

The Evolution of the Universe: A New Vision

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FORWARD

The confrontation of holy Books with scientific data has always been a subject of meditation for human beings. It is in this context that many researchers have examined the Bible and the Quran in order to see to what extent they are compatible with modern scientific data.

In this paper we present a study of the Quranic verses, which relate to Astronomy without adopting a selective choice. This theme has been chosen because the majority of the Quranic verses related to the modern sciences are about Astronomy in particular. It is to be noted that the emphasis on this aspect is justified in the Quran itself. ("***The creation of the heavens and of the Earth is indeed more grandiose than the creation of Man.***" Quran 40:57).

This paper does not aim to find a "concordance" between the Quran and modern science. It is rather an analysis of an ancient document and the comparison of some of its extracts with modern knowledge. The interpretation of verses relating to the fate of the universe should not, in any case, be taken as a new "theory" or "proof" paralleling the scientific theories themselves. The gist of our work is a search for meaning at the level of man and of the religious message. The approach is therefore quite different and complements other fields, which may enrich rational knowledge.

Our input is in fact at the crossroads of religion and science: how can our present knowledge help us to understand the ancient texts? How can a prophetic message, dating back very far in the past, agree or not with our present knowledge?

Rational knowledge cannot guarantee the religious message and vice versa. However, both aspects are an ever-flowing source of questions and interrogations referring back to each other and helping us to find a meaning to our existence.

It should also be made clear that this not a suggestion of an alternative model of the universe meant to replace those that have been so far patiently put forward by astronomers on the basis of their observations.

ABSTRACT

In this paper, we analyze the Quran description of phenomena linked to the evolution of the universe in the light of our present knowledge in this domain. In fact, according to the Quranic text, the verses concerning Astronomy may be classified into two categories: the verses related to the solar system and those concerning the universe in general.

For the first category, the Quran specifies that towards the end of its life, the sun will start to swell (The Quran uses the term "Kuwwirat", which can literally be translated as "ballooned", implying a homogeneous swelling). The consequences of this swelling are the following: the sky will turn red and will look like a scarlet rose; light intensity will increase and it will not be possible to observe the stars from the surface of the Earth.

The Quran also specifies that the sun will get closer to the moon (that is to the earth). The Quran uses the word joined ("*...And the sun and moon are joined together.*" Quran 75:9). The sun will destabilize the moon; it will be rent and will ultimately fall onto the Earth. Moreover, the orbits of the planets of the solar system will be modified. As for our planet Earth, it will witness an overheating and boiling of the seas and oceans and an expansion of waters, a disintegration of mountains, and expansion of the Earth crust. The Quran also indicates that the Earth will survive in spite of these cataclysms.

Concerning the universe, the Quran discusses the following points: the expansion of the universe, the repetition of the creation process, the existence of a multitude of planets resembling ours, and an extra-terrestrial life. Finally, the Quran specifies that our universe is

cyclic, contrary to what an increasing number of contemporaneous astronomers think.

On the basis of the relativity of time referred to in the Quran, we deduce the initial structure of the universe, the general chronology of its formation and the date of the beginning of what might constitute its collapse (i.e. The Big Crunch).

(Key words: science history, religion, Islam, Quran, science in holy texts, philosophy of science).

1. INTRODUCTION

Nearly a century ago, the creation of the universe was a concept that was unknown as such by astronomers. The commonly accepted idea was that of an eternal universe. When examining the universe, scientists supposed that it was simply an aggregate of matter and thought that it had no beginning. The idea of creation, that is a point when the universe and all its contents began, did not exist in accepted scientific theory.

It is only after the emergence of the theory of the Big Bang in the 1950's that astronomers admitted that the universe had a beginning: that is, its creation. But this important discovery made astronomers eager to find an answer to a great number of questions. What is the future of our universe? What is the future of our solar system and of our planet Earth in particular? After examination of the history of man, we notice that our ancestors also asked similar questions without, however, providing any scientific answer.

When we review the Arab-Moslem civilization, we notice that traditionalists report such questions put forward by the Moslems of the seventh century. It is on the basis of such reports that we embark to study objectively the Quran, the holy book of Moslems, in order to see how this book, which dates back to the seventh century, treats this fundamental problem.

This paper is, consequently, a contribution, which needs further improvement, in the exegesis of this ancient document, which, contrary to what might be thought, includes highly astonishing allusions and assertions that deserve to be objectively examined by any non-biased observer.

This document is organized as follows: In Section 2 we will briefly speak about the pre-Islamic epoch in order to brief the reader on the context of the Quran revelation. Section 3, which constitutes the main part of our contribution, consists of two sub-sections. The first one examines the verses concerning the solar system; the second one is about the verses associated to the universe in general. In the conclusion, we put forward some deductions resulting from what preceded.

2. THE CONTEXT OF THE REVELATION

Before the period of revelation, (610-632 AD) the entire Arabic peninsula was prey to unenlightened habits and obscurantism. Residents of the desert lived a very humble and primitive life. The following anecdote illustrates this aspect: it is reported that bandits, one day, attacked a tribe and took as hostage the daughter of the chief. These bandits asked a member among them to exchange the girl against a ransom. The latter proposed to the father 100 camels. His companions, thereafter, reproached him not to have asked for more camels especially since the chief of the tribe was known for his wealth. The extortioner simply replied that he did not know that there existed a number larger than 100.

Another indicator, which testifies to the state of the inhabitants of the Arabic peninsula, was the practice of the burial of young girls alive. With the advent of the Islamic era, God warned people against such practices.

- Sura 81, verses 8-9

"When the female (infant), buried alive, is questioned. For what crime she was killed?"

The only specificity of the Arab nomads was that they mastered the Arabic language. Some of them were even able to produce a sentence or a poem verse about a specific subject, and which could be read in opposite directions. God challenged these people to produce a Sura similar to the Quran. But they could not do it at that time in spite of their erudition. Who can do it nowadays?

- Sura 2, verses 23-24

"And if ye are in doubt as to what We have revealed from time to time to Our servant, then produce a sura like thereunto; and call your witnesses or helpers (if there are any)

besides God, if your (doubts) are true. But if ye cannot -and of a surety ye cannot- then fear the fire whose fuel is men and stones, which is prepared for those who reject Faith."

For the interpretation of the verses related to modern science and namely astronomy, the Moslem exegetes of the classical epoch had succeeded in correctly interpreting the verses dealing with general concepts but they had not done as well regarding the verses concerning life science. As for the interpretation of the verses about astronomy, it was more or less a failure. The reason is simple: one has to be versed in astronomy in order to correctly interpret these verses. Regarding the translation of the holy Quran into foreign languages, the classical translators interpreted the verses including scientific notions according to their own understanding; it would have been more logical for them to give a literal translation in order to avoid misinterpretation. In fact, a good translation supposes a sufficient knowledge of the domain treated by each verse.

3. VERSES RELATED TO ASTRONOMY

The majority of Quranic verses related to modern science are about astronomy. The reason for this is explained in the Quran itself. In the following verse, it is explained that the creation of the universe represents an event that is far more important than that of human beings.

***- Sura 40, verse 57
"Assuredly the creation of the heavens and the earth is a greater (matter) than the creation of men: Yet most men understand not."***

The next verse invites humans to focus first on what exists in the heavens and then on what exists on Earth. Everything in them points to the might of God. It is after this invitation for reflection that Moslems began to develop Astronomy.

***- Sura 10, verse 101
"Say: "Behold all that is in the heavens and the earth..."***

The verses related to Astronomy may be classified into two categories: those related to the solar system and those that deal with the heavens in general.

3.1 Verses related to the solar system

3.1.1 Generalities

The Quran refers to the solar system as "the nearest heaven".

***- Sura 37, verse 6
"We have indeed adorned the lowest heaven with an ornament, the planets."***

We know that among the nearest elements of our heaven there are no other permanent elements but the planets and their natural satellites.

3.1.1.1 Spherical shape of the Earth

It is to be noted here that the Earth

**** is a sphere :***

***- Sura 39, verse 5
"... He coils the night upon the day and He coils the day upon the night."***

**** but which is not perfect :***

***- Sura 13, verse 41
"See they not that We reduce the Earth from its outlying borders? ..."***

Both verses above are clear. The same idea stating that the Earth is a sphere and that it rotates (suggestion of movement) is found in the following verse:

***- Sura 79, verse 30
"After that (God) spread the Earth out (dahaha: from the verb 'daha')."***

Because they did not understand the meaning of this verse, (since they did not imagine that the Earth was spherical) the ancient exegetes had earlier explained the Arabic verb (dahaha) by (has flattened it). The same explanation has been introduced in the Arab dictionaries. But in these very dictionaries, the origin of this verb is found in the word (Ud-hiya), which means, "egg of ostrich". Thus the Earth would look like an ostrich's egg. The same verb is also used to refer to the action of rain on the pebbles that the water current moves.

A logical consequence of the spherical shape of the Earth and of its rotation is that the night does

not precede the day as it is explained in the following verse:

- Sura 36, verse 40

"... The sun must not catch up the moon, nor does the night outstrip the day. Each one is traveling in an orbit with its own motion."

It is clearly understood, from the expression "nor does the night outstrip the day" that there is a coexistence of the day and the night. In fact, the sun shines over the terrestrial hemisphere facing it whereas darkness covers the other hemisphere. From the preceding verse, we cannot deduce the rotating movement of the Earth; however, verse 54 in Sura 7 explains this rotation:

- Sura 7, verse 54

"(God) covers the day with the night which is in haste to follow it..."

The rotating movement of the Earth may also be understood from verse 29 in Sura 31, which specifies that there is no order in the succession of the day and the night.

- Sura 31, verset 29

"Hast thou not seen how God merges the night into the day and merges the day into the night?"

The following verse refers to the concomitance and gradual appearance of the day and the night.

- Sura 36, verse 37

"Another sign for them is the night from which we withdraw the day..."

Here God establishes a similitude between the gradual appearance of the day and the night and the process of the withdrawal of the skin (representing the night) that covers the flesh (representing the day).

From the following verse, Sura 70, verse 40, it is understood that there is not a unique place for sunrise or sunset. This fact was unknown when the prophet was still alive.

- Sura 70, verse 40

"...Lord of Orient and Occidents."

3.1.1.2 Reflection of the light by planets

It is also explained, in the verse below, that the sun's nature (qualified as a **dazzling lamp**) different from the moon's (qualified as "giving light").

- Sura 25, verse 61

"Blessed is the One Who placed the constellations in heaven and placed therein a lamp and a moon giving light."

The distinction, here, between the sun (a star, source of light) and the moon (a heavenly cold body playing the role of light reflector) is evident. This distinction between star/planet/satellite is still ambiguous for the general public. The notion of light reflection by planets is more specified in the following verse:

- Sura 24, verset 35

"God is the light of the heavens and the earth. The similitude of His light is as if there were a niche and within it a luminary. The luminary is in a glass. The glass is as if it were a planet glittering like a pearl."

3.1.1.3 Existence of lunar cycles

In the following verse, the previously mentioned ideas are confirmed. Moreover, the lunar cycles are referred to:

- Sura 10, verse 5

"God is the One Who made the sun shine and the moon a light and for her ordained mansions, so that you might know the number of years and the reckoning (of the time). God created this in truth. He explains the signs in detail for people who know."

3.1.2 Evolution of the solar system

The Quran uses an evolutionary term for the sun as well as a destination place. The sun is a star, the age of which is approximately 4.6 billion years. As it is the case for all the stars, the sun goes through evolutionary stages. It is presently at the first stage, characterized by the transformation of hydrogen atoms into helium. This stage should theoretically still last 4.6 billion years (cf. §3.2.2 Duration of creation) until the transformation of hydrogen into helium is over and then the transformation of helium into carbon and oxygen is also over. Once its energy

is used up, the sun will consequently reach a stable state.

- Sura 36, verse 38

"The Sun runs its course towards a proper state (or site) of stability. This is the decree of the Almighty, the Full of Knowledge."

In the following verse, God says that the sun and the moon do not collide because each one of them (sun, moon) moves following a different trajectory **"Each one is traveling in an orbit with its own motion"**.

- Sura 36, verses 39-40

"...The sun must not catch up the moon... Each one is travelling in an orbit with its own motion."

The second verse points to the fact that the trajectories of both celestial bodies are governed by laws (physical gravitation laws and kinematic laws).

- Sura 55, verse 5

"The sun and moon (are subjected) to calculations."

In fact, these human calculations are but symbolic representations of these fundamental physical subjacent laws.

It is to be noted here that the two previously mentioned verses have emphasized only the harmony in the movements of the sun and the moon (but not in those of the other planets of the solar system). The explanation of this point resides in the two following facts: on the one hand because the moon and the sun are the most visible and evident celestial bodies, and on the other hand because both these stars will undergo a grandiose astrophysical phenomenon. In fact, at the final stage of the sun's life, the transformation of hydrogen atoms into helium will be over and as a result of that the outer layers of the sun will expand. As we will deduce it later on, this will lead to the swelling of the sun, which will destabilize the moon. The latter will be rent (cf. §3.1.3.1-e) and will ultimately fall onto the Earth (cf. §3.1.3.2-e)

3.1.3 Future of the solar system

Regarding the solar system, the Quran has mentioned the apocalypse phenomenon very often. Because they were not much versed in

Astronomy, the ancient Moslem exegetes made only general comments (and not explanations) about the verses related to this phenomenon, which is considered as a signal indicating that the day of the last judgment is getting closer.

The most known Sura, which refers to the beginning of the solar expansion and the phenomena resulting from this expansion, is Sura 81, verses 1-6. But it should be noted that many Suras have also spoken about these phenomena. Let us examine them hereafter:

- Sura 81, verse 1

" When the sun becomes like a swelling ball (kuwwirat)."

Here, the selection of the word **"kuwwirat"**, deriving from the verb **"kawwara"** (leading to the word **"kura(t)"**, meaning "ball"), is intentional. This verb is used especially to designate the ball-shaped winding (for example of a silk string or a cloth band). It is known that the further the winding the greater the volume of the ball. This implies a swelling of the ball. In fact, towards the end of its life, the sun will undergo the same phenomenon. Its volume will increase with time to constitute a red giant. The specialists indicate that the expansion of the sun will result in its surface coming closer to the Earth's orbit. The decreasing distance between the sun's surface and the Earth's orbit is not explicitly mentioned in the Quran (cf. §3.1.3.1-d Sura 75, verse 9) but it is quoted in a "Hadith" (tradition of the prophet Muhammad).

"When the apocalypse gets closer, the surface of the sun and the Earth's orbit will get closer" [3].

Many consequences of the sun's expansion and of its movement closer to the Earth's surface are mentioned in the Quran. However, the successive events are not referred to in sequence. They can be classified into two categories:

3.1.3.1 Concerning the sky (heaven)

a) Aspect of the sky

When the sun turns into a red giant, the solar disc will occupy a greater part of the heavens. The sudden appearance of this red giant with a remarkable volume will give the illusion of an invasion of the heavens. At this stage, the Quran

indicates that the sky will look like a rose (the sun representing the heart of the rose) and the rest of the sky will become like red hide (the rose's petals). This is mentioned in the following verse:

*- Sura 55, verse 37
"Then, when the heaven is rent asunder,
becoming scarlet-rosy like red hide."*

The following verse gives more information on the overall aspect of the sky, which besides its scarlet color, will look like a molten metal (a metal-red color):

*- Sura 70, verse 8
"The Day that the sky will be like molten metal".*

Note: It is interesting to note here that if it were possible to simulate this phenomenon of solar expansion on a computer, we would perhaps understand why God has chosen to compare the aspect of the heavens with a red rose: Is it for its color only, or for both its color and its shape? Knowing that in the Quran there is a wise choice even in the use of the frequency of the alphabet letters [2], what can then be said concerning the choice of words? According to us, it is the second hypothesis (combination of color and shape) that applies.

During its final spasm, which will last some thousands of years, the sun will occupy the whole of the celestial dome and will certainly look like one of those agonizing stars, which have been very often observed by Hubble Space Telescope (in particular the "Cat's eye" nebula). These stars have been stripped of their gas envelope, giving birth to superb planetary nebulae.

b) Increase of light intensity over the Earth

The following verse says that light intensity will considerably and excessively increase and will cause sight dazzling.

*- Sura 75, verse 7
"So, when the sight is dazzled. "*

It is to be noted, however, that the previous verse, like those relating to the final episode of the sun's life, does not express what will be "observed" or "experienced" by eventual inhabitants of the Earth, because the Earth will have become uninhabitable a long time before

this event. Sight dazzling is therefore only a way to explain the increase of light intensity and does not imply that there will still exist human beings to witness this phenomenon. In fact, the Quran specifies that the occurrence of this event is not isolated but it is associated with the appearance of other phenomena, such as the boiling of the seas and oceans (cf. §3.1.3.2-b) due to temperature increase. This will lead to the Earth's surface water evaporation, thus eliminating all forms of life.

c) The stars will no longer be visible

The following verses indicate that it will be difficult to see the stars from the Earth, probably because of the light intensity (of the sun), which is very strong, as it has already been mentioned.

*- Sura 77, verse 8
"Then when the stars become dim. "*

*- Sura 81, verse 2
"And when the stars, lose their luster. "*

d) The moon will no longer be visible

The difficulty of observation caused by the increase of the light intensity does not in fact concern only the stars; it applies to the totality of the other celestial bodies. In fact when the Earth is covered by the extreme intensity of the sun's light, it will be impossible to observe even the moon, as it is explained in the following verse:

*- Sura 75, verse 8
"And the moon will be eclipsed."*

The fact that this verse immediately follows verse 7 of Sura 75 mentioned above (cf. §3.1.3.1-b) and speaking about sight dazzle confirms once again that the moon's eclipse is certainly due to the increase in light intensity. This is in fact, a final and irreversible eclipse.

For a terrestrial observer used to the moon's light, the non visibility of the moon will give him the illusion of a fusion or "joining" of both celestial bodies (sun and moon). The Quran, in Sura 25, verse 61, has attributed a distinctive quality to the sun (it refers to it as a torch) and another one to the moon (it is referred to as a gleam) (cf. §3.1.1.2). After the start of the sun's expansion process, the moon will be totally immersed in the sun's atmosphere. In the celestial dome, only the red giant will be present.

The two celestial bodies will be joined as it is specified in the following verse:

- Sura 75, verse 9
"...And the sun and moon are joined together."

The enormous increase of the sun's volume will in fact result in its "coming closer" to the moon (joining of the two celestial bodies), therefore closer to the Earth.

Note: This verse is also explained by a "Hadith" (tradition of the prophet Muhammad) [3] (vol. 4, N° 422), which specifies that the sun and the moon will both be bathing in fire. This refers in fact to the immersion of the two celestial bodies in the very high temperature of the sun's atmosphere. The same "Hadith" refers to the increase of the volume of both celestial bodies. As regards the sun, the Quran has already dealt with this phenomenon; concerning the moon, this volume increase is due to the moon's expansion as a result of the sun's intense heat.

In the presence of the star's (sun and moon joined) tenuous atmosphere, the moon will be submitted to viscous forces and will gradually lose its energy and also its angular moment. This will result in the destabilization of its orbit (orbital braking) the moon's orbit will shrink little by little resulting in its progressive fall onto the Earth's surface after having been fragmented.

e) The moon's fragmentation

Long before its fall onto the Earth, the effects of the Earth's tide on the moon will ultimately lead to its fragmentation below a certain distance, known as Roche limit. This moon's "break up" would occur suddenly and brutally once the limit is reached, as it is specified in the following verse:

- Sura 54, verse 1
"The Hour has drawn near and the moon has been cleft asunder."

An alternative explanation of this consists in supposing that the moon's fragmentation is a result of its expansion (cf. note in §3.1.3.1-d above). But if we take into account the verses of §3.1.3.2-e (below), which suggest that the moon's fragments will fall onto the Earth's surface, the thesis of fragmentation resulting from the effect of orbital braking would be more plausible.

The moon's fragmentation will constitute its final stage of disappearance from the solar system. It is evident that the sun will destabilize the moon only after having swallowed up Mercury and Venus, which are closer to it than the moon.

f) Modification of the solar system planets orbits

The Quran specifies that there occurs a dispersion in the movement of the solar system planets (modification of orbits), including the Earth (see note at the end of section §3.1.3.2-b).

- Sura 82, verse 2
"...And when the planets will disperse (intatharat)."

This is confirmed by the use of the Arabic term "intatharat" which means an organized dispersion, by opposition to the term "tanatharat" which means a random dispersion.

3.1.3.2 Concerning the Earth

The phenomena, which will affect the Earth as a result of the sun's progressive expansion, are referred to in many Quranic verses. We will examine them hereafter.

a) Exodus movement and gathering of wild beasts

Once a certain degree of heating of the Earth's surface is reached, forest fires will become more frequent. Feeling the danger, wild beasts will start general and continuous escapes, which will correspond to great gatherings as it is specified in the following verse.

- Sura 81, verse 5
"...And when the wild beasts are herded together. "

b) Boiling and bursting forth of the seas and oceans

The Quran indicates that the sun's expansion will result in the warming up of the seas and oceans as it is specified in the verse below:

- Sura 81, verse 6
"And when the seas become as blazing fire. "

The warming of the seas and oceans will result in their boiling as explained below:

- Sura 52, verses 5-6
**"(I Swear)... by the Canopy Raised High,
And by the boiling sea."**

After the boiling of the seas and oceans, water expansion will follow as it is said in the verse below:

- Sura 82, verse 3
"... And when the seas are burst forth."

The warming up and expansion of the seas and oceans' waters are certainly indicators of a first stage before their evaporation. According to our understanding, these phenomena will take place at the beginning of the sun's swelling process and in all cases before the destruction of the moon by the sun, because at that moment the Earth's surface would already be totally turned molten.

Note: It is obvious that the seas and oceans' evaporation will result in a considerable loss of the Earth's mass. But, we should also note that when the sun turns into a red giant and reaches its maximum volume, it would already have lost a part of its mass. According to Newton's law of gravitation a fraction of mass loss (in relation with the initial mass) greater for the sun than for the Earth will result in the orbit of the Earth moving off from the sun's and vice-versa. Because the solar atmosphere will consequently be lost in the intergalactic space, the previous conclusion remains a fortiori valid for any (surviving) planet. Thus, the term "will disperse" (cf. §3.1.3.1-f) should be interpreted as "will move farther away from the sun". The changing of orbits for the surviving planets of the solar system, and especially for the Earth, allows us to suggest that modifications in its revolution and rotation will occur leading to a change of the length of the day, the night and the year.

c) Expansion of the Earth's crust

In the same way, the Earth's overheating will result in its expansion, hence a repulsion and rejection of its content (probably the most volatile compounds: atmosphere, water and some trapped elements presently below the crust).

- Sura 84, verses 3-4
".... And when the Earth expands. And has cast forth what is within it."

Note: The Earth's expansion is not explicitly referred to in the Quran; it is in fact mentioned in the prophet's "Hadith" quoted in §3.1.3.1-d.

d) Pulverization of mountains

The fate of mountains, known for their rigidity is explained in the following verse:

- Sura 101, verse 5
" ... And the mountains will be carded wool."

The choice of the expression "carded wool" denotes in fact the change of the mountains-forming rocks' nature; these initially highly compact and tough rocks will ultimately become, because of the heat, viscous and more voluminous (like carded wool). Hence, it is clearly shown that the change in the rocks' state is due to the excessively high temperature prevailing over the Earth after the sun's expansion.

Another fact corroborating the former is referred to in another verse indicating that the mountains will melt like "crumbling sand dunes" and will gradually lose height and rigidity:

- Sura 73, verse 14
"...And the mountains will be like crumbling sand dunes."

The comparison with crumbling sand dunes aims to show the progressive loss of height and rigidity of mountains. These two features certainly indicate that the rocks constituting these mountains will be in the process of fusing. This fusion will go on until these mountains are totally flattened as it is indicated in the following verse:

- Sura 20, verses 105-106
"They ask thee concerning The Mountains say: "My Lord Will demolish them and He will leave them as plains Smooth and level"."

In other words, mountains will totally disintegrate under the effect of heat. The same reference to "disintegration" is found in the following verse:

- Sura 56, verse 6
"And the mountains turning into crumbles to end up as sparse particles."

Thus, the tough and high mountains will ultimately be frittered away and will look like a mirage as is explained in the following verse:

- Sura 78, verse 20

"And the mountains shall vanish, as if they were a mirage."

From the preceding verses, it can be deduced that the Earth's crust will undergo the same fate, that is, it will fuse.

e) Fall of lunar fragments on the Earth

In another verse, it is said that the Earth (the land's surface) and the mountains will be suddenly and fatally hammered (the Quran uses the verb "dakka" to describe what will happen); this verb means to bombard, to hammer.

- Sura 69, verses 13-14

"And the soil and the mountains are lifted, then violently hammered at one stroke. On that day, shall the (great) Event come to pass."

The lifting cited above is to be related to the expansion of the Earth's crust (cf. §3.1.3.2-c). The hammering of the land's surface and of the mountains, as a result of one stroke, which, according to the Quran is fatal, would probably refer to the result of the fall of the biggest (giant) lunar fragment after the moon's disintegration (cf. §3.1.3.1-e) onto the Earth's surface; this event would have the same destructive effect as the explosion of multiple atomic bombs. This will certainly constitute a remarkable and unique event in the Earth's life cycle: **"On that day, shall the great Event come to pass"**.

The Quran even specifies the occurrence of this violent shaking. In fact, according to verse 14, Sura 73 (already quoted above), the Earth (the soil) and the mountains will quake only after the mountains have become comparable to crumbling sand dunes, that is after having lost much height. In other words, the occurrence of the "great Event" will follow the crucial phase of mountain disintegration.

- Sura 73, verse 14

"The day when the earth (the soil) and the mountains are shaken up, once the mountains have become like crumbling sand dunes."

It is to be noted that the Quran stipulates that after the "great event" (violent shaking of the land's surface), the land surface will undergo successive poundings, which are in fact but the results of the fall of lunar fragment remains.

- Sura 89, verse 21

"Nay! When the earth (the soil) undergoes hammering after hammering."

f) The impacts of the lunar fragments fall on the Earth

Another consequence of the Earth's hammering by the enormous lunar meteorites is the formation of "swirling clouds" in the sky as it explained in the following verse:

- Sura 52, verse 9

"The day when the sky is agitated by a swirling cloud."

The swirling clouds in the sky will be in fact accompanied by the formation of a real ashy and dusty screen of clouds the thickness of which would probably reach tens of kilometers and which would cover the whole earth. This covering of the earth by a great mass of smoke ("clouds") is referred to in the following verse:

- Sura 25, verse 25

"And the day when the sky shall be rent asunder with clouds... "

The next verse specifies that the smoke in question is not a common one similar to that known by the prophet's contemporaries. This cloud of smoke will certainly occur after very violent impacts resulting from enormous collisions of great rock bodies (meteorites) falling on the Earth. This cloud of smoke will then be very dense and unique in its kind (a very particular kind of smoke).

- Sura 44, verse 10

"Then wait you for the Day when the sky will bring forth a visible smoke."

g) Other impacts of the fall of lunar fragments on the Earth

Except for the reference in the verses mentioned earlier to the very violent quakes, to the swirling smoke over the sky and to the formation of a giant screen of smoke round the Earth, there is no mention of verses in the Quran relating explicitly to other impacts of the fall of giant lunar

meteorites on the earth (the soil). It is after examining "Hadiths" that we have been able to compile other impacts.

- Slowdown in the speed of the Earth's rotation:

We know that the moon insures the stability of the Earth's movement. The disturbance exerted by the other planets: Venus, Mars, Jupiter, and the others, might, in the absence of the moon, enter in resonance with the movement of the Earth's axis of rotation. The Earth would not leave its present orbit, but its movement might become chaotic and totally unpredictable.

It is specified in a "Hadith" that when the apocalypse approaches:

"A day will become like a year, then like a month, then like a week... and finally like a present day." [3]

According to our interpretation, the friction and the violent impact of giant lunar meteorites with a diameter of some hundreds of kilometers, added to the forces exerted by the tide of the nearby sun, which once reaching its maximum size, will cause a slowdown in the speed of the Earth's rotation round its axis. This slowing down would result in a longer day. A literal interpretation of the "Hadith" mentioned above means that a day becoming like a year implies a slowdown and a reduction of the initial rotation speed with a ratio of 1/365. This slowdown will gradually continue until the initial rotation speed is re-established.

- Changing of the Earth's rotation direction round its axis:

According to the second "Hadith", which specifies that:

"At the approach of the apocalypse, the sun will rise in the West." [3]

It may be deduced that the huge collisions of lunar fragments with our planet's surface (cf. §3.1.3.2-e Sura 89, verse 21), will first end the rotation of our planet round its axis and will ultimately lead to the inversion of the rotation direction. It is obvious that the resumption of rotation in another direction will be progressive, which explains the gradual return to a stability speed as mentioned in the first "Hadith". It is clear that without taking into account the moon,

the inversion in the Earth's rotation direction cannot be explained. The sun's expansion has but morphological transformations on the Earth (cf. §3.1.3.2), and a changing (enlargement) of its orbit (cf. §3.1.3.1-f).

Note: As we have just noticed, the Quran verses referring to the consequences of the turning of the sun into a red giant on the evolution of the Earth's crust and on the other solar system planets, describe a multitude of facts without respecting these events chronology. For example, when the Quran specifies that there will occur an expansion of the Earth's crust (cf. §3.1.3.2-c), and that the mountains will be pulverized (cf. §3.1.3.2-d), it should be understood that these phenomena would take place only after the boiling and evaporation of the seas and oceans (cf. §3.1.3.2-b). They are in fact separated by thousands (or millions) of years.

3.1.4 The aftermath of the solar system collapse

The Quran has clearly dissociated the apocalypse, which is a phenomenon proper to the solar system and the universe collapse phenomenon (cf. §3.2.4). In fact, the verses that we have just exposed mention only the sun, the moon, the Earth and the bodies which turn around the sun. The Quran has clearly specified in Sura 82, verse 2 (cf. §3.1.3.1-f) that the planets of the solar system will disperse. Then only the solar system planets will be affected by the expansion phenomenon of the sun. The Quran does not mention the stars, which are distant from our solar system. The only references to the stars are found in Sura 77, verse 8 and Sura 81, verse 2 (cf. §3.1.3.1-c) and they specify that during the sun swelling stage, the stars will lose their luster and will become difficult to observe because of the light intensity increase on the Earth.

It is very interesting to note that the Quran has specified that after the apocalypse, the Earth will be transformed into another earth. Its general aspect will be different from the present one.

- Sura 14, verse 48
"The Day when the Earth turns out into another Earth and so will be the heavens."

The Earth will undoubtedly undergo great transformations as a result of the sun's expansion and its closer position from the

earth's surface. But these transformations concern certainly the earth's crust only. This may be consolidated by the fact that the Quran says in Sura 82, verse 2 "...that the planets will disperse" (cf. §3.1.3.1-f). In other words, the Earth and its sisters Mars, Jupiter, and the others, will move farther from the sun (change of orbit) and will continue to turn round the sun which will progressively use up its energy.

It is also interesting to note that the use of the expression "transformed into another earth" in the previous verse does not give further details, which might shock the prophet's contemporaries, who had already accused him of madness and magic because the Quranic revelation ran counter to their beliefs and modes of life.

Open question: Astrophysical calculations show that when the sun begins to lack hydrogen, it will then start to swell until it becomes a red giant which will swallow up the two closest planets, Mercury and Venus. The sun will consequently be at least a hundred times brighter than it is now. After completely using up its hydrogen, the sun will begin to consume its helium, which will be transformed into carbon and oxygen. This sudden change will make it contract quickly to a certain extent, then combustion will again be hampered; the sun will resume its expansion, at a greater pace than the first time. Once it has used up its helium, the sun will collapse. It will become a white dwarf, which will shine faintly; then it will die out.

The great luminosity that will cover the Earth following the sun's expansion will start to decrease progressively with the sun's contraction; this will result in the quasi-darkness of the earth. After the sun's second expansion, its intense light will, once again, cover the Earth. After mentioning the phenomenon of the sun's expansion and its consequences (cf. §3.1.3.1 and §3.1.3.2), the Quran announces that an intense light will cover the Earth and this will indicate the beginning of the judgment of human beings on the basis of their actions on Earth. The question is whether the light, which will shine intensely all over the Earth, has something to do with what is announced in the following verse?

- Sura 39, verse 69
"And the earth will shine with the light of its Lord and the book will be placed; and the

Prophets and the witnesses will be brought forward; and it will be judged between them with truth, and they will not be wronged."

No answer to this question can be given.

Note: We have mentioned at the beginning of this section (Sura 14, verse 48) that our planet will not undergo the same fate as the moon. The previous verse (Sura 39, verse 69) constitutes further support of this assertion.

3.2 Verses relating to the universe

3.2.1 Generalities

3.2.1.1 Time relativity

The Quran explains that time is a relative notion. This notion of relativity can be found in several Suras:

- Sura 22, verse 47

"... in a period of time (yaum) whereof the measure is a thousand years of your reckoning."

- Sura 70, verse 4

"... in a period of time (yaum) whereof the measure is fifty thousand years."

We think that these figures should not be understood literally. They should be taken as representing symbolic values (cf. §3.2.1.7).

3.2.1.2 Intrication in the process of creation

- Sura 21, verse 30

"Do not the unbelievers see that the heavens and the earth were joined together, then We clove them asunder..."

- Sura 41, verse 11

"Moreover He turned to heaven when it was smoke and said to it and to the earth: "come willingly or unwillingly!". They said: "we come in willing obedience"."

In several places, the Quran specifies that the creation phenomenon is a continuous one. The creation of the universe began about 13.8 billion years ago (cf. §3.2.2 Duration of creation), and that of the Earth about 4.6 billion years ago. There is, therefore, a phase intrication of the creation of the heavens and of that of the Earth.

It is well understood, then, that the creation of the Earth did not precede that of the Universe and that by God's will it was similar to that of the Universe. On the other hand, it is known that the Earth was formed from fine particles of a gas cloud and from dusts of celestial bodies according to an agglomeration and gathering process. It is to be noted that this very process is at the origin of the formation of galaxies and consequently of the Universe.

Note: A little time after its formation, the still soft and hot Earth probably underwent an intensive and continuous bombarding by metallic meteorites. The following verse specifies that the presence of iron on the Earth is the result of a "descending" process.

- Sura 57, verse 25

"...And We sent down iron, a source for great might, as well as many benefits for mankind... "

It is to be noted that the action phrase "sent down" has been used only for iron (and not for any other metals referred to in the Quran such as gold, silver, copper etc...). This suggests that the iron origin is extra-terrestrial.

3.2.1.3 Repetition of the creation process in the universe

The Quran states that the creation phenomenon in the universe is a continuous process.

- Sura 30, verse 11

"It is God Who begins (the process of) creation; Then repeats it."

This notion of repetition in the creation process is found in several verses and may be interpreted in two ways: the creation process is a continuous operation in our universe, because the latter is permanently transformed (stars die and others are born, etc.), and whatever is produced in a point in space would also be produced in another point, in the same way. The second interpretation is the cyclical birth of our universe or perhaps the creation of other universes (cf. §3.2.4).

3.2.1.4 The position of stars

- Sura 56, verses 75-76

"Furthermore I swear by the setting of the stars, - And that is indeed a mighty oath if

ye but knew - That is indeed a Quran most honourable."

This verse reminds us of the Kepler theorem, which states that: "the movement of each planet of the solar system is an ellipse where the sun occupies one of its foci". The other stars, which are analogous to the sun, also follow specific orbits; the eventual planets turning around these stars also behave in the same ways, as it is the case for the sun. This verse also includes an allusion to the universal gravitation of Newton, which determines the trajectories of all stars and planets.

A Syrian engineer has recently published a study of the Quranic text; it is titled "The Miracle" [4]. This study is based only on statistical considerations. Thus, the author has examined the symmetry in the use of words and letters, which, in terms of data analysis is called "the oppositions".

He has, in this way, demonstrated an important result (which seems to be applicable to the whole Quranic text), namely that for a given verse or Sura, the frequency of word or letter use is closely related to the subject which is treated. From the previous verse, he has deduced that the words and letters of the Quran occupy well-determined places exactly as it is the case for the position of stars in the universe. Indeed, God swears by the position of stars that the Quran is God's revelation.

It is clear, here, that during the prophet's epoch, the meaning of this verse could not be understood. It is for this reason that the expression (if ye but knew) was used.

3.2.1.5 Space conquest

The Quran has explicitly invited Man, not only to conquer space but also to explore the depths of the Earth.

- Sura 55, verse 33

"O assembly of Jinns and Humans, if you can pass beyond the zones of the heavens and the earth, then pass beyond (them)! Not without a power shall ye be able to pass!"

(It is the power of science, which is referred to here). Concerning the same subject:

- Sura 15, verses 14-15

"Even if We opened unto them a gate to heaven and they were to continue ascending therein, they would say: "our sight is confused. Nay, we are people bewitched"."

In the above-mentioned verse, the use of the word "bewitched" simply means to be subjugated by the surprise of discovery following a spatial view of the Earth and its surroundings.

In the following verse, there is also reference to the difficulties of breathing when progressively ascending in the heavens.

- Sura 6, verse 125

"Those whom God (in His plan) willeth to guide, He openeth their breast to Islam. Those whom He willeth to leave straying, He maketh their breast close and constricted, as if they had to climb up to the skies..."

3.2.1.6 Existence of extra-terrestrial life

Many Astronomy researchers assert that the existence of an extra-terrestrial life is highly probable because of the incredible number of galaxies in the universe consisting of huge clusters of stars and planets. In the following verse, the Quran refers not only to the existence of other extra-terrestrial creatures, but also to a possible encounter with the inhabitants of the Earth (probably indirectly by exchanging messages or by means of space travel). At the present state of our technological progress, this verse should be regarded as a prediction.

- Sura 42, verse 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 reference to an extra-terrestrial life is also found in the four following verses where the first one indicates that every thing in the heaven or on the Earth praises God, whereas the second one specifies that the living creatures of heaven and those on Earth belong to God and that angels obey Him willingly.

The third and fourth verses explain the bewilderment of humans and of the heaven's

inhabitants when God decides to end life on Earth.

- Sura 61, verse 1

"Whatever is in the heavens and on earth, let it declare the praises and glory of God: for He is the Exalted in might, the Wise."

- Sura 21, verse 19

"To Him belong all (creatures) in the heavens and on earth: even those who are in His (very) presence are not too proud to serve Him, nor are they (ever) weary (of His service)."

- Sura 39, verse 68

"The trumpet will (just) be sounded, when all that are in the heavens and on earth will swoon, except such as it will please God (to exempt). Then will a second one be sounded, when, behold, they will be standing and looking on!"

- Sura 27, verse 87

"And the day that the trumpet will be sounded, then will be smitten with terror those who are in the heavens, and those who are on earth, except such as God will please (to exempt): and all shall come to His (presence) as beings conscious of their lowliness."

From what preceded, it is clear that creatures are classified into three different groups:

- those who are on Earth
- those who are in heaven (they are creatures who walk as it is mentioned above in Sura 42, verse 29)
- those who are in His (very) presence (they are angels as it is explained in many Suras).

3.2.1.7 Existence of planets like the Earth

It is important, too, to mention that the Quran explicitly refers to the existence of numerous planets like ours in the universe as it is mentioned in the following verse:

- Sura 65, verse 12

"God is the One Who created seven heavens and of the earth a similar number. The command descends among them so that you know that God has power over all things and comprehends all things in His knowledge."

The number of heavens and planets is designated by the digit 7. The choice of this digit as a symbol originates from its particular status since it is the smallest prime number after 1, 3 and 5 which are more ordinary ones. All commentators agree that the digit 7 and its multiples designate plurality. This is explained in the Quran itself as indicated in the verses below:

- Sura 9, verse 80

"Whether thou ask for their forgiveness, or not, (their sin is unforgivable): if you ask seventy times for their forgiveness, God will not forgive them: because they have rejected God and His Apostle: and God guideth not those who are perversely rebellious."

- Sura 2, verse 261

"The parable of those who spend their substance in the way of God is that of a grain of corn: it groweth seven ears, and each ear hath a hundred grains. God giveth manifold increase to whom He pleaseth: And God careth for all and He knoweth all things."

3.2.2 Duration of creation

There remains an important remark to complete this study; it concerns the duration of creation. Indeed, the Quran announces, in the following verse, that the universe, including the galaxies' matter, was created in six days (yawm) and yet God did not experience any weariness. This seems to be a reply to the Biblical thesis, which says that after completing His creation in six days, God took a rest on the seventh day.

- Sura 50, verse 38

"We created the heavens, the earth and what is between them in six days (periods), and no weariness touched Us."

The same meaning is found in the following verse which clearly states that there are three groups of things created; they are:

- those which are found in heavens;
- those which are found on Earth;
- those which are found between the heavens and the Earth.

- Sura 32, verse 4

"God is He Who has created the heavens and the earth, and all that is between them in six days (periods)..."

It should be noted; in addition, that the expression "what is between the heavens and the Earth" is also found in at least eight other Suras.

However, the word "day" should not be understood as the period included between two successive sun rises, because the "day" was only defined after the creation of the Earth. This remark was made by Maurice Bucaille in his book "The Bible, the Quran, and Science" [1]. This can also be understood from the verses seen in §3.2.1.1 (Time relativity).

It is evident that if we consider the universe as being what it is, in permanent evolution, the duration of its creation will coincide with its age (cf. §3.2.1.3). I think that it will be possible, then, to explain the creation of the Earth in two days (two periods) as indicated in the following verse:

- Sura 41, verse 9

"Say: "Do you disbelieve Him Who created the earth in two periods? Do you ascribe equals to Him. He is the Lord of the Worlds"."

3.2.2.1 Duration of Earth's life

As it is known, the present age of the Earth is approximately equal to 4.6 billion years. A period will then be equal to 2.3 billion years. Always on the basis of the "period creation" notion, it will be possible, I think, to deduce the duration of Earth's life from the following verse:

- Sura 41, verse 10

"He set in the (earth) mountains standing firm. He blessed it. He measured therein its sustenance in four periods, in due proportion..."

From the expression "He measured therein its sustenance in four periods, in due proportion..." we understand that these periods correspond well to the productivity of the Earth and consequently to its life's span, which will be equal, on the basis of what preceded to four periods of 2.3 billion years, that is 9.2 billion years.

Note: The death of the sun may be deduced from the preceding verses and will coincide with that of the Earth. In fact, the duration of the Earth's life is linked to the sun's expansion (cf. §3.1.3 Future of the solar system).

3.2.2.2 Age of the universe

From the preceding verses, the ratio between the age of the Earth and that of the universe may be deduced without reference to the notion of "day", which is very relative in the Quranic text. We thus have:

$$(\text{age of Earth})/(\text{age of the universe}) = 2/6 = 1/3.$$

This rule will be very useful for the estimation of the universe's age.

As we said earlier, if we estimate the age of the Earth as being 4.6 billion years, a period will be equal to 2.3 billion years. Hence, the age of the universe would be equal to 13.8 billion years.

It is to be noted that a new method of dating the age of the universe, based on recent observations carried out by H. Richer et al. from the University of British Columbia (Canada) by means of the Hubble Space Telescope did confirm the approximate figure of 13-14 billion years. More recent estimations put forward by NASA have suggested an age of 13.7 billion years with an uncertainty margin of 100 million years [6].

It is interesting to note that the ratio (age of Earth)/(age of the universe) which we have deduced from the Quranic verses, was quite accurate at the epoch of the Quran revelation. After the passage of x periods from that date the ratio becomes: $(2+x)/(6+x)$. If we compare this ratio to $1/3$ (at 10^{-3} for example), we obtain:

$$[(2+x)/(6+x)] - 1/3 = 10^{-3}$$

Which implies a value of x around 21 million years, which is negligible compared with the present age of the Universe. Thus, at a historical scale, we may consider that the ratio (age of Earth)/(age of the universe) is constant and surely equal to $1/3$.

Note: It is pertinent to note here that the verb "created" used in verse 4, Sura 32 is an attempt to translate the Arabic verb "Khalafa" (accomplished past), which may mean, and especially in the language of the Quran, an action which began in the past but which still continues. According to the Quranic text, the creation and transformation operation has not ended.

Moreover, in the Quran, we often encounter descriptions of future phenomena and use of verbs in the accomplished past. This is, in fact, a special style destined to express with certainty the occurrence of cited events. The following verse (referring to an event which has not yet taken place) illustrates this point:

- Sura 5, verse 116

"And behold! God will say (literally «said»): «O Jesus son of Mary! Didst thou say unto men, worship me and my mother as gods in derogation of God?» He will say: «Glory to Thee! Never could I say what I had no right (to say). Had I said such a thing, Thou knowst indeed have known it. Thou knowest what is in my inner-self, though I know not what is in Thine. For Thou knowest in full all that is hidden»."

3.2.3 Evolution of the universe

3.2.3.1 Formation and expansion of the universe

In the following verses, the Quran says that the universe was created from a gaseous mass with fine particles (first verse) the elements of which were initially soldered to form one unit which will later be divided (second verse). Expansion started after the build up operation and it continues until now (third verse)(the present is used for the verb expand):

- Sura 41, verse 11

"Moreover He turned to heaven when it was smoke and said to it and to the earth: «come willingly or unwillingly!» They said: «we come in willing obedience»."

- Sura 21, verse 30

"Do not the unbelievers see that the heavens and the earth were joined together, then We clove them asunder and We got every living thing out of the water. Will they not then believe?"

- Sura 51, verse 47

"The heaven, We have built it with power, Verily We are expanding it."

(The word "heaven" designates all that is exterior to Earth).

It is clear that the Quran thesis concerning the creation (first verse) evidently contradicts the classical Big Bang theory according to which the

universe would have been first concentrated at a very hot and dense but infinitely small point.

In what follows, we mean "Big Bang" to be the instant of beginning of the universe formation according to the Quran view point and not according the "primitive atom" theory.

It is to be noted that some modern exegetes have suggested the existence of several universes. They have referred to the following Quranic verse:

- Sura 1, verse 1
"Praise be to God, The Cherisher and Sustainer of the worlds (alamin)."

Because in Arabic the word "alamin", plural of "alam" means either world or universe. This meaning of multiple universes was already encountered in §3.2.1.3.

3.2.3.2 General structure of the universe

In the same way, and taking into account the same considerations of period notion, we can understand from the following verse:

- Sura 41, verse 12
"Then He ordained them seven heavens in two periods, and He assigned to each heaven its mandate by Revelation."

The global structure of the universe has not changed much after the passage of two periods, starting from the beginning of the universe creation (4.6 billion years). This can be clearly understood from the expression "He assigned to each heaven its mandate". Consequently, the major changes in the evolution of the universe occurred before the latter reaching 4.6 billion years. During these 4.6 billion years, the galaxies were certainly more numerous and more active than today and were prey to continuous collisions, agglomerations, etc. This is the crucial period of the history of the universe according to the Quranic text. In fact, what we called stabilization of the general structure of the universe is a decrease in the evolution activity of the galaxies and therefore does not constitute a contradiction with the continuous evolution that we mentioned in §3.2.1.3.

Note: It is interesting to note that so far, many astronomers think that the main transformations that affected our universe occurred during the 300,000 years following the Big Bang and that

later on the general structure of the universe has not changed much [5]. Sura 41, verse 12 does not support this idea.

3.2.4 Collapse of the universe

It is interesting to note that, so far, the present Astronomy research has not permitted to know with certainty whether our universe is closed or open, since the expansion parameters of the universe are not well determined; however, the most recent data seem to plead for an open universe. The Quran specifies that after expansion there will be a collapse, then a re-birth in exactly the same way as at the beginning (therefore a new Big Bang).

- Sura 21, verse 104
The day when We will fold the heaven as letters to the roll! Even as We have produced the first creation, thus so We shall produce a new one: a promise We have undertaken: truly shall We fulfill it."

It should be born in mind, here, that ancient Arabs wrote letters on a papyrus or leather sheet, which was then rolled. Thus we can make the following comparison: the universe began as one mass (comparable to a roll of papyrus); expansion is comparable to the un-rolling of this papyrus and the collapse of the universe will take place as if it were an open papyrus which would resume its initial shape (a roll) due to its torsion constant. After this "folding" action there will be a repetition of the creation process.

The same meaning of cyclic re-birth is also found in the following verse (cf. §3.2.1.3).

- Sura 30, verse 11
"It is God Who begins (the process of) creation; Then repeats it."

The idea of cycle, which implies returning to the beginning, may be understood from the expression "Even as We have produced the first creation". This expression may also mean the repetition of the creation of other universes "...thus so We shall produce a new one: a promise We have undertaken..." But even if infinity of other universes exists, ours is unique: it is the one we inhabit and we will never know others. If this interpretation of the creation of other universes proves to be accurate, then a multitude of universes, similar to soap balls in systolic movement (contraction and expansion) with no contact between them, would exist.

Note: The Quran states that the beginning of the universe collapse will start on the resurrection day. In §3.1.4 (cf. open question) we spoke about the existence of a possible relation between the beginning of resurrection and the second expansion of the sun, which will thus lead to the complete end of the solar system. If our suggested interpretation proves accurate, then the beginning of the universe collapse (Big Crunches) will coincide at the latest with the end of the solar system which will take place 4.6 billion years from now, that is 18.4 billion years after the Big Bang, as implied in the following verse:

- Sura 39, verse 67

"They made not a just estimate of God such as due to Him. And on the day of Resurrection the whole of the Earth will be under His will and the heavens will be rolled up... Glorified be He, and High be He above all that they associate as partners with Him!"

Here is another point of view concerning verse 104, Sura 21, which we have already quoted:

"The most recent analyses show that the universe is condemned to a continuous expansion. The mass of universe is not sufficient. Moreover, it is now advanced that the cosmological constant imagined by Einstein is not nil. There would exist, therefore, a force of repulsion at a great scale associated to the "void energy". This energy would originate from tiny void quantic fluctuations, where matter and anti-matter separate before being annihilated in most cases. However, in this process, slightly more important fluctuations might be maintained and grow. But, immediately, the dimensions of this object detach themselves from the space-time dimensions of our own universe. This would give rise to the beginning of a new universe. An infinite number of universes might thus be born permanently, but without possibility of communication with ours (detached universes).

Though the concept is different, it may well be interpreted according to the Sura. In fact, the ropes theory, which predicts these void fluctuations, indicates that these objects are subtended by our usual space-time dimensions in addition to the new dimensions, which are those that will separate if a new universe "diverges" and develops. But the ordinary dimensions span a quasi-infinite space and so have no measurable curve (plane or very low-

curve geometry). However, the new dimensions originating from the previous ones have quantic dimensions and are consequently curved over radii approximately the size of an atom. In this way, the image of "roll" and rolling reflect well enough this concept, as origin of the creation of a new universe. It is to be noted that this is the best theory at present, but like everything in cosmology, the idea still remains a speculation. It must be proven by observations. The verse, after all, does not really suggest the idea of a collapse. Simply, what has been done to create our universe would be continuously and infinitely repeated everywhere in our own universe."

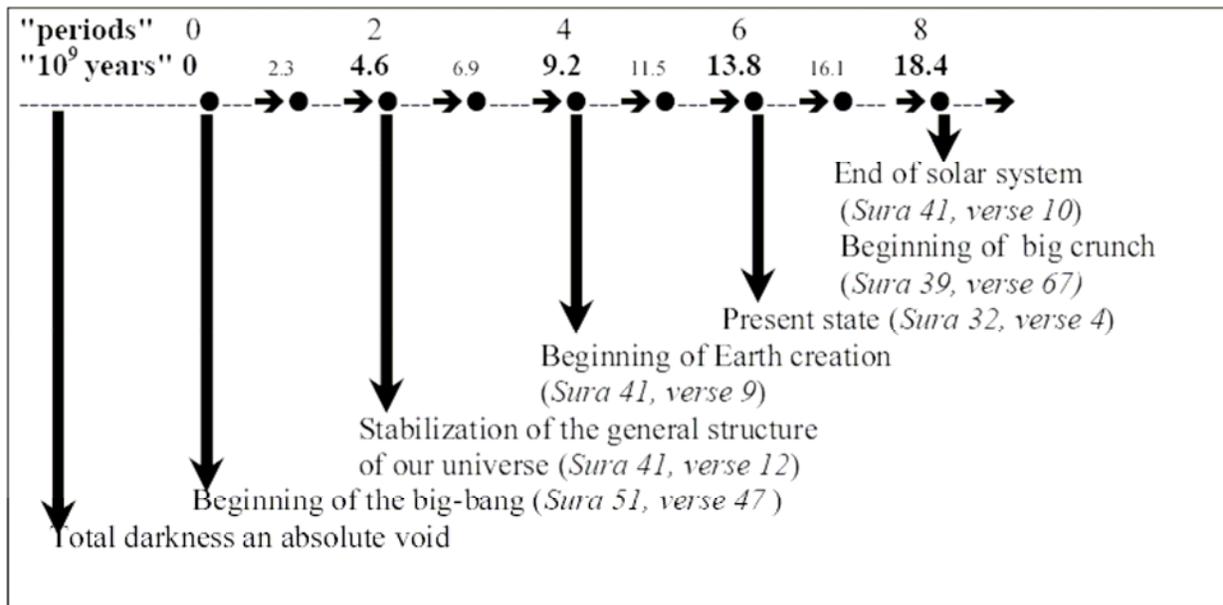
We should mention, here, that according to a recent study presented by P. Steinhardt (Princeton University) and N. Turok (Cambridge University), the universe would experience an endless succession of "Big Bangs" and "Big Crunches", separated by expansion and contraction periods. It is curious to note that the authors developed in their theory the representation of the universe by two parallel sheets of paper (cf. Sura 21, verse 104) that meet and bounce [7].

Thus, according to the verses concerning the creation and the evolution of the universe, the following chronology may be established:

- beginning of the creation of the universe 13.8 billion years ago (the Big Bang)
- beginning of the universe expansion which still continues according to Sura 51, verse 47.
- stabilization of the general structure of the universe after the passage of two periods (that is 4.6 billion years) (cf. §3.2.3.2 Sura 41, verse 12).
- beginning of the creation of the Earth after the passage of two more periods, that is 9.2 billion years after the start of expansion.
- the duration of the Earth's life is 9.2 billion years. Its end is linked to that of the solar system (according to Sura 81, verse 1 and Sura 41, verse 10), which would occur towards 18.4 billion years after the Big Bang.

The above figures may be summed up in the following scheme (the unit is billion of years) (Figure 1).

Figure 1: A representation of a cycle of the Universe.



3.2.5 The post-collapse phase of the universe

Let us reexamine the verse of §3.1.4:

- Sura 14, verse 48

"On the Day when the Earth turns out into another Earth and so will be the heavens."

It is clearly understood, from this verse, that after the collapse of the universe, the latter will be transformed in the same way as the Earth. Hence, after the re-birth of the universe, its evolution will not be the same as that we know today.

It is also interesting to note that the expression "and so will be the heavens" in the previous verse reconfirms the collapse of the universe (cf. §3.2.4 Sura 21, verse 104) which will have an end in the same way as the solar system, but with a different chronology.

4. CONCLUSIONS

As a conclusion to this paper, one wonders whether the Quran was written by a human being who had lived through a period of obscurantism (cf. §2) or whether it is really a divine revelation. If the Quran was a pure invention of a highly intelligent person, why

would this person take the risk to put forward scientific theses which would prove false afterwards?

What we can say is that the study of the Quran verses related to scientific notions has not, so far, revealed any discordance with our present knowledge, contrary to the ideas, which prevailed 14 centuries ago. But it should be noted that such questions which cross the mind of any human being had already been asked in the Quran which gives an answer in the following two verses:

- Sura 41, verse 53

"We will show them Our signs in the universe, and in their own selves (souls), until it becomes manifest to them that this (the Quran) is the truth. Is it not sufficient in regard to your Lord that He is a Witness over all things? "

- Sura 4, verse 82

"Do they not then consider the Quran carefully? Had it been from other than God, they would surely have found therein many a contradiction. "

Our study is far from being exhaustive. Our aim was especially to show that the Quran includes verses related specially to science, which no objective reader can deny. We can

quote here the points dealing with Astronomy, e.g. the apocalypse scenario and the final fate of the Earth and the moon (cf. §3.1.3). We refer the reader, especially, to the universe expansion parameters and to the difficulty of space travel outside the solar system and in corollary the great difficulty to detect traces of life in the distant space. It is interesting to note that one of the interesting aspects of this study is the fact that there exists a difference between the Quran theses and some present scientific knowledge concerning points, which have not definitely been settled. I am referring here to the stabilization of the general structure of the universe 4.6 billion years after the Big Bang and the beginning of its collapse (Big Crunches) at the end of the solar system.

“Verily! In the creation of the heavens and the earth, and in the alternation of night and day, there are indeed signs for men of understanding. Those who remember (celebrate) The praises of God standing, sitting, and lying down on their sides, and think deeply about the creation of the heavens and the earth, (saying): Our Lord! You have not created (all) this without purpose, glory to You!” (Quran 3:190-191)

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When translating the Quranic text, we have mainly adopted the works of M. Hamidullah (in French), of Youssef Ali (in English) and of Maurice Bucaille (in his book "The Bible, the Quran, and Science"). In some translations, the word God is replaced by **Al lâh**, which means, in Arabic, **the unique God** of Abraham... of Moses and Jesus.

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