌ مُّخْتَلِفٌ أَلْوَانُهَا وَعَرَايِبُ سَوْدٌ

35 : 27 See you not that Allah sends down rain from the sky ? With it We then produce fruits of diverse hues. And among the hills are tracts of white and red, of various shades of colours and others intense black in hue.

The verse draws our attention to three phenomena in nature, viz. (i) sending down rain from the sky, (ii) production of fruits of diverse hues, and (iii) the various shades of colours in the hills.

### **i. Sending down rain from the sky**

The falling of rain and its beneficial effects on plants has already been explained under verse 2 : 22.

### **ii. Production of fruits of diverse hues**

The train of biological events that starts from falling of rain culminates in the production of fruits. Unripe fruits are often green and are concealed among the green leaves from the birds, mammals and insects until they are ripe. The changes in colour that accompany ripening are a device to attract the various animals and birds which act as dispersal agents of seeds. Carotenoid pigments are responsible for the bright colours of fruits from yellow to red. Anthocyanins produce shades from pale to purple or blue. Although the word ثمرات literally means fruits, its meaning can be extended to include all food grains like cereals which are undeniably fruits formed as a result of fertilization. Pulses are seeds or in other words parts of fruits and thus also fall under this category if we regard ثمرات as fruits in the broad sense. Whatever may be the definition, the diversity of hues in fruits is too evident to be overlooked by us, and all these represent Allah's bounty to men and animals.

### **iii. The various shades of colours in the hills**

The diversity of rocks which constitute the hills exhibit a variety of colours depending on their type of origin, and is a treat to the eye for any naturalist. The dolomites of the mountain ranges, the limestone and chalk, formed in part by calcareous remains of countless marine creatures are white or grey. The marble which is ordinarily white to grey is often marked by veins of darker colours in exquisite designs. The serpentine rocks exhibit red and green crystals. The laterite is red and the basaltic rocks are dark grey to black where as flint is pitch black. Galena contains sulphide of lead which imparts blue grey colour ; greenish colour of fluor spar is due to the presence of calcium fluoride ; bauxite contains aluminium mixed with oxides of

iron, silicon or titanium in varying quantities and ranging in colour from white to deep brown of red.

These are only a few examples of the wide range of shades of colours one comes across among the rocks of hills. The various colours depend on the physical and chemical constitution of the rocks, each one serving a different purpose to us, and all contributing in part to the gorgeous pageantry of colours in Allah's creation.

۞ وَمِنَ النَّاسِ وَالذَّوَابِّ وَالْأَنْعَامِ مُخْتَلِفٌ أَلْوَانُهُ كَذَلِكَ ۗ إِنَّمَا يَخْشَى اللَّهَ مِنْ عِبَادِهِ الصَّالِحِينَ ۝

35 : 28 And so amongst men and crawling creatures and cattle, are they of various colours. Those truly fear Allah among his servants, who have knowledge ; For Allah is Exalted in might, Oft Forgiving.

The theme of diverse hues referred to in the preceding verse is continued here, but the subjects specified in this context are men, crawling creatures, and cattle.

The diversity in the skin colour of human beings has been dealt with under verse 2 : 213.

The word **الذباب** derived from the root **دب** meaning 'crawl' or 'creep'<sup>1</sup> can be interpreted as crawling animals which group includes all reptiles. These are of diverse hues and some of them like chameleon can even change the skin colour from brown to green or red to match with the surroundings. One of the most colourful groups of reptiles is snakes with hues ranging from pitch black to the most spectacular green, yellow or brown, occasionally mottled or speckled with other bright colours. All these diverse colorations are protective in function against the predators and also help the reptile to remain concealed while seeking prey. For instance the vipers in the rain forests of the tropics are green, the rattle snakes of deserts are yellowish-brown, and the cobras of the bush are dark brown to black, all colours matching well with their habitat.

The word **الأنعام** meaning cattle includes cows, oxen, and buffaloes, but in a wider sense also for animals domesticated for milk, meat, skin and

wool. Buffaloes are blackish, but cows and oxen show a variety of skin colour ranging from pure white to pure brown, and often with patches of black or dark brown. Horses, camels, goats and sheep also show a diversity of colour of their skin or wool depending on their breed. All the various colours, along with other characters, distinguish the individual breed of the cattle, each serving a different purpose in the human society.

The diversity of hues in the physical and biological world is evident to all of us but it is only the learned who can really appreciate the great wisdom of the Almighty.

### **Reference**

1. F. Steingass., *Arabic-English Dictionary*, Cosmo Publications, New Delhi, India, p. 351, 1884, reprint 1982.

٣١- إِنْ أَلَّ اللَّهُ يُسَبِّحُ السَّمَوَاتِ وَالْأَرْضِ أَنْ تَكُونُوا لَهُ سُلْطَانًا وَاللَّهُ  
 إِنْ أَمْسَكَهُمَا مِنْ أَحَدٍ مِنْ بَعْدِهِ إِنَّهُ كَانَ عَلِيمًا غَفُورًا ○

35 : 41 It is Allah Who sustains the heavens and the earth, lest they cease (to function) and if they should fail, there is none—not one—can sustain them thereafter : Verily, He is Most Forbearing, Oft forgiving.

That Allah is the Sustainer of all things—living and inert—has been explained under verse 1 : 2.

٣٣- أَوَلَمْ يَسِيرُوا فِي الْأَرْضِ فَيَنْظُرُوا كَيْفَ كَانَ عَاقِبَةُ الَّذِينَ مِنْ قَبْلِهِمْ  
 وَكَانُوا أَشَدَّ مِنْهُمْ قُوَّةً ۗ وَمَا كَانَ اللَّهُ لِيُعْجِزَهُ مِنْ شَيْءٍ فِي السَّمَوَاتِ وَلَا  
 فِي الْأَرْضِ ۗ إِنَّهُ كَانَ عَلِيمًا قَدِيرًا ○

35 : 44 Do they not travel through the earth and see what was the end of those before them though they were superior to them in strength ? Nor Allah is to be frustrated by anything whatever in the heaven or on earth : for He is All-Knowing, All-Powerful.

This is a general observation asking the people who would not listen to the prophets and obey the Qur'an, to travel and see what the fate was of mighty people like 'Ad, and Thamud who disobeyed Allah's order. This has been discussed under verse 3 : 137.

١٢- إِنَّا نَحْنُ مُخِي السَّمَوَاتِ وَنَكْتُبُ مَا قَدَّمُوا وَآثَارَهُمْ ۗ وَكُلُّ شَيْءٍ أَحْصَيْنَاهُ  
 فِي إِمَامٍ مُبِينٍ ○

36 : 12 Verily We shall give life to the dead, and We record that which they send before, and that which they leave

**behind, and of all things have We taken account in a clear tablet (of evidence).**

As far as the recording of all things are concerned, if by all things we mean all events then this verse offers an interesting interpretation from the scientific point of view. An event corresponds to a certain state of one or more bodies—such states are characterised by particular values of co-ordinates and momenta of the bodies. These values change and hence the states of bodies also change. The dropping of a ball is an event—this event is characterised by a number of continuous changes of the positions and momenta of the ball. The jumping of an electron from one orbit to another is an event—this event happening in the microscopic world is, of course, characterised by discrete (i.e., sudden or jerky) changes in the positions and velocity of the electron. When a human sperm and an ovum meet and form a zygote, the states of the zygote go through a continuous progression of changes, till the child is born— all these continuous changes may be termed a continuous set of states i.e., a continuous set of events characterised by the continuously changing values of position and momenta of the parts of the zygote. The number of such changes is infinitely great. A question that arises therefore is 'how can such a large number' of events be recorded ? Even if we were able to make a stock taking of the changes at the microscopic levels, the recording of these events would need enormously big space. In this connection, attention may be drawn to the gradual development of computers, as we have seen it in the last four decades. The early electronic computers used valves—the later ones used transistors. The development of microelectronics, ever since the discovery of transistor, has been unimaginably fast. Values, transistors, Integrated Circuitis (IC), Large Scale Integration (LSI), and Very Large scale Integration (VLSI), etc. are only different phases of the microelectronics revolution. Today, the state of miniaturization has reached such a stage that in an area of  $1'' \times 1''$ , more than one million electronic components can be accommodated. The size of a micro-processor has been reduced to the size of a stamp. A pocket size calculator can now do what a mainframe computer could do in the early sixties. Thus, the size of computers is diminishing, their storage power is increasing, their speed is also increasing. Technological perfection is also being attained in 'etching',

so much so that all words which a man living for hundred years, will have spoken can be stored in a disc smaller than the size of the palm. Thus these spoken words which are also events from the acoustic point of view can be recorded and can be reproduced later.

The point to be noted in this connection is simply this. If man being the vice-gerent of Allah, can master so much technological capability as to store or preserve millions of events within a tiny space, then why can't Allah, the Creator of man, with his infinite Wisdom preserve all things on record? It is just that we do not know His mechanism of storing things. But then looking at the gradual development of storage of information we witness a revolution in micro-electrons which was unimaginable even in the early forties when the transistor was not yet discovered. The future development of electronics will probably bring forth even more dramatic changes in information storage systems and with more and more of such development, could man have a better scientific understanding of the present verse.

۳۱- اَلَمْ يَرَوْا كَمْ اَهْلَكْنَا قَبْلَهُمْ مِّنَ الْقُرُونِ اَنْهَضْنَاهُمْ لَيُّهُمْ لَا يَرْجِعُونَ ۝

36:31 See they not how many generations before them We destroyed? Not to them will they return.

This has been discussed under verse 7 : 4.

۳۳- وَاٰیةٌ لَهُمُ الْاَرْضُ الْمَيِّتَةُ ۚ اَحْيَيْنَاهَا وَاَخْرَجْنَا مِنْهَا حَبًّا لِّیَسۜمُوۡهُ ۙ وَیَاۡكُلُوۡنَ ۝

۳۳- وَجَعَلْنَا فِيهَا جَدَاتٍ مِّنۢ نَّخِيْلٍ وَّاَعْنَابٍ وَّفَجَّرْنَا فِيهَا مِنَ الْعُيُوۡنِ ۝

36:33-34 A Sign for them is the earth that is dead. We do give it life, and produce grain therefrom, of which you do eat. And We produce therein orchards with date palms and vines, and We cause springs to gush forth therein.

The explanation to the first verse regarding the bringing back to life of the dead earth has been given under verse 2:164. The production of grains dates and vines as a consequence of rain, has been elaborated under verse 6:99. The formation of springs has been explained under verse 2:60.



٣٦- سُبْحٰنَ الَّذِيْ خَلَقَ الْاَزْوَاجَ كُلَّهَا مِمَّا تُنْبِتُ الْاَرْضُ وَمِنْ اَنْفُسِهِمْ  
 وَمِمَّا لَا يَعْلَمُوْنَ ۝

36 : 36 Glory be to Him Who created all the pairs of that which the earth grows and of themselves and of that which they know not.

The creation of pairs in animals and plants has already been discussed while explaining verse 13 : 3. The creation of males and females of mankind is also referred to here. Man has no control in the creation of a male or female child and it is determined by Allah long before man can know the sex of the foetus. This subject has already been discussed under verse 4 : 1.

٣٧- وَاٰيَةٌ لَهُمُ الْيَلِّ نَسَلَخْنٰ مِنْهُ النَّهَارَ فَاِذَا هُمْ مُظْلِمُوْنَ ۝

36 : 37 And a Sign for them is the night ; We withdraw therefrom the day, and behold, they are plunged into darkness.

The night and the day are caused by the rotation of the earth. The period for which the sun remains above the horizon at a place is the day-time there. The day is withdrawn when due to the rotation of the earth, the sun is below the horizon and is out of sight. Then the night sets there and the place plunges into darkness. This has been discussed under verse 3 : 27.

٣٨- وَالشَّمْسُ تَجْرِيْ لِمُسْتَقَرٍّ لَّهَا ذٰلِكَ تَقْدِيْرُ الْعَزِيْزِ الْعَلِيْمِ ۝

36 : 38 And the sun runs his course for a period determined for him : that is the decree of (Him), the Exalted in Might, The All-Knowing.

This point has been explained under verse 7 : 54.

٣٩- وَالْقَمَرَ قَدَرْنٰهُ مَنَازِلَ حَقِّيْ عَادَ كَالْعُرُوْجِ الْقَدِيْمِ ۝

**36:39** And the moon We have measured for her mansions (to traverse) till she returns like the old (and withered) lower part of a date stalk.

The moon as a means of measurement of time has been discussed under verse 10 : 5.

۴- لَا الشَّمْسُ يَنْبَغِي لَهَا أَنْ تُدْرِكَ الْقَمَرَ وَلَا الْبَيْتُ سَابِقُ النَّهَارِ  
وَكُلٌّ فِي فَلَكٍ يَسْبَحُونَ ۝

**36:40** It is not permitted to the sun to catch up the moon nor can the night outstrip the day. Each swims along its own orbit, (according to law).

#### Catching up of the moon by the Sun

One body is said to catch up another when the two are together i.e., are in the same position. Mathematically two bodies are in the same position, when they have the same co-ordinates. In astronomy three kinds of co-ordinates are in vogue : altitude-azimuth, celestial latitude-longitude, and right ascension-declination. Altitude-azimuth are local co-ordinates, i.e., as seen from a particular place on the surface of the earth. Two bodies may have the same altitude-azimuth as seen from one place but as seen from other places these co-ordinates may be, and generally are, different. Though celestial latitude and longitude are universal, they are not much in use, except in Hindu astronomy. The co-ordinates, right ascension and declination are universal and are in general use. On the occasion of conjunction right ascension (or Greenwich hour angle) of the sun and the moon is the same but declinations may be different. These two co-ordinates of the sun and the moon are same at the time of the solar eclipse. So at that time the sun seems to catch up the moon. But these co-ordinates are two dimensional; as all the celestial bodies seem to lie at the same distance from the earth. But there is the third dimension, distance from the earth. This distance between two celestial bodies is enormous. Thus, at the time of the solar eclipse, the distance between the sun and the moon is about 158 million kilometers. So the sun is not permitted to catch up the moon, at any time.

### Outstripping of the day by night

The statement "nor can night outstrip the day" means that night cannot overtake any portion of the day. At a place where the sun is below the horizon, it is night, and it is day when the sun is above the horizon there. The sun cannot be both above and below the horizon at the same time and at the same place ; so at a place it can not be night and day at the same time. Thus, night can not outstrip the day (vide discussion under verse 7 : 54).

### Each swims along its own orbit

The laws governing the motion of the sun and the moon have been discussed under verse 7 : 54. Indeed they swim along in their orbits in the most exact and precise manner. They meticulously follow the laws as ordained by the creator so that they never come into collision with each other.

٣١- وَإِيَّةَ لَهُمْ أَنَا حَمَلْنَا ذُرِّيَّتَهُمْ فِي الْفُلِّ الْمَشْحُونِ ۝

٣٢- وَخَلَقْنَا لَهُمْ مِنْ مِثْلِهِ مَا يَرْكَبُونَ ۝

36:41-42 And a Sign for them is that We bore their race (through the flood) in the loaded Ark ;  
And We have created for them similar (vessels) on which they ride.

The verse 41 refers to the Prophet Nuh's (a.s.) ship in which his people were carried at the time of the flood. The verse 42 speaks of ships made later on.

The matter of ships has been discussed under verse 2 : 164.

٦٨- وَمَنْ نُعَمِّرْهُ نُنَكِّسْهُ فِي الْخَلْقِ أَفَلَا يَعْقِلُونَ ۝

36 : 68 He whom We bring into old age, We reverse him in creation ; have you then no sense ?

That in old age men, like children, become weak and dependent on others. has already been discussed under verse 30 : 54. Here, special attention is drawn to the reversal of man's physical mental strength to those of childhood.

٤٢- وَذَلَّلْنَاهَا لَهُمْ فَمِنْهَا رَكُوبُهُمْ وَمِنْهَا يَأْكُلُونَ ○

٤٣- وَلَهُمْ فِيهَا مَنَافِعُ وَمَشَارِبٌ أَفَلَا يَشْكُرُونَ ○

**36:72-73** And that We have subjected them to their (use)? Of them some do carry them and some they eat. And they have (other) profits from them (besides), and they get (milk) to drink. Will they not then be grateful ?

The first verse refers to cattle, as is evident from the previous verse (36 : 71), which Allah has subjected to us to carry loads, and some which provide meat for us. This aspect has been elaborated under verses 16 : 5, 16 : 7 and 16 : 8.

The explanation of the provision of milk by cattle has been discussed under verse 16 : 66.

٤٤- أَوَلَمْ يَرِ الْإِنْسَانُ أَنَّا خَلَقْنَاهُ مِنْ نُطْفَةٍ فَإِذَا هُوَ خَصِيمٌ مُبِينٌ ○

**36: 77** Has not man seen that We have created him from a drop of fluid ? yet, lo ! he is an open opponent.

The creation of man from *nutfah* or a drop of fluid has already been explained in the discussion on verses 16 : 4, 18 : 37 and 35 : 11.

٨٠- الَّذِي جَعَلَ لَكُمْ مِنَ الشَّجَرِ الْأَخْضَرِ نَارًا فَإِذَا أَنْتُمْ مِنْهُ تُوقِدُونَ ○

**36 : 80** The same Who produces for you fire out of the green tree, when behold ! you kindle therewith (your own fire)!

One of the earliest commentators of the Holy Quran, Ibn Abbas, a companion of the Holy Prophet Muhammad (sm) was the first to explain that 'the fire owt of the green tree' in this verse refers to the *مرخ (markh)*, a leafless bush that grows in the Arabian deserts.<sup>1</sup> Forskal<sup>2</sup> who originally described this plant gave the name of *Cynanchum pyrotechnica* Forsk

which later on came to be known as *Pyrotechnica* (Forsk) Decne. The specific name 'pyrotechnica' was given by its author on the basis of the characteristic property of its green branches which strike fire by natural friction against each other when the wind blows. This property was made use of by the ancient Arabs in making fire. Their method was to use a wooden instrument called *zinad* consisting of two twigs belonging to this plant, the upper one known as '*afar* or *zand*', and the lower, *markh*, which are rubbed together<sup>3</sup>. This was evidently the method of ignition used by Arabs before striking fire against steel and flint was introduced.

Migahid<sup>4</sup>, in his *Flora of Saudi Arabia*, mentions this plant under the Arabic names *مرخ* or *سداده* and describes it as a leafless shrub or tree upto 5m high with numerous, long, wand-like branches.

The word *الشجر الاخضر* meaning green tree has a special significance in the context of this verse. The green plants by virtue of the green chlorophyll, present in their aerial parts, can trap the solar energy through the process of photosynthesis resulting in the production of carbohydrates which store this energy in a potential state. This 'bottled up' solar energy (in the chemical form) is released in a dynamic form of light and heat when the twigs of the plant are ignited.

## References

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2. P. Forskal. *Flora of Aegyptiaco-Arabica* Beirut, p. 53, 1775.
3. A. Y. Ali *The Holy Quran-text, translation and commentary*, Shaikh Muhammad Ashraf, Lahore, p. 1188, 1938.
4. A. M. Migahid *Flora of Saudi Arabia* Vol. 1. 2nd edn. Riyadh University Publications, 1978.

○ ۸۲- إِنَّمَا أَمْرُهُ إِذَا أَرَادَ شَيْئًا أَنْ يَفْعُولَ لَهُ كُنْ فَيَكُونُ

**36 : 82** Verily, when He intends a thing, His command is “Be” and it is !

This verse clearly indicates that Allah can make any event happen. When we speak of an event, we also say whether this event is more probable or less probable. We also tend to say sometimes ‘this is an impossible event’. For example, if one rolls up a ball against a hill with kinetic energy less than the potential energy at the height of the hill, one would say that it is impossible for the ball to surmount the hill. But in quantum mechanics (i. e., the mechanics of the small, which is different in many ways from the mechanics of large bodies i. e., Newtonian mechanics) one does not say that an event is impossible. Quantum mechanics associates an amplitude for any event. The absolute square of this amplitude gives the probability for the happening of this event. Thus, an event can be highly probable or highly improbable but not impossible. The probability amplitude just mentioned is called ‘wave function.’ Quantum mechanics says that even if the velocity of the ball is such that its kinetic energy is less than the potential energy at the height of the hill, there is a finite probability for the ball to get over the top of the hill. This is technically known as ‘quantum tunneling’. Such tunnelling’ in this potential barrier problem has been experimentally verified also. It is found that if a particle with kinetic energy  $\frac{1}{2} mv^2$  is thrown against a potential barrier of height  $V$ , and if  $\frac{1}{2} mv^2$  is somewhat smaller than  $V$  then the particle is reflected most of the times and is sometime transmitted. The probability of transmission is of course much less than the probability of reflection. A detector can be placed on one side of the hill and another detector on the other side. If the detector on the side from which the particle is thrown against the barrier is triggered i. e., if it shows a flash, for example, then we know that the ball has been reflected. if the detector on the other side of the hill is triggered, then we know that the particle has been transmitted. The problem that poses itself is that for the same initial kinetic energy, a particle whose property remains the same, is sometimes reflected

and sometimes transmitted. Who makes the choice whether the particle will be reflected or transmitted?, Squires<sup>1</sup> in his recent book entitled ‘Mystery of the Quantum world’ has attributed two roles to God in this connection. The first role is pertinent to the present verse and is quoted here:

“The first role is to make the ‘choices’ that are required whenever a measurement is made that selects from a quantum system one of the possible outcomes. Such a God would remove the indeterminacy from the world by taking upon himself those decisions that are not forced by the rules of physics. Although expressed in nontraditional terms, this is reasonably in accordance with the accepted role of a God. He would be very active in all aspects of the world and would be totally omnipotent within the prescribed limits. Prediction of his behaviour from the laws of physics would be impossible (note that we are not permitting any hidden variables in this chapter). although from both the theological and the scientific viewpoint we would want to believe that there were reasons for at least some of the choices, otherwise we would be back with random behaviour and the God would not have played any part. It is interesting to note that this role might even permit ‘miracles, if we were to regard these as events so highly unlikely that they would be effectively impossible without very specific, and unusual, ‘divine’ choice. For example, according to quantum theory, there must be a small, but non-zero, probability that if I run into a wall, then I will pass right through it. This is a special case of the potential barrier experiment and the wavefunction on the left hand side, corresponding to transmission, is never quite zero. Then however small the probability for transmission might be a God would be able to select it as the outcome, if he so chose.”

In Islam, we talk of one and only one god namely Allah Who obviously has the power to select as outcome any improbable event which He chooses to happen. All he says “Be” and it is.

The creation of the universe through the Big Bang is one of the wonderful facts of science and was indeed controlled through a Divine order. One may say that the creation of the universe started from a point wherein all matter of the universe, as we see it, was concentrated. One may also very well ask ‘how is it possible for a single point to contain infinite energy,’ It is indeed difficult to answer such a question. One has to assume that the whole thing was a singularity and time began with the Big Bang.

This assumption by itself is an article of faith and all later events seem to be explainable in good measure if only the initial sudden explosion is taken for granted. One cannot, however, answer who made the decision for the explosion. One may attempt to give explanations in terms of 'quantum fluctuations' but no satisfactory explanation is obtained for the event. On the other hand, the Omnipotent God who is conceived, in Islam, as Allah without any equal could easily decide upon the Big Bang to happen, however improbable it could be. A divine order 'Be' could set the stage for the universe and for the evolution of the organisation of matter both at the macro and micro level.

### Reference

1. Evan Squirers. *The Mystery of the Quantum World*. Adam Hilger Ltd. Bristol, and Boston, pp. 66-67,1986.



## ه- رَبُّ السَّمَوَاتِ وَالْأَرْضِ وَمَا بَيْنَهُمَا وَرَبُّ الْمَشَارِقِ

**37:5 Lord of the heaven, and of the earth and all between them, and Lord of the east.**

### **Lord of the heaven and the earth**

This has been discussed under verse 5:19.

### **Lord of the easts**

The verse states that there are many easts, i. e., many points at which the sun rises and that Allah is the Lord of all such points.

We know that the earth has two kinds of motion: diurnal motion of rotation about its own axis and annual motion of revolution around the sun. The orbit of the annual motion of revolution of the earth (apparent annual motion of the sun) is a great circle, known as the ecliptic. Due to this annual motion, the sun appears to be at different positions on the ecliptic in the sky, on different days of the year and due to the daily motion of rotation of the earth, the sun appears to traverse the sky in different circles, thus rising and setting at different points. Practically on every day of the year, the sun appears to rise from a different point and set at a different point. Thus there are many rising points (east points) and many setting points (west points) of the sun. If the sun did not rise at different points on different days, seasonal variation would not take place. These seasonal variation along with their impact on plant and animal world are of great significance to life-patterns on earth; thus the rising of the sun at different points i.e., at different easts is a Master-Minded phenomenon. No wonder, Allah is the Lord of all such points.

### **The east point and the west point**

Though there are many east points and many west points as discussed in the preceding paragraph, there is only one north point and one south point. The north and south poles are the points of intersection of the axis of rotation of the earth with the celestial sphere. The points of intersection of

the meridian (the great circle passing through the poles and the zenith) and the horizon (the great circle obtained by the intersection of the plane touching the surface of the earth at the point of observation with the celestial sphere) are the north point and the south point. As at a place, there is only one meridian and one horizon there is only one north point of intersection and south point of intersection. Points of intersection of the celestial equator (great circle at right angles to the polar axis) with the horizon i. e., the points 90 deg. away from the north point are the east point and the west point.

### The two east points and the two west points

We know that the earth moves round the sun (or the sun appears to move) in the great circle, the ecliptic. This ecliptic is inclined at an angle 23 deg. 28 min to the celestial equator. So on its journey northward along its orbit, the sun cannot go beyond 23 deg. 28 ; it has to take a here a turn southward. Similarly the sun appears to take a turn northward from 23 deg. 28 south. So these are the two limiting points, beyond which the sun cannot go and hence cannot rise. These two turning points are the solistical points or solistices. Of the series of east points, these are the limiting points. Similarly there are also the two limiting west points. These limiting points are the two east points and the two west points as referred to in verse 7 : 137.

٦- إِنْ أَنْزَلْنَا السَّمَاءَ الدُّنْيَا بِرِزْقَةٍ مِنَ الْكَوَاكِبِ ۝

37 : 6 We have indeed decked the lower heaven with beauty (in) the stars.

In 2 : 29 it has been observed that the space is divided into seven separate regions or skies. The first region or sky is the region containing the sun, and the planets, Mercury, Venus, Earth, and Mars with their satellites. Planets of the solar system are distinctly divided into two classes, terrestrial and Jovial. Planets Mercury, Venus, Earth and Mars are terrestrial and the other five planets are Jovial. Densities of the terrestrial planets range between 4.0 and 5.5 times the density of water ; while those of Jovial range between 0.7 and 1.7 only. A 3.1 A. U. (Astronomical

Unit) wide belt of asteroids separate the two classes. The terrestrial part of the solar system i. e., the 1st sky contains the earth : so this is the sky of the earth. This region of space is decorated by the sun, moon and the planets referred to above. During the day time, the sky is dominated by the sun which appears to move along the sky with varying shades of illumination, starting from the faint glow of early twilight to the majestic rising as a red ball. Then the sun appears to travel along the sky radiating light from mild, soft sunshine in the morning to scorching rays at noon, and again resuming the mild attitude, ultimately setting below the horizon with the majestic red glow ; it fades gradually into darkness passing through various shades of darkness of the evening twilight. After sunset, the moon takes over the sky with all its beauty. The moon changes gradually from the shape of a sickle to that of a full circle. The planets Mercury and Venus appear only shortly after sunset and shortly before sunrise. So the 1st sky is the region containing the sun and the terrestrial planets with the belt of asteroids as the boundary. The region containing the entire solar system constitutes the 2nd sky.

The current theories of stellar evolution suggest that the majority of stars are formed in groups or clusters, rather than singly. Family affiliation, or social or political or other affiliation of man draws men together to form groups. Similarly, stars of a particular region are loosely bound in group, by the force of gravitation. Retaining their individual entities in the group they move, more or less, together as a unit. In our Milky Way galaxy there are about 100 billion stars. By the force of gravitation, most of the stars are bound loosely into local groups. Our sun has a local group of about 30 stars bound together in a region of about 20 light years of radius. This local group of stars of the sun constitutes the 3rd sky.

The distance between local groups is more than 10,000 light years. The conglomeration of all such local groups of stars together with single stars, constitutes the Milky Way galaxy, which is the 4th sky.

In exactly the same way there are local groups of galaxies bound loosely by gravitation. The distance between galaxies in a local group is more than 500,000 light years. The local group of galaxies of which the Milky Way is a member, forms the 5th sky.

The conglomeration of all such local groups of galaxies form a separate unit, the super galaxy. The distance between local groups is more 25,000,000 light years. This forms the 6th sky.

All the super galaxies form the rest of the universe, which may be regarded as the 7th sky.

٤٧- وَنَجَّيْنَاهُ وَأَهْلَهُ مِنَ الْكَرْبِ الْعَظِيمِ ۝

37: 76 And We delivered him and his people from the great calamity.

This refers to the flood at the time of prophet Nuh (a. s.) and deliverance of his people on the ship built by him. This has been discussed under verse 7 : 64.

٨٢- ثُمَّ أَغْرَقْنَا الْآخَرِينَ ۝

37: 82 Then the rest We overwhelmed with the flood.

The verse refers to the flood at the time of prophet Nuh (a. s.) in which all people except those taken in the Ark were drowned. The flood has been discussed under verse 7 : 64.

١٣٢- فَالْتَقَمَهُ الْحُوتُ وَهُوَ مُلِيمٌ ۝

١٣٣- فَلَوْلَا أَنَّهُ كَانَ مِنَ الْمُسَبِّحِينَ ۝

١٣٤- لَكُنْتُمْ فِي بَطْنِهِ إِلَى يَوْمِ يُبْعَثُونَ ۝

١٣٥- فَنَبَذْنَاهُ بِالْعَرَاءِ وَهُوَ سَقِيمٌ ۝

١٣٦- وَأَلْبَسْنَا عَلَيْهِ شَجَرَةً مِّنْ يَقْطِينٍ ۝

37 : 142-146 Then the big fish did swallow him, and he had done acts worthy of blame.

**Had it not been that he (repented and) glorified  
Allah,  
He would have certainly remained inside the fish till  
the day of Resurrection,  
But We cast him forth on the naked shore in a state of  
sickness,  
And We caused to grow over him, a spreading plant of  
the gourd kind.**

These five consecutive verses narrate in brief the story of the prophet Yunus (a. s.) who departed in wrath as he was rejected by the people of Nineveh to whom he was sent to work against wickedness. Nineveh was the ancient capital of the Assyrian empire on the bank of the Tigris opposite the modern city, Mossul in Iraq. Instead of relying on the powers of Allah in the most discouraging circumstances, he left Nineveh and took a ship, according to Biblical commentators, at the port of Jaffa in the eastern Mediterranean about 600 miles west of Nineveh. But his destination to the nearby Tigris river is more likely. The ship met with foul weather and the sailors threw him overboard evidently regarding him as a bad man after casting lots. A large fish swallowed him but as he repented and glorified Allah while he was inside the fish, he was cast by the fish on the shore. While he was lying in a state of sickness obviously from the ordeal of remaining in the entrails of the fish, he was provided with shade from a plant which enabled him to refresh from this tiredness.

The scientific interpretation of this episode would centre around two items. namely the identity of (a) the organism that swallowed Yunus (a. s.), and (b) the plant that gave him comfort on the shore to recover from his sickness.

a) The word الحوت in the verse 37 : 142 means a large fish or a whale. To swallow a human, the organism must be (i) large enough (ii) must have the habit of sucking food and (iii) in this particular case must be an inhabitant of the aquatic region near Nineveh. Although whales include species which are the largest animals in the world, their distribution is restricted to the Arctic, Antarctic, Atlantic, Indian, and Pacific oceans which rules out the possibility of a whale being the contender in this case. Among

the fishes that reach enormous sizes are sharks and sturgeons. The former are oceanic in their habitat and notorious as one of the deadliest with very sharp jaws. It is highly unlikely for such a fish to simply swallow a man without first killing the victim by cutting him into pieces. On the other hand, sturgeons which are the largest present day fresh water fish known; live in the sea but migrate into fresh water to spawn. They have a suckorial and toothless mouth which indicates their habit of sucking in various smaller animals and plants as food. There are some twenty species of sturgeons known, distributed in Europe, Asia, and along both coasts of N. America<sup>1</sup>. The Russian sturgeon (*Acipenser huso*) is one of the species reaching a length of 24 feet and a weight of 2000 pounds (900 kgs)<sup>2</sup>. It inhabits the Caspian and Black Seas with which the river systems in the Mesopotamia are connected by the various tributaries. It can be expected that sturgeons of that size must have frequented the river Tigris during the time of Yunus (a. s.), a date assumed to be about 800 B. C. The peculiar feeding habit of the sturgeon and its toothless mouth would explain the sucking of the sinking Yunus (a.s.) into its entrails without causing any harm. In this connection it may be noted that there should be enough air in the belly of such a large fish enabling the victim inside to continue his breathing activities. Further, the toxic fluids inside the belly would cause severe uneasiness or even may cause acid burning. As the prophet Yunus (a.s.) prayed and glorified Allah under such circumstances, he was cast on the shore by the fish through the mercy of Allah as mentioned in the verse 37:145.

b) يقطين means pumpkin or squash belonging to the family Cucur-bitaceae including all kinds of gourds, melons, and their various allies that form an important source of food in the tropical and subtropical regions. The pumpkin or squash plant does not grow into a tree but its soft stems climb up any support by means of special organs called tendrils. They are very vigorous in growth and can cover a trellis or any dilapidated masonry structure to give enough shade for a person to relax under it. The plants belonging to gourd family are well adapted to the sandy, well-drained soils and commonly found in the deserts of the Mediterranean region and the Middle East. They are also frequently met with on sandy river banks. It is interesting to note that verse 146 says that Allah caused a plant of the gourd kind to grow over Yunus (a.s.) as he was

tying helplessly in a state of sickness. This indeed is what is meant literally by the phrase انبتنا عليه

### References

1. *Encyclopaedia Americana*, Vol. 25, Americana Corporation, Danbury, Connecticut, U.S.A., p. 810. 1979.
2. *Encyclopedia Britannica*, Vol. 21, Ency. Brit. London, p. 485, 1962.

○ كَمْ أَهْلَكْنَا مِنْ قَبْلِهِمْ مِنْ قُرُونٍ فَمَا أَذَا وَآلَاتٍ حِينَ مَنَاصٍ ○

38 : 3 How many generations before them did We destroy ? In the end they cried (for mercy)—when there was no longer time for being saved !

The first part of this verse has been discussed under verses 7 : 4 and 17: 17.

۳۳- وَمَا خَلَقْنَا السَّمَاءَ وَالْأَرْضَ وَمَا بَيْنَهُمَا بَاطِلًا ذَلِكَ ظَنُّ الَّذِينَ كَفَرُوا  
قَوْلُ الَّذِينَ كَفَرُوا مِنَ النَّارِ

38 : 27 Not without purpose did We create heaven and earth and all between! That were the thought of the unbelievers. But woe to the thought of the unbelievers because of the fire (of hell)!

That nothing has been created for nothing has been explained under verse 3 : 191.

○ كِتَابٌ أَنْزَلْنَاهُ إِلَيْكَ مُبَارَكٌ لِيَدَّبَّرُوا آيَاتِهِ وَلِيَتَذَكَّرَ أُولُو الْأَلْبَابِ ○

38 : 29 (Here is) a Book which We have sent down unto you, full of blessings, that they may meditate on its Signs and that men of understanding may receive admonition.

The Signs of Allah as explained at various places in this Book (e. g. 27 : 86) do convey His Message and it has already been discussed under verse 2 : 269 that only men of understanding are able to comprehend His Message.

۳۴- فَسَخَّرْنَا لَهُ الرِّيحَ تَجْرِي بِأَمْرِهِ رُخَاءً حَيْثُ أَصَابَ ○



**38 : 36** Then We subjected the wind to his power to flow gently to his order whithersoever he willed.

This has been discussed under verse 34 : 12.

٦٦- رَبُّ السَّمَوَاتِ وَالْأَرْضِ وَمَا بَيْنَهُمَا الْعَزِيزُ الْغَفَّارُ ۝

**38 : 66** The Lord of the heavens and the earth, and all between, exalted in might, able to enforce His will, forgiving again and again.

That Allah regulates and governs everything in the material and biological worlds has been discussed under verses 7 : 54, 7 : 185 and appendices I, II and III. Allah is thus “the Lord of the heavens and the earth, and all between”.

٤١- إِذْ قَالَ رَبُّكَ لِلْمَلَائِكَةِ إِنِّي خَالِقٌ بَشَرًا مِّنْ طِينٍ ۝

**38 : 71** Behold, your Lord said to the angels.” I am about to create man from clay.”

The role played by clay in creation of man has been discussed under verse 7 : 12.

٥- خَلَقَ السَّمَوَاتِ وَالْأَرْضَ بِالْحَقِّ ۗ يَكْوَرُ اللَّيْلُ عَلَى النَّهَارِ وَيَكْوَرُ النَّهَارُ عَلَى اللَّيْلِ وَسَطَرَ الشَّمْسَ وَالْقَمَرَ ۗ كُلٌّ يَجْرِي لِإِجَلٍ مُّسَمًّى ۗ أَلَا هُوَ الْعَزِيزُ الْغَفَّارُ ۝

**39 : 5** He created the heaven and the earth in true (proportions): He makes the night overlap the day, and the day overlap the night; He has subjected the sun and the moon (to His laws); each one follows a course for a time appointed. Is not He exalted in power—He who forgives again and again?

**In true proportion**

This has been discussed under verse 25 : 2.

### Overlapping of the night on the day and of the day on the night

This has been discussed under verse 36 : 40.

### The laws governing the sun and the moon

This has been discussed under verses 7 : 54 and 36 : 40.

١٠- قُلْ يُعْبَادُ الَّذِينَ آمَنُوا الْقُوَارِبُ كَرُمٌ لِلَّذِينَ أَحْسَنُوا فِي هَذِهِ الدُّنْيَا حَسَنَةٌ  
وَأَرْضُ اللَّهِ وَاسِعَةٌ ۗ إِنَّمَا يُوَفَّى الصَّابِرُونَ أَجْرَهُمْ بِغَيْرِ حِسَابٍ

39 : 10 Say : "O you my servants who believe! fear your Lord. Good is (the reward) for those who do good in this world. Spacious is Allah's earth! Those who patiently persevere will truly receive a reward without measure!"

This verse according to some commentators was revealed perhaps prior to the migration by some early Muslims to Abyssinia urging them to do so when their life in Makkah was made unbearable due to the oppression and atrocities of the non-believers. The word "spaciousness" assumes a greater significance when we consider this with respect to the discoveries of new geographical frontiers, namely northern and southern America, Canada and Australia.

٢١- أَلَمْ تَرَ أَنَّ اللَّهَ أَنْزَلَ مِنَ السَّمَاءِ مَاءً فَسَلَكَهُ يَنَابِيعَ فِي الْأَرْضِ ثُمَّ يُخْرِجُ بِهِ  
زُرْعًا مُخْتَلِفًا أَلْوَانُهُ ثُمَّ يَهِينُ فِقْتَرُهُ مَصْفَرًّا ثُمَّ يَجْعَلُهُ حُطَامًا  
إِنَّ فِي ذَلِكَ لَذِكْرَى لَأُولِي الْأَلْبَابِ ۝

39 : 21 Do you not see that Allah sends down rain from the sky, and leads it through springs on the earth? Then He causes to grow therewith produce of various colours; then it withers; you will see it grow yellow; then He makes it dry up and crumble away, Truly, in this, is a message to men of understanding.

How rain drops come down from the sky has been explained under verses 2: 22 and 2: 164. The rain water has a great influence on plant growth and

many crops depend entirely on the seasonal rainfall. The rain water that percolates in the soil can also be harnessed and the crops irrigated, as for example, by the help of Artesian wells, deep tube wells, and mountain springs. In the presence of moisture in the soil, the crops grow to maturity and produce crops each distinguished by the characteristic colour of its produce. After the production of crops, the annuals will have no more function to perform. and thus the entire plant withers. The process is gradual and is a consequence of the death of living tissues and their cell contents. The plants which were once green turn yellow on account of the destruction of the green pigment, chlorophyll. The shape and rigidity of the plant and its leaves which are maintained by the turgor pressure created inside the living cells due to continuous absorption of water, is lost on the death of cells. The plant gradually dries up and crumbles away ultimately becoming a part of the soil.

All the phenomena mentioned above speak of Allah's unlimited power and mercy. The men of understanding ponder over them, and as they comprehend their import, exclaim in wonder, declare the glory of Allah and bow down to Him in deep gratitude.

۲۳- اللَّهُ نَزَّلَ أَحْسَنَ الْحَدِيثِ كِتَابًا مُتَشَابِهًا مَثَلًا ۖ تَقْعُرُونَ عَنْهُ جُلُودَ الَّذِينَ يَخْشَوْنَ رَبَّهُمْ ثُمَّ تَلِينُ جُلُودُهُمْ وَقُلُوبُهُمْ إِلَىٰ ذِكْرِ اللَّهِ ۚ ذَٰلِكَ هُدَىٰ اللَّهِ يَهْدِي بِهِ مَن يَشَاءُ ۚ وَمَن يُضِلِلِ اللَّهُ فَمَا لَهُ مِن هَادٍ ۝

39 : 23 Allah has revealed the most beautiful message in the form of a Book, consistent and repeating; the skins of those who fear their Lord, tremble threat; then their skins and their hearts do soften to the remembrance of Allah. Such is the guidance of Allah. He guides therewith whom. He pleases; but such as Allah leaves to stray, can have none to guide.

In this verse Allah refers to the physical consequences of the state of fear.

Fear is the affective response to an actual danger. This emanates most frequently from possible danger to the physical integrity of the individual. The sense of fear may be caused by the actual sight of any imminent

physical danger or hearing of some dire consequences in future or it may be a psychological state of mind due to anticipation of some dreadful situation in future.

However, in a state of fear, the instinct of self preservation leads to excess secretion by the adrenal glands (epinephrine and non-epinephrine). When these excess chemicals enter the blood, there is a rise of blood pressure, increased rate of heart beats (pulse) and respiration and the contraction of arterioles of the skin. These changes help to provide excess blood supply to the lungs, muscles and brain, where it is of maximum service. in a state of emergency e. g., fear.

The sense of fear also stimulates the cutaneous nerves in the skin muscles (arrector pili) and their contraction leads to the erection of hairs, and contraction of the skin giving it 'goose skin' appearance. The skin consists of two parts, the external epidermis which is very thin and the internal dermis or true skin in which are situated the hair roots, blood vessels, nerves, muscles, sweat and sebaceous glands. It is a common occurrence that skin contracts due to fear. Besides, sugar is mobilised for the production of energy in the muscles, the coagulability of the blood is increased so that wounds are less likely to be fatal and the pupils are dilated to widen the field of vision.

All these changes serve to help the self preservation drive of the individual and are fused in the fields of sensation and consciousness into an effect which is known as fear<sup>1</sup>. The contraction of skin is an attempt to stiffen it so that physical injury is minimised.

Those who are believers and fear the punishment of Allah in the hereafter will feel the sensation of fear when they hear the verses of the Holy Quran referring to the punishment of the sinners, and their skin is contracted and their hearts beat rapidly. But the faithful will soon be reassured by the promise of rewards and happiness in the heaven, and such verses will relieve their sense of fear and the skin will be soft again and the hearts will function normally. When fear disappears the arrector muscles will be relaxed and the normal amount of adrenal secretion will remove the abnormal changes caused by its excess secretion.

As for the softening of the hearts or minds, this psychological state is still beyond the reach of experimental science. It is however known to us that when the sense of fear is removed, the mind becomes happy and the

heart functions normally. It may be pointed out that the heart beat is abnormal due to fear as mentioned before. The verse in question does not mention the effect of fear on the heart but it only mentions the normal functioning of the heart after the removal of the sensation of fear.

## Reference

1. L. C., Kolb, *Noyes' Modern Clinical Psychiatry*, 7th edn. Oxford & IBH Publishing Co. Calcutta; p. 62, 1968.

٣٢- اللَّهُ يَتَوَفَّى الْأَنْفُسَ حِينَ مَوْتِهَا وَالَّتِي لَمْ تَمُتْ فِي مَنَامِهَا فِيمِمْكَ الْبَرِّ  
 قَضَىٰ عَلَيْهَا الْمَوْتَ وَيُرْسِلُ الْأَخْرَىٰ إِلَىٰ أَجَلٍ مُّسَمًّى ۗ إِنَّ فِي ذَٰلِكَ لَآيَاتٍ  
 لِّقَوْمٍ يَتَفَكَّرُونَ ○

39: 42 It is Allah Who takes the souls (of men) at death and of those who are not in their sleep. He keeps that soul for which He ordained death and the rest (souls) He sends back (to their bodies) for a term appointed. Verily in this are Signs for those who reflect.

Since the soul is still beyond human comprehension, scientific analysis and experiments, present day knowledge is not enough to explain this verse. We know certain aspects of sleep which have already been discussed under verse 30 : 23 and appendix VIII.

٣٣- قُلْ لِلَّهِ الشَّفَاعَةُ جَمِيعًا ۗ لَهُ مُلْكُ السَّمٰوٰتِ وَالْاَرْضِ  
 ثُمَّ اِلَيْهِ تُرْجَعُونَ ○

39: 44 Say, "To Allah belongs exclusively (the right to grant) intercession; to Him belongs the dominion of the heavens and the earth; In the End it is to Him that you shall be brought back."

That the domain of the heavens and the earth belongs to Allah has been discussed under verse 5 : 19.

٦١- اللَّهُ خَالِقُ كُلِّ شَيْءٍ ۗ وَهُوَ عَلَىٰ كُلِّ شَيْءٍ وَكِيلٌ ○

39: 62 Allah is the Creator of all things, and He is the Guardian and Disposer of all affairs.

That Allah is the Creator of all things has been discussed under verse 2 : 117.

۶۰- وَمَا قَدَرُوا اللَّهَ حَقَّ قَدْرِهِ ۗ وَالْأَرْضُ جَمِيعًا قَبْضَتُهُ يَوْمَ الْقِيَامَةِ  
 وَالسَّمَوَاتُ مَطْوِيَّاتٌ بِيَمِينِهِ ۗ سُبْحٰنَهُ وَتَعَلٰى عَمَّا يُشْرِكُونَ ۝

**39 : 67** No just estimate have they made of Allah, such as is due to Him: on the day of Judgement, the whole of the earth will be but His handful and the heavens will be rolled up in His right hand. Glory to Him! High is He above the partners they attribute to Him!

Here Allah states that in the end the universe will be rolled up and the earth would be shrunk to an insignificant volume. It is known that two opposite forces are acting on the universe; force of expansion set up in the wake of the big bang and force of attraction due to gravity. It is the force of expansion that is still dominating and so the clusters of galaxies are moving apart from one another. But will the universe keep expanding for ever? This is the key question.

The force of gravity opposes the expansion of universe. The attraction between clusters of galaxies tries to slow down their separation. It is the tussle between the momentum of the expanding universe and the long range force of gravity. If the momentum wins over, the universe will continue on its course of expansion for all eternity. If on the other hand gravity wins over, the attractive forces will slow down the speeding clusters of galaxies and bring them to a standstill. Gravity will draw them all together again. The universe will shrink to a small size. Scientists have not yet been able to know for certain which of these two forces will ultimately win. Allah says that the universe will ultimately roll up i. e., shrink into a small volume, so the gravity will win. So we take it for granted that ultimately the force of gravity will be predominant and the whole universe will collapse in a tremendous implosion, called the big crunch. With this assumption, we can calculate a time tale for the catastrophic countdown to the big crunch. According to the American scientist Freeman Dyson<sup>1</sup>, "A thousand million years before big crunch clusters of super galaxies and quasars, speeding together will close up the empty space between them (i. e., the universe will begin to shrink first from the edge). By hundred million years before big crunch, the space between individual galaxies will close up

and all the galaxies will merge together. The entire universe will now be filled with stars at roughly the same spacing as the stars in our galaxy. Space will be still shrinking, galaxies will merge, gravity will be pulling the stars closer and closer together. At a time 100,000 years before big crunch the stars will be so close, that the sky will not only be blindingly bright but searingly hot also. It must be the end of any living being on any planet in the universe. By a 1000 years before the universe destroyed itself in the big crunch, stars will be colliding with each other in their hundreds; each resulting melange collapses into a black hole. And in the final act, all the contents of one-time universe will shrink to a tiny infinitely compressed singularity.”

Thus ultimately the universe will be rolled up into an infinitely small volume.

### Reference

1. F. Dyson, *Restless Universe*, Henbest and Couper George Philip, 1982.



هـ. وَتَرَى الْمَلَائِكَةَ حَافِظِينَ مِنْ حَوْلِ الْعَرْشِ يُسَبِّحُونَ بِحَمْدِ رَبِّهِمْ  
وَقُضِيَ بَيْنَهُم بِالْحَقِّ وَقِيلَ الْحَمْدُ لِلَّهِ رَبِّ الْعَالَمِينَ ۝

39: 75 And thou wilt see the angels surrounding the throne (Divine) on all sides, singing glory and praise to their Lord. The decision between them (at judgement) will be in (perfect) justice. And the cry (on all sides) will be 'praise be to Allah, the Lord of the Worlds.'

The reasons for which praises have to be sung for Allah seem to be 'unlimited. Some of these reasons along with the fact of Allah being the Lord of the worlds have been amplified in the discussion under verse 1:2.

۱۳- هُوَ الَّذِي يُرِيكُمْ آيَاتِهِ وَيُنَزِّلُ لَكُمْ مِنَ السَّمَاءِ رِزْقًا  
وَمَا يَسْتَدْكُرُ إِلَّا مَنْ يُنِيبُ ۝

40: 13 He it is Who shows you His Signs, and sends down sustenance for you from the sky: but only those receive admonition Who turn (to Allah).

Sending down of sustenance from the sky has been discussed under verse 15:21.

۱۸- وَأَنْذَرْتَهُمْ يَوْمَ الْآزِفَةِ إِذِ الْقُلُوبُ لَدَى الْحَنَاجِرِ كَوَاطِبٍ ؕ مَا لِلظَّالِمِينَ مِنْ حَمِيٍّ  
وَلَا شَفِيعٍ يُطَاعُ ۝

40:18 Warn them (O Muhammad) of the day of the approaching (doom) when the hearts will be choking the throat, No intimate friend nor intercessor will the wrong-doers have who could be listened to.

The approaching death due to a sudden calamity may cause a sense of choking with increased heart-beat due to fear. The verse expresses the idea of the fearsome situation at the time of Doomsday.

۲۱- أَوَلَمْ يَسِيرُوا فِي الْأَرْضِ كَيْفَ كَانَ عَاقِبَةُ الَّذِينَ كَانُوا مِنْ قَبْلِهِمْ  
 كَانُوا هُمْ أَشَدَّ مِنْهُمْ قُوَّةً وَآثَارًا فِي الْأَرْضِ فَأَخَذَهُمُ اللَّهُ بِذُنُوبِهِمْ  
 وَمَا كَانَ لَهُمْ مِنَ اللَّهِ مِنْ وَاقٍ ۝

40:21 Do they not travel through the earth and see what was the end of those before them? They were even superior to them in strength and in the traces (they have left) in the land: but Allah did call them to account for their sins, and none had they to defend them against Allah.

This has been discussed under verse 22:45.

۵۴- لَخَلْقِ السَّمَوَاتِ وَالْأَرْضِ أَكْبَرُ مِنْ خَلْقِ النَّاسِ  
 وَلَكِنَّ أَكْثَرَ النَّاسِ لَا يَعْلَمُونَ ۝

40:57 Assuredly the creation of the heavens and the earth is a greater (matter) than the creation of men: yet most men understand not.

Our up-date knowledge about the creation of the heavens and the earth has been discussed under verses 2:117, 2: 164 and 7 : 54 and appendices I and II. The creation of man from a quintessence of clay and from a drop of sperm and the development of the foetus in the mother's womb have been explained under verses 23: 12-14.

The well established 'big-bang' theory is beset with many conceptual problems. For example, the singularity problem which means that space-time does not exist at the origin, implying that the universe came into existence out of nothing. What does it mean? To bypass this problem recently the 'string theory' (a dimensional curve) has been proposed. These strings are extremely small and this is why we can never hope to observe them directly. This is nothing but again an article of faith to bypass the problem of singularity. The second serious problem to be answered is why is the 3 deg k background radiation, the remnant of the 'big-bang' isotropic? A space-time which is flat in the 3 spatial

dimensions has the unique property of isotropizing at large times. This is known as the flatness problem. If one looks at such a universe at the early cosmic time, e.g., at the Planck time ( $t=10^{43}$  sec), one notices that the expansion rate had to be fine-tuned to the accuracy of less than  $10^{57}$  in order to have the universe as it is to-day. This extremely balanced behaviour of the universe cannot be just an accident like the 'inverse gambler's fallacy'. A gambler entering the casino and finding that sixes have appeared simultaneously in two dice, may quite erroneously conclude that this has happened because of his lucky entrance. It is rather the funny nature of the law of probability which implies that the low probability event may occur at any time in the long number of trials, and the number of successes would not be more than the probability states.

Finally mention should be made of Dirac's large number hypothesis which shows that only within a limited epoch of cosmic time, when the astrophysical conditions are favourable, life, mind and consciousness can develop. It would be falling into 'inverse gambler's fallacy' to say that such an almost zero probability event occurred because we are here; rather this happened for us to be here.

A deep probe into the understanding of the creation of this vast universe has baffled human minds and some of the most intriguing problems yet to be answered have been discussed before. Whatsoever may be the mathematical intricacies, one ultimately ends up in a faith like singularly, string etc. On the other hand, creation of men through the process of fertilization is now well understood. The understanding of the deoxyribonucleic acid (DNA) has broadened our knowledge further. A great deal more is yet to be known. But definitely the most intriguing problems are faced in our attempts to understand the creation of the heavens and the earth.

٥٩- إِنَّ السَّاعَةَ لَأْتِيَةٌ ۖ لَا رَيْبَ فِيهَا وَلَكِنَّ أَكْثَرَ النَّاسِ لَا يُؤْمِنُونَ ۝

40:59 The hour will certainly come; therein is no doubt; yet most men believe not.

Ordinarily people think that life on earth would continue to exist forever. But this notion is mistaken. Continuity of life is mainly dependent on the

energy supplied by the sun. However, the sun is losing its mass in producing energy at a tremendous rate and is bound to collapse some day as has been explained under verse 7:54.

٦١- اللَّهُ الَّذِي جَعَلَ لَكُمْ الَّيْلَ لِتَسْكُنُوا فِيهِ وَالنَّهَارَ مُبْصِرًا ۗ إِنَّ اللَّهَ لَذُو فَضْلٍ عَلَى النَّاسِ وَلَكِنَّ أَكْثَرَ النَّاسِ لَا يَشْكُرُونَ ○

40:61 It is Allah Who has made the night for you that you may rest therein, and the day, as that which helps (you) to see. Verily Allah is full of grace and bounty to men: yet most men give no thanks.

That the night is for rest and tranquility has been discussed under verse 6:96. That the day is for giving light so that we can see things therewith has been explained under verse 10:67.

Evidently both night and day are bounties of Allah for which we should always be thankful to Him.

٦٢- ذَلِكُمْ اللَّهُ رَبُّكُمْ خَالِقُ كُلِّ شَيْءٍ ۗ لَآ إِلَهَ إِلَّا هُوَ ۗ فَآلَىٰ تُوْفِكُونَ ○

40:62 Such is Allah, your Lord, the Creator of all things. There is no god but He: then how you are deluded away from the Truth!

That Allah is the Creator of all things has been discussed under verses 2:117, 2:164 and 7:54 and in details under appendices I, II and IV.

٦٣- اللَّهُ الَّذِي جَعَلَ لَكُمْ الْأَرْضَ قَرَارًا وَالسَّمَاءَ بِنَاءً ۖ وَصَوَّرَكُمْ فَأَحْسَنَ صُوْرَكُمْ ۗ وَرَزَقَكُمْ مِنَ الطَّيِّبَاتِ ۗ ذَلِكُمْ اللَّهُ رَبُّكُمْ ۗ فَتَعْبَرُوا اللَّهَ رَبَّ الْعَالَمِينَ ○

40:64 It is Allah, Who has made for you the earth as a resting place, and the sky as a canopy, and has given you shape and made your shapes beautiful,—and has provided for you sustenance, of things pure and good; such is Allah your Lord. So glory to Allah the Lord of the Worlds!

### The earth as a resting place

This has been discussed under verse 2:22.

### The sky as a canopy

That the sky acts as a protective and beneficial covering over man's head like a canopy has been discussed under verse 2:22.

### Giving beautiful shape to man

This has been discussed under verse 13:8 and appendix VI.

### Provision of sustenance

Sending down sustenance from the sky has been discussed under verse 15:21.

٤٦- قُلْ إِنِّي نُهِيتُ أَنْ أَعْبُدَ الَّذِينَ تَدْعُونَ مِنْ دُونِ اللَّهِ لَمَّا جَاءَنِي الْبَيِّنَاتُ  
مِنْ رَبِّي وَأُمرْتُ أَنْ أُسَلِّمَ لِلرَّبِّ الْعَالَمِينَ ○

٤٤- هُوَ الَّذِي خَلَقَكُمْ مِنْ تُرَابٍ ثُمَّ مِنْ نُطْفَةٍ ثُمَّ مِنْ عَلَقَةٍ ثُمَّ يُعْزِجُكُمْ طِفْلاً  
ثُمَّ لِتَبْلُغُوا أَشَدَّكُمْ ثُمَّ لِتَكُونُوا شُيُوخًا وَمِنْكُمْ مَنْ يُتَوَفَّى مِنْ قَبْلُ  
وَلِتَبْلُغُوا أَجَلَ مُسَمًّى وَ لَعَلَّكُمْ تَعْقِلُونَ ○

40:66-67 Say "I have been forbidden to invoke those whom you invoke besides Allah—seeing that the clear Signs have come to me from my Lord; And I have been commanded to bow (in Islam) to the Lord of the worlds."

It is He Who has Created you from dust, then from a sperm drop, then from a leech-like clot, then does He get you out (into the light) as a child, then lets you (grow and) reach your age of full strength; then lets you become old—though of you there are some who die before—and lets you reach a term appointed in order that you may learn wisdom.

### Signs of Allah and the Lord of the Worlds

In verse 40: 66, reference has been made to the clear Signs of Allah and to the fact of Allah being the Lord of the Worlds. As we have explained

earlier, most of the signs of Allah mentioned in the Holy Quran are of a scientific nature. Some of these have already been discussed with reference to other verses. That Allah is the Lord of the worlds has been explained under verse 1:2.

**Creation of man from dust.**

The creation of man from dust as mentioned in verse 40:67 can be understood from the fact that all the essential elemental constituents present in the human are also present in dust. An analysis of a typical sample of soil shows the composition of the soil as given in the following table 1:

Table 1. Average Chemical composition of the earth's crust.<sup>1</sup>

Element	% of element present in the soil	Oxides	% of oxides present in the soil
O	46.46		
Si	27.61	SiO <sub>2</sub>	59.08
Al	8.07	Al <sub>2</sub> O <sub>3</sub>	15.23
Fe	5.06	Fe <sub>2</sub> O <sub>3</sub>	3.10
Ca	3.64	Fe O	3.72
Mg	2.07	Ca O	5.10
Na	2.75	Mg O	3.45
K	2.58	Na <sub>2</sub> O	3.71
Ti	0.62	K <sub>2</sub> O	3.11
P	0.12	Ti O <sub>2</sub>	1.03
Mn	0.09	P <sub>2</sub> O <sub>5</sub>	0.29
S	0.06	MnO	0.12
Cl	0.05	H <sub>2</sub> O	1.30

Interesting enough, these same elements are also present in the human body. However it must be mentioned that the collection of these elements by itself is not life. The creation of life from these elements is a divine act—modern science has unveiled only a very limited portion of this act.

**Creation from a Sperm drop and from a leech-like clot**

This matter as mentioned in verse 40:67 has been explained under verses 18:37; 22:5 and 23:13-14.

**Reference**

1. F.W., Charke, and S.H.S. Washington, *The Composition of the Earth's Crust*. U.S. Geological Survey Profess. Paper 127, 1924.

٦٨- هُوَ الَّذِي يُحْيِي وَيُمِيتُ ؕ فَإِذَا قَضَىٰ أَمْرًا فَإِنَّمَا يَقُولُ لَهُ كُنْ فَيَكُونُ ۝

40:68 It is He Who gives Life and Death and when He decides upon an affair, He say to it 'Be' And it is.

The divine order 'Be' has been discussed under verse 36:82.

٤٩- اللَّهُ الَّذِي جَعَلَ لَكُمُ الْأَنْعَامَ لِتَرْكَبُوا مِنْهَا وَمِنْهَا تَأْكُلُونَ ۝

٨٠- وَلَكُمْ فِيهَا مَنَافِعُ وَلِتَبَلَّغُوا عَلَيْهَا حَاجَةً فِي صُدُورِكُمْ

وَعَلَيْهَا وَعَلَى الْفُلْكِ تُحْمَلُونَ ۝

40:79,80 It is Allah Who made cattle for you, that you may use some for riding and some for food.

And there are (other) advantages in them for you (besides); that you may through them attain to any need (there may be) in your hearts; and on them and on ships you are carried.

The references to the uses derived by cattle provided to us, by the Beneficent Allah, in the form of riding, meat, milk, and various other advantages like clothing have been discussed in detail under verses 16:5, 16:7, 16:8, and 16:66

The reference to ships plying on the sea for the profit of mankind has been explained under verse 2:164.

٨٢- أَفَلَمْ يَسِيرُوا فِي الْأَرْضِ فَيَنْظُرُوا كَيْفَ كَانَ عَاقِبَةُ الَّذِينَ مِن قَبْلِهِمْ

كَانُوا أَكْثَرَ مِنْهُمْ وَأَشَدَّ قُوَّةً وَ أَثَارًا فِي الْأَرْضِ

فَمَا أَغْنَىٰ عَنْهُمْ مَا كَانُوا يَكْسِبُونَ ۝

40:82 Do they not travel through the earth and see what was the end of those before them? They were more numerous than

these and superior in strength and in the traces (they have left) in the bed: yet all that they accomplished was of no profit to them.

This has been discussed under verse 7:4.

- ٩- قُلْ أَرَأَيْتُمْ لَكُمْ كَفْرًا الَّذِي خَلَقَ الْأَرْضَ فِي يَوْمَيْنِ وَتَجْعَلُونَ لَهُ أَنْدَادًا  
ذَلِكَ رَبُّ الْعَالَمِينَ ۝
- ١٠- وَجَعَلَ فِيهَا رِزْقًا مِنْ قَبْلِهَا وَبَارَكَ فِيهَا وَقَدَّرَ فِيهَا أَقْوَامَهَا فِي أَرْبَعَةِ أَيَّامٍ  
سَوَاءً لِّلنَّاسِ يَلْبَسُونَ ۝
- ١١- ثُمَّ اسْتَوَىٰ إِلَى السَّمَاءِ وَهِيَ دُخَانٌ فَقَالَ لَهَا وَ لِلْأَرْضِ انثَبِي طَوْعًا أَوْ كَرْهًا  
قَالَتَا أَتَيْنَا طَائِعِينَ ۝
- ١٢- فَقَضَاهُنَّ سَبْعَ سَمَاوَاتٍ فِي يَوْمَيْنِ وَأَوْحَىٰ فِي كُلِّ سَمَاءٍ أَمْرَهَا ۚ وَزَيَّنَّا السَّمَاءَ  
الْأَدْنَىٰ بِمَصَابِيحَ ۚ وَحِفْظًا ۚ ذَٰلِكَ تَقْدِيرُ الْعَزِيزِ الْعَلِيمِ ۝

41:9-12 Say: Is it that you deny Him Who created the earth in two days? And do you join equals with Him? He is the Lord of (all) the worlds.

He set on the (earth) mountains standing firm, high above it, and bestowed blessings on the earth, and measured therein all things to give them nourishment in due proportion in four days, in accordance with (the needs of) those who seek (sustenance).

Moreover He comprehended in His design the sky, and it had been (as, smoke, He said to it and to the earth : "Come you together, willingly or unwillingly." They said : "We do come (together), in willing obedience :"

So he completed them as seven firmaments in two days, and He assigned to each heaven its duty and command. And We adorned the lower heaven with lights, and (provided it) with guard. Such is the decree of (Him) the Exalted in Might, full of knowledge.



### **Creation in phases**

In these verses it is stated that Allah created the earth in 2 days, food for sustenance in 4 days and seven heavens in 2 days. Thus it appears that the creation of the events mentioned in those verses was completed in a total of 8 days. It seems to be contradictory to the statement made in verse 7:54, wherein it is stated that the creation of the heavens and the earth was completed in 6 days. Thus there appears to be a discrepancy of 2 days. In the discussion of verse 7 : 54, it was observed that a 'day' does not indicate the period of rotation of the earth about its axis. To Allah, a 'day' denotes a period necessary to accomplish a phase of an event. The period may be longer in the case of one event and shorter in the case of another event. Thus Allah's day may be 1000 years or 50,000 years of our time. Moreover two events may occur simultaneously. In the discussion of verse 7 : 54, it was observed that the creation of the heavens and the earth occurred simultaneously and not separately. So the 2 events of mere creation of the heavens and the earth were completed in the same phase. Under verse 7:54, it was pointed out that after creation, the earth was brought to its present condition with plants and animals in 4, more phase of 4 geological eras.

In the verse under discussion, creation of earth is mentioned in one verse, verse 41:9, and that of heavens in another verse 41 : 12. Thus the same 2 phases have been mentioned in 2 different verses. These phases are to be counted as 2 and not as 4, so there is nothing contradictory in the verses.

### **Lord of the Worlds**

This has been explained in the discussion under verse 1 : 2.

### **Mountains standing firm**

This has been discussed under verses 13 : 3 and 21 : 31.

### **Nourishment in due proportion**

'To give nourishment in due proportion' means to bestow different kinds of food, so that the ingredients may be taken in due proportion, to make balanced food for human beings, necessary for good health. A perfect food contains 15% protein, 60% carbohydrate, 15% fat and 10% water, minerals, and vitamins. Similarly, ideal food for other living beings contains necessary ingredients in due proportion. Sources of the foods are plants and

animals, as available on the surface of the earth. These sources evolved in 4 phases of 4 geological eras. This point was discussed under verse 7 : 54.

### **Coming together of the sky and the earth**

This refers to the first phase of creation. It has been observed under verse 7:54 that after Big Bang, the primeval fireball exploded into a rapidly expanding and cooling gas (smoke) of protons, neutrons, and electrons, immersed in an intense sea-radiation. At first, the pressure of radiation maintained smooth expansion; but eventually at the beginning of the second phase, the force of gravitation came into existence and began to bring matters together. Protons and electrons came closer together and formed hydrogen nuclei. Matter mostly of hydrogen atoms, with some helium, began to come closer and form clumps. The clumps or blobs of gas (smoke) continued to fly apart from each other. But by the force of gravitation, neighbouring celestial bodies came closer together and formed loosely bound groups, such as local groups of stars, galaxies, local groups of galaxies etc. forming different skies. Stellar systems like our solar system with a sun in the centre and planets in the orbits were formed. Thus by the force of gravitation, i.e., by the command of Allah, the earth began to be attracted to the sun and come closer. Thus by the end of second phase i.e., 2 days seven firmaments were completed.

### **Seven firmaments**

The formation of seven firmaments has been discussed in verse 2:29.

The universe with all its parts i.e., with seven firmaments, is well-ordered and well-balanced. Every part of the universe has a role to play in this orderliness and razor-edge balance. Any disturbance or disobedience to the command, in any part of the universe may have disastrous effect on the entire universe. Lovell<sup>1</sup> comments about 1 second after the Big Bang: "If at that moment the rate of expansion had been reduced by only one part in a thousand billion, then the universe would have collapsed after a few million years." He also writes: "Conversely, if the rate had been marginally greater then the expansion would have reached such magnitudes that no gravitationally bound system (that is, galaxies and stars) could have formed."

The solar system and stars of our galaxy, the Milky Way form the sky nearer to earth. In it are situated the sun, moon, planets and different

varieties of stars, which adorn the sky with lights. These heavenly bodies follow meticulously the laws ordained by Allah as discussed under verse 7:54.

### **Reference**

1. Lovell, Bernard, *In the Centre of Immensities*, Hutchinson and Co. Ltd., London, pp. 122-23, 1979.

۱۳- وَإِنْ أَعْرَضُوا فَقُلْ أَنْذَرْتُكُمْ ضِعْفَةَ  
مِثْلِ ضِعْفَةِ عَادٍ وَثَمُودَ ۝

41:13 But if they turn away, say you: "I have warned you of a stunning punishment (as of thunder and lightning) like that which (overtook) the 'Ad and the Thamud!"

The verse speaks of the consequence of non-belief. The non-believers may be punished like the 'Ad and the Thamud which has been discussed under verses 11:60 and 22:65.

۱۴- فَأَرْسَلْنَا عَلَيْهِمْ رِيحًا صَرْصَرًا فِي أَيَّامٍ نَحْسَاتٍ لِنَدِينَهُمْ عَذَابَ الْخِزْيِ فِي  
الْحَيَاةِ الدُّنْيَا ۖ وَلَعَذَابُ الْآخِرَةِ أَكْثَرُ ۖ وَهُمْ لَا يُنصَرُونَ ۝

41: 16 So We sent against them a furious wind through days of disaster, that We might give them a taste of a penalty of humiliation in this life; but the penalty of the Hereafter will be more humiliating still: and they will find no help.

The verse speak of the punishment of the 'Ad' for their disobedience. One of the punishments was in the form of a furious wind. The matter of different kinds of winds has been discussed under verse 17:69.

۱۵- وَأَمَّا ثَمُودُ فَهَدَيْنَاهُمْ فَاسْتَحَبُّوا الْعَمَىٰ عَلَى الْهُدَىٰ  
فَأَخَذَتْهُمُ ضِعْفَةُ عَذَابِ الْهُونِ بِمَا كَانُوا يَكْسِبُونَ ۝

41:17 As to the Thamud, We gave them guidance, but they preferred blindness (of heart) to guidance: so the stunning punishment of humiliation seized them, because of what they had earned.

The scientific explanation of *Saaikat* meaning thuder and lightning has been made in verse 2:19. The damage caused by lightning has been discussed under verse 13:12.

۳۸- وَمِنْ آيَاتِهِ اللَّيْلُ وَالنَّهَارُ وَالشَّمْسُ وَالْقَمَرُ لَا تَسْجُدُوا لِلشَّمْسِ وَلَا لِلْقَمَرِ

وَاسْجُدُوا لِلَّهِ الَّذِي خَلَقَهُنَّ إِن كُنتُمْ رَآيَاهُ تَعْبُدُونَ ○

41:37 Among his Signs are the night and the day, and the sun and the moon. Adore not the sun and the moon, but adore Allah, Who created them, if it is Him you wish to serve.

Night and day as Signs of Allah have been discussed under verse 2:164. The sun and the moon as Signs of Allah has been discussed under verse 10:5. The laws governing the sun and the moon has been explained under verse 7:54. The creation of the sun and the moon has been explained in appendix I.

Many ignorant people adore the sun and the moon whereas Allah—the Creator and Sustainer of the worlds, is the only Being worthy of worship.

۳۹- وَمِنْ آيَاتِهِ الْكَلْبُ تَرَى الْأَرْضَ خَائِبَةً فَإِذَا أَنزَلْنَا عَلَيْهَا الْمَاءَ اهْتَزَّتْ وَرَبَتْ

إِنَّ الَّذِي أَحْيَاهَا لَمُحْيِ الْمَوْتِ إِنَّهُ عَلَى كُلِّ شَيْءٍ قَدِيرٌ ○

41: 39 And among His Signs in this : you see the earth barren and desolate; but when We send down rain to it, it is stirred to life and yields increase, truly, He Who gives life to the (dead) earth can surely give life to (men) who are dead. For He has power over all things.

That Allah revives the barren earth by rain has been explained under verse 2:164.

۴۰- إِلَيْهِ يُرَدُّ عِلْمُ السَّاعَةِ وَمَا تَحْرَجُهُ مِنْ شَرِّتٍ مِنْ كَلِمَاتِنَا  
وَمَا تَحْمِلُ مِنْ أُنْثَىٰ وَلَا تَضْمُرُ إِلَّا بِعِلْمِهِ ۗ وَيَوْمَ يُنَادِيهِمْ أَيْنَ شُرَكَآؤُكُمْ  
قَالُوا اذْذِكْ مَا مِنَّا مِنْ شَيْءٍ ○

41:47 To Him is referred the knowledge of the Hour (of Judgement: He knows all): No date fruit comes out of its

sheath, nor does a female conceive nor bring forth (young) but His knowledge. The day that (Allah) will propound to them the (question), "Where are the partners (you attributed) to Me"? They will say, "We do assure You not one of us can bear witness!".

Conception in the womb means fertilization of the mature ovum by a spermatozoon and its implantation in the uterus. This occurs in such a way that man has no knowledge of its exact time but Allah knows all about it. It has been already discussed under verse 31:34.

Again, the successful termination of pregnancy is within the knowledge of Allah. This has been discussed in appendix VI.

٥٣- سَرَّيْهِمْ آيَاتِنَا فِي الْأَفَاقِ وَفِي أَنْفُسِهِمْ حَتَّىٰ

يَتَّبِعِينَ لَهُمْ أَنَّهُ الْحَقُّ ۗ أَوَلَمْ يَكْفِ بِرَبِّكَ أَنَّهُ عَلَىٰ كُلِّ شَيْءٍ شَهِيدٌ ۝

41:53 Soon We shall show them Our Signs on the horizons and within themselves until it will be manifest unto them that it is the truth. Does not your Lord suffice since He is witness over all things.

Let us first discuss the Signs on the horizons and also how these horizons expand with the expansion of knowledge. The Signs of Allah have been made manifest to mankind in stages from the very early civilisation and will continue to be so made for all time to come. Upto the 16th century it was known that in the sky, there are stars and seven planets; the sun and the moon were considered to be two planets and the earth was not a planet but immovably fixed at the centre. Since then, it has been known that the sun and the moon are planets but the earth moves round the sun. It is also known that there are different types of celestial bodies, such as stars, planets, satellites, nebulae, galaxies, quasars etc. It has also been made manifest to mankind that stars of different kinds evolve through different stages. It has been pointed out in appendix I that if the mass of a star is less than 1/10 of the sun, nuclear fusion cannot take place and it shines by the temperature caused by the gravitation pressure alone. The colour of the star at that temperature is brown ; so such a star is known as a brown dwarf. If the mass of a star is larger but does not exceed 1.44 times that of the sun

(critical mass; Chandrasekhar's limit) nuclear fusion stars ; this force of gravitation tries to contract it, while that of a radiation pressure tries to expand. A balance is maintained for a very long period, about 12 billion years. At this stage the star is said to be a main sequence star. But ultimately radiation pressure gains over the force of gravitation and the star expands to a huge extent ; its temperature falls and it looks redder. At this stage the star is called a red giant star. Expansion continues and a state of unrest prevails on the star. It pulsates, expanding and contracting alternately. At this stage the star is known as a pulsating star. Ultimately the outer shell of the star gets separated and drifts away, leaving the central portion drastically reduced. Temperature becomes high and the star looks whiter. At this stage the star is known as a white dwarf star.

If the mass of the star is above, but not too much above the critical mass, say ten times the mass of the star, gravitation pressure becomes too high for the core to stand. The white dwarf star collapses. This catastrophic event releases an enormous amount of energy as nova and supernova explosion. The star constitutes of a core composed of neutrons. At this stage the star is known as a neutron star. It has the enormous density of 10<sup>14</sup> grams/cc. Neutron star is also called a pulsar (vide appendix 1.)

If the mass of a star be still higher, say 100 or 1000 times that of the sun, the white dwarf collapses beyond the neutron stage, throwing off large amounts of stellar debris, which burns brighter than billion suns causing supernova explosion. The remaining part is so dense that even light cannot out of the grip of the gravitational pull. The star just vanishes out of sight and constitutes what is known as a black hole.

Besides the stars, Allah has made manifest other celestial bodies in the sky which form part of the universe. These bodies are planets, satellites, nebulae, galaxies, quasars etc.

Though planets of stars, other than those of the sun, have not yet been visually observed, there is strong evidence that some of the stars have planets revolving round them. Nebulae denote clouds of gas and dust found in the inter revolving round them. Nebulae denote clouds of gas and dust found in the inter stellar space. It has been noted above that gas masses drift away from red giants, stellar debris is thrown out in case of implosion causing nova and supernova explosion. These materials constitute the inter-stellar gas and dust forming the nebulae. The nebulae are the birth place of stars and the stellar system. A galaxy is a loosely gravitational bound

system of stars. Galaxies are receding away from one another with tremendous speed. Quasars are the most curious and most energetic objects in the universe. A quasar emits 100 or 1000 times more energy than a galaxy like the Milky Way with 100 billion stars in it. They are very strong radio sources of diameter, sometimes less than a second of arc. The objects are not only extra galactic but are to be ranked with the most distant galaxy. Quasars have been found at distances of 20 billion light years, receding with a velocity about 90% than of light. The present theory is that quasars are unseen galaxies with massive black holes at the centre.

The above developments in the macroscopic world extending from the earth to the farthest end of the universe so far explored (i. e., 1028 cm) speak of the ever increasing horizons of knowledge. And everytime the horizon of knowledge expands, we see a new Sign of Allah . In fact, the study of the cosmos has revealed many Signs of Allah, each of which demonstrates a part of the infinite Wisdom of Allah in the organisation of matter. In the microscopic world also, we see several levels of organisation. Starting from fire, water, air, soil which were considered elementary, man through a process of scientific analysis has gone through the stages of compounds, elements, molecules, atoms, protons, neutrons, electrons, ending at the present time at quarks (building blocks of protons and neutrons and of other strongly interacting particles and leptons (electrons, neutons, neutrons etc.) which are being considered as the building blocks of nature. What a quark is made of is a question that only future investigations can answer. In the quest for the elementarity of matter, man has discovered a number of horizons in the organisation of matter on very small scales. In this process man has explored new Signs of Allah, namely, the electromagnetic force operative in the making of atoms, the weak nuclear force responsible for radioactivity and also the strong nuclear force which holds the nucleons in the nucleus together. How did these forces originate is still a mystery.

The physicist can explain to a reasonable extent, how these forces work rather than why they work. On the other hand, one has to wonder at the fact that without these forces, matter (both inert and living) would not have existed as at present. Interestingly, the work of Salam, Weinberg and Glashow and more recently of others in the unification of the four forces of nature known so far (the three forces just mentioned together with the gravitational force) have been shedding light on the origin of creation and



have been wonderfully combining the very big (dealt with in cosmology) and the very small (dealt with in particle physics). Such a synthesis of the big and the small is revealing the wonderful subtlety of the Lord in initiating and sustaining creation through a chain of mathematical laws according to a Grand Design.

A few words about the manifestation of the Signs of Allah within ourselves i. e., within our own human bodies would be in order.

The human body as we have studied it over the last hundred years is appearing to be a micro cosmos by itself. The cell in the human body is known to be the most sophisticated factory we can ever think of and manufactures all the essential things that we need for our body. Within the cells, in the threadlike chromosomes are located the DNA (Deoxyribo Nuclie Acid) molecules which are called the Master molecules of life and constitute the hereditary blue print of life. All information about our traits (colour, height, intelligence) and our biological activities are located in the form of codes or signals (which are just arrangement of some chemical compounds like Adenine, Thymine, Guanine and Cytocine). The decoding of these signals has been made possible only with the understanding of the structure of the DNA molecule in recent times. Thus the gradual developments in the understanding of how our body system works has shown newer horizons and has revealed Signs of Allah displaying an unimaginable organisation and planning, which should make any human being turn towards the Creator in awe and wonder.

۴- لَّهُ مَا فِي السَّمٰوٰتِ وَمَا فِي الْاَرْضِ ۗ وَهُوَ الْعَلِيُّ الْعَظِيْمُ ۝

**42 : 4 To Him belongs all that is in the heaven and on earth : and He is Most High, Most Great.**

This has been discussed under verses 5 : 19, 7 : 54 and 7 : 185.

۹- اَمْ اَتَّخَذُوْا مِنْ دُوْنِهٖ اَوْلِيَاءَ ۗ كَالَّذِيْ هُوَ الْوَلِيُّ وَهُوَ يُحْيِي الْمَوْتِي

وَمُوْعَلٰى كُلِّ شَيْءٍ وَهُوَ قَدِيْرٌ

**42 : 9 What ! Have they taken (for worship) protectors besides Him ? But it is Allah,— He is the Protector, and it is He**

## Who gives life to the dead : it is He Who has power over all things.

That Allah is the Protector is amply manifested by the fact that if in the earliest stage of creation, the rate of expansion was as lightly greater or smaller than the rate that occurred then there would have been stellar explosion long before the formation of stars and solar systems (vide 2: 164). Some aspects of the protection given by Allah to creation have been discussed under verse 1: 1 That Allah revives vegetation of the dead earth after rainfall has been explained under verse 2: 164.

۱۱- فَأَظْهِرُ السَّمَوَاتِ وَالْأَرْضِ ۖ جَعَلْ لَكُمْ مِنْ أَنْفُسِكُمْ أَزْوَاجًا  
وَمِنَ الْأَنْعَامِ أَزْوَاجًا ۖ يَذُرُّكُمْ فِيهِ ۖ لَيْسَ كَمِثْلِهِ شَيْءٌ ۗ  
وَهُوَ السَّمِيعُ الْبَصِيرُ ۝

42: 11 (He is) the Creator of the heavens and the earth. He has made for you pairs from among yourselves, and pairs among cattle. By this means does He multiply you; there is nothing whatever like unto Him, and He is the one that hears and sees (all things).

Allah as the Creator of the heavens and the earth has been discussed under verses 2: 117, 2: 164 and 7: 54 and more elaborately under the appendices I and 11.

The reference to pairs from among human beings and cattle, and the process of multiplication through this means has much food for thought to understand the creation of Allah. The two most important attributes of life are nutrition and reproduction. Nutrition is provided by Allah through the environment, and reproduction is the consequence of separation of male and female sexes which is so evident in human beings and cattle which are mentioned in this verse as two examples. In fact, the occurrence of two sexes, male and female, is a universal phenomenon both in the animal and the plant world, although there are exceptions where reproduction is possible even by non-sexual means, e. g., lower plants like bacteria, algae and liverworts, and in *amoeba* and *Hydria* from the animal kingdom.

The presence of two sexes in itself does not lead to multiplication unless the male and female units from the parents unite to form a zygote which

will ultimately develop into an offspring. This process is essential for a living organism for two reasons, viz. (1) to perpetuate its kind to which a specific reference is made in this verse, and (2) to introduce variation in its offspring through shuffling of the genes from both parents, a device through which the offspring will be better equipped genetically to adapt to diverse kinds of environment. Thus the occurrence of sex in the form of pairs in the living world has a profound significance pointing to the inimitable and omnipotent attributes of the Almighty Allah.

١٢- لَهُ مَقَالِيدُ السَّمَوَاتِ وَالْأَرْضِ ۗ يَبْسُطُ الرِّزْقَ لِمَن يَشَاءُ وَيَقْدِرُ  
إِنَّهُ بِكُلِّ شَيْءٍ عَلِيمٌ ۝

**42 : 12** To Him belongs the keys of the heavens and the earth. He enlarges and restricts the sustenance to whom will, for He knows full well all things.

This verse indicates that the creation of the heavens and the earth is shrouded with mysteries. and that the final unveiling of the mysteries can be done only by Allah who created all things according to a Grand Design. Man, with his scientific explorations, is also awed by these mysteries. If one looks at the scientific achievements of man over the last couple of hundred years, one finds that man has learned a lot but only to realise that what he has learnt is a tiny part of what yet remains to be learnt. There have been many moments in the history of man's civilization when scientists thought that they had learnt all that was to be learnt. But these certain facts of nature made their appearance in a dramatic fashion and demanded a complete revision of the scientific ideas held so far. This has been the case earlier in this century when two major revolutions in physics took place, namely, the emergences of quantum mechanics (i.e., the mechanics of very small particles) and the theory of relativity. These two major breakthroughs enabled man to dive deep into the mysteries of the creation. But every time one mystery has been solved, another appeared at a deeper level. This has been the case the with the exploration of the elementarity of matter. Every time something was thought to be elementary, a further level of elementarity appeared to be hidden in it. Thus we have gone through the stages of elements, molecules. atoms, protons, neutrons, quarks

etc. It is as if we are peeling one layer of a cosmic onion, before another appears. Where is the final peel is a question that stirs the enquiring mind.

Interestingly enough in recent times, tracing the history of creation from a scientific point of view, scientists have started making a wonderful synthesis of cosmology and particle physics which is the science of the big and the science of the small in their search for the grand unification of the four apparently different types of forces, namely, strong nuclear force, weak nuclear force, electromagnetic force and gravitational force. As this effort has been launched more and more concerning the beginning of time are arising. The solving of these mysteries gives rise to new knowledge but it would be imprudent to say that the last word on the subject would be known with certainty. Whether the ultimate reality will ever reveal itself to man remains a question of metaphysical significance. This verse indicates that the ultimate truth could be evasive—only the Creator of the worlds knows the truth.

۲۸- وَهُوَ الَّذِي يُنَزِّلُ الْغَيْثَ مِنْ بَعْدِ مَا قَنَطُوا وَيَنْشُرُ رَحْمَتَهُ ۗ

وَهُوَ الْوَكِيلُ الْحَمِيدُ ۝

42: 28 He is the One that sends down rain (even) after (men) have given up all hope, and scatters His mercy (far and wide). And He is the Protector, worthy of all praise.

The formation of rain drops in the sky and their falling down to earth have been explained under verse 2 : 164.

Sometimes it happens that a particular region goes without rain continuously for quite a long time and its inhabitants give up all hope for the welcome shower, but Allah in His mercy causes rain to come down there if He so wills. Conditions for rainfall at a particular place have been elaborated under verse 30 : 48.

It has been explained under verse 7 : 57 how rain water constitutes a great mercy of Allah and how it is scattered far and wide by the winds.

۲۹- وَمِنْ آيَاتِهِ خَلْقُ السَّمَوَاتِ وَالْأَرْضِ وَمَا بَيْنَهُمَا مِنْ دَابَّةٍ

وَهُوَ عَلَىٰ جَنبِهِمْ إِذْ يَأْتِيهِمْ قَدِيرٌ ۝

**42 : 29** And among His Signs is the creation of the heavens and the earth, and the living creatures that He has scattered through them : and He has power to gather them together when He wills.

The scientific theory about the creation of the heavens and the earth has been explained under verse 2 : 164 and appendices I and II. The distribution of life in the earth has been explained under verse 2:164.

This verse presumably refers to the existence of extra terrestrial life. Astronomers have started suspecting the presence of complex organic molecules in space and meteorites D. Wickramasinghe claimed the detection of bacteria in the Halley's comet<sup>1</sup>. Considering the huge number of solar systems in the universe, Frank, Drake of Cornell predicted the possibility of the existence of life in some form in many of the planets in other solar systems<sup>2</sup>.

### References

1. *New Scientist*, 17 April, 1986.
2. Jay M. Pasachoff, *Contemporary Astrophysics*, W. B. Saunders, London. 1976.

٣٢- وَمِنْ آيَاتِهِ الْجَوَارِ فِي الْبَحْرِ كَالْأَعْلَامِ ۝

42 : 32 And among His Signs are the ships, smooth running through the ocean, (tall) as mountains.

The matter of ship and its sailing has been discussed under verse 2 : 164.

٣٣- إِنْ يَشَأْ يُسْكِنِ الرِّيحَ فَيَظْلَلْنَ رَوَاكِدَ عَلَى ظَهْرِهِ ۗ إِنَّ فِي ذَلِكَ لَآيَاتٍ لِّكُلِّ صَبَّارٍ شَكُورٍ ۝

42 : 33 If it be His will, He can still the wind : then would they become motionless on the back of the (ocean). Verily in this are Signs for everyone who patiently perseveres and is grateful.

One of the greatest inventions has been the utilization of wind power in the sailing of ships. The direction in which the ship moves is controlled by varying the angle of incidence of the wind to the sail<sup>1</sup>. Such a mechanism is possible by the resolution of forces (law of parallelogram of forces) as ordained by the Creator.

#### Reference

1. *The New Encyclopaedia Britannica*, Vol. 2, p. 1978, p 1167.

٣٩- اللَّهُ مُلْكُ السَّمَوَاتِ وَالْأَرْضِ ۖ يَخْلُقُ مَا يَشَاءُ ۚ يَهَبُ لِمَن يَشَاءُ إِنَاثًا  
وَيَهَبُ لِمَن يَشَاءُ الذُّكُورَ ۝

**42 : 49 To Allah belongs the domain of the heavens and the earth. He creates what He wills (and plans). He bestows (children) male or female according to His will (and plan).**

That to Allah belongs the domain of the heavens and the earth has been discussed under verse 5 : 19.

The sex organs of male and female foetuses are not distinct before the 12th week because only by that time the external genitalia are formed<sup>1</sup>. When the foetus is fairly developed ultrasonography may find out the sex of the foetus if the position of it is such that the external organ is accessible to the technique. So the real knowledge of foetal sex is with Allah.

The sex of the child is dependent on the combination of X or Y chromosomes of the male with the X-Chromosome of the female during fertilization and this is entirely beyond human control. If man can isolate X or Y chromosome from the sperm and cause the fertilization in the test tube, desired sex of the foetus is theoretically possible. But, even then fertilization would take place according to the law ordained by Allah.

### Reference

1. K.L., Moore, and A.M. Azzindani, *Developing Human with Islamic Additions*, 3rd edn. Dar-al-Qibla, Jeddah, p. 281, 1983.

٥- أَوْ يُزَوِّجُهُمْ ذُكْرَانًا وَإِنَاثًا وَيَجْعَلُ مَنْ يَشَاءُ عَقِيمًا

إِنَّهُ عَلِيمٌ قَدِيرٌ ۝

**42 : 50 Or He bestows both males and females and he leaves barren whom He will; for He is full of knowledge and power.**

The subject of the sex of foetus has already been discussed in verse 42 : 49.

The sex of the child does not depend on the wish of the parents. There are many who desire a male child but get only female offspring while others who desire a female child get only male offspring. Again there are others who do not get any child at all. This is determined by the laws ordained by Allah.

The balance of male and female population in the society is very important, which is maintained by Allah through His infinite knowledge. If man could control the sex of the foetus, this balance could be greatly affected, thereby the existence of the human race would be in jeopardy.

١١- الَّذِي جَعَلَ لَكُمُ الْأَرْضَ مَهْدًا وَجَعَلَ لَكُمْ فِيهَا سُبُلًا

لَعَلَّكُمْ تَهْتَدُونَ ۝

**43 : 10 (Yes , the same that) has made for you the earth (like a carpet) spread out, and has made for you roads (and channels) therein, in order that you may find guidance (on the way) :**

The spreading out of the earth has been explained under verses 2 : 22 and 13 : 3.

That Allah has made roads and channels therein has been discussed in the explanation of verse 20 : 53.



۱۱- وَالَّذِي نَزَّلَ مِنَ السَّمَاءِ مَاءً بِقَدَرٍ فَأَنْشَرْنَا بِهِ بَلْدَةً مَيْتًا  
 كَذَلِكَ نُخْرِجُكُمْ

**43 : 11 Who sends down water from the sky in (due) measure and We revive a dead land therewith, even so will you be raised (from the dead).**

The falling of rain-drops from the sky and the revival of the dead earth therewith have been explained under verse 2 : 164. The quantity of rain contains in a cloud depends on the nature and size of the cloud.

In this verse the revival of the dead earth has also been mentioned as a similitude for the raising of the dead souls on the Day of Resurrection.

۱۲- وَالَّذِي خَلَقَ الْأَزْوَاجَ كُلَّهَا وَجَعَلَ لَكُم مِّنَ الْفُلُكِ وَالْأَنْعَامِ مَا تَرْكَبُونَ

**43 : 12 He Who created all the pairs and has made for you ships and cattle on which you ride.**

This verse is scientifically very interesting because mention has been made here of the creation of everything in pairs. One may ask, how can there be pairs in everything. The creation of pairs in the animal and in the plant kingdom has been discussed under verses 13 : 3, 31 : 10 and 43 : 12. But how can there be pairs in non-living things? The latter aspect of the verse could not have been full comprehended till the early thirties when it was realised that for every particle of nature constituting matter in stable or unstable form there is an antiparticle. For example, the particles electron, proton and neutrons have antiparticles positron, antiproton and antineutron respectively. When a particle and its antiparticle meet and destroy each other completely, we get bursts of energy. The existence of anti-particles was predicted by P. A. M. Dirac when he was trying to solve an equation for a free electron. This equation, known as the Dirac equation, was meant to describe the behaviour of very small particles at very high energies i. e., if was combining quantum mechanics and the special theory relativity motion. Incidentally, the special theory of relativity is applicable its bodies moving with velocities considered non-negligible compared to the velocity of light.

The electron, being a tiny particle of the atomic world, obeys quantum mechanics and since it moves at great speeds, the special theory of relativity should also be applicable to its motion. The solution of the Dirac equation for the free electron posed a problem, however. For the energy of the electron, Dirac was forced to obtain square roots of a quantity — one of the two square roots being positive and the other negative. The positive and negative roots of any number were understood by all. For example, the square root of the number 25 can be +5 or -5. The problem however was that while the +ve square root solution for the energy of the free electron was all right, the negative root i. e., the negative value for the energy of the free electron posed a difficulty. The energy of a free electron is always positive- so what can be the meaning of the negative energy solution? In order to overcome this difficulty. Dirac made an unusually bold assumption that the states of the electron for which their energy can be negative are all filled up-the negative energy electrons cannot be observed at all-they are immersed in a sea. Only when they are pulled out of the sea with an investment of energy, can they come to positive energy states. We can then observe them as electron and the seats in the negative energy sea of electrons which they have vacated make themselves appear as positrons. The charge of a positron is positive although the magnitude of the charge is the same as that of an electron. When an electron and a positron will meet, they will destroy each other completely and appear as radiation energy. In order to bring an electron from a negative energy state of  $-mc^2$  (where  $m$  is the mass of the electron and  $c$ , the velocity of light) to a positive energy state of  $+mc^2$ , one needs to spend an energy of  $2 mc^2=1.1$  Mw. In fact , a photon (particle of radiation) with this energy of 1.1 Mw has been found to give rise to pair production- an electron and a positron. The electron and the positron are identified by opposite curvatures of deflection in magnetic fields, due to their opposite charges.

Thus the Dirac theory of electrons gave rise to the concepts of matter and anti-matter. Every matter should have an antimatter. In fact, in the years following the acceptance of Dirac's theory-the anti particles corresponding to many short and long lived elementary particles were experimentally detected. These antiparticles on meeting particles destroy each other.

Thus the creation of inanimate things in pairs makes sense. Matter is made of building blocks- the so called elementary particles- and these particles have their antiparticles. That matter can exist in pairs can now be easily understood.

The interesting thing to note in this connection is that when the present verse was revealed about 1400 years ago, nobody could conceive of anti-particles and the creation of non-living things in pairs could not obviously be comprehended. Needless to say, the recent scientific developments of the micro-world have provided an opportunity to have a better understanding of the present verse. Similar situations have been found to prevail with respect to the understanding of many other verses also. With increase of scientific knowledge, the full meaning of the verses revealed by Allah becomes clearer. No wonder, Allah has laid emphasis on the acquisition of knowledge.

The aspect of ships for riding has been discussed under verse 2 : 164. The riding on cattle has been discussed under verses 16 : 5, 16 : 8.

لَتَسْتَبْرَأَ عَلَىٰ ظُهُورِهِمْ لَعَنَ تَذَكُّرًا وَنِعْمَةً رَبِّكُمْ إِذَا اسْتَوَيْتُمْ عَلَيْهِ وَتَقُولُوا  
سُبْحَانَ الَّذِي سَخَّرَ لَنَا هَذَا وَمَا كُنَّا لَهُ مُقْرِنِينَ ۝

43:13 In order that you may sit firm and square on their backs, and when so seated, you may celebrate the favour of your Lord, and say, "Glory to the subject of Him who has subjected these to our use, for we could never have accomplished this (by ourselves)".

Cattle as beasts for riding has been already discussed under verse 16 : 8. Under the present verse, the same theme has been further elaborated to explain that Allah has created the cattle for the use of man and in His mercy, has given man the knowledge and technique to domesticate them. The ride on the backs of some of them, e. g., horses and donkeys is quite comfortable because the backs of these have been so designed as to make our sitting comfortable during a journey. We are reminding in this verse that this great favour of Allah on us to make our lives comfortable demands glorifying Him, for the comfort and benefit we derive which we ourselves could not have accomplished.

٣٨- حَتَّىٰ إِذَا جَاءَنَا قَالَ يَا لَيْتَ بَيْنِي وَبَيْنَكَ بُعْدَ الْمَشْرِقَيْنِ

كَيْشَ الْقَرِينِ ۝

43 : 38 At length when (such a one) comes to Us, he says (to his evil companion) ; "Would that between me and you were the distance between two easts !" Ah ! evil is the companion.

It has been observed in verse 37 : 5 that the two easts denote the two limiting positions of the series of rising points of the sun, one in the north and the other in the south. These are the two solstitial points, which the sun seems to occupy on June 22 and December 22 respectively. Thus the time distance between the two easts in 6 months. Angular distance between the two solstitial points or the two easts is  $46^{\circ}56'$  or about  $47^{\circ}$ . Arcual distance between two points on the arc of a circle, of radius  $r$ , with angular distance  $\theta$  radians, is  $r\theta$ . Mean distance of the sun from the earth is about 93,000,000 miles ( $1 : 5 \times 10^8$  km) and angular distance between the two easts i. e., the two solstitial points is about  $47^{\circ}$ . which is  $22 \times 4717 \times 180$  radians. Thus the arcual distance between the two easts or the two solstices comes upto about 74,320,000 miles (123093000km) and this arcual distance would imply a distance of about 300 miles (5000 km) on earth which is also a great distance by earth standards.

Referring to "the distance of two easts"it has been stated that the phrase used in verse 43 : 38 implies the maximum possible distance on earth.

This interpretation would actually mean a large separation which the sinner had wished from Satan. This verse implies figuratively that man would keep his maximum distance from Satan.

It is indeed surprising to note that arcual distance between the two solstices as well as maximum distance on earth based on two easts and two wests was not known to the Arabs before this divine revelation came.

٨٥- وَتَبَرَّكَ الَّذِينَ لَهُ مُلْكُ السَّمَوَاتِ وَالْأَرْضِ وَمَا بَيْنَهُمَا

وَعِنْدَهُ عِلْمُ السَّاعَةِ ۚ وَالَّذِينَ كُفَرُوا

**43: 85** And blessed is He to Whom belongs the dominion of the heavens and the earth, and all between them; with Him is the knowledge of the hour and to Him shall you be brought back.

That to Allah belongs the dominion of the heavens and the earth has been discussed under verse 5 : 19.

رَبِّ السَّمَوَاتِ وَالْأَرْضِ وَمَا بَيْنَهُمَا إِنْ كُنْتُمْ مُوقِنِينَ ۝

**44 : 7** The Lord of the heavens and the earth and all between them, if you (but) have an assured faith.

This point has been discussed under verse 5 : 19.

۱۰- فَارْتَقِبْ يَوْمَ تَأْتِي السَّمَاءُ بِدُخَانٍ مُّبِينٍ ۝

**44 : 10** Then watch you for the day that the sky will bring forth a kind of smoke plainly visible.

As we see it, the sky is dominated by the sun. "The sky will bring forth a kind of smoke' means the sun will be enveloped by a gas cloud and thus a kind of smoke is brought forth in the sky. It is known that two opposite forces are acting on the sun; (1) force of attraction due to gravity and (2) that of expansion due to radiation pressure caused by fusion of hydrogen at the centre of the sun. At present the two opposing forces are in equilibrium and the sun is more or less in an equilibrium state. In such a state the sun or any other star, is said to be in the main sequence. When the hydrogen content at the centre, which is about 10% of the total mass of the sun, is converted into helium, internal equilibrium of the sun is disturbed. Due to radiation pressure the external gaseous part of the sun expands to a huge extent and the smoke covers a large portion of the sky; the internal part contracts still further. As the size of the sun increases, the surface temperature falls and the sun becomes cooler and looks redder and is in the red giant state. As the radiation pressure increases the equilibrium becomes unstable. Once the enveloping gas cloud, i. e., the smoke, expands and again it contracts. This expansion and contraction continue for several thousand years and the sun turns into a pulsating star or cepheid variable.

Ultimately radiation pressure wins over; the gas cloud drifts away, leaving the sun in a white dwarf state.

٢٢- وَأَشْرَاكِ الْبَحْرِ رَهْوًا ۖ إِنَّهُمْ جُنْدٌ مُّغْرَقُونَ ۝

44 : 24 And leave the sea as a furrow (divided) for they are a host (destined) to be drowned.

This verse refers to prophet Musa's ( a. s.) crossing of the sea and the drowning of the Pharaoh and his followers. The details have been discussed under verse 26 : 64.

٣٤- أَلَمْ خَيْرًا مِّنْ قَوْمِ تَبَّعَ ۖ وَالَّذِينَ مِنْ قَبْلِهِمْ أَهْلَكْنَاهُمْ ۖ إِنَّهُمْ كَالظَّالِمِينَ ۝

44 : 37 What ! are they better than the people of Tubba and those who were before them? We destroyed them because they were guilty of sin.

Tubba is the title of the kings of Yaman but the name Tubba was given to those kings who were rulers of Saba and Hadramaut and the Himayar<sup>1</sup>. At one time they seem to have extended their hegemony over all Arabia and perhaps beyond to the East African coast. But when they were intoxicated with power they fell into sin and gradually they ceased to count. Some think Tubba was a prophet while his people were disbelievers.

The Quran does not mention the nature of their punishment nor how they were destroyed.

## Reference

1. A. Yusuf, Ali. *The Holy Quran, Translation and Commentary*, The American Trust Foundation, p. 1350. 1977.

٣٨- حَتَّىٰ إِذَا جَاءَنَا قَالَ يَا لَيْتَ بَيْنِي وَبَيْنَكَ بُعْدَ الْمَشْرِقَيْنِ

○ فِيمَنْ الْقَرِينُ

43 : 38 At length when (such a one) comes to Us, he says (to his evil companion) ; "Would that between me and you were the distance between two easts !" Ah ! evil is the companion.

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٨٥- وَتَذَكَّرَ الَّذِينَ لَهُمْ مَلَائِكَةُ السَّمَوَاتِ وَالْأَرْضِ وَمَا بَيْنَهُمَا

○ وَعِنْدَهُ عِلْمُ السَّاعَةِ وَالَّذِينَ كُفِرُوا

هـ-وَإِخْتِلَافِ اللَّيْلِ وَالنَّهَارِ وَمَا أَنْزَلَ اللَّهُ مِنَ السَّمَاءِ مِنْ تَرَائِدٍ

فَأَحْيَا بِهِ الْأَرْضَ بَعْدَ مَوْتِهَا وَتَصْرِيفِ الرِّيحِ آيَاتٍ لِقَوْمٍ يَعْقِلُونَ ۝

45 : 5 And in the alternation of night and the day and the fact that Allah sends down sustenance from the sky, and revives therewith the earth after its death, and in the change of the winds, — are Signs for those that are wise.

**In the alternation of night and day**

This has been discussed under verses 2: 164 and 10 : 6.

**Sending down of sustenance from the sky**

This aspect has been discussed under verse 15 : 21.

**Reviving of dead earth**

This has been discussed under verse 2 : 164.

**Change of the winds**

This has been discussed under verses 2 : 164 and 7 : 57.

١٧-اللَّهُ الَّذِي سَخَّرَ لَكُمْ الْبَحْرَ لِتَجْرِيَ الْفُلُكُ فِيهِ بِأَمْرِهِ

وَلِتَبْتَغُوا مِنْ فَضْلِهِ وَلِعَلَّكُمْ تَشْكُرُونَ ۝

45 : 12 It is Allah Who has subjected the sea to you, that ships may sail through it by His command, that you may seek his bounty, and that you may be grateful.

The various aspects mentioned in this verse are discussed under verses 2 : 164 and 16 : 14.

١٣-وَسَخَّرَ لَكُمْ مِمَّا فِي السَّمَوَاتِ وَمِمَّا فِي الْأَرْضِ جَمِيعًا وَقَدْ

إِنَّ فِي ذَلِكَ لَآيَاتٍ لِقَوْمٍ يُتَفَكَّرُونَ ۝

45 : 13 And He has subjected to you, as from Him, all that is in the heavens and on earth ; behold in that are Signs indeed for those who reflect.



The subject matter of this verse has been discussed under verses 3 : 190-191 and 16 : 12.

۱۴- وَقَدْ آتَيْنَا بَنِي إِسْرَائِيلَ الْكِتَابَ وَالْحِكْمَةَ وَالتُّبُوَّةَ  
وَرَزَقْنَاهُمْ مِّنَ الطَّيِّبَاتِ وَفَضَّلْنَاهُمْ عَلَى الْعَالَمِينَ ۝

45 : 16 We did aforetime grant to the children of Israel the Book, the power of command, and Prophethood; We gave them, for sustenance, things good and pure; and We favoured them above the nations.

The provision of good and pure sustenance to the Israelites has been discussed under verses 2 : 57 and 2 : 61.

۲۲- وَخَلَقَ اللَّهُ السَّمَوَاتِ وَالْأَرْضَ بِالْحَقِّ وَلِتَجْزَىٰ كُلُّ نَفْسٍ  
بِمَا كَسَبَتْ وَهُمْ لَا يُظْلَمُونَ ۝

45 : 22 Allah Created the heavens and the earth for just ends, and in order that each soul may find the recompense of what it has earned, and none of them be wronged.

The creation of the heavens and the earth has been discussed under verse 2 : 164. That the Creations of Allah have been made for just ends becomes clear from the discussion dealing with verse 1 : 1 wherein it was stressed that behind every creation of Allah, there is an element of Mercy and that all things extending between the heavens and the earth were created with a rightful purpose.

۲۶- قُلِ اللَّهُ يُحْيِيكُمْ ثُمَّ يُمِيتُكُمْ ثُمَّ يَجْمَعُكُمْ إِلَىٰ يَوْمِ الْقِيَامَةِ  
لَا رَيْبَ فِيهِ وَلَكِنَّ أَكْثَرَ النَّاسِ لَا يَعْلَمُونَ ۝

45 : 26 Say : "It is Allah Who gives you life, then gives you death : then He will gather you together for the day of Judgement about which there is no doubt": but most men do not understand.

The subject of giving life by Allah has been discussed in verse 2 : 28. It is known to us that all living things die and all men are mortal.

۳- مَا خَلَقْنَا السَّمَوَاتِ وَالْأَرْضَ وَمَا بَيْنَهُمَا إِلَّا بِالْحَقِّ وَأَجَلٍ مُّسَمًّى  
وَالَّذِينَ كَفَرُوا عَمَّا أُنذِرُوا مُّعْرِضُونَ ○

46 : 3 We created not the heavens and the earth and all between them but for just ends, and for a term appointed ; but those who reject faith turn away from that whereof they are warned.

The creation by Allah of the heavens and the earth and all between them for just ends has been referred to also in verse 45 : 22, and has been dealt with while discussing verse 1 : 1, and verse 2:164. Reference is also made to the discussion under verse 3:190-191 wherein it has been pointed out that anyone studying the creation of Allah will declare that nothing in this creation has been made for nothing.

۱۰- وَوَهَبْنَا الْإِنْسَانَ بِوَالِدَيْهِ إِحْسَانًا حَمَلَتْهُ أُمُّهُ كُرْهًا وَوَضَعَتْهُ كُرْهًا  
وَحَمَلُهُ وَفِضْلُهُ ثَلَاثُونَ شَهْرًا ۖ حَتَّىٰ إِذَا بَلَغَ أَشُدَّهُ وَبَلَغَ أَرْبَعِينَ سَنَةً ۚ  
قَالَ رَبِّ أَوْزِعْنِي أَنْ أَشْكُرَ نِعْمَتَكَ الَّتِي أَنْعَمْتَ عَلَيَّ وَعَلَىٰ وَالِدَيَّ  
وَأَنْ أَعْمَلَ صَالِحًا تَرْضَاهُ وَأَصْلِحْ لِي فِي ذُرِّيَّتِي ۗ إِنِّي تُبْتُ إِلَيْكَ  
وَإِنِّي مِنَ الْمُسْلِمِينَ ○

46 : 15 We have commended to men kindness towards parents. His mother bears him with pain and brings him forth with pain, and the bearing of him and the weaning of him is thirty months. At length when he attains full strength and reaches forty years, he says : "My Lord! arouse me that I may give thanks for the favour wherewith you have favoured me and my parents, and that I may do right acceptable unto You. And be gracious unto me in the matter of my children. Lo! I have turned unto you repentant, and verily I am of those who surrender (unto you).

Islam enjoins kindness to parents. Here, one of the reasons to be kind to the mother is given. The mother bears the child in the womb with discomfort and gives birth through severe pain during labour. This is essential because the pain induces the voluntary pressure necessary to evacuate the foetus.

The total period of bearing the child and weaning is given as thirty months here. In the verse 2 : 233 Allah says : "Mothers shall suckle their children for two whole years". So if these two years are subtracted, there remains only 6 months or 24 weeks for pregnancy. According to Moore and Azzindani<sup>1</sup>, the minimum age of the viable foetus is 22 weeks and the minimum weight is 500 gm. But it is very difficult for such immature foetuses to survive. So the age of 24 weeks or 6 months which is a little more than 22 weeks should be enough for a viable foetus. The usual gestation time is 38 weeks or 266 days ( $9\frac{1}{2}$  lunar months= $8\frac{3}{4}$  solar months). So the range of a viable foetus is from 22 weeks to 38 weeks<sup>2</sup>. The decision of Khalifa Ali ibn Abi Talib (r.a) declared the baby of six months after marriage to be legitimate on the basis of these verses. It seems it is acceptable as the lowest period of gestation for a viable foetus.

Another point may throw light on the spirit of verse 46 : 15. The word حمل means to carry or bear a load and the word كرها means with pain and grief. The pregnant mother does not feel any weight or load of the foetus to cause her pain upto the 12th week of pregnancy as the size and weight of the foetus at that stage are 87 mm (8.7 cm=3.5 inches) and 45 gms (0.032 pound) respectively<sup>3</sup>. So if we ignore this 12 weeks or 3 months from the total pregnancy, the actual period of carrying the load of the foetus will be 3 months less. Thus the total period of pregnancy will be 9 months (6+3) which is the average gestation period. So six months of bearing may mean the later six months of pregnancy.

## References

1. K.L., Moore, and A.M. Azzindani. *The Developing Human with Islamic Additions*, 3rd edn. Saunders and Dar al-Qibla, Jeddah, Saudi Arabia, p. 95, 1983.
2. *Ibid*, p.94.
3. *Ibid*, p. 95.

٢٣- فَلَمَّا رَأَوْهُ عَارِضًا مُسْتَقْبِلَ أَوْدِيَّتِهِمْ قَالَ لَوْ هَذَا عَارِضٌ مُّسْطَرٌّ نَا  
 بَلْ هُوَ مَا اسْتَعْجَلْتُمْ بِهِ رَاحٍ فِيهَا عَذَابٌ أَلِيمٌ ۝

46 : 24 Then when they saw a cloud traversing the sky coming to their valleys they said, "This cloud will give us rain !" "Nay, it is that which you were asking to be hastened!-a wind wherein is a grievous penalty !"

This refers to the people of 'Ad and the punishment meted out to them. The matter of cloud has been discussed under verse 2 : 19.

١٠- أَفَلَمْ يَسِيرُوا فِي الْأَرْضِ فَيَنْظُرُوا كَيْفَ كَانَ عَاقِبَةُ الَّذِينَ مِنْ قَبْلِهِمْ  
 دَمَّرَ اللَّهُ عَلَيْهِمْ وَالْكَافِرِينَ أَمْثَالَهُمْ ۝

47 : 10 Do they not travel through the earth and see what was the end of those before them. Allah brought utter destruction on them, and similar (fate awaits) those who reject Allah.

This has been discussed under verses 3 : 137, 6 : 11 and 22:46.

١٣- ذَكَاتَيْنِ مِنْ قَرْيَةٍ هِيَ أَشَدُّ قُوَّةً مِنْ قَرْيَتِكَ الَّتِي أَخْرَجْتِكَ  
 أَهْلُكُنَّهُمْ فَلَا نَاصِرَ لَهُمْ ۝

47 : 13 And how many cities with more power than the city which has driven you out, have We destroyed? and there was none to aid them.

This has been discussed under verses 7 : 4, 7:64, 17:17 and 20:128.

٣- هُوَ الَّذِي أَنْزَلَ التَّكْوِينَةَ فِي قُلُوبِ الْمُؤْمِنِينَ لِيَزِدُوا إِيمَانًا مَعَ إِيْمَانِهِمْ  
 وَرَبُّهُ جُتُودُ السَّمَوَاتِ وَالْأَرْضِ وَكَانَ اللَّهُ عَلِيمًا حَكِيمًا ۝

**48:4 It is We Who sent down tranquillity into the hearts of the believers, that they may add faith to their faith; for, to Allah belong the forces of the heavens and the earth and Allah is full of Knowledge and Wisdom.**

Reference has been made here to the forces of nature. As is known to date, scientists have discovered four fundamental forces of nature, namely, the gravitational force, the weak nuclear force, the electromagnetic force and the strong nuclear forces. The ranges and the strengths of these forces as mentioned under verse 1:2 are quite different. The gravitational forces acting over very large distances in the universe are active in keeping the planets in motion and depends on the masses of the two bodies, irrespective of the geometries of these bodies, Without this gravitational force, we would not be held on to the planet. The weak nuclear force is operative in nuclei and is responsible for beta decay. This beta decay leads to processes responsible for the release of solar energy. The electromagnetic force is at the root of the making of atoms and governs all electrical and magnetic phenomena. The strong nuclear force holds the nuclei of atoms together. Although vastly different in range and strength (the gravitational force acting over vast distances is about  $10^{40}$  times weaker than the strong nuclear force holding particles together within a range of  $10^{13}$  cms), all these forces have their own domains. The recent work of Salam, Weinberg and Glashow unifying the weak and the electromagnetic force has given a further impetus to look at all the forces of nature as different manifestations of one and the same force. There are speculations that at the beginning of creation, these forces were unified into the Super Symmetric force and soon with the spontaneous breaking of symmetries, they appeared to be different. Scientists are trying to build very high energy accelerators in order to test the ideas about the unification of forces. It is expected that the accelerators will stimulate the initial conditions of ultra high energies at the beginning of creation. But the energies produced by the high energy accelerator in the Tev region (1 Tev= $10^3$  Bev.) a Bev being  $10^9$  electron volt (ev.). may still not match the early-universe energies. Nevertheless with the gradual advancement of particle physics and with the synthesis of particle physics and cosmology through the grand unification of forces, the scientists have revealed many interesting features of these interactions. They have understood, to some extent, how these interactions work. But why these interactions were switched on at all remains a great mystery. On the other

hand when one wonders how matter (living and inert) could be organised at all without the introduction of these forces, one cannot but gratefully acknowledge that these interactions were indeed Masterminded by Allah and it is He Who has the full knowledge about them. These forces with all their ramifications act as the Signs of Allah, and the wonderful intricacies inherent in the working of these forces also add the Faith of the believers to their faith.

وَاللَّهُ جُنُودُ السَّمَوَاتِ وَالْأَرْضِ ۗ وَكَانَ اللَّهُ عَزِيزًا حَكِيمًا ۝

**48 : 7 For to Allah belong the forces of the heavens and the earth ; Allah is Exalted in Power, full of Wisdom.**

The subject mentioned here has been discussed under verse 48:4.

۱۴- وَاللَّهُ مُلْكُ السَّمَوَاتِ وَالْأَرْضِ ۗ يَغْفِرُ لِمَن يَشَاءُ ۖ وَيُعَذِّبُ مَن يَشَاءُ ۗ

وَكَانَ اللَّهُ عَفُورًا رَّحِيمًا ۝

**48 : 14 To Allah belongs the domain of the heavens and the earth; He forgives whom He wills, and He punishes whom He wills : but Allah is Oft-Forgiving, Most Merciful.**

That to Allah belongs the domain of the heavens and the earth has been discussed under verse 5 : 19.

... كَزَّرِعِ أَخْرَجَ سُطُوعًا ۖ فَأَنْزَرَهُ ۖ فَاسْتَغْلَظَ فَاسْتَوَىٰ عَلَىٰ سُوقِهِ  
يُحِبُّ الزَّرْعَ ۖ ۖ ۖ ۖ

**48 : 29 .....Like a seed which sends forth its shoot, then makes it strong, it then becomes thick, and stands on its own stem filling the sowers with wonder and delight.....**

Among the various biological phenomena found in plant life, the emergence of a tiny embryo plant from a seed and its growth from a week seedling into a large adult plant standing firmly on own stem inspires us with wonder, and the tillers with great delight. The mature seeds germinate in presence of conducive environment of suitable temperature and adequate

amounts of moisture and oxygen. The embryo plant resting inside the seeds becomes activated and puts forth the first root in the soil, and then the shoot grown vertically upwards to form a tender seedling. At this stage, the seedling is dependent for its sustenance on the food stored inside the seed. Gradually, the first green leaves develop and the seedling becomes independent as it is now capable of manufacturing its own food material. The shoot which holds the leaves is at first soft and is called the primary shoot. But gradually it produces branches and more leaves and thus needs greater rigidity to bear the weight and to perform its other function of conduction of water from the roots to leaves, and of the food materials from one part to another. The rigidity of the stem increases through a process called secondary growth in which secondary tissues mostly consisting of dead thick-walled cells are produced. This process continues throughout the life of the plant to give adequate mechanical strength and rigidity on ingenious engineering principles adequate enough to hold all the branches and foliage. The development of a large tree from a tiny seed in stages with strong stem is referred to in this verse as a similitude to the growth of Islam from a fragile beginning gradually into a strong community.

يَا أَيُّهَا النَّاسُ إِنَّا خَلَقْنَاكُمْ مِنْ ذَكَرٍ وَأُنْثَىٰ وَجَعَلْنَاكُمْ شُعُوبًا  
وَقَبَاثِلَ لِتَعَارَفُوا ۗ إِنَّ أَكْرَمَكُمْ عِنْدَ اللَّهِ أَتْقَاكُمْ  
إِنَّ اللَّهَ عَلِيمٌ خَبِيرٌ ۝

49 : 13 O Mankind ! We created you from a single (pair) of a male and a female, and made you into nations and tribes that you may know one another. Verily the noblest of you, in the sight of Allah, is the best in conduct. Verily, Allah has full knowledge and is well acquainted.

The subject of creation of mankind from a single pair of a male and a female has been discussed in detail under verses 4 : 1 and 39 : 6. The differences in human populations which gradually resulted in the major races and their characteristics have been explained under verse 2 : 213.

After the different races in human populations have been stabilized, the adaptations of territorialism, dominance, and the leader-follower relationship have evolved and helped to make human societies possible. The differences

in manners, customs, and behaviour between the races stimulated an urge among men to know each other's race, and at the same time a need arose to seek new frontiers to fulfil their daily necessities like food, clothing and shelter. Thus started a process of social intercourse between the tribes, races and nations. This is evidently what is implied in the phrase *لتعارفوا* (that you may know one other) mentioned in the verse.

٦- أَفَلَا يَنْظُرُونَ إِلَى السَّمَاءِ فَوْقَهُمْ كَيْفَ بَنَيْنَاهَا وَزَيَّنَّاهَا  
 وَمَا لَهَا مِنْ فُرُوجٍ ۝

50 : 6 Do they not look at the sky above them ? How We have made it and adorned it, and there are no flaws in it ?

The creation of the heaven has been discussed under verses 2 : 117, 2:164 and appendics I and II. Adornment of the sky by heavenly bodies refers to the beauty of the night sky which has been discussed under verse 37 : 6. In it are visible millions upon millions of stars that twinkle, the planets giving steady light and the shining moon, which changes phases during a lunar month. The sun is another adornment of the sky which reigns supreme during the day time and makes the glow of all other heavenly bodies. In the creation of the heavens even a careful observer cannot detect any flaw whatsoever ; everywhere exists delicate balance and harmony as has been explained under verses 6 : 73. and 25 : 2.

٤- وَالْأَرْضَ مَدَدْنَاهَا وَأَلْقَيْنَا فِيهَا رَوَاسِيَ وَأَوْبَقْنَا  
 فِيهَا مِنْ كُلِّ زَوْجٍ بَهِيمٍ ۝

50 : 7 And the earth We have spread it out, and set thereon mountains standing firm, and produced therein every kind of beautiful growth (in pairs).

The spreading out of the earth has been discussed under verses 2:22 and 13:3. Setting of mountains as standing firm on the earth has been discussed under verse 13:3. Producing of beautiful growth of every kind on the earth has been discussed under verse 6:99.



٩- وَتَزَلْنَا مِنَ السَّمَاءِ مَاءً مُبَارَكًا فَأَنْبَتْنَا بِهِ جَنَّاتٍ وَحَبَّ الْحَصِيدِ ۝

١٠- وَالتَّخْلُ بِسِقْتِ لَهَا طَلْعٌ تَضِيدٌ ۝

١١- زُرْقًا لِّلْعِبَادِ ۚ وَأَحْيَيْنَا بِهِ بَلْدَةً مَّيْتًا ۚ كَذَلِكَ الْخُرُوجُ ۝

- 50 : 9-11 And We send down from the sky rain charged with blessing, and We produce therewith gardens and grains for harvest;  
And tall palm trees, with shoots of fruit stalks, piled one over another ;  
As sustenance for (Allah's) servants; and We give (new) life therewith to land that is dead; thus will be the resurrection.

The sending down of rain from the sky and its beneficial effects in the production of fruits and grains has been explained under verse 2:22.

The production of tall palm trees with shoots of fruit stalks has been discussed under verse 6:99 and giving life to the dead land under verse 2:164.

٣٦- وَكَمْ أَهْلَكْنَا قَبْلَهُمْ مِّنْ قَرْنٍ هُمْ أَشَدُّ مِنْهُمْ بَطْشًا فَنَقَّبُوا فِي الْبِلَادِ ۝

٥ هَلْ مِنْ مَّجِيصٍ ۝

- 50 : 36 But how many generations before them did We destroy (for their sins),—stronger in power than they? Then did they wonder through the land : was there any place of escape (for them)?

This aspect has been discussed under verses 3:137, 6:11, 7:4.

٣٨- وَلَقَدْ خَلَقْنَا السَّمَوَاتِ وَالْأَرْضَ وَمَا بَيْنَهُمَا فِي سِتَّةِ أَيَّامٍ ۝

٥ وَمَا مَسَّنَا مِنْ لُغُوبٍ ۝

- 50 : 38 We created the heavens and the earth and all between them in six days, nor did any sense of weariness touch Us.

The creation of the heavens and the earth and all between them in six days has been discussed under verse 7:54.

١- وَالَّذِينَ يَذُرُّونَ ۝ ٢- فَالْحَمَلَاتِ وَقَرًا ۝  
٣- فَالْجَارِيَاتِ يُسْرًا ۝ ٤- فَالْمُقْسِمَاتِ أَمْرًا ۝

51 : 1-4 **By those that winnow with a winnowing;  
And those that bear the burden (of the rain);  
And those that glide with ease;  
And those who distribute (blessings) by command.**

Most of the commentators agree that the pronoun "those" occurring in this verse refers to winds. The classification of winds on the basis of their speed of flow has been explained under verse 2:164.

In this verse four functions of winds have been briefly mentioned.

First, strong winds and gales blow with a great force and carry away dry dust, dirt and rubble and scatter them far and wide, thus producing a cleansing effect. Secondly, it is also the winds which carry aloft by their upward thrust, heavily laden huge cloud masses with thousands of tons of water. How such a huge amount of water particles, comprising the cloud, remain suspended in the air has been explained under verses 2:164 and 7:57. Thirdly, the winds cause the clouds to glide along various directions and distribute the blessings of Allah in different forms, such as, fecundating winds (verse 15:22), falling of rain-drops reviving the dead earth (verse 2:164), provision of pure water for quenching the thirst of living beings (verse 25:48).

٤- وَالسَّمَاءِ ذَاتِ الْحُبُوبِ ۝

51 : 7 **By the sky with (its) numerous paths.**

This point has been discussed under verse 21 : 33.

٢٢- وَفِي السَّمَاءِ رِزْقُكُمْ وَمَا تُوعَدُونَ ۝

51: 22 **And in heaven is your sustenance, as (also) that which you are promised.**

The aspect of sustenance in heaven has been discussed under verse 15:21.

٢٨- فَأَوْجَسَ مِنْهُمْ خِيفَةً ۗ قَالُوا لَا تَخَفْ ۗ وَبَشَّرُوهُ بِغُلَامٍ عَلِيمٍ ۝

٢٩- فَأَقْبَلَتِ امْرَأَتُهُ فِي صَوْتٍ نَصَّتَ وَجْهَهَا وَقَالَتْ عَجُوزٌ عَقِيمٌ ۝

٣٠- قَالُوا كَذَلِكَ قَالَ رَبُّكَ إِنَّهُ هُوَ الْحَكِيمُ الْعَلِيمُ ۝

51: 28-30 Then he (Ibrahim) conceived a fear of them. They (Angels) said: "Fear not!" and gave him the glad tidings of (the birth of) a wise son.

Then his wife came forward, making moan and smote her forehead and cried : "A barren old woman!"

They said : Even so says your Lord. Lo! He is the Wise, the Knower.

This subject of the birth of a son to old Ibrahim (a.s.) and his barren wife has already been discussed under verses 11:71-72.

٣٣- لِنُرْسِلَ عَلَيْهِمْ حِجَارَةً مِنْ طِينٍ ۝

51 : 33 "To bring on, on them, stones of clay."

This refers to the punishment meted out to the people of Lut (a.s.) and has been discussed under verses 7 : 84, 11 : 82 and 15 : 74.

٣١- وَفِي عَادٍ إِذْ أَرْسَلْنَا عَلَيْهِمُ الرِّيحَ الْعَقِيمَ ۝

٣٢- مَا تَدْرُونَ مِنْ شَيْءٍ آتَتْ عَلَيْهِ إِلَّا جَعَلَتْهُ كَالزَّمِيمِ ۝

51: 41-42 And in the "Ad people, behold We sent against them a devastating wind. It left nothing whatever that it came up against but made it all as dust.

The matter of wind has been discussed under verse 17 : 69.

٣٣- وَفِي ثَمُودَ إِذْ قَبِلَ لَهُمْ تَمَتُّعًا حَتَّىٰ حِينٍ ۝

٣٤- فَعَتَوْا عَنْ أَمْرِ رَبِّهِمْ فَأَخَذْنَا لَهُمُ الضُّعْفَةَ ۗ وَهُمْ يَنْظُرُونَ ۝

٣٥- فَمَا اسْتَطَاعُوا مِنْ قِيَامٍ وَمَا كَانُوا مُنْتَصِرِينَ ۝

51 : 43-45 And in the Thamud (was another Sign): behold, they were told, "Enjoy (your brief day) for a little while!" But they insolently defied the command of their Lord. So the stunning noise (of an earthquake) seized them, even while they were looking on. Then they could not even stand (on their feet), nor could they help themselves.

The verses refer to the punishment meted out to the Thamud. This has been discussed under verse 11:67.

٣٤- وَالسَّمَاءَ بَنَيْنَاهَا بِأَيْدٍ وَإِنَّا لَمُوسِعُونَ ۝

51 : 47 With power and skill did We construct the firmament, and verily We are the expanders.

The technique of creation requires strong imaginative power and deft skill. And insignificant deviation or error, like one in a thousand billion, would spoil creation. No heavens with heavenly bodies and no earth with all its beauties and life with different forms, would have been possible without the Power and Skill of Allah. (appendices I and II).

The second part of this verse signifies that the universe is expanding and this aspect has been explained in detail in appendix II.

٣٨- وَالْأَرْضَ فَرَشْنَاهَا فَنِعْمَ الْمُبْدِيُونَ ۝

51 : 48 And We have spread out the earth How excellently We do spread out!

This has been explained under verses 2 : 22 and 13 : 3.

٣٩- وَمِنْ كُلِّ شَيْءٍ خَلَقْنَا زَوْجَيْنِ لَعَلَّكُمْ تَذَكَّرُونَ ۝

51 : 49 And of everything We have created pairs that you may receive instruction.

This aspect has been discussed under verse 43:12

## ٥- وَالسَّمَاءِ الرَّفُوعِ ۝

### 52 : 5 By the canopy raised high.

It is known that two separate kinds of force are acting in this universe, (1) the force of expansion due to the Big Bang, and (2) force of gravitation. Force of expansion drives everything away whereas gravitational force is one that attracts. Any two objects in a universe, even in an expanding universe, will attract each other. The closer the two objects are the stronger the gravitational attraction between them and the more likely they are to cling together, so to speak, against the separating influence of the expanding universe.

The expanding universe does not, for instance, separate the components of the solar system from each other or separate the stars within a galaxy from each other. On every group of heavenly bodies act the forces of expansion due to the Big Bang and attraction due to gravitation. If the force of attraction due to gravitation is stronger than the force of expansion, the group will cling together to form clusters. Thus there are clusters of stars, galaxies etc. in the universe. And on groups in which the force of expansion is greater than that of gravitation, the group will recede away. Thus there are galaxies which are receding away. Thus we get the seven tiers of the sky groups clinging together and receding away. These seven tiers are: (1) interior planets whose orbits are situated between the asteroid belt and the sun, (2) the solar system, (3) the Sun's local group of stars, (4) galaxies, (5) cluster of galaxies, (6) super galaxy, and (7) the peripheral region of the universe. Thus we see that the canopy rise from the earth up to super galaxies and universe. These aspects are discussed under verse 2:29.

## ٦- وَالْبَحْرِ السُّجُورِ ۝

### 52 : 6 By the ocean filled with swell.

The ocean/sea is the great mass of water which covers nearly 71% of the earth's surface. These water masses are interconnected by a rather orderly

system of currents. These currents are more or less permanent in their location. The driving forces for ocean/sea current are wind friction at the sea surface and horizontal and vertical differences in the density of ocean/sea water. Differential heating and cooling, precipitation and evaporation produce differences of water density at the sea surface. Because, the oceanic circulation is closely linked to the atmosphere and its behaviour, the great oceanic current systems cannot be as stable or as steady as might be expected. Besides, the external force of gravity, the most important forces that cause and affect ocean currents are horizontal pressure gradient forces, the coriolis forces and frictional forces. Ocean currents are largely responsible for the temperature distribution at the sea surface which, in turn, affects the overlying atmosphere.<sup>1</sup>

The average depth of the sea has been estimated at about 3790 metres (12430 ft). The maximum depth of the ocean is 10850 metres (35595 ft.). This depth exceeds the height of the Mt. Everest which is 8848 metres (29028 ft.).

While currents are large scale motions of water through the various oceans of the world, waves in the sea/ocean are oscillations of water that are generated by winds blowing over the ocean surface.

Waves of the sea are of many different kinds one of which is gravity waves. Of the non-tidal kinds of running surface waves three types may be distinguished, namely wind waves and swell, surges, and sea waves of seismic origin.

Wind waves are wind generated waves. The Beaufort scale table gives a description of the condition of the sea according to the wind speed.

The height of the wind waves increases with increasing wind speed and with increasing duration and fetch of the wind with the height, the dominant wave length also increases. For instance wind speed of 5m (16 ft.), 15m (50 ft.), 25m (80 ft.), per second may raise waves with significant height up to 0.5m (1.6 ft.), 4.5m (15ft.), 12.5m (41 ft.) respectively with corresponding wave lengths of 16m (53 ft.), 140m (460 ft.) and 400m (1300 ft.) respectively.

When the wind speed decreases and the waves have travelled out of the generating area, they are gradually transformed into swell, which is the term applied to surface waves that have more uniform profiles, longer and longer periods and wave lengths. Swell can travel for thousands of miles. It

comprises the waves that are transformed into the breakers and surf that occur along exposed ocean coasts.

### **Reference**

1. *Encyclopaedia Britannica*, vol. 13, pp. 437-443. 1978.

٩- يَوْمَ تَمُوتُ السَّمَاءُ مَوْرًا ۝

١٠- وَتَكُونُ الْجِبَالُ كَغِيبَابٍ ۝

**52 : 9-10 On the day when the firmament will be in dreadful commotion. And the mountains move away with (awful) movement.**

At a time about 100,000 years before the final collapse of the universe, i.e., the big crunch, the stars would be so close that the night sky would not only be blindingly bright, but searingly hot. It must be the end of any living being on any planet in the universe. Under the incandescent skies oceans will boil away, stars will pass so close that their heat will melt the solid rocks and the molten rocks will boil away. In the magma there will be turbulence and the mountains will fly away. The stars will be colliding with each other. Thus the whole universe will be in a dreadful commotion.

١- وَالنَّجْمُ إِذَا هَوَىٰ ۝

**53 : 1 By the star when it goes down.**

Due to the rotation of the earth, all the heavenly bodies including the stars appear to rise in the east and set in the west. In this verse by, "The star", is meant a particular star. It seems that the star Sirius has been hinted at. The star Sirius is the brightest star in the sky. It is astronomically known as Alpha Canis Majoris. It with its companion Sirius B is one of the nearest stars. It is at a distance of 8.7 light years from the earth and lies in a descending line from the Orions belt.

٣١- وَ لِلّٰهِ مَا فِي السَّمٰوٰتِ وَمَا فِي الْاَرْضِ ۗ لِيَجْزِيَ الَّذِيْنَ اَسَاءُوْا بِمَا عَمِلُوْا  
وَلِيَجْزِيَ الَّذِيْنَ اَحْسَنُوْا بِالْحُسْنٰى ۝

**53 : 31 Yes, to Allah belongs all that is in the heavens and on earth : so that He rewards those who do evil, according to**



**their deeds, and He rewards those who do good, with what is best.**

That everything in the heavens and the earth belongs to Allah has been discussed under verses 5:19, 7:54 and 7:185.

۳۲- الَّذِينَ يَجْتَنِبُونَ كَبِيرَ الْإِثْمِ وَالْفَوَاحِشَ إِلَّا اللَّغَمَ إِنَّ رَبَّكَ وَاسِعٌ الْمَغْفِرَةِ ۗ  
 هُوَ أَعْلَمُ بِكُمْ إِذْ أَنْشَأَكُمْ مِنَ الْأَرْضِ وَإِذْ أَنْتُمْ أَجْنَةٌ فِي بُطُونِ أُمَّهَاتِكُمْ ۗ  
 فَلَا تُزَكُّوْا أَنْفُسَكُمْ هُوَ أَعْلَمُ بِمَنِ اتَّقَى ۖ

**53 : 32 Those who avoid great sins and shameful deeds, only (falling into) small faults, verily your Lord is ample in forgiveness. He knows you well when He brings you out of the earth, and when you are hidden in your mother's wombs. Therefore justify not yourselves : He knows best who it is that guards against evil.**

That man is created from the earth has already been discussed in verses 2:28, 6:2 and 18:37. That foetal life and the developments in the womb are all within the knowledge of Allah need no explanation as man has practically no control over procreation. The subject of human development in the mother's womb has already been discussed under verse 13:8.

۴۴- وَإِنَّهُ هُوَ آخِصٌ بِأَعْيُنِنَا ۗ وَاتَّقِ اللَّهَ ۚ إِنَّ اللَّهَ شَدِيدُ الْعِقَابِ ۗ  
 ۴۵- وَإِنَّهُ خَلَقَ الذَّكَرَ وَالْأُنثَىٰ ۗ مِنْ نُطْفَةٍ إِذَا تُمْنَىٰ ۗ

**53 : 43-46 That it is He Who grants laughter and tears;  
 That it is He Who grants death and life:  
 That He did create in pairs – male and female–  
 From a drop (of seed) when it is poured forth.**

The action of laughter and crying depends on mental conditions which give rise to the feeling of joy and sadness. The mechanism of laughing and weeping is a complex one which requires both the psychic factors and the physical factors, the contraction and relaxation of some facial muscles

۱۱- فَفَتَحْنَا أَبْوَابَ السَّمَاءِ بِمَاءٍ مُنْهَمِرٍ ۝۱۲- وَفَجَرْنَا الْأَرْضَ عُيُونًا  
 فَالتقى الماء على أمرٍ قد قُدر ۝۱۳- وَحَمَلْنَاهُ عَلَى ذَاتِ الْأَوَّاجِ وَدُسْرٍ ۝  
 ۱۴- تَجْرِي بِأَعْيُنِنَا ۚ جَزَاءً لِمَنْ كَانَ كُفِرًا ۝  
 ۱۵- وَلَقَدْ تَرَكْنَاهَا آيَةً فَهَلْ مِنْ مُدَكِّرٍ ۝

54:11-15 So We opened the gates of heaven, with water pouring forth.

And We caused the earth to gushforth with springs, so waters met (and rose) to the extent decreed.

But We bore him on an (Ark) made of broad planks and caulked with palm-fibre.

She floats under Our eyes (and care): a recompense to one who had been rejected (with scorn)!

And we have left this as a Sign (for all time); then is there any that will receive admonition?

The phenomenon of the sky pouring down abundant rain has been explained under verse 11 : 57. In some tropical regions with forests and hills, sometimes huge cumulo-nimbus clouds overcast the sky and send down incessant torrential rains for weeks together as if the gates of heaven have opened wide; such rainfall causes high floods, submerging vast areas and bringing about extensive damage.

The verses refer to the flood as a punishment to the people Nuh (a. s.). This aspect has been discussed under verses 7 : 64, 10 : 73 and 11 : 40-42.

۱۹- إِنْكَارُ الَّذِينَ أُرْسِلْنَا عَلَيْهِمْ رَسُولًا صَرِيحًا فِي يَوْمٍ نَحْسٍ مُسْتَمِرٍّ ۝  
 ۲۰- تَنْزِعُ النَّاسَ كَأَنَّهُمْ أُجْرَارٌ نَحْلٍ مُنْقَعِرٍ ۝

54: 19-20 For We sent against them a furious wind, on a day of violent disaster, plucking out men as if they were roots of palm-trees torn up (from the ground.).

These two verses refer to the punishment meted out to the Ad and have been discussed under verse 11 : 67.

٣٨- وَمَا خَلَقْنَا السَّمَوَاتِ وَالْأَرْضَ وَمَا بَيْنَهُمَا لِعَيْبِينَ ۝

**44 : 38** We created not the heavens, the earth and all between them merely in (idle) sport.

This present verse indicates that nothing has been created by Allah in a spirit of sport. Behind each one of His creation is a deep-rooted purpose which we may or may not know. This point has been explained in the discussion under verse 3 : 191 wherein Allah asserts that nothing has been created for nothing.

٣- إِنَّ فِي السَّمَوَاتِ وَالْأَرْضِ لَآيَاتٍ لِّلْمُؤْمِنِينَ ۝

**45 : 3** Verily in the heavens and the earth, are Signs for those who believe.

The understanding of the behaviour of all matter (living and inert) between the heavens and the earth needs a scientific analysis. Such analysis reveals a Grand Design of the Creator and speak of His Power and Glory to those who have faith in Allah and have a responsibility to understand the language of His creation. As already mentioned earlier, many of the Signs of Allah are of a scientific character (e. g., 2 : 164 where amongst other things, the creation of the heavens and of the earth has been referred to) and some of these signs have been mentioned in the discussion under verse 27 : 81.

٣- وَفِي خَلْقِكُمْ وَمَا يَبُتُّ مِنْ دَابَّةٍ آيَاتٍ لِّقَوْمٍ يُوقِنُونَ ۝

**45 : 4** And in the creation of yourselves and the fact that animals are scattered (through the earth), are Signs for those of assured faith.

The creation of man has already been discussed under verses 16 : 4, 18 : 37, 23 : 13 and 23 : 14. Scattering of animals has been discussed under verse 2 : 164.

٣١- إِنْآ أَرْسَلْنَا عَلَيْهِمْ صَيْحَةً وَآحِدَةً فَكَآنُوا كَهَشِيمِ الْمُخْتَظِرِ ۝

**54 : 31 For We sent against them a single mighty blast, and they became like the dry stubble used by one who pens cattle.**

This has been discussed under many previous verses, e. g. 7 : 72, 26 : 139.

٣٢- إِنْآ أَرْسَلْنَا عَلَيْهِمْ حَآصِبًا  
الْآآلَ لُوطِ ۝ نَجَّيْنَاهُمْ بِسَحَرٍ ۝

**54 : 34 We sent against them a violent tornado with showers of stones, (which destroyed them), except Lut's household : them We delivered by early dawn.**

This refers to the punishment meted to the people of Lut (a. s.). This has been discussed under verse 7 : 84.

٣- عَلَّمَهُ الْبَيَانَ ۝

**55 : 4 He has taught him speech.**

Man is the only creature on earth whom Allah in His mercy, has favoured with the highly developed faculty of speech. Without this gift of speech human civilization would not have been possible; literature, music, scientific discoveries, inventions and their advancement would not have taken place; even organised human society could not have come into existence.

“The human voice can express ideas through a variety of arrangements of consonant and vowel sounds. It can also be used for singing. It can combine speech with music and sing words. With his highly developed voice, man has developed elaborate languages. He can describe the most exact details of his thoughts and actions.

“The vocal cords are the main sound producers in man. These two small bands of tissue stretch across the larynx (voice box). One band stretches on

each side of the wind pipe opening. Muscles in the throat stretch and relax the vocal cords.

When we breathe, we relax the vocal cords, and they make a V-shape. When we speak, the attached muscles pull the vocal cords, narrowing the wind pipe opening. Then air passes into the larynx from the lungs and the light vocal cords are vibrated by the air. The larynx (voice box) produces sounds by causing vibrations in the air passing through it. As air passes through the larynx from the lungs, the vocal cords vibrate rapidly, opening and closing the air passage. The pitch of the sound produced depends on the length, thickness, and tension (tautness) of the cords. Muscular action alters the tension producing sounds of various pitches. A person produces words by altering the sound with his lips tongue and mouth.”<sup>1</sup>

While voice is the result of laryngeal sound production, speech is the super position of oral and nasal resonances.<sup>2</sup> A child learns speech by hearing from its mother and others in the surroundings. Human speech has gone through developments and changes with advancement of knowledge and civilization.

## References

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2. *Encyclopaeda Britannica*, Vol. 17, Willium Benton, Publisher, p. 477, 1978.



## هـ- الشَّمْسُ وَالْقَمَرُ بِحُسْبَانٍ ۝

55 : 5 The sun and the moon follow courses (exactly) computed.

This point has been discussed under verses 7 : 54 and 36 : 38-39.

## ۞ وَالنَّجْمُ وَالشَّجَرُ يَسْجُدَانِ ۝

55 : 6 And the herbs (or the stars) and the trees bow in adoration.

The word نجم (Najm) means a heavenly body, star or a constellation. The other meaning is a herb or a grass.<sup>1</sup> As this word occurs along with الشجر (Asshajar), that is a tree, it is reasonable to assume the meaning of *najm* in this particular context to be a herb. A herb and a tree stand for both the soft-stemmed and woody plants, and broadly speaking can be interpreted as the entire plant kingdom. Bowing in adoration implies complete submission to the laws ordained by Allah. Plants show amazing life phenomena that obey, in precision, the natural laws. Their roots (in the case of vascular plants) exhibit positively geotropic movements seeking the nutrient material and sources of water in the earth. The shoot of a plant is always negatively geotropic, that is it grows away from the earth into the atmosphere to avail itself of sunlight, oxygen, and carbon dioxide. The minute pores on the leaves and young stems perform rhythmic opening and closing movements which control the entry and exit of gases. The carbon dioxide is utilized by the plants in the production of plant foods and the release of oxygen, both being crucially important for the survival of the living organisms. The plants also show various degrees of sensitivity to light, chemicals, and physical shocks, from which they guard themselves through ingenious devices. Recent research points out that plants can also have a feeling and can react to music favourably in their growth and fruit production. The flowers are produced on each plant species precisely in a particular season and perform their function of pollination and fertilization which results in the production of an embryo plant in the seed. The dispersal of the seed and fruit is effected by certain agencies like wind, water, birds, and animals to which the plants have appropriate adaptation at the right

moment when they are ripe. The seeds germinate only when the conditions are favourable. Seeds of different species have various periods of dormancy, a safety factor to tide over unfavourable periods. All these phenomena and many more point to the absolute submission of plants to the laws ordained by Allah. In other words, plants figuratively bow down to Allah in adoration.

### **Reference**

1. F. Steingass, *Arabic-English Dictionary Second Cosmo Print*, P. 1104, 1982. Cosmo Publications, New Delhi.



٤- وَالسَّمَاءَ رَفَعَهَا وَوَضَعَ الْمِيزَانَ ۝

٨- أَلَّا تَطْغَوْا فِي الْمِيزَانِ ۝

**55 : 7-8 And the firmament has He raised high and He has set up the Balance. In order that you may not transgress (due) balance.**

The matter of the firmament being raised high has been discussed under verse 52 : 5.

If we take the word balance mentioned in the above two verses in a broad sense and take it to mean also the balance of nature, then an interesting aspect of Allah's creation emerges. This aspect is that in nature, all things including the firmament have been set up in an extremely balanced manner and that man has been warned not to transgress the balance of nature. All this becomes apparent if we consider one of the much discussed issues of modern times, namely, the pollution of the environment. The components of our environment can be broadly classified into two categories : (a) physical components and (b) biological components. Let us consider one important item of the physical components, namely air. We know that air consists of nitrogen (78%), oxygen (21%), carbon-dioxide (.03%) and a few other elements. It is very important that the ratio of the elements in air is maintained. Allah has made nature preserve this ratio through a number of cycles, namely, the carbon cycle and the nitrogen cycle. Without these cycles, the existence of life would be in jeopardy. We should take great care in seeing that the actions of human beings on earth do not grossly alter the environment he is in. For example. all living forms including plants are constantly taking in oxygen and breathing out carbon dioxide. Plants, however, through the process of photosynthesis release oxygen during the daytime. Now if because of fuel requirement, we fell down the trees indiscriminately, and if the number of automobiles increases indefinitely, then there is a build up of carbon dioxide which can lead to a warming of the environment. Also, through our mechanised civilization we are discharging into the environment a number of gases like carbon dioxide, methane, nitrous oxide and CFC (chloroflouro carbons). These gases, called 'Greenhouse gases' trap the longer wavelength part of the solar radiation when it is reflected back from things on the earth's surface. This means that

heat which is associated with longer wavelengths builds up in the environment and there is a note of caution that it may increase the rise in the sealevel and may lead to inundation of low lying areas. The CFC's may also deplete the ozone layer allowing the harmful ultraviolet radiation into the earth's atmosphere. Though there is no quantitative model of the so-called greenhouse effect, this caution is being taken seriously by the concerned circles. The way to remedy the situation is, of course, to restore the balance of nature. All human actions have to be so reorganised that they do not alter the ratio of the relative constituents of air which are so essential to the existence of life.

Again, talking of the biological components of our environment, one notes that there is a meaningful interaction between man and the other members of the biosphere. These are a large number of microorganisms in the environment. Only about five per cent of these microorganisms are pathogenic i.e., causes diseases, the rest have different utilities for us in the preparation of food, medicine etc. Now if through human interference with the environment, some of these life forms are completely destroyed, then this could spell irreversible damage for us. \*The message that Allah gives us through the above two verses is that we should try to understand the delicate balance of Allah's creation and in no way should we transgress it. We should live in harmony with nature and not interfere with it in any harmful manner in the name of conquering it.

١٠- وَالْأَرْضَ وَضَعَهَا لِلْأَنَامِ ۝

55 : 10 It is He Who has spread out the earth for (His) creatures.

Spreading out of the earth has been explained under verses 2:22 and 13:3. In the present verse, the only addition is *انام* meaning 'creatures'. This word gives further emphasis to the favour bestowed by Allah in 'spreading out the earth.'

١١- فِيهَا فَاكِهَةٌ وَالنَّخْلُ ذَاتُ الْأَكْمَامِ ۝

١٢- وَالْحَبُّ ذُو الْعَصْفِ وَالرَّيْحَانُ ۝

\* The example gives us only two of the innumerable instances of balance and harmony of nature.

**55 : 11-12 Therein is fruit and date palms with spathes.**

**Also grain with its leaves and stalk, and sweet smelling herbs.**

Allah's favours to us in the form of various kinds of fruits, including date palms with spathes full of clusters of dates, have been explained under verse 6 : 99.

The word **حَبّ** (*habb*) meaning grain represents all cereals which form the staple food of mankind throughout the world. While the grains provide food for humans, the leaves and stalk of the cereal plant form an excellent forage for cattle, e.g., the stalk and leaves of maize, straw of paddy plants, etc. Although the leaves and stalks of crop plants are edible only by herbivorous animals, there has been a scientific breakthrough recently to convert the indigestible carbohydrates to simpler forms that can be used as human food. Thus both the grains, and the leaves and stalks are great favours of Allah for the sustenance of men and cattle.

The word **رَيْحَان** (*Raihan*) has been translated by many commentators as 'scented herbs'<sup>1</sup> or 'sweet-smelling plants'<sup>2</sup>. Following this interpretation, the aromatic plants which are another gift from Allah, are considered as having a profound impact on the industry of medicines and perfumes. Another meaning of *Raihan*, a singular noun, however, is 'sustenance'<sup>3</sup> which agrees well with the context of grain and forage.

### References

1. M. Pickthall, *The Meaning of the Glorious Quran*, Kutub Khana Ishayat-ul-Islam, Delhi, P. 595.
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3. F. Steingass, *Arabic English Dictionary*, Kutub Khana Ishayat-ul-Islam, Delhi, p. 445, 1980.

١٣- خَلَقَ الْإِنْسَانَ مِنْ صَلْصَالٍ كَالْفَخَّارِ ۝

55 : 14 He created man from sounding clay like unto pottery.

This aspect has been discussed under verses 6 : 2 and 18 : 37.

١٤- رَبُّ الْمَشْرِقَيْنِ وَرَبُّ الْمَغْرِبَيْنِ ۝

55 : 17 (He is ) Lord of the two Easts and Lord of the two Wests.

This aspect has been discussed under verse 37 : 5.

١٩- مَرَجَ الْبَحْرَيْنِ يَلْتَقِيَانِ ۝

٢٠- بَيْنَهُمَا بَرْزَخٌ لَا يَبْغِيَانِ ۝

55: 19-20 He has let free the two bodies of flowing water, meeting together !

Between them is a barrier they do not transgress.

This has been discussed under verse 25 : 53.

٢٢- يَخْرُجُ مِنْهُمَا اللُّؤْلُؤُ وَالْمَرْجَانُ ۝

55 : 22 Out of them come pearls and coral.

The phrase *منهما* (*minhuma*) meaning 'out of them' evidently refers to the two kinds of water bodies, mentioned in verses 19 and 20 of this sura. Water as the source of pearls and coral can be explained by the fact that both these are the products of organisms that live in water.

'Pearl' the substance forming the inner layers of the shells of certain kinds of bivalves like pearl oysters belonging to the phylum Mollusca. The inner part of the shell is composed of numerous layers of a crystalline carbonate of lime known as nacreous layers. If any foreign body like a grain of sand is lodged on this layer, it will act as an irritant and stimulate secretion of nacreous matter at this point forming a symmetrical, globose, lustrous concretion called pearl. The pearls are usually white or bluish grey, some

derived from fresh water oysters are pink in colour. They are highly prized as gems and a variety of attractive ornaments made out of these are worn by the rich. The true pearl oyster, *Pinctada (Meleagrina) margaritifera*, has a wide distribution from the Red Sea to the Indian ocean.<sup>1</sup> The finest salt water pearls come from the Persian Gulf. Pearls are also produced by introducing small particles artificially on the nacreous layer of oysters cultured in cages for several years.

'Coral' belonging to the phylum, Coelenterata, is a small marine animal fastened permanently in a calcareous cup. Most of the corals live in colonies forming stony skeleton. The combined activities of many colonies of various species over the centuries build up a calcareous ridge in the sea attaining great depths and are known as coral reefs, Species belonging to *Corallium*, known as red coral are very attractive and are used for jewellery, Besides, a number of colonial stony corals occur in a variety of shapes and designs and are used as decorative pieces on the mantle piece.

### Reference

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٢٣- وَلَهُ الْجَوَارِ الْمُنشَآتُ فِي الْبَحْرِ كَالْأَعْلَامِ ۝

**55 : 24 And His are the ships sailing smoothly through the seas lofty, as mountains.**

This has been discussed under verse 2 : 164. Here special mention has been made to very big tall ships riding high seas and ploughing high waves.

٣٣- يَعْشَرَ الْجِنِّ وَالْإِنْسِ إِنِ اسْتَطَعْتُمْ أَنْ تَنْفُذُوا مِنْ أَنْقَارِ السَّمَوَاتِ وَالْأَرْضِ فَانْفُذُوا ۗ لَا تَنْفُذُونَ إِلَّا بِسُلْطٰنٍ ۝

**55 : 33 O assembly of Jinns and men ! If it be, you can pass beyond the zones of the heavens and the earth, pass you ! Not without authority shall you be able to pass.**

This verse is very interesting in view of the fact that when man first landed on the moon in 1969, some who did not have a scientific background referred to this verse and seemed doubt the success of the moon landing mission. In fact, if these people were deeply rooted in scientific knowledge, they would have known that the 'authority mentioned in this verse means the authority of knowledge. The effort of launching satellites would not be possible if man did not acquire the technological know-how needed in attaining the so-called escape velocity (7 miles/sec) and thus in overcoming the force of gravity. The history of space exploration shows that in the beginning before the Wright brothers could evolve a flying aircraft, it was unimaginable that man could overcome gravity and lead expeditions into space. But then the knowledge of mechanics and of materials advanced and only about a quarter of a century ago, man could acquire enough technological skills in launching manned or unmanned space vehicle pass the zones of the heavens and the earth. Obviously Allah endows this authority (i. e., knowledge and skill) to only those who are bent upon acquiring it. Without such authority, passing beyond the zones would indeed not be possible.

۳۴- فَإِذَا انشَقَّتِ السَّمَاءُ فَكَانَتْ وَرْدَةً كَالدِّهَانِ ۝

55 : 37 When the sky is rent asunder, and it becomes rosy like red hide.

This has been discussed under verse 25 : 25.

۶۸- فِيهِمَا فَاكِهَةٌ وَنَخْلٌ وَرُمَّانٌ ۝

55 : 68 In them will be fruits, and dates and pomegranates.

This verse is a part of symbolic references to the many favours of Allah in the heavenly bliss.

The favour of fruits for our sustenance has been explained under verse 2 : 22. Dates and pomegranates as gifts of Allah have been discussed under verses 6 : 99 and 16 : 67.

۴- إِذَا دُجَّتِ الْأَرْضُ رَجًا ۝

۵- وَبُسَّتِ الْجِبَالُ بَسًّا ۝

۶- فَكَانَتْ هَبَاءً مُتْبِنًا ۝

56 : 4-6 When the earth is shaken with a great shake.

And the hills are ground to powder,  
So that they become a scattered dust.

Upto a depth below the earth lies the crust, Below the crust, there exists a layer about 100 km thick, of cold rigid material. This is known as lithosphere. Our planet's main feature lies in the fact that the surface of the earth together with the lithosphere, is broken up into a number of rigid lithospheric plates. Below the lithosphere, there is a region, from 100 km to 250 km, where the mantle is warm relatively plastic. partially molten like thick porridge. This layer is known as aesthenosphere. The lithospheric plates are driven by thermal convective motion in the aesthenosphere.

When in about 7 billion years hence, the sun becomes a red giant and engulfs the inferior planets, Mercury and Venus and reaches the orbit of the

earth, temperature in the mantle of the earth will become very high and the convective motion of the asthenosphere very rapid and erratic. The lithospheric plates will collide with one another more rapidly and violently. As a result, the earth will quake violently and almost continuously. Very high temperature of the sun causes everything on the surface of the earth including mountains to be incinerated, and thus transforming them into dust. Also the ocean would be boiling at this temperature.

٥٦- نَحْنُ خَلَقْنَاكُمْ فَلَوْلَا تُصَدِّقُونَ ۝

٥٨- أَفَرَأَيْتُمْ مَا تُمْنُونَ ۝

٥٩- أَأَنْتُمْ تَخْلُقُونَهُ أَمْ نَحْنُ الْخَالِقُونَ ۝

٦٠- نَحْنُ قَادِرُونَ بِبَيْنِكُمْ الْمَوْتَ وَمَا نَحْنُ بِمَسْبُوقِينَ ۝

56: 57-60 It is We Who have created you, why will you not testify the truth?

Do you see (the human seed) that you throw out?

Is it you who create it or are We the Creators?

We mete out death among you, and we are not to be frustrated.

That Allah is the Creator of mankind is accepted by all the religions. It is now scientifically proved that male semen is one of essentials for the procreation. Here Allah points out to the non-believers that the seminal fluid Which they throw out for procreation is not created by man, but it is the creation of the Creator and the Sustainer. It is an indisputable fact that no man can create any biological cell in the laboratory, so the creation of sperm by man is out of the question.

Allah further declares that death is inevitable for all living beings including mankind and none can dispute this fact.

٦٨- أَفَرَأَيْتُمُ الْمَاءَ الَّذِي تَشْرَبُونَ ۝

٦٩- أَأَنْتُمْ أَنْزَلْتُمُوهُ مِنَ الْمُزْنِ أَمْ نَحْنُ الْمُنزِلُونَ ۝

٧٠- لَوْ نَشَاءُ جَعَلْنَاهُ أَجَابًا فَلَوْلَا تَشْكُرُونَ ۝



**56: 68-70 Do you see the water you drink?  
Do you bring it down from the cloud or do We?  
If it were Our will, we could make it bitter; why do you  
not then give thanks?**

Rains from the clouds constitute the basic source of water—the water we drink and the water which revives the dead earth.

The formation of clouds in the sky and falling of rain-drops therefrom have been explained under verses 2 : 164 and 15 : 22.

The word **أجاجا** in the verse 70 means bitter, and in a wider sense, can be taken a unpalatable. In the mountainous streams near the water shed, the water is clean and pure. But further down it can become polluted due to the introduction of waste materials of human activity generally from industrial plants, pesticides or city sewers, and accidentally through nuclear wastes, through natural causes like the mixing of silt, thus making the water unpleasant to humans and dangerous to health. Certain processes of mining coal can also ruin streams that were once sparkling and clear. Pollution of rain water can also be caused under certain conditions resulting in acid rain. Burning of fossil fuels, and smelting of sulphide ores causes emission of large quantities of sulphur oxides and nitrogen oxides which react with raindrops in the atmosphere to impart a high degree of acidity to the rainfall with PH values less than 5 . 6. Apart from having adverse effects on plants, and fish populations, the acid rain through its influence on the solubility of potentially toxic metals in the aquatic environment can be hazardous to human health.<sup>1</sup> It is only through the infinite mercy of Allah that we have been provided with the drinking water which comes down to us in pure form through rain. Had it been His will, the water would turn undrinkable. Should we not then be thankful to Allah?

### **Reference**

1. P Raven and F. Evert, *Biology of Plants*, 3rd edn. Worth Publishers Inc, New York, p. 556 .

٤١- أَقْرَعَيْتُمُ النَّارَ الَّتِي تُورُونَ ۝

٤٢- ءَأَنْتُمْ أَنْشَأْتُمْ شَجَرَتَهَا أَمْ نَحْنُ الْمُنشِئُونَ ۝

56 : 71-72 See you the fire which you kindle?

Is it you who grow the tree which feeds the fire or do We grow it?

Fire is the rapid combination of oxygen with other materials producing heat, the resulting incandescent gases known as flames providing illumination. Fire is one of man's most ancient and fundamental tools and perhaps the most important agent which put him on the road to civilization. Without artificial light and heat, man might have been left in an animal state. It afforded early man protection against wild animals and human enemies. The application of heat to food stuffs produces chemical and mechanical changes facilitating digestion, improves flavour, kills harmful micro-organisms and eliminates volatile poisons.

Before the discovery of flint, the ancient method of making fire was by fire drill through friction between two pieces of wood, one being a stick which is twirled in a hole of another large piece. This phenomenon of ignition by friction between two pieces of wood reminds us that the ultimate source of nearly all energy on the earth is the sun. It is through the process of photosynthesis in green plants that light energy from the sun is fixed in the form of chemical energy holding together the carbon, hydrogen and oxygen of the carbohydrate molecule. This potential energy remains trapped in coal, petroleum, and coal gas known collectively as fossil fuels whose source is the fossilized remains of the green plants. The ignition of these fossil fuels releases the 'bottled up' energy into a dynamic form. This is evidently the implication of the phrase. "the tree which feeds the fire" in this verse. A simple connotation of this phrase, however, would be firewood which is derived from the trees used as fuel.

Further details on the subject of fire from the tree have been given under discussion on verse 36 : 80.

٤٥. فَلَا أَقْسَمُ بِمَرَاتِعِ النُّجُومِ ۝

56 : 75 Furthermore I call to witness the setting of the stars.

This aspect has been discussed under verse 53 : 1.

٥٥. تَنْزِيلٌ مِّن رَّبِّ الْعَالَمِينَ ۝

56 : 80 A revelation from the Lord of the worlds.

That Allah is the Lord of the worlds has been explained under verse 1 : 2.

٥٦. لَهُ مُلْكُ السَّمَوَاتِ وَالْأَرْضِ ۖ يُحْيِي وَيُمِيتُ ۗ

وَهُوَ عَلَىٰ كُلِّ شَيْءٍ قَدِيرٌ ۝

57 : 2 To Him belongs the dominion of the heavens and the earth: it is He Who gives life and death: and He has power over all things.

That to Allah belongs the dominion of the heavens and the earth has been discussed under verse 5 : 19.

That Allah gives life and death has been discussed under verse 5 : 19.

٥٧. هُوَ الَّذِي خَلَقَ السَّمَوَاتِ وَالْأَرْضَ فِي سِتَّةِ أَيَّامٍ ثُمَّ اسْتَوَىٰ عَلَى الْعَرْشِ ۗ يُعَلِّمُ مَا يَلْبِغُ فِي الْأَرْضِ ۖ وَمَا يَخْرُجُ مِنْهَا وَمَا يَنْزِلُ مِنَ السَّمَاءِ ۖ وَمَا يَرْجِعُ فِيهَا ۗ وَهُوَ مَعَكُمْ أَيْنَ مَا كُنْتُمْ ۗ وَاللَّهُ بِمَا تَعْمَلُونَ بَصِيرٌ ۝

57 : 4 He it is Who created the heavens and the earth in six days, and is moreover firmly established on the throne (of authority). He knows what enters within the earth and what comes forth out of it, what comes down from heaven and what mounts upto it. And He is with you wheresoever you may be. And Allah sees well all that you do.

That Allah created the heavens and the earth in six days, i.e. phases has been discussed under verse 7 : 54.

The things entering into the earth and what comes forth out of it, what comes down from the sky and what mounts upto it have been explained under verse 34 : 2.

هـ- لَهُ مُلْكُ السَّمَاوَاتِ وَالْأَرْضِ ۗ وَإِلَى اللَّهِ تُرْجَعُ الْأُمُورُ ۝

**57 : 5 To Him belongs the dominion of the heavens and the earth : and all affairs are referred back to Allah.**

That to Allah belongs the dominion of the heaven and the earth has been discussed under verse 5 : 19.

٤- يُؤَلِّجُ اللَّيْلَ فِي النَّهَارِ وَيُؤَلِّجُ النَّهَارَ فِي اللَّيْلِ ۗ وَهُوَ عَلِيمٌ بِذَاتِ الصُّدُورِ ۝

**57 : 6 He merges night into day and He merges day into night: and He has full knowledge of the secrets of (all) hearts.**

How the night passes into the day and vice-versa has been explained under verse 3 : 27.

١٤- اِعْلَمُوا أَنَّ اللَّهَ يُحْيِي الْأَرْضَ بَعْدَ مَوْتِهَا ۗ قَدْ بَيَّنَّا لَكُمُ الْآيَاتِ لَعَلَّكُمْ تَعْقِلُونَ ۝

**57 : 17 Know you (all) that Allah gives life to the earth after its death! Already have We shown the Signs plainly to you that you may learn wisdom.**

The revival of the earth after its death has been discussed under verse 2 : 164.

..... كَثُرَ غَيْثٌ أَعْجَبَ الْكُفَّارَ نَبَأُهُ ثَمَّ يَهَيِّجُهُ قُدْرَةُ مُصْفَرًّا  
ثُمَّ يَكُونُ حُطَامًا ۝.....

57 : 20 ....How rain and the growth which it brings forth delight the tillers; soon it withers, you will see it grow yellow, then it becomes dry and crumbles away...

The growth of vegetation as a result of rain has been discussed under verse 2 : 164. The fully grown vegetation, whether it is representing grain crops or an orchard, is green due to the presence of chlorophyll in the foliage and soothing to the human eye. If, along with the greenery, there is also a fruitful production of crops, it will be sheer delight to the farmers who have put in their toil and sweat in tilling the soil and taking care of the crops. After the harvest is over, the remaining parts of the plant, especially in the case of the annual grain crops which have fulfilled the function of the production of grain, gradually become dehydrated, lose the living contents of cells and chlorophyll due to which the vegetation grows yellow, dries up and crumbles away.

It is interesting to note that the similitude which Allah has chosen in order to stress the futility of the pompous life of this world is of profound scientific bearing.

٢٥- لَقَدْ أَرْسَلْنَا رُسُلَنَا بِالْبَيِّنَاتِ وَأَنْزَلْنَا مَعَهُمُ الْكِتَابَ وَالْمِيزَانَ  
لِيَقُومَ النَّاسُ بِالْقِسْطِ ۚ وَأَنْزَلْنَا الْحَدِيدَ فِيهِ بَأْسٌ شَدِيدٌ  
وَمَنَافِعُ لِلنَّاسِ وَلِيَعْلَمَ اللَّهُ مَن يَنْصُرُهُ وَرُسُلَهُ بِالْغَيْبِ ۗ  
إِنَّ اللَّهَ قَوِيٌّ عَزِيزٌ ۝

57 : 25 We sent aforetime Our apostles with clear Signs and sent down with them the Book and the balance (of right and wrong), that men may stand forth in justice; and We sent down iron, in which is (material for) mighty war, as well as many benefits for mankind, that Allah may test who it is that will help, Unseen, Him and His apostles : for Allah

**is full of Strength, exalted in Might (and able to enforce His Will).**

In verses 34 : 10 and 34 : 11 the strength of cast iron and steel has been discussed. Steel is a purified alloy of iron, traces of carbon and other elements that is manufactured in the liquid state. It is interesting to note that the binding energy per nucleon i.e., the energy needed to separate a nucleon from the nucleus to infinity is the highest for iron amongst all the elements. This explains the exceptional stability of iron and hence its observed prevalence in the universe.

Both steel and cast iron have many important and varied uses in industry, transportation, agriculture and warfare. An adult needs 15.20 mg iron per day. This is taken through intake of fruits and vegetables where iron compounds are present. About 92.9% of iron is present in haemoglobin. This iron carries oxygen to different parts of the body, helps in the construction of red cells and in the chemical reactions in different parts of the body.

۲- الَّذِينَ يُظَاهِرُونَ مِنكُم مِّن نِّسَائِهِمْ مَاهُنَّ أُمَّهَاتُهُمْ إِلَّا  
 الْبَنَىٰ وَكَذٰلِكَ نَبَيِّنُهُمْ لِكَلِمَاتِهِمْ لِيَقُولُوا مُنكَرًا مِّنَ الْقَوْلِ وَرُذُولًا ۚ وَلَٰئِن لَّمْ يَكْفُرُوا  
 بِاللَّهِ لَكُنَّا بِأَعْيُنِنَا ۗ سَبَّحْتَ لِلَّهِ مَا فِي السَّمٰوٰتِ وَمَا فِي الْأَرْضِ ۗ وَهُوَ الْعَلِيُّ الْعَظِيمُ

58 : 2 Such of you as put away your wives (by saying they are as their mothers); none are their mothers except those who gave them their birth; they indeed utter an ill word and a lie. And lo! Allah is forgiving, Merciful.

According to this verse only the woman who gives birth to a child, is the mother of that child, none else.

With the development of scientific technology test tube babies are borne in the wombs of surrogate mothers from the zygotes produced in the laboratory with the sperm and ovum of other couple before transferring to uterus of surrogate mother.

The question is whether this surrogate mother is to be treated as the mother referred to in the verse.

The only difference between the surrogate mother and the real mother is that the former does not provide the ovum in the formation of the child

concerned. She however like the real mother provides to the zygote the nourishment while it was developing within her uterus and also to make physical and mental contribution for the proper development of the child. She, like the real mother, suffers the pain of delivery.

The Quranic verse, it seems, refers to all the phases in the birth of a child.

۳- خَلَقَ السَّمَوَاتِ وَالْأَرْضَ بِالْحَقِّ وَصَوَّرَكُمْ فَأَحْسَنَ صُورَكُمْ  
وَالِيهِ الْمَصِيرُ

64 : 3 He has created the heavens and the earth in just proportions and has given you shape and made your shapes beautiful; and to Him is the final Goal.

That Allah has created the heavens and the earth in just proportions has already been discussed under verse 6 : 73.

A reference has been made here to the shape given by Allah to man. This shape obviously has an element of beauty and harmony in it. This beauty and harmony is, in turn, determined by the wonderfully balanced proportions of the different parts of the human body. This aspect has been discussed under verse 13 : 8.

۳- وَيُرْسِلُهُمْ مِنَ جَيْثُ لَا يَحْتَسِبُ ۖ وَمَنْ يَتَوَكَّلْ عَلَى اللَّهِ فَهُوَ حَسْبُهُ ۗ  
إِنَّ اللَّهَ بِالْأَمْرِ أَعْلَمُ ۖ قَدْ جَعَلَ اللَّهُ لِكُلِّ شَيْءٍ قَدْرًا ۝

65 : 3 And He provides for him from (sources) he never could imagine. And if anyone puts his trust in Allah, sufficient is Allah for him. For Allah will surely accomplish His purpose. Verily for all things has Allah appointed a due proportion.

This verse clearly states that the sustenance of man can be provided by Allah from sources that he could not even think of. If we look at the history of development of man's food and habitat, we find that the gradual development of science and technology, more and more things are finding their place on the list of food and other useful materials. A number of new foods and new clothes have been made, for example, out of sea-weeds

and petrochemicals respectively. Who would have thought of these developments only a half century ago ? That new sources of food and materials are being developed our things in our environment is wonderfully consistent with verse 3 : 191 where in Allah has emphasised that nothing has created for nothing. If we put our trust in Allah as our Sustainer and if we apply our minds to the scientific analysis of all matters created by Allah, then we are likely to come up with new things (both living and inert) for our sustenance.

There is also a mention in this verse that Allah has created all things in due proportion. This matter has been discussed under verse 25:2.

۴- وَالرِّجَالُ يَسْتَخْفُونَ مِنَ الْمَيْحِضِ مَا مَنَآءُكُمْ إِنِ ارْتَبْتُمْ فَعِدَّتُهُنَّ ثَلَاثَةُ أَشْهُرٍ  
وَأَنَّى لَمْ يُخَيَّرُوا ذَوَاتُ الْأَرْحَامِ أَجَلَهُنَّ أَن يَضَعْنَ حَمْلَهُنَّ  
وَمَنْ يَتَّقِ اللَّهَ يَجْعَلْ لَهُ مِنْ أَمْرِهِ يُسْرًا ۝

65 : 4 And for such of your women as despair of menstruation, if you doubt, their period (of waiting) shall be three months, along with those who have it not. And for those who carry, their period shall be till they bring forth their burden. And whosoever keeps his duty to Allah, He makes his course easy for him.

In verse 2 : 228 the period of waiting (*Iddat*) before remarriage of a divorced woman was given as three menstrual periods, which is about three months. But the problem may arise in the case of those who are in the premenopausal or menopausal stage or in pregnancy. In this verse Allah enjoins three months' waiting period for women whose menstruation is getting stopped or already has ceased. The real purpose of the waiting period is to be sure about any conception that might have occurred. The wisdom of waiting for three menstrual period has already been discussed under verse 2 : 228. In the case of irregular menstruation, nearing menopause, the waiting of three months will remove any possible chance of pregnancy. If, there is pregnancy in spite of initial irregular periods supposed to be premenstrual irregularities, the evidence of pregnancy will be obvious within three months, thus the determination of fatherhood would be resolved.



In the case of menopausal women, Allah enjoins three months, the actual reason for this is not ascertainable yet.

If the divorced woman is already pregnant then the period of waiting will be up to the delivery of the child. This will remove the chance of any paternity problem.

..... سَكَنْتُمْ مِنْ وُجْدِكُمْ وَلَا تَضَارُّوهُنَّ  
 لِتَضَرِّتُوهَا عَلَيْهِنَّ ۗ وَإِنْ كُنَّ أُولَاتٍ حَمِيلًا فَأَنْفِقُوا عَلَيْهِنَّ حَتَّىٰ يَضَعْنَ حَمْلَهُنَّ ۚ  
 فَإِنْ أَرْضَعْنَ لَكُمْ فَآتُوهُنَّ أُجُورَهُنَّ ۚ وَتَسْرِعُوا بِبَيْنِكُمْ بِسَعْرٍ ۚ وَإِنْ تَعَاوَرْتُمْ  
 فَسَرِّضْهُ لَهَا أُخْرَىٰ ۙ

65 : 6 .....And if they are with child then spend for them till they bring forth their burden. Then, if they give suck for your (offspring), give them their recompense: and consult together in kindness, but if you make difficulties for one another, then let some other woman give suck for him on the (father's) behalf.

Here Allah enjoins breast-feeding of the infants. In the case of divorce due to strained relationships between the parents, the mother may claim financial recompense for breast feeding the child. But if breast feeding by the mother is not possible, due to the bad relationship, then a foster mother should be arranged to suckle the infant. This shows the emphasis laid by Allah on breast feeding of the infants which is universally endorsed by medical experts. This subject has already been discussed in detail under verse 2:233.

۱۲-اللَّهُ الَّذِي خَلَقَ سَبْعَ سَمَاوَاتٍ  
 وَمِنَ الْأَرْضِ مِثْلَهُنَّ ۚ  
 يَتَنَزَّلُ الْأَمْرُ بَيْنَهُنَّ  
 لِتَعْلَمُوا أَنَّ اللَّهَ عَلَىٰ كُلِّ شَيْءٍ قَدِيرٌ ۚ  
 وَأَنَّ اللَّهَ قَدْ أَحَاطَ بِكُلِّ شَيْءٍ عِلْمًا ۙ

65 : 12 Allah is He, Who created seven firmaments and of the earth a similar number. Through the midst of them (all)

**descends His command : that you may know that Allah has power over all things, and that Allah comprehends all things in (His) knowledge.**

The point of seven firmaments has been discussed under verse 2:29. The earth is divided mainly into three layers: crust, mantle and core. A gaseous envelope, called the atmosphere, is gravitationally connected with the earth and is an integral part of it. The mantle again is divided into three sub-layers: lithosphere, aesthenosphere and mesosphere. The core is also divided into two sublayers, outer core and inner core. Thus the earth is divided into a total of seven layers: (1) atmosphere, (2) crust, (3) lithosphere, (4) aesthenosphere, (5) mesosphere, (6) outer core and (7) inner core.

1. **Atmosphere** is the outermost layer of the earth. It extends upto a height of about 500 km above the surface of the earth. Above that height atmospheric constituents, because of their rarity, lose contact with each other.
2. **Crust.** The outer shell of the earth is called the crust. It makes up only 0.6% of the volume of the earth. Its thickness varies from a fairly uniform 5 km below the ocean to 35 km under continental surface and as much as 80 km under great mountain-ranges, like the Himalayas, the Alps etc.
3. **Lithosphere.** Below the crust there is a layer of cold, rigid material about 100 km thick. This is known as lithosphere. Our planet's main feature lies in the fact that its surface together with the lithosphere is broken up into a number of rigid lithospheric plates.  
Below the lithosphere is a very pronounced change in structure, marked by a boundary, known as Moho discontinuity. Below this lies the rest of the mantle, which goes down to a depth of 2900 km and makes up more than 82% of the volume of the earth.
4. **Aesthenosphere.** From 100 km to 250 km there is a region, where the mantle is warm, relatively plastic, partially molten like a sea of thick porridge. This layer is known as aesthenosphere. This treacly layer, by its convective motion, allows the solid lithospheric plates to move about shifting continents around the globe.

5. **Mesosphere.** The rest of the mantle is of pitch like nature and is known as mesosphere.  
Deeper still there is the core divided into two sub-layers, outer core and inner core.
6. **Outer core.** The outer core, 2100 km thick, is made of liquid iron, with a slight amount of sulphur mixed with it .
7. **Inner core.** The inner core is 1370 km in radius at the centre of the earth. The inner core is probably solid, having iron and other heavy materials in it.

The current scientific knowledge thus is in agreement with the statements in this verse.

٤- يَا أَيُّهَا الَّذِينَ آمَنُوا قُوا  
 أَنْفُسَكُمْ وَأَهْلِيكُمْ نَارًا  
 وَتُورِثُهَا النَّاسُ وَالْأَنْجَارُ  
 عَلَيْهَا مَلَائِكَةٌ غِلَاظٌ شِدَادٌ  
 لَا يَعْصُونَ اللَّهَ مَا أَمَرَهُمْ  
 وَيَفْعَلُونَ مَا يُؤْمَرُونَ ○

- 66 : 6 O you who believe ! Save yourselves and your families from a fire whose fuel is men and stones, over which are (appointed) angels stern (and) severe, who flinch not (from executing) the commands they receive from Allah, but do (precisely) what they are commanded.

The subject of stones being the fuel has been discussed under verse 2 : 24.

٢- الَّذِي خَلَقَ سَبْعَ سَمَاوَاتٍ طِبَاقًا ۗ مَا تَرَىٰ فِي خَلْقِ الرَّحْمَنِ مِن تَفْوِيتٍ  
 فَارْجِعِ الْبَصَرَ ۗ هَلْ تَرَىٰ مِن مَّفْضُورٍ ○

- 67 : 3 He Who created the seven heavens one above another; no want of proportion will you see in the creation of (Allah) Most Gracious. So turn your vision again : do you see any flaw?

The creation of seven heavens was discussed under verse 2:29. Creation of everything in due proportion has been discussed under verses 6:73 and 25:2.

هـ- وَلَقَدْ زَيَّنَّا السَّمَاءَ الدُّنْيَا بِمَصَابِيحَ وَجَعَلْنَاهَا رُجُومًا لِلشَّيْطِينِ  
وَاعْتَدْنَا لَهُمُ عَذَابَ السَّعِيرِ ۝

67 : 5 And We have, (from of old), adorned the lowest heaven with lamps, and We made such (lamps as) missiles to drive away the evil ones, and have prepared for them the penalty of blazing fire.

Adornment of the lowest heaven has been discussed under verse 37:6 and 50:6.

هـ- هُوَ الَّذِي جَعَلَ لَكُمُ الْأَرْضَ ذَلُولًا فَامْشُوا فِي مَنَاكِبِهَا  
وَكُلُوا مِنْ رِزْقِهِ ۗ وَإِلَيْهِ النُّشُورُ ۝

67 : 15 It is He Who has made the earth manageable for you, so traverse you through its tracts and enjoy of the sustenance which He furnishes; but unto Him is the resurrection.

The tracts of the earth has been explained under verse 20:53.

Sustenance furnished by Allah has been explained under verses 6:99 and 16:67.

هـ- ءَأَمِنْتُمْ مَنْ فِي السَّمَاءِ أَنْ يَخْسِفَ بِكُمُ الْأَرْضَ  
فَإِذَا هِيَ تَمُورُ ۝

67 : 16 Do you feel secure that He Who is in heaven will not cause you to be swallowed up by the earth when it shakes (as in an earthquake)?

Allah warns the people that they may be punished by earthquake for their disobedience. The matter of earthquakes has been discussed under verse 7:91. During violent earthquakes, the earth shakes violently, sometimes the

upper layers of the earth split, forming deep gorges and swallowing whatever stands on the affected surface.

١٦- أَمْ أَمِنْتُمْ مَهْنِ فِي السَّمَاءِ أَنْ يُرْسِلَ عَلَيْكُمْ حَاصِبًا

فَسَتَّعْلَمُونَ كَيْفَ نَذِيرٍ ۝

67 : 17 Or do you feel secure that He Who is in heaven will not send against you a violent tornado (with showers of stones), so that you shall know how (terrible) was my warning?

Allah warns the people that they may be punished by tornado for their disobedience. The matter of tornadoes has been discussed under verse 17:68, where classification of winds including gales and tornadoes has been made. Tornadoes blow at a tremendous speed, sometimes as high as 150 miles per hour, creating havoc by uprooting trees, destroying buildings, and killing men and animals.

١٩- أَوَلَمْ يَرَوْا إِلَى الطَّيْرِ فَوْقَهُمْ صَفَيْتَ وَيَقْبِضْنَ ۗ مَا يُنصِبْنَ إِلَّا الرِّحْلَ ۗ

إِنَّهُ بِكُلِّ شَيْءٍ بِصِيرٌ ۝

67 : 19 Do they not observe the birds above them spreading their wings and folding them in? None can hold them up except (Allah) most gracious. Truly it is He Who watches over all things.

This has been discussed under verse 16 : 79.

٣٣- قُلْ هُوَ الَّذِي أَنْشَأَكُمْ وَجَعَلَ لَكُمُ السَّمْعَ وَالْأَبْصَارَ وَالْأَفْئِدَةَ ۗ

قَلِيلًا مَّا تَشْكُرُونَ ۝

67 : 23 Say : It is He Who has created you and made for you the faculties of hearing, seeing and understanding : little thanks do you give.

The subject of creation of human child has already been discussed under verses 23:12-14.

The subjects of hearing, seeing and understanding have already been discussed under verses 10:31 and 23:78.

٢٣- قُلْ هُوَ الَّذِي ذَرَأَكُمْ فِي الْأَرْضِ وَإِلَيْهِ تُحْشَرُونَ ○

67 : 24 Say : "It is He Who has multiplied you through the earth, and to Him shall you be gathered together".

The process of multiplication of human beings is through biological reproduction which has been discussed in detail under verses 23:12-14.

٣- قُلْ أَرَأَيْتُمْ إِنْ أَصْبَحَ مَاؤُكُمْ غَوْرًا

فَمَنْ يَأْتِيكُمْ بِمَاءٍ مَعِينٍ ○

67 : 30 Say : "See you ? If your stream be some morning lost (in the underground earth), who then can supply you with clear-flowing water?"

Earthquakes, at many times, cause slumps, landslides, avalanches of loose earth, and cracks and fissures in the ground. The various changes in position and elevation during earthquakes may stop drainage offsetting stream channels leading to ponds or lakes. Springs and wells are also frequently disturbed by earthquakes.

١- وَالْفَجْرِ ○

68 : 1 Nun, by the pen and that which they write.

In this verse the oath taken in the name of the pen and what men write therewith emphasises the tremendous importance of writing.

Writing is purposive association of symbol with sound (spoken words) and the process is quite difficult and abstract. Archaeologists believe that man, by dint of his knowledge, intelligence and creative thinking was able to invent the skill of writing quite early in the history of civilization, about five thousand years ago from now at first in the form of pictures<sup>1</sup>. The invention of writing added a new dimension to his capacity as it helped man to put his ideas and thinking into a lasting form. Thereafter, with the

passage of time, the art of writing improved and developed towards perfection at a rapid pace. But for this, the progress of human civilization and advancement of science would not have been possible. Written words are not only a potent vehicle of effective communication, but also a means for preserving knowledge and thoughts and carry the stored-up knowledge to posterity from one age to another.

What men write is, therefore, of the utmost significance. Beside writing letters, drawing up reports and documents we can acquire newer knowledge i.e., know the unknown by reading books written by others and be in touch with the master-minds of both past and present.

### **Reference**

1. *Encyclopaedia Britannica*, Vol. 19, pp. 1033-1044, 1978.

٣- كَذَّبَتْ ثَمُودُ وَعَادٌ بِالْقَارِعَةِ ○ ٥- فَأَمَّا ثَمُودُ فَأهْلِكُوا بِالطَّاغِيَةِ ○  
 ٦- وَأَمَّا عَادُ فَأهْلِكُوا بِرِيحٍ صَرْصَرٍ عَاتِيَةٍ ○ ،- سَخَّرَمَا عَلَيْهِمُ  
 سَبْعَ لَيَالٍ وَثَمِينَةَ أَيَّامٍ حُسُومًا ۚ فَذَرَى الْقَوْمَ فِيهَا صَرْعَى ۚ كَأَنَّهُمْ أَعْجَازُ  
 مَخْلُوحَاتٍ ○ ٨- فَهَلْ تَرَى لَهُمْ مِنْ بَاقِيَةٍ ○ ٩- وَجَاءَ فِرْعَوْنُ وَمَنْ  
 قَبْلَهُ وَالسُّوءَفَكَتْ بِالْخَاطِئَةِ ○ ١٠- نَعَصُوا رَسُولَ رَبِّهِمْ فَاخَذَهُمْ أَخْذَةً  
 رَابِيَةً ○ ١١- إِنَّا لَنَاطِقُا الْمَاءِ حَمَلُنكُمْ فِي الْبَارِيَةِ ○  
 ١٢- لِنَجْعَلَهَا لَكُمْ تَذْكُرَةً ۖ وَتَعِيماً أُولَئِكَ ○

69: 4-12 The Thamud and the 'Ad people (branded) as false the  
 stunning calamity!  
 But the Thamud they were destroyed by a terrible storm  
 of thunder and lightning !  
 And the 'Ad,-they were destroyed by a furious wind  
 exceedingly violent ;  
 He made it rage against them seven nights and eight  
 days in succession so that you could see the (whole)  
 people lying prostrate in its (path), as if they had been  
 roots of hollow palm-trees tumbled down!  
 Then do you see any of them left surviving ?  
 And Pharaoh, and those before him, and cities  
 overthrown, committed habitual sin,  
 And disobeyed (each) the apostle of their Lord; so He  
 punished them with an abundant penalty.  
 We when the water (of Noah's flood) overflowed beyond  
 its limits, carried you (mankind), in floating (Ark).  
 That We might make it a memorial unto you, and that  
 ears that should hear the tale retain its memory.

The destruction of the peoples of the Thamud and the 'Ad has been  
 discussed under verses 7:4 and 11:67. The destruction of the people of Nuh



(a.s.) has been discussed under verse 7:64. The destruction of Pharaoh and his followers has been discussed under verse 7:136.

۱۶- وَأَنْشَقَّتِ السَّمَاءُ فَهِيَ يَوْمَئِذٍ وَاهِيَةٌ ۝

69:16 And the sky will be rent asunder, for it will that day be flimsy.

This point has been discussed under verse 25:25.

۳۶- نَحْرًا لَقَطَعْنَا مِنْهُ الْوَتِينَ ۝

69 : 46 We should certainly then cut off the artery of his heart (or life-artery).

The life-artery is the main artery of the heart known as aorta which arises from the left ventricle and distributes the purified blood to different parts of the body. So if this artery is cut one cannot survive. Such a condition may occur due to injury and bursting as in aneurysm. So the verse signifies the end of life.

۴- نَعْرُجُ الْمَلَائِكَةَ وَالرُّوحَ إِلَيْهِ فِي يَوْمٍ  
كَانَ مِقْدَارُهُ خَمْسِينَ أَلْفَ سَنَةٍ ۝

70 : 4 The angels and the spirit ascend unto Him in a day the measure whereof is (as) fifty thousand years.

This point has been discussed under verses 22:47 and 32:5.

۹- وَتَكُونُ الْجِبَالُ كَالْعِهْنِ ۝

70 : 9 And the mountain will be like wool.

This aspect has been discussed under verses 56:4-6.

۱۴- وَقَدْ خَلَقَكُمْ أَطْوَارًا ۝

71 : 14 When it is He Who has created you in diverse stages.

The creation of human beings from the zygote in different embryonic and foetal stages has already been discussed under verses 23 : 12-15.

The theory of evolution, in which some scientists claim that man is a gradual evolution of higher life from the primitive life, may have been referred to here.

هـ-الَمْ تَرَوْا كَيْفَ خَلَقَ اللَّهُ سَبْعَ سَمَاوَاتٍ طِبَاقًا ۝

71 : 15 See you not how Allah has created the seven heavens one above another.

This aspect has been discussed under verse 23 : 86.

١٤-وَجَعَلَ الْقَمَرَ فِيهِنَّ نُورًا وَجَعَلَ الشَّمْسَ سِرَاجًا ۝

71 : 16 And made the moon a light in their midst, and made the sun a lamp.

The moon and the sun are the main luminaries that illuminate the earth. The main difference between them is that the moon is a satellite, the only natural satellite of the earth and shines by reflected sunlight. The sun on the otherhand is a star and shines by energy generated internally by itself by thermo-nuclear processes, the most important of which is the proton-proton chain reaction at the centre. This takes place in the central core, which is about 400,000 km in diameter and contains about 60% of the sun's mass in barely 2% of its volume. Outside the core is an envelope of unevolved material, through which energy from the core is radiated. This extends to within about 100,000 km of the surface, where convection becomes the more important mode of energy transportation. From the centre to the surface of the sun, temperature falls from around 15, 000,000<sup>0</sup>K to 6,000<sup>0</sup>K. The surface of the sun, the photosphere, represents the boundary between the convective zone and the solar atmosphere. It is a stratum several hundred km thick, from which all the energy emitted by the sun is radiated. A part of this is received by the earth.

The moon, the only natural satellite of the earth has a diameter 3476 km and is at a mean distance of 384,400 km and orbit round the earth in 27.322 mean solar days. It is in synchronous rotation, i. e., its angular velocity of

rotation about its axis is equal to that of revolution round the earth. So it shows the same face towards the earth. The most obvious thing about the moon is that the shape of the illuminated and visible part of the surface changes from night to night. This phenomenon, the phases of the moon, is a simple consequence of two facts. (1) The moon is not self-luminous, but shines by the reflected light of the sun ; and (2) the moon orbits round the earth. Since the sun always illuminates half the surface of the moon, that faces it at any given time, the phases depend solely on the illuminated part of the lunar-hemisphere visible from the earth.

Thus it is seen that the sun and the moon are different types of luminaries: the moon simply reflects sunlight and the sun generates light within itself, like a lamp.

۱۷- وَاللَّهُ أَنْبَتَكُمْ مِنَ الْأَرْضِ بِأَنْبَاتٍ

**71 : 17** And Allah has caused you to grow as a growth from the earth.

The word **انبث** is derived from a root which means to germinate or to produce. It is also used as a fruit of the womb. So here Allah refers to the creation of the human child in the womb. As a tree plant grows on the earth from its seed, so the human seeds, ovum and sperm, combine to form the zygote and then gradually develop into the embryo and foetus. As the plant grows drawing nutrition from the earth through roots, similarly the human embryo draw its nutrition through the placenta of the mother and the mothers derive their nourishment from the earth through foods. Thus the germination of seed and its growth to a plant is comparable to the gradual development of the human foetus. This verse may also refer to the growth of man from earth which aspect has been explained under verse 6 : 2.

۱۹- وَاللَّهُ جَعَلَ لَكُمْ الْأَرْضَ بِسَاطًا

**71 : 19** And Allah has made the earth for you as a carpet.

This aspect has been explained under verses 2 : 22 and 13 : 3.

۲۰- لَتَسْلُكُوا مِنْهَا سُبُلًا فِجَاجًا

71 : 20 That you may go about therein, in spacious roads.

This has been discussed under verse 20 : 53.

٢٥- وَمَتَّأَخِطِيَّتِهِمْ أُغْرِقُوا فَأَدْخَلُوا نَارًا ۖ فَلَمْ يَجِدُوا لَهُمْ  
 قَرْنَ دُونَ اللَّهِ أَنْصَارًا ۝

71 : 25 Because of their sins they were drowned (in the flood), and were made to enter the fire (of punishment) : and they found in lieu of Allah—none to help.

This verse speaks of the flood at the time of Prophet Nuh (a. s.). This has been discussed under verses 7 : 59-64.

١٣- يَوْمَ تَرْجُفُ الْأَرْضُ وَالْجِبَالُ وَكَانَتِ الْجِبَالُ  
 كَيْبًا مَهِينًا ۝

73 : 14 One day the earth and the mountains will be in violent commotion. And the mountains will be as a heap of sand poured out and flowing down.

This aspect has been discussed under verse 18 : 47.

١٨- السَّمَاءُ مُنْقَطِرَةٌ بِهِ ۚ كَانَ وَعْدُهُ مَفْعُولًا ۝

73 : 18 The sky being then cleft asunder ; His promise has to be fulfilled.

This aspect has been discussed under verse 25 : 25.

..... وَاللَّهُ يُقَدِّرُ اللَّيْلَ وَالنَّهَارَ ۗ عَلِمَ أَنْ لَنْ تُحْصَوْهُ .....

73 : 20 ....Allah measures the night and the day and He knows that you are unable to keep count thereof,....

In accordance with the laws ordained by Allah, the earth rotates about its own axis once in about twenty-four hours and revolves round the sun once in about 365.24 days always making an angle of 230.5<sup>0</sup> with its orbit of



٣٩- جَعَلَ مِنْهُ الذَّكَرَ وَالْأُنثَى ۝

75:39 And of him He made two sexes, male and female.

The creation of male and female sex has been discussed under verse 13:3.

٤٠- أَلَيْسَ ذَلِكَ بِقَدِيرٍ عَلَىٰ أَنْ يُحْيِيَ الْمَوْتَىٰ ۝

75:40 Has not He (the same), the power to give life to the dead?

That Allah gives life to the dead and gives death to the living has already been discussed under verse 3:27.

١- هَلْ أَتَىٰ عَلَى الْإِنْسَانِ حِينٌ مِّنَ الدَّهْرِ لَمْ يَكُن شَيْئًا مِّنْ كَوْرٍ ۝  
٢- إِنَّا خَلَقْنَا الْإِنْسَانَ مِنْ نُّطْفَةٍ أَمْشَاجٍ ۚ نَّبْتَلِيهِ  
فَجَعَلْنَاهُ سَمِيعًا بَصِيرًا ۝

76:1-2 Has there been over man a period of time when he was nothing to be mentioned?

Verily We created man from a drop of mingled fluid in order to try him. So We gave him (the gifts of) hearing and sight.

A man is identified and known only after birth as a child. But the creation of the child began long from the time of creation of the sperm and ovum which formed the zygote. Yet, the child had no identification and even the sex of the child remains mostly unknown till its birth. So it is clear that in the life of a human being there is a long time when he was not worth mentioning. This verse may have a reference to the beginning of life prior to the creation of humans as has already been discussed under verse 23:12.

٣٨- نَحْنُ خَلَقْنَاهُمْ وَشَدَدْنَا أَسْرَهُمْ ۚ وَإِذَا شِئْنَا  
بَدَلْنَا أَمْثَالَهُمْ تَبْدِيلًا ۝

**76:28 It is We Who created them (mankind) and We made their joints strong, but when We will, We can substitute the like of them by a complete change.**

The creation of man has already been discussed. The joints in our body means the articulation or meeting-place between parts of skeleton, whether bones or joints. The joints are generally of two types-fixed and moving joints. The fixed joints may be fibrous and cartilaginous and the movable joints are usually synovial.

In fixed joints a layer of cartilage or fibrous tissues intervenes between the bones and binds them firmly together. In some cases the bone margins are serrated and are fitted in a jig-saw system.

The joints are very strong and physical injury usually does not break these joints. The fracture in such bones is mostly irrespective of the regions of junction.

In a movable joint four structures are involved, the two ends of the bones forming the joint, a layer of cartilage covering the ends of these bones to make the surface smooth, a sheath of fibrous tissue called capsule which holds the bones (with formation of bands and ligaments at places) together, and a membrane lining the capsule (synovial membrane) which produces a viscous fluid (synovial fluid) to lubricate the movements of the joint. The joints are further strengthened by the muscles passing over them which originate above the joint and are inserted in the form of fibrous bands or tendons below the joint. Besides, atmospheric pressure also helps the joints to keep the bones in position.<sup>1</sup>

In some joints additional structures like discs of fibro-cartilage and large movable pads of fat under the synovial membrane help to fill up larger spaces in the joint and afford additional protection to the joint. This ball and socket of joints allows movement in different directions as in the shoulder and hip joints. Even the joints are so strong that dislocation of joints is uncommon. The fracture in long bones are usually above or below the joints.

Thus the statement in the Quran of making the joints strong is noteworthy.

## **Reference**

1. W.A.R. Thomson, *Black's Medical Dictionary*, 33rd edn., Adam and Charles Black. London, pp. 503-504, 1981.

۱- وَالرَّسَابِلَ عُزُفًا ۝ ۲- فَالْعَصْفَ عَصْفًا ۝

۳- وَالثَّرَاتِ نَشْرًا ۝ ۴- فَالْفِرْقَتِ فَرْقًا ۝

۵- فَالْمَلَقَاتِ ذِكْرًا ۝

**77:1-5** By the winds sent forth one after another,  
which then blow violently in tempestuous gusts,  
and scatter (things) far and wide, then separate them one  
from another, then spread abroad a message.

The Classification of winds including gales and tornadoes has been explained under verses 2: 164 and 17:68.

It has been explained under verse 30:48 how winds spread the clouds in the sky and later separate them.

Spreading abroad a message may mean winds functioning as heralds of glad tidings as has been explained under verse 7:57.

۸- فَإِذَا النُّجُومُ طُبِسَتْ ۝

**77 : 8** When the stars become dim.

It was observed in appendix I that all stars, except the brown dwarfs, which are too dim to be visible, evolve through the following stages: main sequence stage, pulsating stage, and red giant stage. After that stage, the pattern of evolution depends on the mass of the star. If the mass is within Chandrasekhar's limit, then the star ultimately becomes a white dwarf and radiates internal energy and gradually becomes a black dwarf. Stars of mass greater than Chandrasekhar's limit, ultimately collapse into novae or super novae, which become very bright for a short time, lose their energy and become dimmer and dimmer and finally become invisible. Stars of still greater mass finally collapse into blackholes remaining invisible.

Thus all stars finally become dim and invisible.

۹- وَإِذَا السَّمَاءُ فُرِجَتْ ۝

**77:9** When the heaven is cleft asunder.



This aspect has been discussed under verse 25:25.

١٠- وَإِذَا الْجِبَالُ نُسْفَتُ ۗ

77:10 When the mountains are scattered (to the winds) as dust.

This point has been discussed under verses 56:4-6.

١٤- أَلَمْ نُهْلِكِ الْأَوَّلِينَ ۗ

١٦- ثُمَّ نُنشِئُهُمُ الْآخِرِينَ ۗ

77:16-17 Did We not destroy the men of old (for their evil)?  
So shall We make later (generations) follow them.

These verses warn the non-believers that people of the old who did not believe in the words of their prophets were destroyed. No particular people of the old has been mentioned in these verses. However, destruction by earthquake, by tornado, and by flood of many old peoples have been discussed under verses 7:4, 59-64 and 17:68.

٢٠- أَلَمْ نَخْلُقَكُمْ مِنْ مَّاءٍ مَّهِينٍ ۗ

٢١- فَجَعَلْنَاهُ فِي قَرَارٍ مَّكِينٍ ۗ

٢٢- إِلَىٰ قَدَرٍ مَّعْلُومٍ ۗ

٢٣- فَقَدَرْنَا ۗ فَنَعْمَ الْقَادِرُونَ ۗ

77:20-23 Have We not created you from a fluid (held) despicable?  
The which We placed in a place of rest, firmly fixed,  
For a period (of gestation), determined (according to need)?  
For We determine (according to need); for We are the Best to determine (things).

The creation of human progeny from the seminal fluid and the formation of the zygote by the fertilization of the ovum by a spermatozoon, the

fixation and embedding of it in the uterus have already been discussed under verses 23:12-14.

The period of gestation and its variation which is beyond human control has been discussed under verse 22:5.

۲۷- وَجَعَلْنَا فِيهَا رَوَاسِيَ شُعْبَاتٍ وَأَسْقَيْنَاكُمْ مَاءً فُرَاتًا ۝

77:27 And made therein mountains standing firm, lofty (in stature); and provided for you water sweet (and wholesome)?

The aspect of mountains standing firm has been discussed under verse 13:3.

Allah through His infinite mercy has provided us with potable water the main source of which is rain as discussed under verse 2:164. The secondary source of potable water is rivers, lakes, ponds, springs and underground reservoirs.

۷- أَلَمْ نَجْعَلِ الْأَرْضَ مِهْدًا ۝

78:6 Have We not made the earth as a wide expanse?

The earth is a huge sphere having a radius of about 4,000 miles and a surface area of 20.1 crore sq. miles.

The spreading of the earth has been explained under verses 13:3 and 15:19.

۸- وَالْجِبَالِ أَوْتَادًا ۝

78:7 And the mountains as pegs?

This has been explained under verse 13:3.

۸- وَخَلَقْنَاكُمْ أَنْثَرًا وَاجْبًا ۝

78:8 And (have We not) created you in pairs.

The aspect of creation in pairs in animal and plant kingdoms has been discussed under verse 13:3.

٩- وَجَعَلْنَا نَوْمَكُمْ سُبَاتًا ۝

78:9 And made your sleep for rest.

The subject of sleep has been discussed under verse 30:23 and appendix VIII.

١٢- وَبَيْنَنَا قُوفِكُمْ سَبْعًا سِدَادًا ۝

78:12 And (have We not) built over you the seven firmaments.

This aspect has been explained under verse 2:29.

١٣- وَجَعَلْنَا سِرَاجًا وَهَاجًا ۝

78:13 And placed (therein) a light of splendour.

This refers to the sun which has been discussed under verse 7:54.

١٤- وَ أَنْزَلْنَا مِنَ الْمُعْصُوتِ مَاءً نَّجَّاجًا ۝

78:14 And do We not send down from the clouds water in abundance.

The falling of the rain in abundance has been explained under verse 11:52.

١٥- لِنُخْرِجَ بِهِ حَبًّا وَنَبَاتًا ۝

١٦- وَجَدَّتِ الْجِبَالُ الْكُفَّاءَ ۝

78:15-16 That We may produce therewith grain and plants.  
And gardens of luxurious growth?

The production of vegetation of all kinds and the greenery in general as a consequence of rains has been explained under verse 6:99.

١٩- وَفَتِحَتِ السَّمَاءُ فَكَانَتْ أَبْوَابًا ۝

٢٠- وَسُيِّرَتِ الْجِبَالُ فَكَانَتْ سَرَابًا ۝

**78:19-20** And the heavens shall be opened as if there were doors,  
And the mountains shall vanish, as if they were a  
mirage.

These aspects have been discussed under verse 56:4-6 respectively.

٣٩- وَكُلَّ شَيْءٍ أَحْصَيْنَاهُ كِتَابًا ۝

**78:29** And all things have We preserved on record.

The recording of all things has been discussed under verse 36:12.

٣٤- رَبُّ السَّمَوَاتِ وَالْأَرْضِ وَمَا بَيْنَهُمَا الرَّحِيمُ

لَا يَمْلِكُونَ مِنْهُ خِطَابًا ۝

**78:37** (From) the Lord of the heavens and the earth, and all  
between,—(Allah) most gracious: none shall have power to  
argue with Him.

That Allah is the Lord of the heavens and the earth, and all between has  
been discussed under verses 5:19 and 7:185.

٢٤- ءَأَنْتُمْ أَشَدُّ خَلْقًا أَمْ السَّمَاءُ بَنَاهَا ۝

**79:27** What! Are you the more difficult to create, or the heaven  
(above)? (Allah) has constructed it.

The subject matter in this verse has been discussed under verse 40: 57.

٢٨- رَفَعَ سَعْتِكُمْ فَأَسْوَأَهَا ۝

**79:28 On high has He raised its canopy, and He has given it order and perfection.**

The signification of the term canopy has been discussed under verse 2:22. The earth began as a red-hot whirling bundle of gas some 4500 million years ago (verse 2:117). As this cooled down, the liquid and solid phases of matter on the earth's crust developed. Some of the gaseous materials namely, oxygen, carbondioxide etc. forming the present day earth's atmosphere were separated from the liquid and solid materials as these cannot be liquified or solidified at temperature surrounding the earth. These gases being lighter tried to escape the earth, but were ultimately ehtrapped by the earth's gravitational field at altitudes depending on their masses—the lighter gaseous elements reaching the highest altitudes. The structure o this canopy hs been discussed in details under verse 2:22 from which it would be clear that it is Allah Who gave it order and perfection with some purpose.

٢٩- وَأَعْطَشَ لَيْلَهَا وَأَخْرَجَ ضُغَمَهَا ۝

**79:29 Its night does He endow with darkness, and its splendour does He bring out (with light).**

As the sun, the source of light sets i.e., goes below the horizon it is- evident that darkness should follow on the earth and the splendour of the night sky decorated with heavenly bodies should emerge. But it is not easy to explain, why the infinite number of stars and other heavenly bodies should not make the night sky bright. In 1826 German scientist Heinrich Olber first posed the question, why the sky is dark at night. This is known as Olber's paradox.<sup>1</sup> To understand the problem, let us assume that the sky is divided into an infinite number of spherical shells of equal thickness and star density is (number of stars per unit volume) is constant throughout the sky, and also that all stars are of equal intrinsic brightness. Let us consider such a shell of thickness  $h$  at a distance  $r$ . Volume of such a shell is  $4\pi r^2 h$ . If  $n$  be the star density, then the number of stars in such a shell is  $4\pi r^2 hn$ . Now the apparent brightness is inversely proportional to the square of the distance. Hence the apparent brightness of the sky due to such a shell is  $4\pi r^2 hnkr^2$ , which is  $4\pi hnk$ . This is independent of the distance  $r$  of the shell. Hence each shell, nearer or farther, contributes the same amount of

brightness to the sky. Thus if space had the simple uniform properties as assumed above, every shell-like region, no matter how far or how near, would contribute an equal of brightness to the sky. And contributions from an infinite number of shells would cause the sky to be dazzlingly bright.

The fact that the universe is expanding at a rate that increase with distance, provides the solution to Olber's paradox. Because the light of more distant galaxies is red shifted by a greater amount it is seen as less energetic than if it were not red shifted. Also assuming Hubble's constant as 100 km per second per magaparsec. It is found that for a galaxy at a distance 3000 megaparsec the recession velocity would approach 3.10 km per second, the velocity of light. Thus galaxies beyond that distance can never be seen. They cannot contribute anything to the brightness of the sky. So the sky becomes dark after sunset.

### Reference

1. I.C. Brandt, and S.P. Maran, *New Horizon of Astronomy*, W.H. Freeman and Co. 1972.

۳۰- وَالْأَرْضَ بَعْدَ ذَلِكَ دَحَمَاهُ ۝

79:30 And after that He spread the earth.

This has been explained under verses 2:22 and 13::3

۳۱- أَخْرَجَ مِنْهَا مَاءَهَا وَمَرْعَاهَا ۝

79:31 He has drawn out therefrom its moisture and its pasture.

Drawing out of water or moisture from the earth, and production of pasture are two natural processes interconnected with each other. These two phenomena mentioned in this verse evidently refer to the water cycles. The accumulation of underground water, its absorption by plants through a special process by roots and the return of moisture into the atmosphere through transpiration or physical evaporation from the surface water has been explained under verses 2:22 and 25:50. Mention may be made of the prairie in the northern America. This is a vast grassy land where thousands of animals graze.

۳۲- وَالْجِبَالَ أَرْسَاهُ ۝

79:32 And the mountains has He firmly fixed.

This aspect has been discussed under verses 13:3 and 21 :31.

۳۳- مَتَاعًا لَكُمْ وَلِأَنْعَامِكُمْ ۝

79:33 A provision for you and for your cattle.

This verse is connected to verse 79:31 in which our attention is drawn to the production of moisture and pasture from the earth—a subject which has been already explained under that verse.

The production of moisture from the earth means the presence of water in the form of ground water, springs, streams, rivers, and lakes. The accompanying benefits of these in the shape of greenery and pasture have been discussed under verse 2:164.

١٨- مِنْ أَرْبَى شَيْءٍ خَلَقَهُ ۖ

١٩- مِنْ نُطْفَةٍ ۖ

٢٠- ثُمَّ السَّبِيلَ يَسْرَهُ ۖ

**80:18-20 From what stuff has He created him?**

**From a sperm drop. He has created him, and then moulded him in due proportions.**

**Then does He make his path smooth for him.**

### **Creation from sperm drop and moulding in due proportions**

The creation of the human embryo stage by stage inside the mother's womb has been explained in detail under verses 23: 13-14. The subject of moulding of the developing embryo in due proportions has been discussed under verse 64:3.

### **Making the path smooth for him**

The birth of a human baby through the tightly closed mouth of the uterus (cervix uteri) and the normally narrow birth canal both of which being surrounded a rigid ring of the bony pelvis appears to be an impossible task. On the basis of the scientific discoveries, as outlined below, we can appreciate the profound meaning of this verse:

### **Labour Consists of three stages**

1. During the first stage, a hormone called relaxin is secreted by the ovaries and placenta due to which the ligaments of the pelvic joints are loosened and the cervix uteri is softened. Then follow the uterine contractions which begin in the upper uterine segment composed of active contracting muscle tissue that supplies to push the baby through narrow passive lower segment of the uterus. Simultaneously with each uterine contraction, the membranes filled with amniotic fluid surrounding the foetus through the mouth of the uterus in the shape of a bag of water and facilitate the dilatation. Eventually, on rupture of this bag, the membranes provide a smooth slippery surface for the baby to glide down.<sup>1</sup>

2. During the second stage of labour, a series of changes in the attitude and position of the foetus facilitate its passage through the irregularly



shaped pelvic cavity. In a normal labour, the head of the child comes out first followed by the body and limbs. During this stage, which usually lasts for two hours, the mother also makes voluntary muscular exertion of the diaphragm and abdominal muscles. The size of the head of an average child is usually just equal to the room for it to pass through the pelvis and no more. So the head is compressed during labour, and this is possible due to the softness of the bones, and the presence of fibrous spaces called *fontanelles* between the bones, which enable the skull to undergo changes of shape during birth. These are the special provisions made by Allah to allow the head of the baby to pass during delivery with the minimum of damage to it and the mother.

3. The third stage of the labour is the delivery of the placenta which is usually accomplished within about half an hour.

### Reference

1. K.L. Moore, and A.A. Azzindani, *The Developing Human.*, 3rd edn., W.B. Saunders Company, Philadelphia, p. 120 a, 1983.

۲۶- ثُمَّ شَقَقْنَا الْأَرْضَ شَقًّا ۝

۲۷- فَأَبْتُنَا فِيهَا حَبًّا ۝

۲۸- وَعِنَبًا وَقَضْبًا ۝

۲۹- وَزَيْتُونًا وَنَخْلًا ۝

۳۰- وَحَدَائِقَ غُلْبًا ۝

۳۱- وَفَاكِهَةً وَأَبًّا ۝

۳۲- مَتَاعًا لَكُمْ وَلِأَنْعَامِكُمْ ۝

80:26-32 And We split the earth in fragments.

And produce therein crops.

And grapes and green fodder.

And olives and dates.

And enclosed gardens of thick foliage.

And fruits and forage.

Provision for you and your cattle.

### We Split the earth in fragments

Splitting of the earth into fragments takes place partly due to the impact of rain drops and partly by weathering of the earth's crust involving the physical integration and chemical decomposition of minerals and rocks at or near the earth's surface. Water and wind often carry these fragments to considerable distances and break these into even smaller fragments. Water enters between the particles, and soluble minerals dissolve in water. This soil water is present primarily as a film on the surface of soil particles and it is in this stage that it is available to plants for absorption through their root hairs.

### And produces therein crops

The production of crops was a consequence of rains and the revival of the earth has been explained under verse 2:164.

**And grapes and green fodder  
And olives and dates**

The consequences of rain and its accompanying beneficial resulting in the production of grapes, greenery, olives, and dates have already been discussed under verses 2:22 and 6:99.

**And enclosed gardens of thick foliage  
And fruits and forage  
Provision for you and cattle**

For discussion on the growth of gardens with fruits, and greenery as a provision from Allah for men and cattle, reference is invited to verse 2:164.

۱- إِذَا الشَّمْسُ كُوِّرَتْ ۝

۲- وَإِذَا النُّجُومُ انْكَدَرَتْ ۝

۳- وَإِذَا الْجِبَالُ سُيِّرَتْ ۝

81:1-3 When the sun becomes dim  
When the stars fall losing their lusture,  
When the mountains vanish.

These aspects have been discussed under verses 56:5 and 77:8 respectively.

۴- وَإِذَا الْبِحَارُ سُجِّرَتْ ۝

81:6 When the oceans boil over with a swell.

It is known that nuclear reaction takes place at the centre of the sun and hydrogen is converted into helium. As more and more hydrogen is converted, more and more helium continues to form at the centre of the sun. Computer calculations show that in the next five billion years, nothing much will change.<sup>1</sup> The sun in the course of its evolution will slowly approach greater luminosity, and become a little hotter at the surface. In about six billion years, the sun will grow to twice its present size. The hydrogen at the centre will be used up and the centre region will be taken up by a core of helium. Nuclear burning cannot take place at the centre since all the hydrogen will be used up and temperature is too low for helium fusion.

With the passage of time the helium core at the centre will continue to increase in size. The sun will grow to about a hundred times its present size. It will engulf the orbits of Mercury and Venus and will almost reach the orbit of the earth. A gigantic red sun spreading across more than half the sky will shine down on an earth devoid of life. The oceans of the earth will boil over and ultimately swell and evaporate.

### Reference

1. Rudolf Kippenhan, *100 Billion Suns*, published by Counterpoint, London, Unwin Paperbacks, 1983.

۱۵- فَلَا أُفِئِدُ بِالْخُنُسِ ۝

۱۶- الْجَوَارِ الْكُنَّسِ ۝

**81:15-16 Verily I call to witness the planets that recede,  
Go straight or hide:**

Planets appear to move in the sky in a very erratic way. Sometime a planet, particularly a superior planet, (whose orbit round the sun is farther away from the orbit of the earth) appears to move from west to east. This motion is said to be direct motion. At some other time, it appears to move in retrograde motion, from east to west (Fig. 14). Again at some other time, it remains stationary or motionless. Some time it is obscured by another planet. This is known as occultation. These phenomena appear to occur due to the relative motion of the planet with respect to the earth. According to Kepler's second law of planetary motion, a planet nearer the sun has got greater velocity than a planet farther away from the sun. Since a superior planet lies farther away from the sun than the earth, its velocity round the sun is less than that of the earth. In course of their motion, some time the earth lies ahead and some time the planet lies ahead. When the planet lies ahead, the earth with its higher velocity tries to catch up the superior planet moving ahead with lower velocity; the distance between them decreases, the outer superior planet still goes ahead of the earth from west to east i.e., in direct motion. Gradually, the earth with greater velocity, catches up the planet. The two, the earth and the planet, lie on the same line with the sun. At this stage the planet seems to remain motionless or stationary. In such a case the planet is said to be in opposition. After that position the earth goes ahead of the planet. The distance between them begins to increase in the opposite direction, from east to west. The planet seems to be going backward i.e., to recede and is said to be in retrograde motion. Sometimes two planets come on the same line of sight and thus one planet is hidden by the other. This phenomenon is known as occultation.

In these verses Allah refers to these phenomena due to motions of planets.

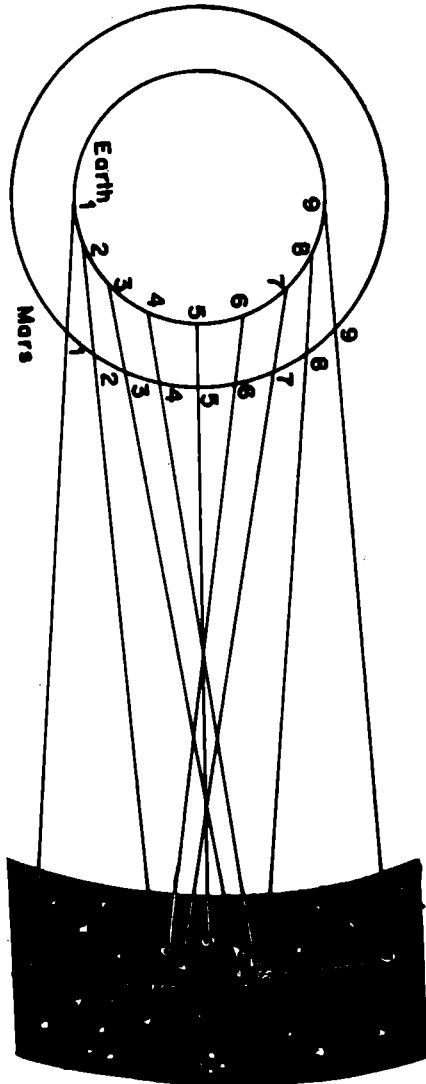


Fig. 14 Retrograde or backward motion of Mars. The planet's apparent track through the sky is shown at right, and the modern explanation is given at the left. For each of nine times the line of sight from the Earth to Mars is drawn to project the apparent position of Mars against stars (from Structure and Change by G.S. Christiansen and P.H. Garretic, W. H. Saunders and Co., 1980).

۱۷- وَاللَّيْلِ إِذَا عَسَسَ ۝

۱۸- وَالصُّبْحِ إِذَا تَنَفَّسَ ۝

**81:17-18** And the night as it dissipates;  
And the dawn as it breathes away the darkness.

Night begins with sunset and ends with sunrise. But the darkness of the night begins to depart with the advent of twilight, which begins when the sun comes within 18° below the horizon.

The phenomenon of twilight has been discussed under verse 2:187.

۱- إِذَا السَّمَاءُ انْفَطَرَتْ ۝

**82: 1** When the sky is cleft asunder.

This point has been discussed under verse 25:25

۲- وَإِذَا الْكَوَاكِبُ انْتَثَرَتْ ۝

۳- وَإِذَا الْبِحَارُ فُجِّرَتْ ۝

**82:2-3** When the stars are scattered,  
When the oceans are suffered to burst forth.

It is known that two forces are acting in the universe: force of expansion due to radiation pressure and force of gravitation. Due to the first force, clusters of galaxies are moving apart from each other. Due to the second force, force of gravitation, clusters of galaxies are attracted towards each other. It is the tussle between the momentum of expanding universe and the long range force of gravitation. If the momentum of expansion wins over, the universe will continue to expand for all eternity. But if gravity wins, the attractive force will slow down the speeding clusters of galaxies and bring them to a standstill. Gravity will still continue to draw them all together. The universe will shrink until all its matter run together in one tremendous implosion. This possible fiery infall is called the 'big crunch'.

Present day scientists are of the opinion that a time table for this catastrophic count-down can be calculated.<sup>1</sup> A billion years before the big crunch, the clusters of galaxies will close up the empty space between them and begin to merge together. By a hundred million years before the big crunch the space between individual galaxies will close up and all galaxies will merge together. The entire universe will be filled with stars scattered at roughly the same spacing as the stars in our galaxy. At a time about 100,000 years before the big crunch, the stars will be so close together that the sky will not only be just blindingly bright, but also searingly hot. Under the incandescent sky, oceans will boil away.

### Reference

1. Nigel Henbest and Heater Couper, *Restless Universe*, George Philip, London, 1982.



۴-الَّذِي خَلَقَكَ  
فَسَوَّكَ فَعَدَلَكَ ۝

۸-فِي أَيِّ صُورَةٍ مَّا شَاءَ رَكَّبَكَ ۝

**82:7-8** Who created you and fashioned you and proportioned you in just measure;  
Into whatsoever form He wills He casts you.

The creation of man and its shaping have already been discussed in verses 13:8 and 23: 12-15 and appendix V. As for the due measure and proportion it may be pointed out that the measurement and size of different parts and organs are so perfect in general that there can be no improvement over it. The height, size of head, limbs, fingers etc. are all in just measure so far as their proper functions are concerned. Creation of everything in due proportion has been discussed in detail under verse 25:2.

۱-إِذَا السَّمَاءُ انشَقَّتْ ۝

**84:1** When the sky is cleft as under.

This point has been discussed under verse 25:25.

۲-وَإِذَا الْأَرْضُ مُدَّتْ ۝

**84:3** And when the earth is spread out.

This aspect has been discussed in verse 13:3. At the time referred to in this verse, the sun would come nearer to the earth and the temperature of the earth including its interior would increase tremendously; the viscosity of the magma would diminish causing the plates (continents etc.) to move more violently, thus spreading out of the different plates.

۱۴-فَلَا أُقْسِمُ بِالشَّفَقِ ۝

**84:16** So I do call to witness the ruddy glow of sunset.

Visible light coming from the sun contains 7 colours depending on wavelength. In the 19th century Lord Rayleigh discovered that dust particles and various gases in the atmosphere scatter light differently, the shortest wavelength i.e., blue colour is scattered most and the longer waves i.e., red colour is scattered the least. During sunset and sunrise sunrays have to traverse the longest air paths during which short waves are scattered most and the rays reaching us are predominantly red in colour. This explains why the horizon looks red during sunrise and sunset.

١٨- وَالْقَمَرَ إِذَا اكْتَمَتْ ۝

84:18 And the moon in her fullness.

The verse refers to the full moon phase of the moon. The moon is the only natural satellite of the earth, visible by virtue of reflected sunlight. It completes one orbit round the earth in 27.322 days. It is in synchronous rotation about the earth i.e. its angular velocity of rotation about its own axis is equal to that of revolution about the earth. As a result it keeps the same face towards the earth. As the moon follows its orbit round the earth, the sun illuminates half the surface of the moon from different positions and we see different portions of the lit up half. The shape of the lit up visible portion is known as the phase of the moon. When the moon lies between the sun and the earth, the face of the moon turned towards us is unilluminated and we cannot see the moon at all. This is the conjunction and the phase is new moon. As the moon pursues its orbit, a narrow strip of the illuminated portion is visible and we see the crescent moon in the sky. On succeeding nights more of the illuminated portion of the moon becomes visible and the phase of the moon continuously changes until the moon is in opposition i.e., the earth lies between the sun and the moon; this is known as opposition. In this position, the full-lit-up half is visible from the earth and the moon is in her fullness. In this full moon phase the apparent magnitude of brightness of the moon is 12.7, and the earth receives the maximum moon light at the full moon phase.

١٩- لَتَرْكَبُنَّ طَبَقًا عَن طَبَقٍ ۝

84:19 You shall surely travel from stage to stage.

Here Allah mentions about several stages of life through which human beings must pass. The journey of our life begins with the formation of a zygote (*nutfah*). Then the stages are those of *alaqa*, *mudghah*, *ezam* (bone), *lahm* (*muscle*), foetus and full grown baby at birth. After birth the important stages are infancy, childhood, adolescence, adulthood, old age and finally the stage after death. However, the stage after death is beyond our scientific comprehension.

From childhood to adulthood the period is utilised to get education and learn a trade or profession for earning a livelihood and man gathers knowledge and experience. During the adult period upto old age one is engaged in worldly activities, social services, marriage, procreation and rearing and providing education and training to the children. The end of worldly life is due to death, though this may occur at any of the stages mentioned above.

١- وَالسَّمَاءِ ذَاتِ الْبُرُوجِ ۝

85:1 By the sky (displaying) the zodiacal signs.

This point has been discussed under verse 15:16.

١- الَّذِي لَهُ مُلْكُ السَّمَوَاتِ وَالْأَرْضِ  
وَاللَّهُ عَلَىٰ كُلِّ شَيْءٍ شَهِيدٌ ۝

85:9 Him to Whom belongs the dominion of the heavens and the earth! And Allah is Witness to all things.

The fact that the dominion of the heavens and the earth belongs to Allah has been discussed under verse 5:19.

١- وَالسَّمَاءِ وَالطَّارِقِ ۝  
١- وَمَا أَدْرَاكَ مَا الطَّارِقُ ۝  
٣- النُّجُومِ الْقَائِمِ ۝

86: 1-3 By the sky and the night visitant.  
And what will explain to you what the night visitant is?

**(It is) the heavenly body of piercing brightness.**

The sun, the planets, satellites including our moon, the stars, galaxies and nebulae constitute the heavenly bodies. During daytime we can see only the sun and cannot see other bodies due to the sun's glare. At night in the absence of the sun the other heavenly bodies become visible. The night visitant referred to in this verse, is a heavenly body of piercing brightness. The Moon is the brightest object in the night sky. But its brightness is soft and cool and not piercing to the onlookers of the night sky. "Like the other planets, Venus shines by reflected sunlight. As seen from the earth night it is brighter than any other planet or star, both because of its proximity to the earth and because it is covered by highly reflective clouds".<sup>1</sup> The Moon's apparent brightness at full moon, is of magnitude 12.7. Next in brightness is the planet Venus. Its maximum apparent brightness is of magnitude 4.4. Its brightness is definitely piercing; sometimes it looks like a blazing torch hanging in the sky. Sometimes Venus is so bright that it casts a shadow and is visible even at day-time.

Venus is an inferior planet (i.e., its orbit lies within the orbit of the earth). So it shows phases like the moon and is always very near the sun. It is seen either in the morning, when it is called the "morning star", or in the evening, when it is called the "evening star". Its greatest elongation (angular distance from the sun) is  $47^{\circ}$ , reaches 72 days before or after inferior conjunction (when the planet lies between the sun and the earth), which occurs at an interval of about 584 days. Venus is brightest when its elongation is  $39^{\circ}$ . This happens 36 days before or after inferior conjunction. It makes a complete revolution round the sun in 225 days. Its direction of rotation is opposite to that of earth and other planets (except Uranus). It makes a complete rotation about its axis in 243 days. Thus a sidereal day of Venus is longer than a Venutian year.

**Reference**

1. *Encyclopaedia Americana*, vol. 28, p. 11, 1979.

هـ- فَلْيَنْظُرِ الْإِنْسَانُ مِمَّ خُلِقَ ۝

٤- خُلِقَ مِنْ مَّاءٍ دَافِقٍ ۝

٤- يُخْرَجُ مِنْ بَيْنِ الصُّلْبِ وَالتَّرَائِبِ ۝

**86 : 5-7 Now let man think from what he is created!  
He is created from a fluid emitted  
Proceeding from between the backbone (or loin) and the  
ribs.**

In this verse instead of '*nutfah*', Allah mentions the word fluid emitted from between the loins and the ribs. We now know that the embryo is developed from the zygote a combination of a ovum and a sperm as discussed in detail under verses 23 : 12-14. That sperm present in semen comes out as emission or ejaculation is well understood but the mature ovum is also forced out of the ovary. The ovum emitted floats in fluid as sperms float in the seminal fluid. So both the male and female seeds are fluids emitted or forced out as mentioned in the 'ayat' as ماء دافق (emitted fluid).

These fluids come out according to the Holy Quran from an area between the loins and the ribs which means the abdominal cavity. From our knowledge of Anatomy we learn that male sperms are produced in the testes which are outside the abdomen in the scrotum. The sperms when mature move to the two seminal vesicle the lower abdomen behind the prostate gland below the urinary bladder. The seminal vesicles are the reservoirs of semen and have direct connection with the urinary tract inside the prostate by two ducts controlled by a muscular sphincter. So semen is ejaculate | not from the scrotum but from the seminal vesicles present inside the abdomen. The ovaries are also situated inside the abdomen. Both tests and ovaries begin their formation inside the abdominal wall by the sides of the spinal column near the 10th thoracic vertebra. Their nerve and blood supplies are also derived from the same level of the spinal cord which shows the importance of the backbone in this regard.

The testicular and ovarian arteries are derived from the abdominal aorta just below the openings of the renal arteries. The nerves are derived from the

tenth and eleventh thoracic segments of the cord, through the renal and aortic plexuses. The arteries of the seminal vesicles are derived from the inferior vesical and derived from the inferior vesical and middle rectal arteries. The nerves are derived from the pelvic plexuses. The arteries and nerves of the scrotum however are derived from the sources outside the abdominal cavity.

## ۱۱- وَالسَّمَاءِ ذَاتِ الرَّجْعِ ۝

**86:11 By the firmament which returns.**

Due to the rotation of the earth about its axis, the firmament above seems to make periodic rotation and appears to return periodically to its original position after a fixed interval of time, with all its wonders and splendour. The period of rotation of the earth is a day; so after one day the firmament returns to its former position. Almost all the celestial bodies show some degree of rotation. So, like the firmament of the earth, firmaments, as seen from all other celestial bodies also appear to return periodically to their original positions.

## ۱۲- وَالْأَرْضِ ذَاتِ الصُّدُوعِ ۝

**86:12 And by the earth which opens out.**

There are natural openings in the earth, such as canyons, gorges, fissures etc. It was observed under verse 13:3, that most of the terrestrial geological actions take place due to plate tectonics. This happens when plates collide. The plates move slowly, at the rate of 5 to 10 cm per year, driven by thermal convective motion in the mantle and by gravity. Earthquakes, volcanoes and mountains result from their massive slow motion of collision. If a plate of heavy oceanic rock jams against a more buoyant plate of continental rock, it is forced back down into the interior. As it sinks, it becomes hot and eventually melts. This less dense molten rock rises and erupts through openings, the volcanoes. This tectonic trauma (injury), called subduction, can make an opening, a trench, upto 11 km deep in the ocean floor and an adjacent are shaped chain of active explosive volcanoes. The lines of volcanoes are generally parallel to shores of the continents. Thus they form a complete 'Girdle of fire' round the Pacific. The Atlantic chain

embraces the volcanoes of Iceland, the Azores and Canaries. Another line is formed by the volcanoes of the Mediterranean. Although most volcanic activities occur at plate boundaries, some activities do not. Volcanic 'hot spots' overlie 'plumes' of molten 'magma rising from unknown depths.

The opening of the earth on a smaller scale is also observed in the case of germination of seeds where the seeding sprouts by splitting the soil, and in the gushing forth of springs where water from inside the earth is forced up. In some places the rushing out of natural gas is used for prospecting. Another example of cleavage of the earth is observed during drought when the scorching rays of the sun rends asunder the arable land.

۲- الَّذِي خَلَقَ قَسْوَى ۝

87:2 Who has created and further, given order and proportion.

The subjection of the present verse has been discussed under verse 25:2.

۳- وَالَّذِي قَدَّرَ فَهْدَى ۝

87:3 Who has ordained laws and granted guidance.

That Allah has ordained the laws has been discussed under verses 5:19 and 7:54, 185 and appendix IV.

۴- تَصْلَى نَارًا حَامِيَةً ۝

۵- تَسْقِي مِنْ عَيْنٍ آتِيَةٍ ۝

87:4-5 And Who brings forth the pasturage and then turns it into brownish stubble.

The growth of vegetation after rainfall has been explained under verse 2:164. The prairie of north America—a vast and plain grassy land, is pasture for thousands of animals.

The phenomenon of turning greenery gradually into stubble has been discussed under verse 67:20.

۱- أَفَلَا يَنْظُرُونَ إِلَى الْإِبِلِ كَيْفَ خُلِقَتْ ۖ

**88:17 Do they not look at the camels, how they are made?**

This verse proposes an interesting scientific study of the camel. The camel is called the Ship of the desert. But what is so unique in the making of the camel that is implied by this verse? In fact, the true essence of the verse could be understood only the other day when it was discovered by Prof. Shkoinick and Prof Kunt Schmidt Nielson of Duke University that a camel has a moisture absorbing membrane in its nostril that does not let moisture out when it exhales. This membrane has never been found in any other animal. Because of this membrane in the nostril of the camel, it saves 68 per cent of the water vapour that other animals breathe out involuntarily.

The researchers dissected the camel's nostrils and found a one-way membrane of 1000 square centimetres (400 square inches). A human mucous membrane covers only 12 square centimetres (4.8 square inches).

The camel's lump contributes to its desert longevity by storing fat for consumption during desert famines. People have fat spread over all their bodies, which acts like an overcoat. But the camel keeps his fat in one place so that he would not be insulated in the heat.

It is interesting to note that a revelation which was made by Allah more than 1400 years ago, on the constitution of the camel could be fully appreciated only recently when scientific researches were conducted exhaustively on the camel.

### **Reference**

1. *The Encyclopaedia Americana*, Vol. 5, Americana Corp. Connecticut. pp. 261-263. 1979.



١٨- وَإِلَى السَّمَاءِ كَيْفَ رُفِعَتْ ۝

88 : 18 And at the sky how it is raised high ?

This has been explained under verse 13 : 2.

١٩- وَإِلَى الْجِبَالِ كَيْفَ نُصِبَتْ ۝

88 : 19 And at the mountains, how they are fixed firm?

This point has been discussed under verse 13 : 3.

٢٠- وَإِلَى الْأَرْضِ كَيْفَ سُطِحَتْ ۝

88 : 20 And at the earth how it is spread out.

The aspect of spreading out of the earth has been explained under verses 2:22 and 13:3.

١- وَالْفَجْرِ ۝

89 : 1 By the break of day.

The break of day meaning dawn has been discussed under verse 2:187.

٦- أَلَمْ تَرَ كَيْفَ فَعَلَ رَبُّكَ بِعَادٍ ۝

٤- إِرَمَ ذَاتِ الْعِمَادِ ۝

٨- الَّتِي لَمْ يُخْلَقْ مِثْلُهَا فِي الْبِلَادِ ۝

89 : 6-8 See you not how your Lord dealt with the 'Ad

Of the (city of) Iram, with lofty pillars

The like of which were not produced in (all) the land?

The verses speak of the punishment inflicted on the 'Ad, but no particular kind of punishment has been referred to. The 'Ad were supposed to have their capital at Iram or Aram where there were lofty buildings. Some think

that Iram was the name of the grand father of 'Ad, and the people of 'Ad were of lofty stature.

The punishment inflicted on the 'Ad has been discussed under verses 41:15-17.

٩- وَتَمُودَ الَّذِينَ جَابُوا الصَّخْرَةَ بِالْوَادِ ۝

89 :9 And with the Thamud (people), who cut out (huge) rocks in the valley?

This verse speaks of the Thamud and has been discussed under verse 11:67.

١١- كَلَّا إِذَا دُكَّتِ الْأَرْضُ دَكًّا دَكًّا ۝

89 :21 When the earth is pounded to powder.

This point has been discussed under verse 56 : 4-6.

٨- أَلَمْ نَجْعَلْ لَهُ عَيْنَيْنِ ۝

٩- وَلِسَانًا وَشَفَتَيْنِ ۝

90 : 8-9 Have We not made for him a pair of eyes ?  
And a tongue, and a pair of lips ?

In these verses Allah reminds us of His special favours to mankind in the form of a pair of eyes, a tongue and a pair of lips.

The eye is the organ through which man acquires knowledge of his environment by virtue of the image that forms in his brain through various complicated mechanisms as explained in verse 2 : 20 and the interpretation of this image. As man has a higher brain, his interaction and interpretation of nature is superior compared to other creatures.<sup>1</sup>

Allah has bestowed upon us a pair of eyes which enable us to have a stereoscopic view of the object. By virtue of the dissimilarity of the images presented by a three dimensional object, or array of objects, the stereoscopic perception of depth is produced.

The tongue consists of two parts—the anterior two-thirds and the posterior or pharyngeal one-third. At the V form junction of two parts, 7 to

12 large flat topped circumvallate papillae are present. Each of them is surrounded by a trench, and upon both sides of the trench open numerous taste buds. On the tip and towards the edges of the tongue, small red rounded fungiform papillae are seen which act as end-organs of the taste buds. Basically there are four types of taste—sweet, salt, bitter and acid.

There are three kinds of uses of the tongue : (1) to push the food between the teeth for mastication and then mould it into a bolus for swallowing ; (2) to act as an organ of taste and also a delicate sense of touch and (3) to play the vital part in the production of speech. The first two functions are common to all animals but the ability of speech is the unique property of mankind. Speech consists of a series of rapid modifications of the voice produced by changes in position of the palate, tongue and lips.

So lips are also of special significance as mentioned in this verse. Speech is possible only when voice is produced by the larynx which is modified in various ways during its passage through the mouth so as to form speech or song.

## Reference

1. *The New Encyclopaedia Britannica*, Helen Hemingway Benton, Publisher, p. 91-116. 1978.

١- وَالشَّمْسِ وَضُحَاهَا ۝

91 : 1 By the sun and his glorious splendour.

This point has been discussed under verse 71 : 16.

٢- وَالْقَمَرَ إِذَا تَلَّهَا ۝

91 : 2 By the moon as she follows him.

This point has been discussed under verse 71:16.

٥- وَالسَّمَاءِ وَمَا بَنَاهَا ۝

91 : 5 By the firmament and its (wonderful) structure.

This point has been discussed under verse 2 : 29 and appendix I

٦- وَالْأَرْضِ وَمَا طَحَاهَا ۝

91 : 6 By the earth and by Him Who spread it.

In this verse an oath has been pronounced in the name of the earth and its Creator Who has spread it.

The creation of the earth has been explained under verse 2:164 and its spreading out under verses 2:22 and 13:3.

The earth, a planet of the sun, has a spherical surface area of 20.1 crore sq. miles. It is a unique wonderful creation of Allah with its diurnal rotation about its axis and its orbital motion around the sun; with its cycle of seasons and the alternation of the day and the night, with its moon-light, sun-shine, colour and beauty ; with its atmosphere, winds, clouds, rains and lightnings ; with its mountains, trees and forests, with its green vegetation in some parts and deserts in others ; with its countless creatures of variegated kind and nature, and above all with its pride inhabitant, man, the vicegerent of Allah.

١٣- فَكُلُّبُوهُ نَعَقْرُوهَا ۗ فَمَا مَدَامَ عَلَيْهِمْ رَبُّكُمْ يَدَّٰئِبِهِمْ

فَسَوَّيْهَا ۝

**91 : 14 Then they rejected him (as a prophet), and they hamstrung her (she-camel) So their Lord, on account of their crime, obliterated their traces and made them equal (in destruction, high and low)!**

The verse refers to the people of the Thamud. This has been discussed under verse 11 : 67.

۱۳- وَإِنَّا لَنَأْتِيهِمُ الْعَذَابَ وَالْأُولَىٰ ۝

**92 : 13 And verily unto Us (belong) the end and the beginning.**

The 'end' has been discussed under verses 82 : 2, 3 ; the 'beginning' has been discussed under verse 2 : 164, and appendices I and II.

۱- وَالزَّيْتُونَ وَالزُّبُرُونَ ۝

**95 : 1 By the fig and the olive.**

The fig, *Ficus carica* is probably a native to western Asia from where it spread to the Mediterranean region, and has been cultivated there for at least 5000 years<sup>1</sup> for its edible fruit. They have a high sugar content (about 64%), and are rich in calcium, iron, and copper<sup>2</sup>. They are one of the delicious and wholesome fruits and are eaten raw or candied, made into jam, brewed into a beverage or canned. A syrup from the fruit is used as a laxative. It was apparently well known during the early Islamic period and consumed by the Arabs both as food and as medicine. The large 3-5 lobed leaves have a structure somewhat similar to the human hand, and probably for this reason, were frequently depicted in the early Christian paintings sculpture hiding the external genitalia<sup>3</sup>.

The fig tree is mentioned several times in the Bible but only once in the Holy Quran as an oath and adjuration in this verse along with the olive, Mount Sinai, and the sacred city of Makka.

The importance of the olive in the Mediterranean and Near East has already been discussed under verse 6 : 99.

## References

1. G. Usher, *A dictionary of plants used by man*. Constable and Company Ltd. London. 1974.
2. *The Encyclopaedia Americana*. International edition. Vol. 11, p. 193, 1979.
3. B. Brouk, *Plants consumed by man*, Academic Press, London, 1975.

۴-لَقَدْ خَلَقْنَا الْإِنْسَانَ فِي أَحْسَنِ تَقْوِيمٍ ۝

95 : 4 We have indeed created man in the best of moulds.

This aspect has been discussed under verse 3 : 6 and 6 : 2.

۱-اقْرَأْ بِاسْمِ رَبِّكَ الَّذِي خَلَقَ ۝ ۲-خَلَقَ الْإِنْسَانَ مِنْ عَلَقٍ ۝

۳-اقْرَأْ وَرَبُّكَ الْأَكْرَمُ ۝

۴-الَّذِي عَلَّمَ بِالْقَلَمِ ۝ ۵-عَلَّمَ الْإِنْسَانَ مَا لَمْ يَعْلَمُ ۝

96 : 1-5 Proclaim ! (or read!) In the name of your Lord and Cherisher, Who created—

Created man, out of a (mere) clot of congealed blood :

Proclaim ! And your Lord is most bountiful,

He Who taught (the use of ) the pen,

Taught man that which he knew not.

The above five verses are the first Quranic verses revealed to the Holy Prophet of Islam. It is interesting that the first revelation stresses the need of learning. This verse should be all the more meaningful to us at the present time when about two-thirds of the Muslim Ummah cannot read or write. It is also interesting to note that one of the objectives of modern scientific investigations, namely, the creation of man, is mentioned in this first revelation.

That Allah is the Lord and Cherisher has been discussed under verse 1:2.

The significance of the word -علق- has already been discussed under verses 23: 12-14.

That Allah is most bountiful has been discussed under verse 1:1. Man is the only creature who can use the pen for organized systematic learning. And it is this learning that enables him to do a lot of creative thinking. This special faculty differentiates man from other creatures. By the use of the pen man documents his experiences, discoveries and intellectual activities for himself and posterity.

The matter of the pen has been discussed under verse 68:1. Records produced by the help in teaching the later generations the collective experience of the past and present formally to society at large through

educational institutions and to individuals through books, periodicals, radio, television etc. Besides this formal education, there is informal education which arises from day to day experience by trial and error and also through unplanned media, intuition etc. Accidental scientific discoveries like the discovery of penicillin, X-rays also come under this category. Man's knowledge is continually expanding thanks to the gifts he has received from Allah.

١- إِذَا زُلْزِلَتِ الْأَرْضُ زِلْزَالَهَا ۝

٢- وَأَخْرَجَتِ الْأَرْضُ أَثْقَالَهَا ۝

99 : 1-2 When the earth is shaken to her convulsion.  
And the earth throws up her burdens.

This point has been discussed under verse 86:12.

٥- وَكَوْنُ الْجِبَالِ كَالْعُيُوشِ ۝

101 : 5 And the mountains will be like carded wool.

This point has been discussed under verse 56:4-5.

١- وَالْعَصْرِ ۝

103 : 1 By (the token of) time (through the Ages).

Allah here swears by time, a subject which has intrigued both scientists and philosophers as well as laymen. Is time absolute or dependent on other things ? Had time a beginning or has it an end?

Common people believe in absolute time, that is one can unambiguously measure the interval of time between two events and that this time would be the same whoever measures it, provided he has a good clock. Time is completely separate from and independent of space. Einstein's special theory of relativity is based on the idea that the laws of science should be the same for all freely moving observers, no matter what their speed is<sup>1</sup>. It can be shown from the theory of relativity that there is no unique absolute time, but instead each individual has his own personal measure of time that depends on where he is and how he is moving<sup>2</sup>.

Space and time are dynamic quantities: when a body moves or a force acts, it affects the curvature of space-time continuum, and in turn the structure of space time affects the way in which bodies move and forces act. Space and time not only affect but also are affected by everything that happens in the universe. Just as one cannot take about events in the universe without the notion of space and time, so in general relativity it became meaningless to talk about space and time outside the limits of the universe we know today. The galaxies are receding away from each other and at some time in the distant past the distance between the neighbouring galaxies must have been zero. At the time of the Big Bang when  $t=0$ , the density of the universe and the curvature of space-time would have been infinite. Such a point is an example of where the theory itself breaks down. Such a point is known as singularity. In fact all our theories of science break down at such a singularity. This means that even if there were events before the Big Bang, one could not use them to determine what would happen afterward, because predictability would break down at the Big Bang. Correspondingly, if, as is the case, we know only what has happened since the Big Bang, we could not determine what happened beforehand. As far as we are concerned, events before the Big Bang can have no consequences. So we can say, time had a beginning at the Big Bang.

The world of science is four dimensional; it has three dimensions of space and one of time. Against this background of space-time the laws of physics aim at giving a mathematical description of the behaviour of various systems existing in the universe. The significant thing about all known laws of physics is that their mathematical formation exhibits symmetries with regard to space and time<sup>3</sup>. That is with a limited exception, the laws themselves make no distinctions between 'left' and 'right', between 'past' and 'future'. Yet in our everyday experience there is a clear distinction between these directions in space and time. If something happens to interchange the meaning of the terms 'left' and 'right' all over the world no significant change will be felt. The number of "right-hearted" and "left handed" persons will be numerous in the world. But in the case of 'past' and 'future', an interchange would produce a drastically new situation. Besides, other seemingly impossible phenomena would take place. Broken Humpty



Dumpty would jump up and sit on the wall completely mended up. This brings the notion of the 'arrow of time.'

### References

1. S. W. Hawking *A Brief History of Time*, Bantam Press, P. 187, 1988.
2. Ibid, P. 33.
3. Jacate Narlikor, *The Structure of the Universe*, Oxford University Press, P. 176, 1980.

ۛ-ۛ لَمۡ يَكُنۡ لَّهٗۤ اٰبَآءٌۙ وَ لَمۡ يُولَدۡ لَہٗۤ ۙ

### 112 : 3 He begets not, nor is He begotten

This verse is not easy to understand from the common sense point of view which obviously demands the existence of generators in order to explain the generated. A child's innocent query 'where did I come from ?' is satisfied only when he begins to understand the chain of human reproduction. One may wonder : what happens if we extend this chain into past. We get a 'starting' man known in Islam as Adam (a. s.). It has been mentioned in the Holy Quran that Allah created Adam (a. s.) from clay and breathed a part of His Soul into him, thus giving him Divine qualities. Another query of a child namely "Who created Allah ?" would seem to be problematic but Allah has provided an answer to this query in very clear terms: Allah does not beget nor is He begotten. This may normally seem a bit enigmatic. Such enigma already exists in the developments of modern physics.

These developments tell us that big particles are made of small particles and small particles are made of smaller particles. And yet, the smaller particles are, in turn, made of even smaller particles, In the material world, one thus witnesses various degrees of smallness and elementarity in the organisation of matter : compounds, molecules, atoms, electrons and nuclei, protons, neutrons and quarks. In the search for elementary particles, the quarks (fractionally charged particles and leptons (electrons, muon neutrino etc) turn out to be the currently accepted building blocks of which all matter in the universe is composed. Quarks, however have not, been experimentally observed. There is a large number of experimental facts which can be explained only when we assume that the hadrons (strongly interacting particles i. e. neutrons, protons, pions etc) are made of different combinations of the fractionally charged quarks (up quark, down quark, strange quark, charmed quark, top quark and bottom quark) and the description of hadronic matter in terms of quarks is found to be quite tenable. However, for reasons into which we would not go here , the quarks are all confined and can never be observed. One can think of hitting the hadron real hard by means

of a number of very high energy projectiles, in order to let the quarks become free and be observed. But strangely enough, in this process, the availability of high energy gives rise to a number of nuclear debris and quarks are not observed. As is already indicated above, these quarks will probably be never observed. Yet we believe in them. Although we do not see the quarks, we know their properties. The non-observability of the quarks ridicules the common sense argument that if 'A' is made of 'B' should be observable by the breaking of 'A'. These arguments, although making sense in the ordinary world of ours, certainly cease to be meaningful in the world of the subatomic particles. There, we talk of the generators of inert matter without the possibility of these generators being ever seen. Thus, if in the material world, we are prepared to accept the existence of a fundamental particle without worrying about the possibility of its being generated from something else, then why should we not accept the existence of a Supreme Creator without Him being generated from someone else and without Him being ever seen. All we need to know are His 'Sifat' i.e., His Attributes as we need to know the properties and attributes of the quarks in order to believe in the quarks. The Attributes of Allah have been mentioned in several places in the Holy Quran.

The above analogy is only an aid towards the understanding of a part of the verse.

Next, let us see if the concept of Allah being in the role of a generator makes any sense at all. Again, let us first examine the mechanistic view of generators as reflected in the researches on elementary particles.

Although at present, the physicists are reasonable happy with quarks being the ultimate constituent of all hadronic matter, it may turn out that quarks have an internal structure i.e., it may be made of further sub-units. Then where would this chain of elementarity finally end? This is one of the puzzling questions of modern physics. Starting from the time of the Greeks, man has discovered a series of generators of matter. Compounds became generators of all substances, elements that of compounds, molecules that of elements, atoms that of molecules, nuclei and electrons that of atoms, quarks that of nucleons and in future quarks could also reveal an internal structure of its own; the search for the ultimate generators of matter is somewhat like the peeling of a Cosmic Onion. As one layer is peeled, another appears and when that layer is peeled,

still another appears and so on. Incidentally, we have mentioned only those particles which have a high degree of stability. Besides, there are a large number of particles which are extremely short-lived. Together, the number of elementary particles becomes so large that talking in terms of the generators of matter may become less meaningful. The situation has been depicted in an analogous manner in figures 15-22.

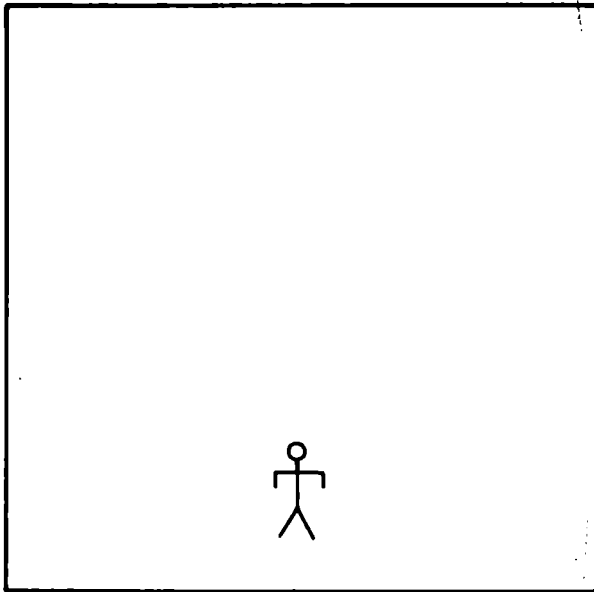


Fig. 15. At around 10,000 B.C the inhabitants of the paper square asked the question "What does the structure of the universe look like ?"

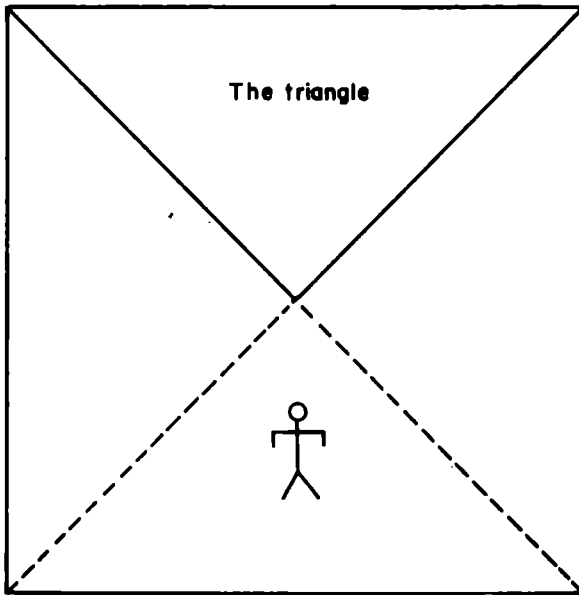


Fig. 16. Physicists of the square at 1900 A.C. discovered a basic subdivision of their universe. They called it the "triangle" and consider it to be the fundamental building block of the universe.

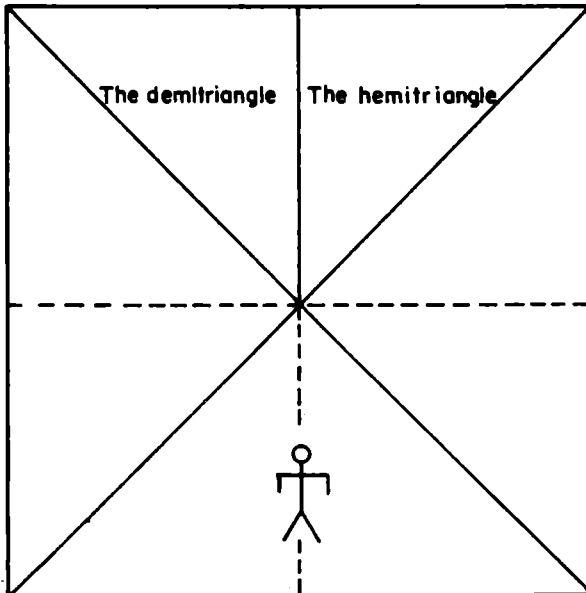


Fig.17. At 1930 A.C. physicists discovered that the triangle can be split. Its parts are termed the 'hemitriangle' and the 'demitriangle'. These were thought to be the fundamental building blocks of the universe.

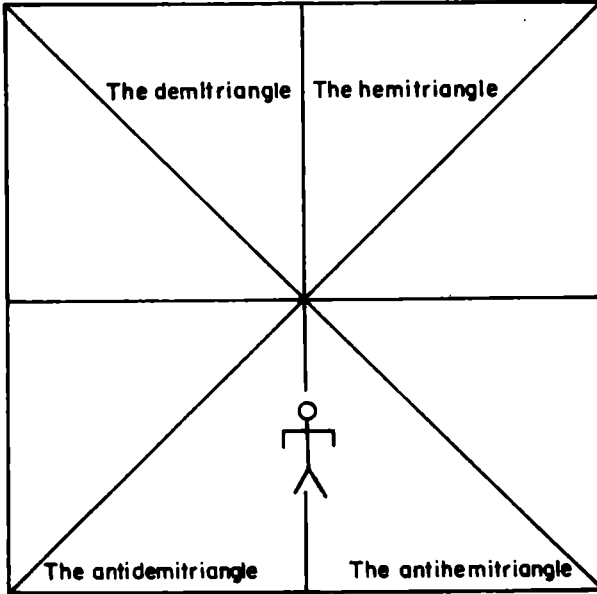


Fig. 18. In 1950 A.C. mirror images of the hemitriangle and the demitriangle were discovered. These were termed 'antihemitriangle' and antidemitriangle.

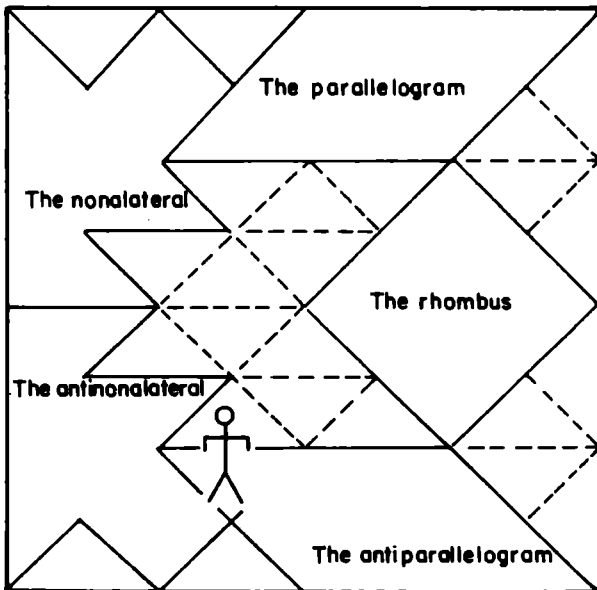


Fig. 19. In 1960 A.C. physicists conception of their universe was further clouded by new discoveries; the rhombus, the parallelogram, the antiparallelogram, the nonalateral and many others. It is unclear what these discoveries signify.

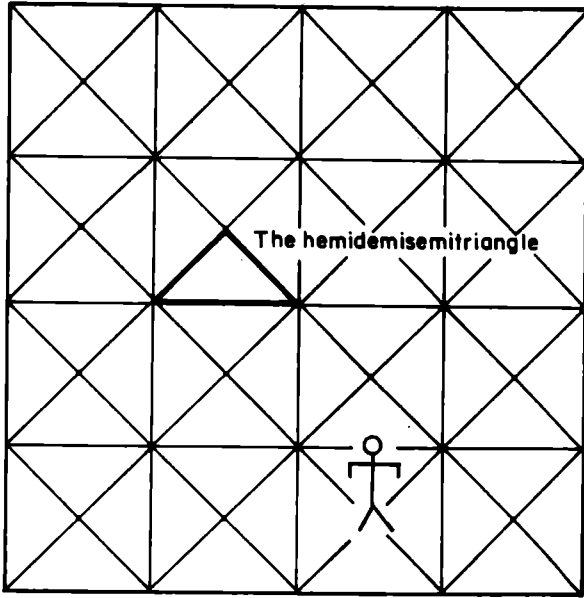


Fig.20. In 1970 A.C. a new configuration, the "hemidemiseitriangle", was hypothesized, out of which all known configuration of the 'hemidemiseitriangle' were thought to be the building block of the universe.

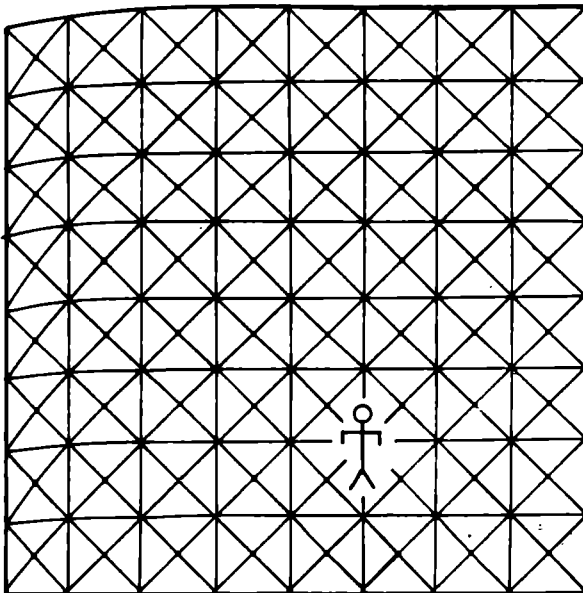


Fig.21. In 1975 A.C. the hemidemiseitriangle was discovered. The following year this was further split.

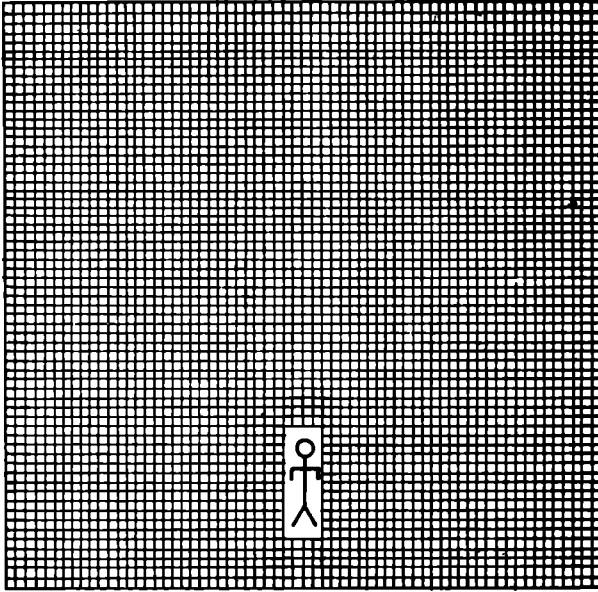


Fig.22. In 2000 A.C. the inhabitants of the paper square ask the question. "What does the structure of the universe look like?"

The figures and most of the figure captions introduced by G.F. Chew in *Physics Today* (October 1970) have reproduced by courtesy of *Physics Today*. In figure 1, around the year 10000 BC, the inhabitant of a paper square asks a question 'What does the structure of the universe look like?' This question is understandable, as the inhabitant did not have any other structure around him. Then slowly and gradually man discovered a number of structures—triangle and its parts, demitriangle and their images, antihemitriangle and antidemitriangle, then later parallelogram, nonalateral, rhombus, antinonalateral, antiparallelogram and then hemidemisemitriangle which is further split. The continuation of the procedure fills the paper square with a myriad of microstructures. The inhabitant of the paper square surrounded by these tiniest structures asks the same question in 2000 AD which he asked around 10000 BC, and is equally bewildered as before. The discoveries of structures within structures as depicted in the above figures characterise the large number of stable and unstable elementary particles (including the short-lived resonant states) discovered during the pursuit of high energy particle physics over more than half a century. The moral behind this description of structures is that while one structure generates another, the members



of such generators may become so awfully large that the very word generator may lose its significance. The main thing is that we stop at a point compatible with our present knowledge and hence believe in a certain structure without even asking from what structure has the present one been generated from or without asking about the numerous structure that the structure under discussion generates by accumulation. Thus if these questions regarding the 'generated' and the 'generator cannot really be answered in the final analogics, then the Revelation by Allah that He did not generate anyone nor was he generated from anyone should not bewilder us at all at any stage in the development of our scientific knowledge which has its own limitation. This statement should be indicative of the fact that the reductionist approach of the scientist, though useful, may not apply to the existence and powers of Allah.

The ultimate truth about the nature of Allah, the Supreme Being may not be comprehended through scientific methodology because of the space-time structure of the universe which we inhabit and because of the limitations of our biology and also that of the scientific methodology which we employ. We can comprehend Allah only through some of His attributes known to us.

-قُلْ أَعُوذُ بِرَبِّ الْفَلَقِ ۝

### 113: 1 Say I seek refuge with the Cherisher of Cleavage (Falaq)

رب الفلق.. (bi-Rabbil Falaq) has been translated by almost all the translators as the "Lord of day-break".

The root meaning of 'Falaq' is cleavage or splitting; day-break is only a special derived meaning in a narrow sense. This is not unjustified as the morning light penetrates the darkness of the night and brings about the glorious dawn. In our opinion, while interpreting this verse, it will be more appropriate to stick to the root meaning of 'falaq' and translate the phrase as "the Cherisher of cleavage or splitting". This verse will then emerge with a much deeper and wider significance as will be evident from what follows.

Splitting is a very important phenomenon occurring all around us. Numerous instances may be cited. In the plant kingdom, germination takes

place by splitting the seeds some of which (such as the strong seeds of date-plam, coconut, olive, plum etc.) have very hard coatings; the roots of the plants penetrate deeper into the earth in search of water and the shoots split the soil and raise their heads above the ground seeking the sun-light.

In the case of animals that lay eggs, the young ones inside the eggs come out by breaking the shells at the right time. In the case of other animals, in the female wombs male sperms penetrate into the female ovum to form a zygote; at birth the baby comes out in the open by breaking the membranous sack that encloses it.

In the material world, rocks split asunder to give way to the gushing forth of springs from beneath the soil. Atoms of some heavy elements split to produce radioactivity.

We also come across splittings of a violent nature called explosions which involve sudden and quick cleaving asunder. To-day modern astro-physicists believe that at the beginning of creation, an ultra-small, ultra-dense, ultra-hot "primeval atom" started expansion with a violent explosion (called "Big Bang") and brought into being the universe with its space, time, matter and energy.

The splittings do not occur haphazardly without any purpose; these are brought about by the combined action of a number of forces working in accordance with the laws ordained by Allah and the design decreed by Him.

## Appendix 1

# Cosmological Evolution

Scientists think that two recent observations have made the idea about the universe almost clear.<sup>1</sup> On a large scale every part of the universe (i.e. every galaxy) is receding away from every other part, with a tremendous velocity ; the further away a part is, the greater is its velocity of recession.<sup>2</sup> The whole sky is flooded with a fading glow, which looks the same in every direction ; the spectrum of the glow suggests that its source is at a very low temperature, about  $3^0$  K. These two observations together suggest that all the parts of the universe were once much closer; in fact packed into an ultra-small, ultra-dense, ultra-hot clump, which in some remote past, started expansion with a violent explosion, the Big-Bang, and brought into being, space time-continuum, matter and energy. At first the four basic forces, gravitational force, electromagnetic force, strong nuclear force and weak nuclear force were unified. Pressure of radiation maintained smooth expansion. Eventually, matter, at first consisting mostly of proton, neutron, electron, some amount of hydrogen and helium, began to form clumps. At Plank's time ( $10^{-43}$  seconds after the Big-Bang), gravity got separated from the other basic forces, and began to attract these matters to form clumps. These clumps continued to fly apart due to force of radiation, but individual clumps began to contract due to force of gravitation. There were strong movements in these clumps or gas clouds, and they also had a violent motion of rotation. Under the influence of these motions, the gas clouds took different shapes, e.g. spiral, spherical, globular, ellipsoidal, etc. These gas clouds ultimately turned into galaxies. Due to the violent rotation, some gas matter was thrown out of these gas clouds, which were brought together by gravitation to form stars. As gravitation attracted more and more matter at the centre, pressure and with it temperature began to increase there. After sometime temperature became so high, that the body began to glow. This is considered to be the foetus state of a star. If the mass is large enough, temperature at the centre rises higher. When the temperature rises to 10 million degree K, nuclear reaction starts at the centre. But if the mass of the star is less than 1/10th the mass of the sun, temperature at the centre cannot

rise so high as to start nuclear fusion reaction. The star continues to shine due to temperature caused by gravitational pressure only. The colour of the star at that temperature is brown, and as the star is small it is known as a "brown dwarf". Such stars remain in this stable condition for billions of years.

If the mass of the star is quite large, but does not exceed 1.44 times the mass of the sun (the critical mass— Chandra Shekhar's limit) sufficient matter is attracted at the centre to raise the temperature to 10 million degree K to start nuclear reaction. Hydrogen is converted into helium. Four atoms of hydrogen produce one atom of helium. As four atoms of hydrogen have 0.03 units of mass more than an atom of helium, the excess mass is converted into energy, which is utilised in converting more hydrogen into helium and also in radiation. At this stage two opposite forces come into play on the star. Force of gravitation tends to contract it, and that of radiation tries to expand it. A balance is maintained and equilibrium is established for a long period. A star in this state is known as a "main sequence" star. The eventual life-time in this stable condition for a star, with mass not exceeding critical mass, is about 12 billion years. But ultimately radiation wins over gravitation. The star expands to a huge extent and looks redder. A star in this state is known as a 'red giant' star. The core now consists mostly of helium, surrounded by a shell of fusing hydrogen. The helium core starts to fuse into carbon, liberating more energy. A state of unrest prevails over the star. It begins to pulsate once expanding and becoming dimmer and again contracting, becoming brighter. The star becomes a Cepheid variable. In this state, the star is known as a "pulsating" star.

As more energy is liberated, the outer shell of the star gets separated and drifts away, leaving the central portion drastically reduced in size. Gravitation now reigns supreme. Density becomes so high that the electron shells around the nuclei of atoms are broken down and electrons and nuclei pushed closer together and form, what is known as degenerate matter. At this stage the star is known as a "white dwarf" star. If the mass of the star is less than the critical mass, nuclear fuel gets exhausted, no further fusion is possible. The star begins radiating away its own internal heat and thus slowly cooling down and fading away. The carbon core of a white dwarf is under enormous pressure and that being so may be transformed into a big diamond crystal.

If the mass of the star above but not too far above, the critical mass, say 10 times the mass of the sun, the gravitational pressure becomes too high for the core to resist. The white dwarf star collapses, or it has an implosion. This catastrophic event releases an enormous amount of energy as nova and supernova explosions. This implosion compresses the star enormously, pushing every thing towards the core. Electron cores are crushed out of existence; they combine with protons of atomic nuclei and form neutrons. The core fuses carbon into iron. Iron absorbs energy, rather than releases it. Gravity overwhelms the core, crushing it into a superdense nucleus, throwing off shock waves. The star consists of a core composed of neutrons. At this stage, the star is known as a "neutron" star. It has an enormous density of  $10^{14}$  gm. Per c.c. A cubical ludo-dice of volume  $1 \text{ cm}^3$  full of neutron-star-material weighs about the same as all the present human beings on earth. These neutron stars rotate rapidly with an intense magnetic field and produce pulses. These pulses of a period, sometime less than a second, keep better time than any man-made machine. So neutron stars are also called "pulsars."

If the mass of the star be still higher say 100 or 1000 times the mass of the sun, the white dwarf collapses beyond the neutron stage, throwing off large amount of stellar debris, which burns brighter than billion suns causing supernova. The remaining part is so dense that even light cannot come out of the grip of the gravitational pull. The star just vanishes out of sight and constitutes what is known as a "black-hole". A neutron star in a binary system might become a medium sized black-hole if enough mass from its companion accumulates on it to push it over a critical stage.

Besides the stars, Allah has placed some other celestial bodies in the sky which form parts of the universe. These are planets, satellites, star-clusters, nebulae, galaxies and quasars.

**Planets and satellites :** Though planets to stars, other than the sun, have not yet been visually observed, there are strong evidences, that some of the stars have also planets revolving round them. A star (like the sun) and the rest of its stellar system (like the solar system) were formed out of the same stellar cloud of contracting gas, flattening and rotating. The star (like the sun) condensed at the centre of the cloud, leaving the planets, the satellite, etc. distributed through the circum-stellar sphere.

**Star-clusters :** In the sky, in addition to many isolated stars that seem to follow their own paths through space, there are pairs of stars, like binary

stars, triple stars, multiple stars consisting of several stars, orbiting round a common centre of mass and larger groups of stars, known as star clusters bound by gravitational force. There are open clusters and globular clusters. A large globular cluster may contain 100,000 member stars. It is presumed they had a common origin.

**Nebulae :** Nebulae denote clouds of gas and dust found in interstellar space. We have seen that gas masses drift away from red giants, stellar debris is thrown out in the case of implosion causing novae and super-novae explosions. These materials constitute the interstellar gas, and dust forming the nebulae. Nebulae are the birth places of stars and stellar systems.

**Galaxies :** A galaxy is a loosely gravitationally bound system of stars. Galaxies are units of the universe. More than 100 million galaxies so far been detected. There are different shapes of galaxies. Our Milky Way galaxy is a spiral galaxy. It contains about 100 billion stars. Galaxies are receding away from one another with tremendous speed.

**Quasars :** Quasars are the most curious and most energetic objects in the universe. A quasar emits 100 or 1000 times more energy than a galaxy like the Milky Way with 100 billion stars in it. They are very strong radio sources of a diameter, some times, less than a second of arc. Absolute radio-luminosity of a typical quasar is more than a million times that of a normal spiral galaxy, with a diameter less than 30,000 times smaller. These objects are not only extragalactic, but are to be ranked with most distant galaxies. Quasars have been found at distances of 20 billion light years receding away with velocity about 90% of the velocity of light. The present theory is that quasars are unseen galaxies with massive black-holes at its centre.

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## Appendix II

### Modern Theory of the Creation of the Universe

How did the universe begin ? When did it begin ? These questions have aroused human inquisitiveness from the earliest civilizations and have given birth to many myths in the past. Answers to these questions have engaged some of the best thinkers of the modern age. Humanity may be compared to explorers on a strange island, earth, in an unknown sea of heavenly bodies surrounding him. Only 20th century science has given clues to the riddle about the origin of the creation in the celebrated 'Big-Bang theory'. The Big-Bang theory almost certainly gives an indication of some events that occurred about 15 billion years ago.

**Red Shift :** The twentieth century witnessed several breakthroughs in scientific technique in the field of astronomy. In one technique light from a far away star or a galaxy would be collected for a sufficiently long time to form images on photographic plates through powerful telescopes developed for the purpose. In another method light from heavenly bodies was split into different wavelengths enabling scientists to identify the element or molecule from which the light originates. With the help of Doppler effect, as every physics student knows, in the case of a star moving away from us, the whole spectrum of light is shifted toward the red or long wave end and this is known as red shift in astronomy. It was in 1888 that the German astronomer, H.C. Voigt, first discovered the red shift in star light. By ingenious interpretation of the red shift it is possible to obtain information about the temperature, size, structure and motion of the celestial bodies. By the middle of the 20th century a new and very powerful method known as radio astronomy was developed enabling astronomers to carry their exploration into far away regions in the sky hitherto unapproachable by the most powerful optical telescopes. In this technique radio signals sent out by heavenly bodies were picked up by radar at various frequencies. Radar is an acronym for "Radio Detection and Ranging." The radio signals of various frequencies picked up from heavenly bodies also have Doppler effect so that analysis of these signals gives us invaluable information about the source such as the element or molecule from which the signal originates, their temperatures, size, structure, and motion.

**Hubble's Law :** In 1929 Hubble announced that galaxies in all direction are moving away from us. There is a linear relationship between the distance of a galaxy and its velocity of recession which increases with distance (fig.1). It is known as Hubble's Law. Hubble arrived at this conclusion from the study of the red shift of galaxies at the famous Mount Wilson astro-laboratory. The best estimate of the ratio of velocity to distance known as Hubble's constant for many galaxies is about 61 units (km/sec/million light years). The inverse of this ratio is the Hubble time : the time it would have taken for any given galaxy at its present velocity to reach its present position, or in other words the time since the Big-Bang. Accordingly 15 billion years ago, there was no sun, no star, no galaxy, i.e. there was no heaven or earth.

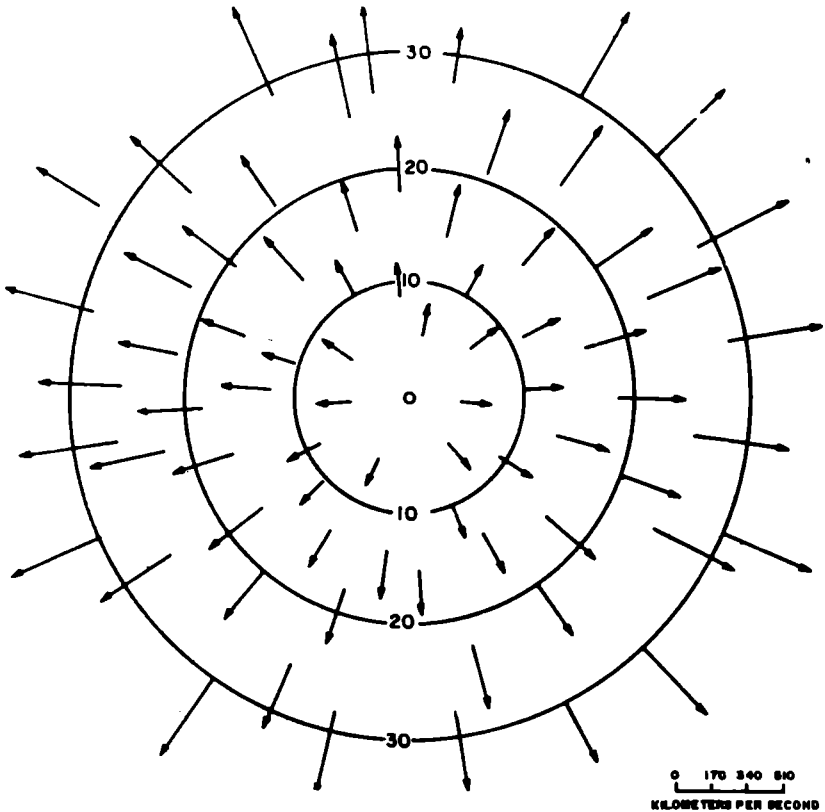


Fig. 1. The Cosmic expansion seems to place the observer at the centre of the universe from which all distant galaxies are receding away with increasing velocities for increasing distances.



**The Big-Bang :** Fourteen years prior to Hubble's remarkable discovery that the universe is expanding in all directions, in 1915 Albert Einstein had proposed his famous general theory of relativity. He saw that the gravitational effect of masses distributed in space and moving in time was equivalent to the curvature of the four-dimensional space-time continuum. Euclidean geometry which holds for flat surfaces was no longer valid in Einstein's space-time continuum. Euclid's axiom about parallel lines that on a plane surface only one parallel line to a given straight line can be drawn through a point not on that line is overthrown in non-Euclidean geometry, e.g. on a negatively curved surface many straight lines called geodesics can be drawn through a point not on a given geodesic without ever intersecting it. The Euclidean theorem that the sum of the angles of a triangle is 180 degrees no longer holds on a curved surface. Analysing the pertinent mathematical equation, Einstein in 1917 constructed the "spherical universe" model. The space coordinates in this model were curved in the same way as the latitude or longitude coordinates on the surface of the earth, and the time axis ran quite straight. The Einstein universe was static ; the galaxies in it stayed put and did not move away from each other. In 1922, a Russian physicist Alexander A. Friedmann discovered that Einstein's proof for a static universe contained an error of division by zero under certain circumstances. He found two non-static models as possible solutions of Einstein's equations. One pictured the universe as expanding with time ; the other contracting. Nobody took any notice of this historic theoretical prediction at that time.

Thus Friedmann and Hubble laid the foundation for the theory of an expanding universe. Soon the Belgian astronomer Georges Lemaitre proposed that our universe had started from a highly compressed and extremely hot state which he called the "primeval atom". Creation started with the expansion of this ultra-hot ( $10^{13}$  degrees K), ultra-dense, ultra small clump of "primeval atom" caused by a violent explosion—the Big-Bang.

**The Steady State Theory :** In 1948 three British theoreticians, namely, Hermann Bondi, Thomas Gold and Fred Hoyle, proposed an alternative theory for the creation of the universe. In the steady state model the universe is ever expanding keeping Hubble's law intact, but the universe has no instance of beginning ( $t=0$ ) or end. Philosophically no beginning or end idea is very catchy. Mathematically this is achieved by continuous creation of

matter as the universe expands thereby maintaining a constant density. The violation of the law of conservation of matter and energy by continuous creation of matter was countered by imagining a reservoir of negative energy radiation, which was called the G-field.

**The 3<sup>0</sup> K Background Radiation and Confirmation of Big-Bang Theory :** In 1946, George Gamow had the boldness to calculate the temperature of the primeval fireball for a Big-Bang to happen and explore its consequences. The details of the calculations are fascinating ; it is quite surprising how much can be reliably deduced about what went on so long ago. The primeval atom was compressed to a fantastically high density at a temperature as high as  $10^{13}$  deg. K. After a violent explosion, the universe started cooling. Gamow predicted that the radiation which was present at the hot epoch had cooled down and would be observable even today as a background radiation that peaks at microwave wavelength of about 2 mm corresponding to the blackbody radiation of 3<sup>0</sup> K. In 1965, Arno Penzias and Robert Wilson, two physicists of the Bell Telephone Laboratories in the USA, made the epoch making detection of the 3<sup>0</sup> K. background radiation which was the remnant of the "Big-Bang". This gave the death blow to the steady state theory and established the theory of the Big-Bang.

### **The Origin of Galaxies, Stars and Planets**

'Big-Bang' resulted in the formation of galaxies and stars and planets. What was torn asunder at the beginning of time has now taken the form of an organised system. To-day scientists believe that within one second after the explosion as the universe expanded, the temperature dropped to  $10^{10}$  deg. K. At this stage the universe contained only the simplest kinds of matter, such as protons, neutrons, electrons, neutrinos and their antimatter. After about a hundred seconds, the temperature dropped to about  $10^9$  deg. K. At this temperature protons and neutrons combined together. Nuclei of light elements like isotopes of hydrogen, helium and lithium were formed. The first nuclear assemblage was deuterium – an isotope of hydrogen, containing a proton and a neutron. Then two protons and a neutron could combine to form the nucleus of a helium isotope, and then another neutron could join to form the nucleus of helium. This process continued for about 1000 seconds and then discontinued when temperature dropped to  $10^8$  deg. K., too low for nuclear reaction to continue. At this stage, the universe contained photons, protons, neutrinos, electrons and helium nuclei. All the neutrons were used

up in nucleosynthesis and 25 to 30% of the mass of the universe was converted into helium nucleus (fig. II).

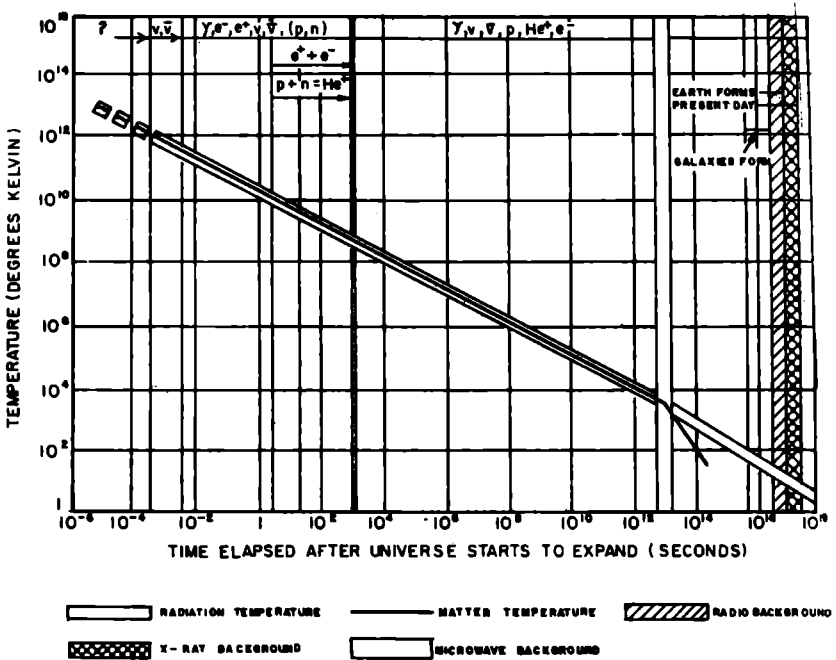


Fig. II A simplified picture of the creation of matter after the Big-Bang.

For the next million years the universe cooled as it expanded until temperature dropped to 3000<sup>0</sup> K when protons captured electrons in the orbitals forming hydrogen atoms. During this period only lighter elements were formed and matter was progressively concentrated by gravitational forces, first into protogalaxies and eventually into galactic types seen today (fig. III). The problem with this gravitational instability theory is that it cannot explain why the galaxies spin and where the angular momentum comes from. The latest version of the alternative theory involves a fundamental cosmic turbulence that existed at the origin of the universe. However, the picture is not clear yet.

**Stars :** The sequence of different stages in a star is described in detail in appendix 1. The formation of lighter elements has been described before. The theory of nucleosynthesis shows that heavy elements are built up in the interior of ordinary stars.

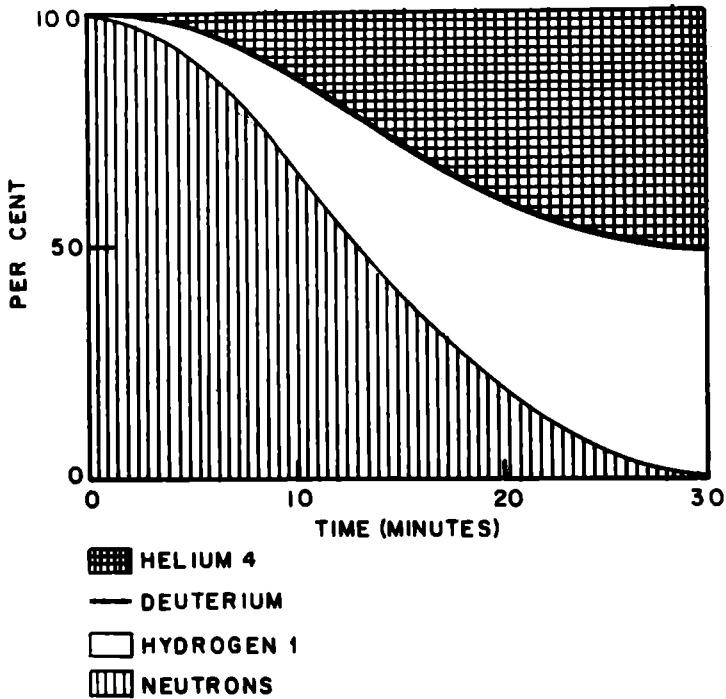


Fig. III. Creation of some elementary nuclei and particles during the first 30 minutes after the Big-Bang due to thermo-nuclear reaction..

At present it is thought that the sun and planets condensed out of smaller clouds of gas and dust in the interstellar space. Some 5 billion years ago, billions of years after the galaxies began to form, smaller clouds of gas and dust having some net spin from the beginning began to spin faster as they condensed because of the conservation of angular momentum. Perhaps rings of material were left behind by solar nebula (interstellar dust and gas) as it contracted towards its centre. The central part of the rotating solar nebula contracted to form the protosun and finally collapsed further to become the sun itself. The outer rings gave birth to planets on further gravitational

collapse. The sun was massive enough to heat up its centre from the heat energy it gained from gravitational contraction and this energy initiated nuclear fusion reaction in the sun giving out heat and light such as we receive today our own sun. The planets were not simply massive enough to heat up sufficiently to have nuclear reactions start.

**The Future of the Universe :** Basically the question is whether the universe goes on expanding for ever to an infinity or if gravity is strong enough, then the expansion will gradually stop and a contraction will begin. The latter possibility may give rise to many oscillations or a single oscillation universe in Friedman's geometry. All the recent experimental studies suggest that the universe will not stop its expansion. However, the ultimate answer is not known yet.

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## Appendix III

### Acquired Immune Deficiency Syndrome (AIDS)

Dr. Michael Gottlieb of the USA noticed some strange phenomena among his homosexual patients in his third case since 1979 to 1981. These patients were suffering from an unusual opportunistic lung infection due to *Pneumocystis carinii* pneumonia (PCP). He suddenly realised that he was probably witnessing medical history, but he still did not realise the gravity of the findings. He then reported his findings to the Centre for Disease Control (CDC). Atlanta, USA in June, 1981. By then Gottlieb found his 4th patient and in all of them he found a 'near wipe out' of helper T-cells.

CDC gave the disease its new name – Acquired Immune Deficiency Syndrome (AIDS) based on the findings of their 5 young previously healthy homosexual males treated in a Los Angeles hospital for the rare lung infection-PCP<sup>1</sup>. Again in 1981, 26 previously healthy homosexual males in New York and California developed Kaposi's sarcoma and 8 of them died within one year. Kaposi's sarcoma is a rare vascular malignant tumour in North America found only among the elderly men above 60 years of Mediterranean or Jewish origin. But these affected homosexuals were aged 20 to 40 years with no such ancestry and none had any known reason for immune deficiency. Thus the appearance of PCP and Kaposi's sarcoma in Young men became 'markers' for the new disease entity– AIDS.

In 1984 the causative virus of AIDS was detected and were named HTLV virus has called HIV virus of Human Immune deficiency virus. These are so far known in three forms - HIV-A, HIV-B and HIV-C.

#### Definition of AIDS as formulated by CDC and approved by WHO

"A reliably diagnosed disease that is at least moderately indicative of an underlying cellular immune deficiency (e.g., PCP, Kaposi's sarcoma, candidiasis etc), but which has had no known underlying cause of the cellular immune deficiency nor any other cause of reduced resistance reported to be associated with that disease".

#### Epidemiology

The sudden appearance and rapid increase in the unnumber of cases in the USA created an alarm in the Western world. Besides. AIDS was found to be

highly lethal as 85% of the diagnosed cases in the last three years died. The number of cases in the USA increased from 64 in pre-1981 period to 12,067 in July, 1985 with about 50.0% death. The number of cases in the USA rose to 54,000 up to April, 1988.

In the UK the number of cases increased from one in pre-1981 to 241 in July 1985, and 1227 in April, 1988 with almost 50.0% death. In 17 European countries including the UK the figure had reached from 940 up to several thousands in April, 1988.

AIDS has been detected in most of the advanced countries in Europe and America. Large number of cases are being reported from the central (Sub-Saharan zone) and south Africa. Due to comparatively free sex, AIDS virus is spreading very rapidly among the Muslim Black African nations, specially in Zimbabwe, where 50% - 60% people are infected.

So far the Asian countries are concerned, according to world Health report, 1995, about 20,000 AIDS cases out of 2000,000 infected people (as on the 15th of May 1995) were reported in 10 countries of South and South East Asia region. Among them India, Thailand, Sri Lanka, Nepal, Myanmar, Bhutan, North Korea and part of Indonesia have the maximum number of AIDS or HIV infected people.

In Bangladesh the incidence of AIDS is very small. So far only 9 cases were diagnosed of which 3 have died, About 51 persons have shown infection with AIDS virus. The main reason of low incidence is the prevalence of Islamic moral code in Bangladesh. Since the neighbouring India has 1200 cases of AIDS and 1,500,000 HIV cases, (WHO report, May 1995), Bangladesh Govt. should take special care to avoid the spread from comparatively free sex society of India and Burma.

All Foreigners and Bangladeshi visitors of western and AIDS infected countries must produce AIDS and HIV free medical certificate before allowed to enter the country.

Besides, Islamic moral code and the importance of total ban on extra marital sex must be incorporated in the teaching courses of the adult students.

### **Who can get AIDS ?**

The following groups of people are in the high risk group to contract AIDS :

1. Homosexual and bisexual men : About 90-95% of AIDS patients are men and about 75% of them are homosexuals or bisexuals. The total

number of homosexual men in the USA and the UK are reported to be 12 million and 9.6 million respectively. So there is a great risk of much increase in the number of AIDS cases in future in those countries.

About 90% of homosexual men with AIDS are aged between 20-49 years and belong to all racial groups in the USA. Homosexuals get AIDS infection through infected semen or blood during anal intercourse (sodomy) with multiple (more than 50 per year) or casual partners. AIDS patients have more sexual partners compared to the AIDS-free homosexuals. In a survey, 50.0% AIDS patients were found to have 10 or more different sexual partners a month<sup>2</sup> and the range of partners was found to be 1 to 1000 a year<sup>3</sup>.

Semen from another person acts as a foreign body - an antigen, and produces an antibody in the recipient. These antibodies are found to be autoantibodies and may affect the body's own cells and in particular the T-lymphocytes. The overall effect is immunosuppression. This has positively been seen in mice. In homosexual men, repeated exposure to semen may be a factor for immune suppression among the homosexual AIDS patients.<sup>4</sup>

2. Intravenous (I.V.) drug abusers: Among normal (heterosexual) men or women with AIDS in the USA, about 60% are reported to be I.V. drug users. The number of I.V. drug abusers among the homosexual men is also very high. The drugs mostly used are heroin and cocaine. A drug itself is not found to be immunosuppressive, but sharing of the needles and renting needles in so-called 'shooting galleries' help spread the AIDS virus like hepatitis B virus. The presence of antibodies to the AIDS virus among the I.V. drug abusers varies in different countries-87% in USA, 37% in Spain and Switzerland and only 1.5% in UK.<sup>5</sup>

It is interesting to note that about 80% of patients with AIDS have antibodies against hepatitis B virus due to past or current infection. Again about 90% of hepatitis B cases in the USA belong to one of the risk groups of AIDS - homosexuals, intravenous drug abusers and haemophiliacs.

3. Haemophiliacs: Haemophiliac patients suffer from an inherited deficiency of one or two of the clotting factors (factor VIII and factor IX), essential for blood clotting. As a result they bleed for a prolonged period even after a minor wound. This sex-linked genetically determined disorder is found only in men, although women can be carriers of this trait. To lead a normal life, haemophiliacs need regular injection of the missing factor or



factors. The commonest defect is the lack of factor VIII (haemophilia A) and the other less common defect is the lack of factor IX (haemophilia B or Christmas disease). The injectable clotting factors are obtained as cryoprecipitate or freeze dried (lyophilised) concentrate. The former is derived from a pool of about 20 donors while the latter (Lyophilised) is derived from a pool of 2000-5000 different donors. So a haemophilia patient may be exposed to tens of thousands of donors each year. Thus the haemophiliacs are far more at risk of contracting AIDS than the recipients of other blood transfusions where a few donors are usually involved. AIDS is now the most important complication in the treatment of haemophilia. In the USA out of 20,000 haemophiliacs 71 (including 6 children) were AIDS patients up to 30th April, 1985<sup>6</sup>.

#### 4. Recipients of whole blood and products other than clotting factors.

Besides clotting factors, whole blood, platelets and which blood cells are also used for treatment, and AIDS can easily spread through these as well. Though the frequency of transfusion associated AIDS is very low, patients undergoing heart surgery and kidney transplant and leukaemic patients may need many transfusions (even 50) and their risk for acquiring AIDS is much greater than that of casual recipients.

5. Heterosexual partners of AIDS patients: AIDS does not spread readily in the community and its spread to the female sexual partners is very limited in comparison to other sexually transmitted diseases (STD) like syphilis, gonorrhoea, herpes etc. Only 6% cases of AIDS in the USA are female sex partners. Again the possibility of anal-genital intercourse with the female partners of AIDS patients cannot be overruled. There are reports of 41 cases of AIDS in the UK, who do not give any history of sex contact with the common high risk group, but all of them had more than 100 heterosexual contacts over the past 5 years. So prostitutes may serve as a reservoir for AIDS. In central and West African countries prostitutes are spreading AIDS at an alarming rate.

6. Childhood AIDS: The AIDS virus may pass from mother to child by the transplacental route or via the mother's milk. Out of 113 infant AIDS patients (out of 148 total paediatric patients) 72% have one or both parents who have AIDS or belong to high risk groups. About 50% of AIDS in children are in milder form and the remaining half are fully expressed AIDS.

AIDS is believed to be occurring commonly in Haiti, Zaire, Zambia, Uganda, Rwanda and other equatorial countries. AIDS in central Africa is

interesting for it is in this area that Kaposi's sarcoma is endemic (13% of all malignancies in Zaire). A recent report showed that 36% children in Zaire have antibodies against the AIDS virus, HTLV-III. Besides, recently about 14000 Haitians visited Zaire and it is possible that infected Haitians introduced the disease in Zaire. Recent study further suggests that heterosexual contact may be the main method of spread among Africans. It is supported by the fact that the ratio of male to female with AIDS is 1 : 1, and 80% of prostitutes in large cities in central Africa have antibodies to the AIDS virus. AIDS is increasing in both sexes in Western African countries like Ghana and the Ivory Coast.

### Clinical picture

The signs and symptoms which may suggest AIDS are:

1. Profound fatigue for several with no obvious cause.
  2. Persistent generalised lymphadenopathy (PGL) usually bilateral in occipital, cervical, supraclavicular, axillary, epitrochlear, inguinal and popliteal regions. The lymph nodes are 1 cm or bigger in size persisting for at least 3 months in at least two anatomically distinct sites other than inguinal nodes, without any apparent cause of lymphadenopathy, Histologically the nodes show benign reactive hyperplasia.
  3. Unexpected weight loss of more than 10 pounds (4.5 kg) in two months.
  4. Persistent fever lasting for several weeks and the patient may seem to general practitioners to be suffering from pyrexia of unknown origin (PUO). The pathogens mostly responsible for the fever are *M. tuberculosis*, atypical mycobacteria, cytomegalovirus or other opportunistic infections.
  5. Night sweating often disturbing sleep at night.
  6. Oral and oesophageal and persistent diarrhoea (Gay Bowel-Syndrome).
  7. Malignant neoplasms like Kaposi's sarcoma, lymphoma, and squamous cell carcinoma of oral cavity and anus.
  8. Symptoms suggestive of CNS (Central Nervous System) involvement e. g., lethargy, depression and even dementia.
  9. Pneumonia and severe chest infection with *Pneumocystis carinii* (PCP).
- Incubation period** is uncertain and is believed to be 6 to 72 months.

**HTLV-III/LAV:** The Lymphadenopathy associated virus (LAV) was first identified by Prof. Luc Montagnier and his team in Paris at the Pasteur Institute in May, 1983 from a male homosexual with lymphadenopathy.

The HTLV-III virus was identified one year later in May, 1984 by Dr. Robert Gallo at the National Cancer Institute in Bethesda, Maryland, USA. Still later Dr. Levy from San Francisco isolated a similar virus called AIDS-related virus (ARV). All these three viruses are probably the same virus as these are indistinguishable by assay tests, genetic codes and electron microscopic appearance. To give proper honour to the first discoverer of LAV and HTLV, the AIDS virus is now called HTLV-III/LAV virus. The ARV virus seems to be the same as HTLV-III. Recently WHO named the virus of AIDS as HIV (Human Immune Deficiency Virus).<sup>7</sup>

Antibodies to HTLV-III/LAV have been detected in 97% of AIDS patients, 60% symptomatic homosexuals, 42% contacts of AIDS or PGL patients and 34% patients of haemophilia receiving clotting factors. The HTLV-III virus has been isolated from a high percentage of AIDS patients, children with AIDS, mothers of paediatric AIDS patients, and clinically normal homosexuals. No control subject outside risk groups showed any evidence of HTLV-III infections.

**Detection of Antibody to HTLV-III-** Abbotts of USA and Welcome Diagnostics of UK have developed enzyme immunoassay technique for the detection of HTLV-III antibody. The technique is known as Elisa method. One should remember that the presence of HTLV-III antibody is not a diagnosis of AIDS. Sero-positive specimens should be reexamined by Western Blot technique (an immunoelectrophoretic method). Again, a negative result does not exclude the possibility of exposure to or infection with HTLV-III. A positive test simply indicates that the subject was exposed to HTLV-III. No positive case had been diagnosed in Bangladesh until 1990.

**Pathogenesis of AIDS-** An antigen specially a virus, when it enters the body, is detected and identified as a foreign body by the macrophage cells which alert the T-cell. The T-cell is activated and multiplies into several kinds of T-cells one of which is Helper T-cells. The Helper T-cells stimulate the B-cells and these in turn multiply and produce specific antibodies against the antigen. The AIDS virus attacks the Helper T-cells and infects them and soon the T-cell is made to manufacture further HTLV-III virus and more T-cells are infected. As a result there is depletion of T-helper cells which in turn causes impaired B-cell antibody response. Depletion of T-helper cells further causes reduction of cytotoxic T-cells and suppressor T-cells against the antigen. It also causes decrease in the production of lymphokines which

activate various white blood cells including lymphocytes. The end result is the deficiency of cell-mediated immunity. Since the antigen also stimulates B-cells which leads to increased activated B-cells (plasma cells) producing humoral antibodies, this is responsible for hyper gammaglobulinaemia (2 & 1) in AIDS.

From the discussion above, it is clear that free and uninhibited sex life with multiple partners, homosexuality among males and intravenous drug habits are mostly responsible for the spread of this disease. (People of prophet Lut (a.s.) were destroyed for the perversion of male homosexuality. The prophet Muhammad (sm.) warned that if any nation becomes so much perverted in sex life that even the sense of shame is lost, then Allah will send upon them diseases which their forefathers never knew.<sup>8</sup> Such was the case when Syphilis first appeared in the 15th century Europe. AIDS of today may be a warning of Allah to the people of the Books in general and to the Western Christian and other westernized nations of the world in particular.)

The key word in the prevention of the spread of AIDS is strict adherence to married sex life with no extra marital sex of any type.

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## Appendix IV

### The Subatomic Particles

Scientists have always debated and probed about the ultimate constituents of matter. *Atomos*, the Greek root of "atom" means indivisible, and it was once thought that atoms were the ultimate, indivisible constituents of matter. In 1911, Ernest Rutherford showed that the atom consists of a small, dense nucleus surrounded by a cloud of electrons. It was subsequently established that the nucleus itself consists of positively charged protons and neutrons. By 1957 thirty so called elementary particles were discovered, and very soon this number increased to more than one hundred. Such proliferation in the number of these particles posed the question whether these could be called elementary at all.<sup>1</sup> It is now thought more reasonable to call these subatomic particles. The search of physicists for an organised and beautiful world of particles was in jeopardy at the subatomic level. However, the situation has changed tremendously during the last decade.

The physicists discovered some common points in these subatomic particles. These can be classified in broad families according to the kinds of force they feel. There are four fundamental forces that account for all interaction of matter, namely, gravitation, electromagnetism, the strong force and the weak force. The gravitational force influences all matter and it acts from the closest range to infinity. However, this force is negligibly small compared to other forces for the infinitesimal masses involved in subatomic events and it has about  $10^{-59}$  of the strength of the strong forces. The electromagnetic also has infinite range, but it acts only on matter that carries an electric charge or current. This force is 137 times weaker than the nuclear forces. Two particles interact electromagnetically by the exchange of a photon or photons. A photon is a particle that has no mass and no charge and it does not participate in either strong or weak interactions. Neutrons and proton are known to interact through the strong, short range (about  $10^{-13}$  cm) nuclear force, which is responsible for the binding of these particles in the atomic nuclei. Two nucleons (protons and neutrons) interact by exchanging pions. The weak interaction is about a one-hundred trillionth  $10^{-14}$  of the strength of the strong interaction. The weak force has also a short range (about  $10^{-14}$  cm) and cannot, as far as anyone knows, bind

anything, it governs the decay of many strongly interacting particles and is responsible for the decay of certain radioactive nuclei<sup>2</sup>.

Those particles which feel the strong force are called hadrons ; these are again subdivided into two classes called baryons and mesons. The baryons include the proton, neutron and their antiparticles. The mesons include such particles as the pion and the kaon. There are in all more than 100 known hadrons, most of them massive and unstable. Particles which do not feel the strong force but do respond to the weak force are called *leptons*. There are just four leptons : the electron and its neutrino and the muon<sup>2</sup> and its neutrino and tau and its neutrinos and their antiparticles. Table 1 is a list of sub atomic particles classified according to the kinds of interaction in which they participate<sup>3</sup>.

Table 1. Present Status of Particle Physics

Interaction	Participating Particles	Carrier	Theory
strong	Quarks : <i>u, d, c, s, t, b</i>	gluon	quantum chromodynamics (QCD)
electroweak	quarks (listed above) and leptons : <i>e, ν<sub>e</sub>, μ, ν<sub>μ</sub>, τ, ν<sub>τ</sub></i>	photon, and intermediate bosons : <i>W<sup>±</sup>, Z<sup>0</sup></i>	SU (2) X U (1) (including quantum electrodynamics (QED))
gravity	everyone and everything	graviton	general relativity

Table 2. The Names and Properties of the Quarks

Quark	<i>u</i>	<i>d</i>	<i>s</i>	<i>c</i>	<i>b</i>	<i>t</i>
mass	~10MeV	5 MeV	100 MeV	2 GeV	5 GeV ?	
charge/e						
Q <sub>q</sub>	2/3	-1/3	-1/3	2/3	-1/3	2/3
species (color)	3	3	3	3	3	3
interaction strength	strong at ~1 GeV energy, but becomes 0 as energy approaches ∞					

The search for the ultimate constituent of matter brought more than one hundred subatomic particles into the scene. In an effort to explain the great proliferation of hadrons, Murray Gell-Mann and George Zweig of the

California Institute of Technology, independently introduced the quark hypothesis in 1963. It is now thought that quarks and antiquarks are the constituents of all strongly interacting particles ; protons, neutrons, pions, kaons, and so forth (Table 2). Experimental evidence indicates that protons and neutrons have an internal structure. Upto now quarks give every indication of being truly elementary particles. They behave like point masses with absolutely no internal structure. Glashaw introduces the idea of gluons. These are particles that are exchanged between 2 quarks keeping them bound together<sup>4</sup>. There was indirect evidence in 1979 suggesting the existence of gluons.

Electrons, muons, neutrinos and taus comprise one family of particles that we call leptons. No matter how hard the probe is with the highest energy accelerates, these appear with absolutely no internal structure. Steven Weinberg suggested that  $w^+$ ,  $w^-$  and  $z^0$  are the three particles that do the job of the weak force.<sup>5</sup> Whereas the strong nuclear force arises from gluons that change colour (a property of quarks), the weak nuclear force changes the flavour (another property) of quarks via W particle. The weak force is colour blind.'

In an effort to unite the forces Salam and Weinberg showed that the electromagnetic and weak interactions are different manifestations of a single force known as the electro-weak force. The carriers of this force are photons and intermediate bosons ( $W^+$ ,  $W^-$  and  $Z^0$ ),

Finally, we find that everything in this universe is constructed from only these two types of particle: lepton and quarks. Thus the search for the ultimate constituents of matter appears to have succeeded. Those two families of particles exhibit profoundly beautiful symmetries in colour, flavour and spins. Indeed even at subatomic level everything is highly organised, symmetrical and beautiful as ordained by the Creator.

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## Appendix v Lunar Stations

	Arabic name	Indian name
1.	الشيطان	Aswini
2.	البطين	Bharani
3.	الثريا	Crittica
4.	الدبران	Rohini
5.	المقعة	Mriga shira
6.	الهنعة	Ardra
7.	الزراع	Punarbasu
8.	النثرة	Pushys
9.	الطرفة	Ashlesha
10.	الجبهة	Magha
11.	الزبرة	Purba Falguni
12.	الصدقة	Uttar Falguni
13.	الهواء	Hasta
14.	كالمسا	Chitra
15.	الفجر	Swarti
16.	النجان	Bishakha
17.	الأكليل	Anuradha
18.	القلب	Jyeshtha
19.	الشولة	Mula
20.	النعام	Purbasha
21.	البلدة	Uttarashadas
22.	حد الجبجج	Adhijit (No longer in use)
23.	صدالبع	Srabana
24.	سعد السعود	Dhanishtha
25.	سعد الأفبية	Shatabisha
26.	فرخ الدولوالمقدم	Purba Bhadra pada al-mukaddam
27.	فرخ الدولو	Uttar Bhadrpada
	المؤخر	
28.	الرشا	Rebati



## Appendix VI

### Congenital Malformations and Their Causes

About 20% of deaths at birth are due to congenital malformations. There are three groups of congenital malformation in the foetus and infants;

- A) Malformations caused by genetic factors;
- B) Malformations caused by environmental factors;
- C) Malformations due to a combination of both the factors which is known as Multifactorial Inheritance.

#### A. Malformations caused by genetic factors

Chromosomal abnormalities are present in about 1 in 200 newborn infants<sup>1</sup>. The chromosome complements are subject to two kinds of change; (i) numerical and (ii) structural, and they may affect either sex chromosomes. The mechanism of genetic malformations is caused by biochemical other means at the subcellular, cellular, or tissue level,<sup>2</sup> (iii) There are also genetical malformation due to mutant genes.

##### (i) Numerical chromosomal abnormalities

This occurs due to nondisjunction, an error in cell division in which there is failure of the paired chromosomes or sister chromatids to separate or disjoin at anaphase.

Normally, the chromosomes exist in pairs and the component of the pair is called homologues. A human male has 22 pairs of autosomes and one X and one Y chromosome to make 23 pairs. (22 + XY). A female possesses 22 pairs of autosomes plus two X chromosomes (22 + XX). One of the two X chromosomes in females forms a mass of X- chromatin, which is absent in cells of normal males.

Any deviation from the diploid number of 46. chromosomes leads to numerical chromosomal abnormalities such as Turner's syndrome, Down's syndrome and Klinefelter syndrome. These defects cause mental deficiency and various physical and physiological defects. Sometimes there are cells which contain multiples of the haploid number of chromosomes heading for polyploidy and in such cases mostly it causes spontaneous abortion.

(ii) Structural abnormalities; These types of abnormalities result from chromosome breaks induced by environmental factors like radiation, drugs,

viruses etc.<sup>3</sup>. There are several types of structural abnormalities like translocation, deletion, duplication and inversion.<sup>4</sup> Some of these defects lead to mental retardation, congenital heart disease and sometimes Down's syndrome.

### (iii) Malformations due mutant genes

About 10 to 15% congenital malformations are caused by mutant genes. These are much rarer than numerical and structural chromosomal abnormalities. Though many genes mutate, only a few cause congenital malformations. The examples of this type of abnormalities are achondroplasia showing some deformed physical features and polydactyly or extra digits. Some malformations are due to autosomal recessive inheritance e. g., congenital adrenal hyperplasia resulting in abnormalities of genitalia. Only those who are homozygous will manifest autosomal recessive genes in the case of heterozygous persons it will remain undetected.<sup>5</sup>

### B. Malformations caused by Environmental factors:

The embryonic organs are most sensitive to teratogens, (agents causing malformations). during critical periods of development, which is the time of most rapid cell division.

The various teratogens affecting adversely development at the embryonic stage are alkalooids, alcohol, hormones, antibiotics, organic mercury, tranquilizers, LSD, infectious agents like German measles, syphilis, radiation, oral contraception etc.<sup>6</sup> In addition to these, mechanical factors related to the uterus may also cause certain congenital deformation.<sup>7</sup>

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## Appendix VII

### History of Knowledge on Human Reproduction

"Men were inquisitive to know the mechanism of reproduction from time immemorial. Most of the early theories were funny and nonsensical, yet it is interesting to study them. It is difficult for us with our accumulated heritage of biological knowledge, to realise how mysterious a thing birth must have been to them"<sup>1</sup>.

Primitive people associated many superstitions and taboos with everything connected with sex and childbirth. These resulted in a sex cult and male and female sex worshippers fought many a bitter fight to justify their cults<sup>2</sup>-Even in this later half of the 20th century there are worshippers of the male genitals in certain parts of the world. The old Egyptians regarded the female genitalia as an emblem of cowardice.<sup>3</sup> In the Old Testament the Psalmist says, "I was shaped in iniquity and in sin did my mother conceive me" (Psalm-Li 5).

The ancient Talmudists had more or less a correct idea about the union of male and female 'seeds' in the creation of infants. They further believed through their prophets that life is breathed in by God. But they were wrong when they thought that the white male seed gave rise to white structures like bones, brain, eyes and teeth while the female red seed (menstrual blood) produce a muscles, skin, finger nails etc.

Rational thinking on a scientific basis began with Hippocrates (400 B.C.), the Father of medicine. He believed that the seminal fluid is full of animalcules or little animals and it was no doubt a very good guess. Plato also believed in this theory of animalcules.

Aristotle (350 B.C.), believed that a male and a female factor in the parents combine to produce the new child. He also thought that the first man emerged from the womb of the earth. He further stated that the mother is responsible for providing the building materials and semen helped them in assuming the shape of human offspring.<sup>2</sup>

Galen (200 A. C.), thought that there was male semen and female semen, the two when mixed produce an offspring. His theory was basically correct though he thought the liver and heart are formed from the blood of the mother and the brain from the male semen. He declared that women also

have got organs like male testes and called them female testes (ovaries). He also correctly thought that female testes secrete female semen. This is remarkable, but for lack of the microscope he did not recognise sperm and ovum. Galen however did not mention about the gradual development of the human embryo. His ideas remained supreme till the 15th century, but all these were based on theory.

The first book on embryology was published by Fabricius (1604 A. C.), In his famous book *de Formatione Ovi at Pulli* (concerning the formation of egg and the chick), he described with illustration the embryological development of the chick embryo. In 1621 he further stated that semen has fecundating capacity and can fertilise the egg even at a distance. Then Harvey in 1651 developed this theory of Fabricius, his teacher at Padua and gave name to it *Aura seminalis*. He stated, "the semen deposited in the birth canal does not enter the uterus at all because, after intercourse there is nothing more to be found in the uterus than there was before the act"<sup>4</sup>. He thought that semen emits an 'aura' or vapour which stimulates the uterus to form the egg in the bird and foetus in the human womb. So Fabricius's finding was to lead towards a wrong direction by Harvey, and Galen's correct theory was discarded.

In 1674, Nicholas Malebranche propounded a theory called theory of Encasement. He thought that the ova of all mankind from Eve to the end of the world were encased in the ovary of Eve so that each woman after Eve had one egg less. One even calculated that after 200 million generations, there will remain no ova in the woman's ovary and thus the human race will be extinguished. According to this theory, ova were the really important factor, hence the supporters of Nicholas were called 'Ovists'. They further believed that the egg contained the fully formed embryo a miniature human being.

Soon another theory was put forward by the Dutch Leeuwenhoek, the discoverer of the microscope when he saw sperms running about, which he thought to be little animals or animalcules. So Leeuwenhoek, "the child is the father's alone" and the uterus served only as a kitchen or incubator i. e., a *receptaculum seminis* for male seed. The supporters of this theory were called the 'Spermatists', Their imagination went so far that so far that in 1699 Francois Plantades-the secretary of the famous Montpellier Academy of Sciences published the picture of a sperm and called it *homunculus*. Some of the spermatists claimed that they saw in the head of sperm the appearance of a preformed *homunculus* (Fig-IV) which cannot be true.

A mature sperm when viewed by an electron microscope shows no resemblance of human head (Fig.V).

De Graaf, another Dutch scholar discovered the mammalian egg or ovum in the 1672 and saw the ovum in the fallopian tube and uterus, but Leeuwenhock ignored this important funding. The feud between ovists and spermatists continued for another century in spite of de Graafs wonderful discovery, However Maupertuis (1698-1750) declared the theory of biparental inheritance<sup>5</sup>.

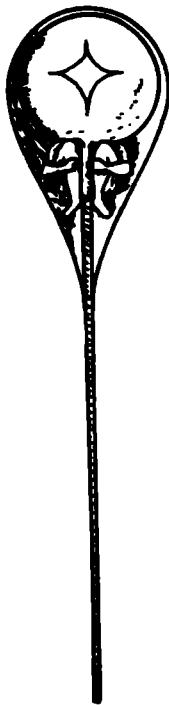


Fig. IV Drawing of a spermatozoon giving the impression of a preformed individual (homonucleus) in the head.

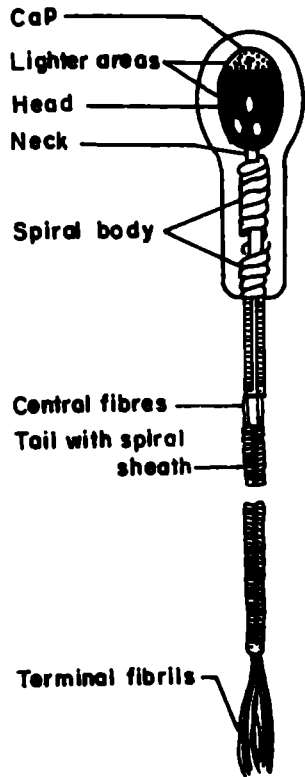


Fig. V Actual spermatozoon as seen under an electron microscope.

In 1750 Needham came forward to support the theory of spontaneous generation, but Spallanzani disproved it by experimental methods in 1786. In 1774, William Hunter in his book "The Anatomy of the Human Gravid

uterus” gave the world for first time the correct observation of the foetus in the womb. Schleiden and Schwann in 1839 established the cellular basis of animal structure thus laying the foundation of modern histology and embryology. The relation of ovulation with menstruation was first explained by Bischoff in 1844. Barry in 1838 was the first to describe the mechanism of fertilization of ovum by spermatozoon<sup>1</sup>. But in 1850 Leibig put forward the chemical theory of reproduction and delayed scientific progress further<sup>4</sup>. Louis Pasteur in 1856 put the study of reproduction on the right track by his ingenious methods of experiment.

So far the observations on the mechanism of reproduction had been based on study of animal materials. The first study on human material was made by Wilhelm His (1880). When the chemical theory was finally discarded. The actual study of the human foetus was made in 1941<sup>4</sup>.

Thus correct knowledge of human reproduction was acquired by the scientists only in the 19th century. But the 7th century Quran categorically declared that the mixed ‘nutfah’ of male and female produces the new born (76 : 2) and gave the description of main stages of development of the human embryo (22 : 5; 23 : 12-14).

In conclusion it appears that human knowledge had at one time contradicted some of the facts brought by Islam (al-Quran) on some aspect of reproduction. The latest scientific findings are in agreement with the Quran.

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## Appendix VIII

### Sleep

Sleep is a periodic resting condition of the body, and specially of the nervous system. It restores us all after a hard day's work. It is more than rest. It is "a recuperative, restorative state of organism characterized by muscular relaxation, reduction, of consciousness and general reduction in the rate of chemical and physiological processes. Sleep may be said to be recuperative, since enforced wakefulness will, after a period of time induce sleep voluntarily; likewise, undoubtedly restorative, since efficiency; is improved after aperiod of restful sleep"<sup>1</sup>

Sleep "is a phase that ensures that the whole body, including the nervous system, can recuperate.....It is the brain that controls sleep and the benefit of sleep is most obvious for the brain"<sup>2</sup>

"Consciousness is reduced to varying degrees depending upon the depth of sleep. Although a sleeping individual will respond to the stimulation of a fly or mosquito on his face by brushing it off, there is apparently no awareness of this act or at least no memory of it. "Heart rate, blood pressure, rate of respiration and metabolic rate are example of some of the chemical and physiological processes which are retarded or reduced"<sup>1</sup>

There are several theories of sleep.<sup>2</sup>

(a) due to cerebral anoxaemia; but it is doubtful as total blood flowing through the brain is not altered during sleep. There is a Possibility of lack of sufficient blood supply in the particular part of the brain (midbrain) which is concerned with sleep; (b) due to lack of oxygen in the nerve centres; the day (working) and night (sleeping) time O<sub>2</sub> intake and CO<sub>2</sub> output given below show significant difference :

	Intake of O <sub>2</sub>	Exhalation of Co <sub>2</sub>
Day (working) time	67.0%	58%
Night time (sleep)	33.0%	42%

So there is less intake of oxygen and less output of CO<sub>2</sub> suring sleep. It is well known that excess CO<sub>2</sub> cause discomfort and unconsciousness, but " these facts, while making it plain that want of oxygen or the presence of CO<sub>2</sub> and other products of activity in the tissues may cause sleep do not explain why sleep comes regularly in persons who are not exhausted by their

day's work nor, why many people are able to compose themselves and fall asleep at any time they find convenient."

(c) The third "theory brings forward the fact that all sensations, volitions and other acts of consciousness are accompanied by chemical disturbances in the brain cells that stimulate the mind to activity.... When external impressions are cut off by closing the eyes and otherwise composing one self for sleep, the mind ceases to be stimulated, and tranquillity ensues.<sup>2</sup> It is thought that during waking hours there is an accumulation in the brain of a sleep inducing substance, and that after a period of time this ultimately induces sleep.

According to Lindsley<sup>1</sup> there is no single theory of sleep which is entirely acceptable. Among chemical theories emphasizing accumulation of toxins, increased CO<sub>2</sub>, decreased O<sub>2</sub> and even the production of a special substance hypnotoxin. The idea most generally accepted is that there is a "wakefulness centre in the brain probably in the diencephalon, which is constantly bombarded by incoming impulses caused by a activity and muscular tension. As long as this centre is activated the person remains awake. However with repose and relaxation of muscles, the number of incoming impulses is greatly reduced ; also with darkness and quiet, the sensory influx is further reduced... When the level of activity in this centre falls below a certain minimum, sleep ensues".

From the above it is evident that none of these theories explain the cause of sleep. It needs further study.

Sleep consists of several cycles of alternation between two stages, NREM (Non Rapid Eye Movement) or orthodox sleep and REM (Rapid Eye Movement) or paradoxical sleep. On falling a sleep one passes straight into the orthodox phase which lasts for about an hour or so. This is followed by REM, which lasts for 2 to 15 minutes. Dacam occurs during this stage. When it is over one passes back into the orthodox stage. By and large, however, orthodox sleep occupies about three quarters of the sleep period in adults. In infants, however, it occupies only about half of the sleep period.

"When sleep comes on, eyes are usually closed, sense of sight quickly lost even if eyes remain open, pupils contract (which dilate widely as the person awakes). Touch remains the least affected of the senses, and even the slightest touch will awaken many people from deep sleep. Will power is the first faculty to go and the last to appear in wakening. Memory and



imagination remain longest. The part of the brain which regulates the power of movement is late in falling asleep and usually awakens before the intellectual faculties and the special senses.<sup>2</sup>

The brain and many other parts of the body rest during sleep. Some parts never get rest during sleep--the heart and the vital centres of the brain never sleep.<sup>2</sup>

The amount of of sleep needed varies with age. Adults need 5-8 hours or more for some. Young people sleep easily, it gets more difficult with age and becomes more broken and less deep. Elderly people require less sleep. while children require more.

"The recording of electrical potentials from the brain in human subjects has demonstrated that sleep occurs by stages and in varying degrees. From a waking pattern of brain waves there is a distinct change to a "drowsy" pattern, followed by another change indicative of "real" sleep .... with large, slow, irregular brain potentials.

"Experiments have shown that most persons shift their positions during sleep apparently as the result of muscular tensions produced by faulty circulation of blood. Photographic records have revealed that the average sleeper may assume twenty to thirty positions, with changes on the average of every seven minutes. So the beds should be large enough to permit such movement.<sup>1</sup>

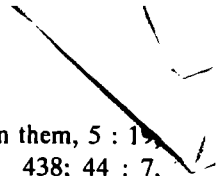
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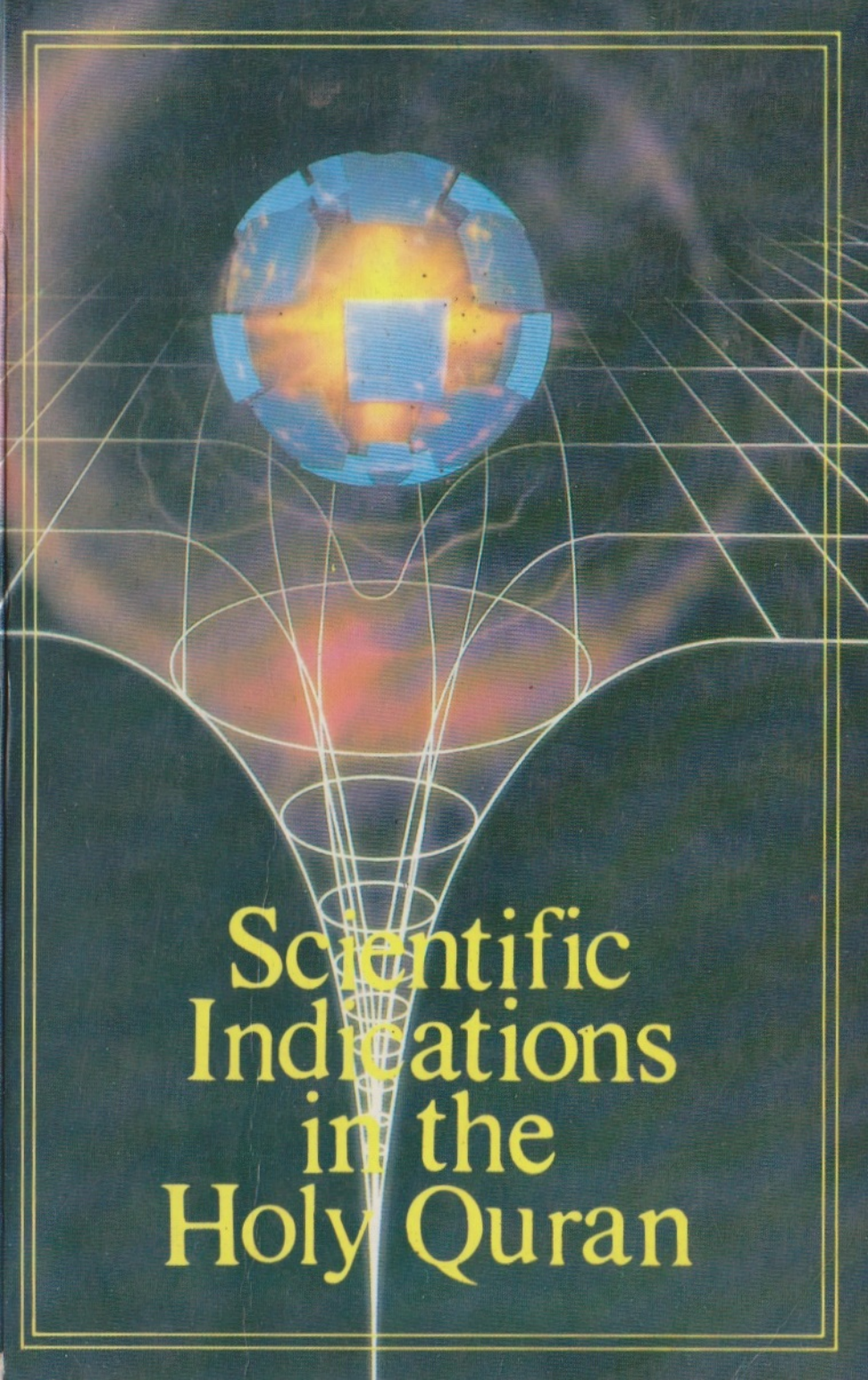
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Scientific  
Indications  
in the  
Holy Quran