

# A New Approach to Estimate the Age of the Earth and the Age of the Universe.

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## FOREWORD

The confrontation of Holy Books with science data has always been a subject of scholarly observance. It is in this context that many researchers have examined the Bible and the Qur'an in order to see to what extent they are compatible with modern scientific data.

In a previous article, we studied the evolution of the Universe, more precisely that of the Solar System, starting from the Qur'anic text. In the present article, we propose a new approach to estimate accurately the ages of the Earth and the Universe, respectively.

The choice of these themes was motivated by the fact that the majority of the Qur'anic verses related to modern science deal with Astronomy in particular. It has to be noted that the emphasis on this aspect is justified in the Qur'an itself since it says: "*The creation of the heavens and of the Earth is indeed more grandiose than the creation of Man. Yet most men understand not.*" (Qur'an 40:57).

We must point out that this paper does not aim to find a "concordance" between the Qur'an and Science. It is rather an analysis of an ancient document and the comparison of some of its excerpts with modern knowledge. The interpretation of verses related to the ages of the Earth and of the Universe should not, in any case, be taken as a new "theory" or "proof" paralleling the scientific theories themselves. Rather, the gist of our work is a search of meaning at the level of man and of the religious message. The approach is therefore quite different and takes place in another domain, which may enrich rational knowledge.

Our contribution here is in fact at the level of crossings between religion and science: how can our present knowledge enlighten our understanding of the ancient texts? Conversely,

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 is not a proposal for an alternative model of the universe, meant to replace those which have been so far patiently put forward by astronomers on the basis of their observations.

## ABSTRACT

In a previous article, we proposed estimations for the age of the Universe and for the date of stabilization of its general structure on the basis of a given age of the Earth equal to 4.6 billion years. In the present article, we propose a new approach to estimate more accurately and at the same time, the age of the Earth and that of the Universe, starting from verse 4 of Sura 70 of the Qur'an. The procedure we followed and which is detailed in this article, should in our view, contribute to enlighten the debate on the question. We must add that our approach can in no case be considered as based on "concordism" or conjecture. Indeed, it rests on rigorous mathematical computations.

(Keywords: age of the Earth, age of the universe, datation method, Qur'an and science, science in holy texts)

## INTRODUCTION

For millennia, the problem of determining the ages of the Earth and that of the Universe has provoked multiple debates and controversies. Before the Scientific Revolution, the notion of the

Universe was blurred. In the Middle Ages, there was the Earth which was considered as the center of the universe, and the Sun which revolved around it, while the stars were only an ornament of the sky. The concern was thus limited to the problem of the Earth: was it eternal or did it have a beginning and an end and how old was it? Scholars studied this question at length and various answers were proposed. It must be emphasized that it was only in the last century that, thanks to the remarkable development of telescopes and the launching of satellites, the problem of the age of the Universe was addressed seriously. Estimations were facilitated thanks to the development of computer science.

Whereas the estimations of the age of the Earth have varied from a few thousand to a few million then to a few billion years, the age of the Universe was estimated according to values which slightly oscillated according to the methods that were applied. In this article, we intend to present a new approach to determine those key-parameters which still preoccupy researchers nowadays.

### Age of the Earth

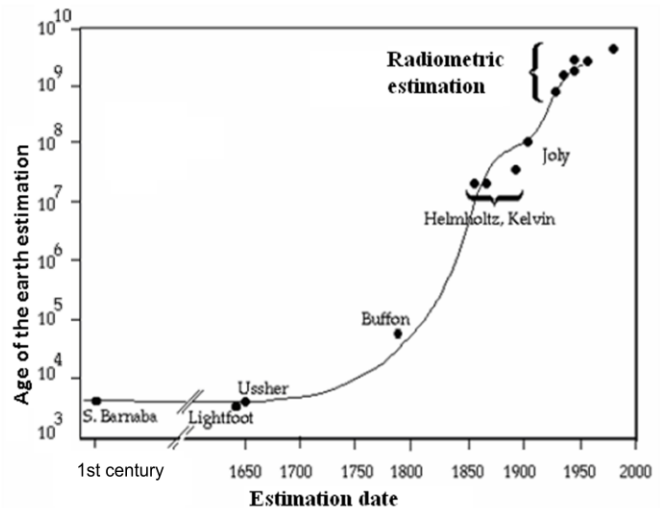
According to Aristotle, the Earth is eternal. With the revolution induced by Copernicus, Aristotle's theses were put aside in favor of the Judeo-Christian theses which put forth the number 5,500 before the birth of Christ [11]. The Creationists, followers of Bishop Ussher, will even set the creation date of the world at *Sunday, October 23<sup>rd</sup> of the year 4004 before Jesus Christ at 10 am* [11].

It was only at the end of the 18<sup>th</sup> century that Geology ceased to be a speculative science and became a science of observation and that a physicist such as Lord Kelvin or geologists such as John Turberville Needham or Jean-Louis Giraud Soulavie proposed for the age of the Earth several million years.

Following the discovery of radioactivity, geologists worked out more reliable dating methods. In 1905, Lord Rayleigh was the first to assert that the Earth was older than one billion years. This figure continued to increase up until 1953 when Clair Patterson showed that the Earth and the meteorites formed at the same time, starting from an identical reservoir, 4.55 billion years ago. This

age was confirmed by other radio-chronological methods and definitely accepted in the 1970s.

The graph below (Figure 1) shows how the estimation of the age of the Earth has evolved in the course of the last two millennia. In this manner, the first one dating back to the first century after Jesus Christ, was according to Saint Barnaba 6,000 years, and the most recent, of about 4.55 billion years according to radio-metric methods [15].



**Figure 1:** Variations in the Estimations of the Age of the Earth in the Course of Time.

### Age of the Universe

Since the advent of the Christian Era, the Church kept the Occident under a lead weight and blocked all attempts at questioning the creed. Everything was in the Genesis. Reason was subdued to Faith. Thus, towards the end of the fourth century, Saint Augustine warned against *"temptation... the ill of curiosity... which drives towards discovering the secrets of nature..."*.

Two centuries later, it was the monk Cosmas who stood *"against those who believe, like the Pagans, that the sky is spherical"*. It was through the south of Spain, where the three great religions coexisted fruitfully for several centuries that the light was to come again. This happened thanks to the Arab-Muslim Andalusians who, after having assimilated Greek knowledge, were to spread it again with important contributions on their part. It was thanks to the Qur'anic revelations that the Arabs underwent a change which affected all the aspects of their life. Indeed, those desert-dwellers who were almost all illiterate, were called

upon to learn to read as early as the first revealed verse.

**- Sura 96, verses 1-5**

*"Read! In the name of thy Lord, Who created, Who created man from something which clings. Read! Thy Lord is the Most Noble, Who taught by the pen, Who taught man what he did not know. "*

These same people, who had no means of transportation other than camels, were even invited to conquer space and to exploit terrestrial depths.

**- 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).*

It was in this manner that human beings realized anew that they could study and understand the nature of the Universe. Astronomy developed thanks to the discovery of the Astrolabe by the Arabs. Then, Western scholars brought on their own contributions. Kepler, Galileo, and Newton laid out the foundations of mechanics starting from the motion of planets. Nevertheless, the Universe was confined to the limits of the Solar System.

Cosmology which studies the Universe as a whole, truly acquired its status as a Science only about a century ago, and has since been constantly evolving. Indeed, up until the beginning of the 20<sup>th</sup> Century, Cosmology could hardly be considered a science, particularly because the different theories on the formation and evolution of the Universe were only based on rudimentary observations. Indeed, the Solar System was understood since Copernicus, and Newton's and Kepler's laws were established and applied, particularly to the motions of planets around the Sun, thereby allowing Le Verrier for instance, to discover the planet Neptune. Nevertheless, it was well and good enough to suspect the existence of very distant objects, without knowing either their distance, their dimensions, or their mass.

It was only in the beginning of the 20<sup>th</sup> Century, in the twenties, that Hubble clearly showed the spectral shift towards the red, of galaxies, thus

proving that they were very distant objects and therefore very massive and composed of millions of billions of stars, further implying that the Universe was expanding. Twentieth Century Astronomy has appealed more and more to Physics, which is helping now better to understand the structure, the formation and the evolution of the Universe. Estimates of the age of the Universe fluctuated between 10 and 20 billion years. The quasi-totality of these estimates are based on the Hubble Constant, which was increasingly refined reaching a value of around 73 km/sec/Mpc leading to a stable value of 13.7 billion years for the age of the universe. Other dating techniques have confirmed this value which has now been definitely accepted.

## **THE CREATION PROCESS ACCORDING TO THE HOLY BOOKS**

### **Creation According to the Biblical Thesis**

We find in the first chapter of Genesis a clear assertion that God created the Universe in six days. No mention is made of billions of years nor any other long period of time.

Most Christians have accepted the argument according to which the word "day" in Genesis did not mean literally a 24-hour day, but that those "days" rather represented six long periods of time (ages): this theory is often designated by the expression "epoch-day". However, this notion of "day" in the creation tale still appears in the context of a 24 hour cycle of light and darkness, as can be seen in the following verse:

*"And God called the light Day, and the darkness He called Night. And the evening and the morning were the first day." (Genesis 1:5)*

The use of the word "day" in Genesis 1 is always specifically attached to the words "one night and one morning". This expression has been utilized several times in the Old Testament. Each time, without exception, it refers to an average day of 24 hours. It is also important to emphasize that nowhere in the Old Testament is this expression used with a metaphorical meaning.

Moreover, when the word "day" is used with a numeral or a numerical adjective such as first day, second day, it always refers literally to a 24 hour day, all the more as there is no clearer manner of specifying that we deal with a regular

day than the expression "one night and one morning" associated with the word "day", itself qualified by the numerical adjective one. The only possible interpretation is that the first chapter of Genesis describes six (self) rotations by the Earth and not an indeterminate period of billions of years.

This conclusion is confirmed by Exodus 20:11. This passage, "engraved in stone by the finger of God Himself" asserts:

*"For in six days the LORD made heaven and earth, the sea, and all that in them is, and rested the seventh day."*

### **Creation According to the Qur'anic Thesis**

The majority of Qur'anic verses dealing with modern science are of an astronomical order. The reason for putting this subject forth is explained by Qur'an itself. Thus, it is made clear in the following verse that the creation of the Universe constitutes a more grandiose feat than the creation of Man.

#### **- Sura 40, verse 57**

*"The creation of the heavens and of the Earth is indeed more grandiose than the creation of Man. Yet most men understand not."*

The verse that follows clearly invites Humans to focus their attention on what exists in the skies in the first place, and then on what is on Earth in second place, keeping in mind that everything manifestly points to the Divine Might. Indeed, it is this invitation which was at the origin of the development of the sciences of Astronomy among Muslims following the Qur'anic revelations.

#### **- Sura 10, verse 101**

*"Say : "Behold all that is in the heavens and the earth ..."."*

The idea of an *ex-nihilo* creation is latent everywhere in Qur'an: *"When it decides a thing, It says to him simply: would be! And it is!"*.

This does not imply that the duration of creation was forcibly instantaneous, as is the case of the creation of the Universe which underwent several stages. Indeed, God willed that the Universe be formed according to a process ruled by the laws of Physics (which He Himself pre-established) as

can be understood from the following verse which makes clear that when the Divine Command is expressed, its realization follows for certain (in a slow progressive manner according to the human scale).

#### **- Sura 16, verse 1**

*"God's command comes; so seek not to hasten it."*

Here, we are in the presence of a new notion of creation, different from that which is known in the other religions.

The Qur'anic verses reserved for creation mention the period of the creation (the age) of the Earth and of the Universe, and indicate that the latter originated from a huge mass of smoke (particles) according to the same process of formation. As for the verses dealing with Astronomy, they are numerous and concern the future of the Solar System and that of the Universe at the same time.

### **Comparison between the Biblical and the Qur'anic Theses**

When the Qur'an speaks about the creation of the Universe, it mentions, like the Bible, that the creation lasted six days. However, it adds that the stabilization of its general structure took two days and that the creation of the Earth lasted two days. But, in contrast to the biblical thesis, it mentions explicitly and unequivocally that the length of one day is a very long period, and in no way compares with a regular day of 24 hours (cf. The Notion of Day according to the Qur'anic Text section). Therefore, the notion of "epoch-day" which was invented by the Christian exegetes, is rather more applicable to the Qur'anic text than to the Bible.

Concerning the Genesis, there is no doubt that that part in the Old Testament which mentions durations or the manner of "measuring" time has been written quite recently (to human scale) and been subjected to numerous free interpretations according to the whims of their authors and translators. The latter have not always known how to perceive the subtleties of the ancient texts and therefore, transmitted them with very liberal interpretations in keeping with the knowledge of the moment [6]. The Biblical thesis and the Qur'anic thesis should in no way disagree regarding the length of the days of creation, since

originally, there was only one religion. Moses' message, Jesus Christ's and Muhammad's are the links of the same chain. Indeed, the Qur'anic revelation continues what was revealed to the previous prophets as is explained in Sura 3, verse 84:

**- Sura 3, verse 84**

"Say (O Muhammad): "We believe in God, and in what has been revealed to us and what was revealed to Abraham, Isma'il, Isaac, Jacob, and the Tribes, and in (the Books) given to Moses, Jesus, and the Prophets, from their Lord : We make no distinction between one and another among them, and to Him (God) we have submitted"."

At this juncture, we should not deny the laudable efforts undertaken by some Christian scholars for research in the spiritual domain, with the aim of bringing the biblical notions closer to the modern scientific notions. In this manner, cosmologist John Barrow of Cambridge University, was able to demonstrate a very important conclusion, to wit, that the fundamental constants of the Universe must correspond exactly to what they are, so that the life and consciousness which scrutinize them may appear in it.

This conclusion was already stated in the Qur'anic text more than 14 centuries ago. Indeed, it is made clear in Sura 25, verse 2, that everything that was created by God was so made in very precise and optimal proportions.

**- Sura 25, verse 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."

**The Solar System in the Qur'an**

The Qur'an deals with the future of the Sun, the Earth as well as the other planets in several verses, which can be summed up as follows [3]:

- The Sun shall swell in the manner of a balloon (1) and the sky shall become red and will have the look of a scarlet rose (2),

(1) " When the sun becomes like a balloon in (the state of ) inflation." (Qur'an 81:1)

(2) "Then, when the heaven is rent asunder, becoming scarlet-rosy like red hide." (Qur'an 55 :37)

Indeed, during its last spasm which will last a few million years, the Sun will occupy the entire celestial vault and will certainly look like one of those agonizing stars which were often times observed by the Hubble space telescope (see images on the site <http://hubblesite.org/newscenter/archive/releases/nebula/planetary>, particularly the Cat's Eye Nebula which was discovered in September 1994, [http://imgsrc.hubblesite.org/hu/db/1995/01/images/a/for mats/full\\_jpg.jpg](http://imgsrc.hubblesite.org/hu/db/1995/01/images/a/for mats/full_jpg.jpg)).

- There will then be an increase in brightness on the terrestrial globe (3) and the stars will no longer be visible from the Earth (4),

(3) "So, when the sight is dazzled" (Qur'an 75:7)

(4) "And when the stars, lose their lustre" (Qur'an 81:2)

- A convergence of the Sun to the Moon will occur, (thus to the Earth). To designate this convergence, the Qur'an utilizes the term « joined »,

"... And the sun and moon are joined together." (Qur'an 75 :9)

- This convergence will, as a consequence destabilize the Moon which will be cleft asunder,

"The Hour has drawn near and the moon has been cleft asunder." (Qur'an 54 :1)

- Further, there will be a modification in the orbits of the planets of the Solar System.

" ... And when the planets will disperse (intatharat)" (Qur'an 82:2)

(The Arabic term "intatharat" which means an organized dispersion, by opposition to the term "tanātharat" which means a random dispersion.)

### Concerning our terrestrial globe, there will occur:

- Boiling of the seas (5) and dilation of the waters (6), disintegration of the mountains which will melt like « crumbling sand dunes » and will lose their height and solidity (7), dilation of the Earth's crust (8)... The Qur'an also makes it clear that the Earth will subsist despite these cataclysms.

(5) *"(I Swear)... By the Canopy Raised High, And by the boiling sea."* (Qur'an 52 :5-6)

(6) *"... And when the seas are burst forth."* (Qur'an 82:3)

(7) *"...And the mountains will be like crumbling sand dunes."* (Qur'an 73:14)

(8) *"... And when the Earth expands."* (Qur'an 84 :3)

All of these happenings are specified in an unequivocal style and can in no way make room for any subjective interpretations [10].

### Deduction Concerning the Universe

Other than the particulars on the origin and formation of the Universe, we find four essential pieces of information in the Qur'anic text [10]:

- The Universe originated from a large mass of smoke: *"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"."* (Qur'an 41:11)
- The Universe is continuously expanding: *"The heaven, We have built it with power, Verily We are expanding it."* (Qur'an 51:47)
- The creation phenomenon in the Universe is a continuous process : *"It is God Who begins (the process of) creation; Then repeats it."* (Qur'an 30:11)
- That there will be a (great) collapse (big crunch) of the Universe towards the end of the Solar System at the latest.

**Note :** It is important to note here that verse 11 of Sura 41 implies in no way that the Earth was created with the rest of the Universe simultaneously. Rather, it was only a command which was transmitted. Achievements by the Divine Will spreads in time as was made clear in the: «Creation According to the Qur'anic Thesis section»..

### DETERMINING THE AGES OF THE EARTH AND OF THE UNIVERSE

#### The Notion of Day according to the Qur'anic Text

The word "day" (yawm in Arabic) was cited several times in the Qur'anic text. This word was used in several Suras according to the context, either to mean the period separating two successive sunrises (it is then a period related to the rotation of the terrestrial globe on its axis) or to mean a long period corresponding in fact to years.

Thus, when the Qur'an narrates the tale of the birth of the prophet Yahya (John the Baptist), son of Zachariah, it is made clear that the latter began by praying God to grant him an offspring. The Angels informed him that God had fulfilled his wish and announced that he will have a son named Yahya who will be chaste, a prophet and one among good men. Zachariah was astonished at the news since he was old and his wife was sterile. So, he asked God for a sign and God asserted to him that the sign was that he would be able to talk to people only through gestures, for three days (ayyam):

#### **- Sura 3, verse 41**

*"He (Zachariah) said: "O my Lord! Make a sign for me". God said: "Your sign is that you shall not speak to mankind for three days except with signals. And remember your Lord much (by praising Him again and again), and glorify (Him) in the afternoon and in the morning"."*

In the same context, the Qur'anic text narrates the story of the Arab prophet Hud and his people (the 'Aad people who lived in southern Arabia) who, after having denied his message, suffered a punishment which lasted seven nights and eight days.

**- Sura 69, verse 6-7**

*"And the 'Aad, they were destroyed by a furious Wind, Exceedingly violent; He made it rage against them seven nights and eight days in succession: So that thou couldst see the (whole) people lying prostrate in its (path), as if they had been roots of hollow palm-trees tumbled down!"*

The use of the word 'nights' (then days) in the preceding verse, allows us to clearly understand that the eight days are in fact terrestrial days.

The use of the word 'day' to mean a long period of time is also frequent in the Qur'anic text. This use can be seen in several Suras. Thus, when the Qur'anic revelation was in its beginnings, the Meccans defied the Prophet of Islam incessantly, demanding that he show them Divine punishment immediately:

**- Sura 22, verse 47**

*"Yet they ask thee to hasten on the punishment! But God will not fail in His promise. Verily a day in the sight of thy Lord is as a thousand years of your reckoning. "*

In fact, the expression "*a day in the sight of your Lord*" in no way indicates that there is a day and a night for the Lord, since the notion of 'day' is always linked with the complete rotation of a planet on its axis. Therefore, this notion of day does have the meaning of a long period, thereby indicating that the measure of time is totally relative.

This notion is also asserted in the following verse which makes it clear that the Divine Command reaches Humans at the end of *one day equivalent to a thousand years of our reckoning*:

**- Sura 32, verse 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 period whereof is (as) a thousand years of your reckoning. "*

We may wonder here about the use of the « thousand » factor in verses 47 of Sura 22 and 5 of Sura 32, since using another factor (three or four thousands for instance, would not change the apparent meaning of the verses, i.e. the huge gap between the human measuring unit and the one chosen by God). We may also wonder about the reason according to which the expression "*a thousand years*" in each one of the two previous verses is followed by the expression "*of your*

*reckoning*". Let's note that only verse 4 of Sura 70 escapes this rule.

**- Sura 70, verse 4**

*"The angels and The Spirit will ascend unto Him within a day (period of time) the measure whereof is fifty thousand years."*

There is no doubt that the *fifty thousand years* quoted in the verse above are not the same kind as the *thousand years* mentioned in the preceding two verses. The choice of the *thousand* factor in verses 47 of Sura 22 and 5 of Sura 32, as well as the reason why the expression "*of your reckoning*" does not appear in verse 4 of Sura 70, will be dealt with in the «Method of Estimation section».

**Note:** According to the exegete Al-Qurtubi [1], it was reported that one person asked Ibn 'Abbas (companion and cousin of Prophet Muhammad, who was considered to be one of the first Qur'an exegetes) about the meaning of the expression "*one day equivalent to thousand years*". The latter answered that God alone knew its meaning and did not volunteer his opinion on a subject that was beyond him.

**The Nature of 'Years' in the Qur'anic Text**

Concerning the two verses which state that *one day in the sight of your Lord is equivalent to a thousand years*, let us ponder about the nature of these thousand years. Is it meant a thousand Lunar years (354.36 days), since the Qur'anic revelation occurred among a people using the Lunar calendar (with possible intercalations) or of Solar years (365.25 days) since some Arabs of the Peninsula (especially those to the North, in Syria-Palestine and to the South in Najran) were Christianized? It seems obvious to us that the answer is that the years mentioned in the preceding verses must have a nature totally different from those utilized in the common calendars. Indeed, the revelation was not intended specifically for the Arabs, were they Polytheists, Christianized or converted to Judaism. We are dealing here with a *universal year*, common to all Humanity. To our mind, *it is the sidereal year, which has been adopted in Astronomy*, and rightfully so, since the Qur'anic revelation was destined to Humanity in its entirety as the following verses confirm it:

**- Sura 34, verse 28**

"We have not sent thee but as a universal (Messenger) to men, giving them glad tidings, and warning them (against sin), but most men understand not."

**- 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!"

**- Sura 49 verse 13**

"O mankind! We have created you from a male and a female, and made you into nations and tribes, that ye may know each other. Verily the most honoured of you in the sight of God is (he who is) the most pious of you. And God has full knowledge and is well acquainted (with all things)."

We must emphasize the fact that the choice to define the term 'year' was dictated by social, cultural and religious considerations (the Gregorian Calendar adopted the Tropical year, because it made seasons coincide with the same periods each year). This justifies appropriately the sidereal nature of years quoted in the Qur'anic text.

**The Sidereal Year**

The Sidereal year is the time needed for the Sun to return to the same position with respect to the stars of the celestial sphere observing from the same place on the Earth. Alternatively, it is the period of time during which the Earth accomplishes a complete revolution around the Sun in a fixed reference frame (axes system). In other words, what is meant here is the time elapsed after which, as seen from the Earth, the Sun occupies the same position with respect to the stars on the celestial sphere. In the last few years, it has been demonstrated that the Earth is steadily slowing down the speed of its rotation. The duration of one day is lengthening by 1.752 milliseconds a day at the end of a century [7]. The duration of one sidereal year should not then be considered as constant. Its value is rendered by the following formula [7]:

$$S(t) = 365.25636300 \text{ days} + 1.1522 \cdot 10^{-6} t + 0.0044 \cdot 10^{-6} t^2$$

where  $t$  is the time elapsed since January 1<sup>st</sup>, 2000 at noon (noted as J2000) and expressed in thousands of Julian years, a Julian year being equal to 365.25 days.

The value of the average sidereal year was at the J2000 epoch of 365.25 days 6h 9mn 9.76 s.

Let's note that the Qur'anic revelation covered a time span extending (approximately) from the year 610 to 632. It happened in two periods: the period known as the Meccan Period (from the beginning of the revelation till the Prophet's migration to Medina i.e. 610-622) and the period known as the Medinese Period (from the Prophet's migration till his death i.e. 622-632). Verse 4 of Sura 70 was revealed in the course of the first period (Meccan). If we wish to find out the mean value of the sidereal year, denoted  $S$ , at the time of the revelation of the mentioned verse, we must then bound it by two values  $S(t_1)$  and  $S(t_2)$  with  $t_1 = (610-2000)/1000 = -1.390$  and  $t_2 = (622-2000)/1000 = -1.378$ .

Therefore:

$$S(-1.390) = 365.25636140694300 \text{ and} \\ S(-1.378) = 365.25636142062300$$

$S$  is thus bounded by two values which can be considered practically identical (10 identical digits). Indeed, the Meccan Period was a short period lasting about a dozen years, and as we mentioned, the lengthening of a day is then of about one millisecond. We'll choose the mean of the two bounds i.e.  **$S = 365.256361414$  days.**

**Method of Estimation**

Sura 70 begins with three verses stating that an individual (whose identity is not revealed) wondered about the date for the occurrence of the inescapable punishment for the Unbelievers.

**- Sura 70 verse 1-3**

"A questioner asked concerning a fateful torment about to befall the unbelievers, which none can avert. From God, the Lord of the ways of ascent."

Let's make it clear that the word ascent (*ma'arij*), from the three consonant root 'rj ('araja) quoted in the verse above, means a rise (ascent) with a certain *inclination* (whereby the link with the word *a'raj*, meaning someone walking with a bent (i.e. who limps).



The answer is provided in the verse immediately following the previous ones. It asserts that the date for the occurrence of this punishment (therefore of Judgement) will correspond to the ascent and return of Angels to their Lord, namely in a time span of one day equivalent to 50,000 years.

**- Sura 70, verse 4**

*"The angels and The Spirit will ascend unto Him within a day (period of time) the measure whereof is fifty thousand years."*

Let's note that many exegetes interpreted the ascent as the time needed by the Angels to reach their Lord. This interpretation is, to us, totally unacceptable, since to our mind the "ascent" of the Angels to their Lord in no way implies notions of points of departure and points of arrival, since the Angels are immaterial creatures who have nothing in common with human beings. Further, God would never be located in a precise material place.

**- Sura 42, verse 11**

*"... There is nothing like Him; and He is the All-hearing, the All-seeing."*

However, it is also interesting to note that one of the Prophet's companions [1] realized that verse 4 of Sura 70 simply indicated that the 50,000 period was nothing "but the period separating the beginning of the creation of the world from its ending", and he designated by "ending" the *Day of the Last Judgement*.

We also encounter this notion of ascent and return of the Angels to their Lord in verse 38 of Sura 78, stating that the apparition of the Angels and of the Archangel (Gabriel) in closed ranks will announce the arrival of the fateful day of the Judgement of humans.

**- Sura 78, verse 38**

*"The day that The Spirit and the angels will stand forth in ranks, none shall speak except any who is permitted by (God) most Gracious, and he will say what is right."*

If we consider verse 4, Sura 70 again, with in mind the fact that one sidereal year is worth an average of **365.256361414 days** at the time of the revelation of the latter verse (cf. The Sidereal Year section), we then find out that the fifty thousand years are equivalent to:

$$50,000 * 365.256361414 = 18,262,818.070 \text{ days}$$

Let's recall here that in verse 4 of Sura 70, the expression "*...whereof the measure is fifty thousand years.*" is not, like the other verses, followed by the expression "*of your reckoning*". Therefore, the 18,262,818.070 days we obtained are not usual days. If we keep in mind the fact that the days mentioned in verse 47 of Sura 22 and in verse 5 of Sura 32 are equivalent to "*a thousand years of our reckoning*", this entails that the ascent will occur at the deadline of 18,262,818,070 years "of our reckoning". This enormous time span is nothing on the Divine scale, as is confirmed by the two verses that immediately follow the previous one and that clearly assert that the punishment of the infidels, considered very distant by the latter, is in actual fact very near from the Divine point of view.

**- Sura 70, verses 5-7**

*"So be patient, with a good patience. Verily! They see it (the torment) afar off, But We see it (quite) near."*

The verses following the above quoted ones, state precisely that the punishment will happen after a given number of extraordinary events have affected our terrestrial globe, decreeing its end, such as the disintegration of the mountains becoming like wool, the transformation of the appearance of the sky blushing, etc. (verses 8 and 9).

**- Sura 70, verse 8-9**

*"The Day that the sky will be like molten metal, and the mountains will be like flakes of wool."*

The following verse describes the aspect of the wool.

**- Sura 101, verse 5**

*"The day when ... the mountains will be like carded wool."*

All these phenomena also foretell the end of the Solar System as we made it clear in [10].

It so happens that the Qur'an asserted that the age of the Earth was two "epoch-days" (or periods), the age of the Universe six periods and that its general structure stabilized in the course of two periods as can be seen in the following verses:

**- Sura 50, verse 38**

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

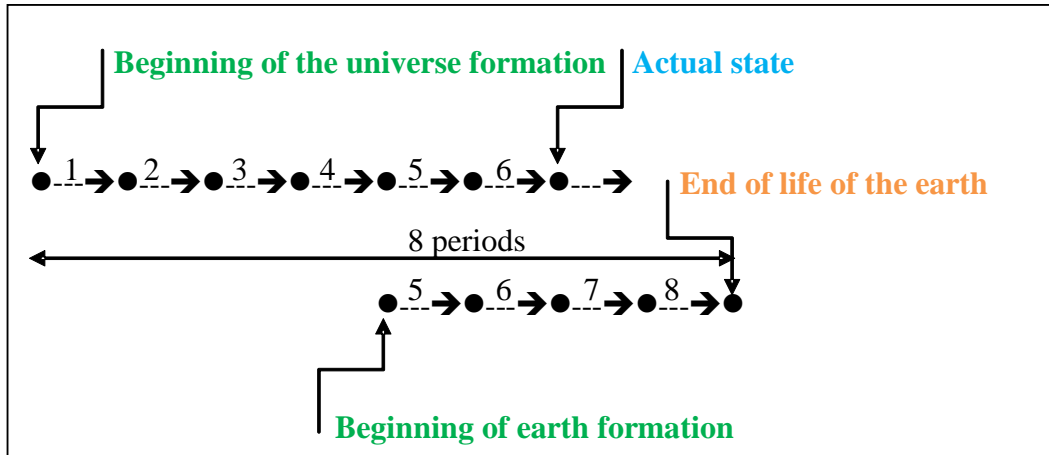
**- Sura 41, verse 9**

"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"."

**- 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..."

The following diagram can thus be drawn:



**Figure 2:** The Phases of Creation of the Universe and the Earth according to the Qur'an.

From the diagram above, we deduce that according to the Qur'anic text:

- The end of the Solar System will occur in a span of 8 periods (P) i.e. in 18,262,818,070 years starting from the Big Bang
- $8P = 18,262,818,070$  years. So  $P = 2,282,852,259$  (2 billion, 282 million, 852 thousand, 259 years).

By «end of the Solar System» we mean the end of the Solar System as we know it today. Indeed, as we demonstrated it from the Qur'anic verses, during the swelling of the Sun, the Earth will not undergo the same fate as the Moon (which will be cleft asunder), but rather, it will only undergo great transformations which will essentially affect its crust. This may be confirmed by the fact that the Qur'anic text stated in verse 2, Sura 82: "...the planets will disperse (change their orbits)."

In other words, the Earth and its sister-planets Mars, Jupiter and the others will move away from the Sun, and will continue to revolve around it,

while the latter will progressively exhaust its energy to become a white dwarf [10]. From what precedes, we can deduce:

- The age of the Earth =  $2P = 4,565,704,517$  years = 4 billion, 565 million, 704 thousand, 517 years.
- The age of the Universe =  $6P = 13,697,113,553$  years = 13 billion, 697 million, 113 thousand, 553 years.

Moreover, we have indicated in [10] that, according to the Qur'anic text, the stabilization of the galactic structure of the Universe was completed after the passing of two periods beginning at the start of the Big Bang. (i.e., 4 billion 565 million 704 thousand 517 years). Consequently, the major changes in the evolution of the Universe occurred before its age reached these 4.565704517 billion years. Certainly, during these first 4.565704517 billion years, the galaxies were more numerous, more active than today and underwent unceasing collisions, agglomerations, etc. This is the crucial period of

the history of the Universe according to the Qur'anic text.

It is obvious that the values which we came up with, represent estimations of the age of the Earth and of the Universe at the time of the revelation. If we take into account the fact that the revelation took place approximately 1,400 years ago, these values become:

Age of the Earth = **4 billion, 565 million, 705 thousand, 909 years.**

Age of the Universe = **13 billion, 697 million, 114 thousand, 944 years.**

The date of stabilization of the galactic structure of the Universe, as well as the date of the ending of the Solar System which are evaluated in relation to the Big Bang, will therefore not be affected by the time shift.

The present estimation of the age of the Earth by the scientists is  $4.55 \pm 0.01$  billion years [5]. As for the estimation of the age of the Universe, it is in the order of  $13.7 \pm 0.2$  billion years [8].

Depending on the followed dating method, accuracy is in the order of a few ten million years for the age of the Earth, and in the order of a few hundred millions for the age of the Universe. This uncertainty is due to the limitations of the dating methods utilized. It would then be interesting to carry out a comparative study between the different dating methods on the one hand and the values we put forth whose accuracy is in the order of thousands of years on the other, while admitting that one thousand years is a trivial value with respect to the age of the Universe or the Earth.

**Note:** We indicated in [10] an important result (which seems to be generalized in the Qur'anic text), to know, that for a given verse or Sura, the frequency in the use of words or letters is closely related to the subject at hand. Let's note that the number of words of the verse which allowed us to deduce the value of the eight periods is equal to eight (the number of words must be calculated from the beginning of the verse until... "whereof the measure is").

As was mentioned above (cf. The Notion of Day according to the Qur'anic Text section), the choice of the factor 'thousand' is not a random

choice. Indeed, it is common knowledge in Astronomy that the end of the Solar system would happen about 18 billion years after the beginning of creation. If in verse 47 of Sura 22 ("*And verily, a day in the sight of your Lord is as a thousand years of your reckoning.*"), the word 'thousand' (*alf*) was replaced by 'x' (a random integer number different from a thousand), we could deduce through a simple arithmetical calculation, that the result  $50,000 \times 365.256361414 \cdot x$  would in no way correspond to the date of the end of the Solar System, and consequently, the values of the ages of the Sun and the Universe we deduced above would be erroneous.

Moreover, we can pose the following problem in two unknowns : let's assume that in verse 47 of Sura 22 (see above), the factor *thousand* (*alf*) was replaced by a factor *x* (*any given integer*) and that in verse 4 Sura 70 ("*...The angels and The Spirit will ascend unto Him within a day (period of time) the measure whereof is fifty thousand years.*"), the factor 50 (*khamseen*) was replaced by *y*. For our results to remain correct, we should have:

$$365.256361414 \cdot xy = 18,262,818,070$$

This implies that  $xy = 5 \times 10^7$ . This is a nonlinear equation with two integer unknowns which has several solutions. However, before solving it, a certain number of points must be made clear:

1/ Verse 47 of Sura 22 ("*And verily, a day in the sight of your Lord is as a thousand years of your reckoning.*") indicates that the notion of time for the Lord is not identical to that of Humans. Let *x* be the number of years cited above (a thousand). If we have to choose any value for *x*, it must be expressed by a simple, concise and persuasive number, namely the largest non-compound unit known in Arabic by the inhabitants of the Peninsula at that time : in fact only a *thousand* fits, since for instance the word corresponding to one million at that time was 'alf alf' (one thousand thousands) i.e. a *compound word* (the result of one word duplication).

2/ In verse 4 of Sura 70 ("*...The angels and The Spirit will ascend unto Him within a day (period of time) the measure whereof is fifty thousand years.*"), The value *y* which can replace *the factor 50* is linked to an extraordinary phenomenon (the end of the Solar System) and must, to our mind, be the greatest possible (larger than *x* while maximising the difference  $y-x$  or the ratio  $y/x$ ).

Consequently, it must be expressed within the same unit as  $x$  (i.e., in thousands).

In the following table, we provide the solutions of the nonlinear equation with integer unknowns  $xy = 5 \times 10^7$  satisfying the preceding two constraints i.e. (i)  $x$  and  $y$  integer multiples of one thousand and (ii)  $y > x$ . We also give the ratio  $y/x$  and the difference  $y-x$ .

**Table 1:** Particular Solutions of the Equation  $xy = 5 \times 10^7$

$x$	$y$	$y/x$	$y-x$
6250	8000	1.28	1750
<b>5000</b>	<b>10000</b>	<b>2</b>	<b>5000</b>
4000	12500	3.12	8500
3200	15625	4.88	12425
3125	16000	5.12	12875
2500	20000	8	17500
<b>2000</b>	<b>25000</b>	<b>12.50</b>	<b>23000</b>
1600	31250	19.53	29650
1250	40000	32	38750
<b>1000</b>	<b>50000</b>	<b>50</b>	<b>49000</b>

It so happens that the maximum gap between  $x$  and  $y$  is achieved by the couple ( $x = 1\,000$ ,  $y = 50,000$ ), which constitutes the simplest and most obvious solution to the equation we have mentioned.

Moreover, we also notice that among the possible values of  $x$ , the only non-compound number is one thousand. Further, it is the easiest number to remember. This is a very important remark as we should not forget that the Qur'an was memorized and recited by heart by Muslims, which was the first guarantee of its authenticity. Here, we do not claim to unveil all the secrets of the use of *the two factors 1,000 and 50,000*. What we presented is only an attempt at an interpretation which remains to be dwelt upon.

## THE EVALUATION OF THE DATING METHODS

In this part, we intend to present, for the purpose of comparison, the latest figures that were obtained for the ages of the Earth and the Universe according to various dating methods. This will allow the evaluation of these methods according to the approach we put forth. The

advantage of this comparison resides in the fact that there is not a single scientific means that makes it possible to judge the pertinence of any given method: we cannot wait for an object until it is billions years old in order to observe the result of the application of one method or another.

## Evaluation of the Dating Methods of the Age of the Earth

There exist diverse dating methods allowing to determine the age of very ancient objects. The principal and most precise of dating methods are those based on radioactivity. Their principle is as follows.

Most atoms (each one constituted of a nucleus surrounded by electrons) are stable and destined to exist indefinitely. Regarding the unstable atoms, their nucleus tends to emit particles spontaneously, in other words, they are radioactive. Thus, the radioactive original element changes its composition into a distinct and stable derived radiogenic element. This change occurs according to a known rate determined by the half-life or the period i.e. the time required by half the initial stock of radioactive atoms to change into stable derived elements. In each half-life or period, the number of radioactive elements is half reduced.

The radioactive elements used for geological dating have relatively long life spans. For example, Rubidium 87 whose life span is 50 billion years produces Strontium 87. Thus, we may compute the age of a rock by measuring the original quantity of Rubidium which was transformed into Strontium.

These radioactive processes constitute a set of natural clocks which indicate the time at which the rock was formed.

There are indeed other methods of dating. The well known Carbon 14 dating method assumes that radioactive Carbon 14, whose life span is of 5,700 years, was transformed into stable Nitrogen. Carbon 14 is used to only determine *the age of organic matters* and more precisely only those less old than 50,000 years. Therefore, we may deduce from the above that only a limited number of methods can be applied to determine the age of the Earth. Among the latter, we may cite:

- The Uranium/Lead method
- The Iodine/Xenon method
- The Lead/Lead method

These three main methods were applied not to terrestrial rocks, but rather to meteorites that hit the Earth, particularly the primitive meteorite Allende originating from the asteroid belt located between Mars and Jupiter orbits. This choice of meteorites is in fact motivated by the following considerations:

- With time, the rocks on the surface of the terrestrial globe underwent multiple alterations. The direct application of these methods on these rocks could lead to erroneous results.

- In view of the fact that all the planets of the Solar System (as well as their satellites) were formed in the same epoch, from an identical reservoir, it would be more judicious to apply these methods to meteorites, which for their part, underwent no alterations in the course of time.

Therefore, the Uranium/Lead method which was introduced by Clair Patterson in 1956, whereby the age of a geological material is computed according to the well-known rates of radioactive disintegration of Uranium-238 into Lead-206 and of Uranium-235 into Lead-207, gave an age for the Earth of the order of 4.55 Gyr, with an uncertainty of 70 million years [5], [14].

The Iodine/Xenon method, which is more recent and more precise than the preceding one, was applied on the same meteorite and gave an age of 4.561 to **4.565** Gyr [12].

The Lead/Lead method, which is older but as precise as the preceding one consists in determining the isotopic relations of the radiogenic  $^{206}\text{Pb}$ ,  $^{207}\text{Pb}$  lead to the non-radiogenic  $^{204}\text{Pb}$  lead (stable lead). The application of this method on the Allende meteorite gave an age included between **4.565** and 4.568 Gyr [2].

The above results can be summarized in the following table:

**Table 2** : Estimation of the Age of the Earth

Method	Obtained Age	Amplitude (*)
Uranium/Lead	4.480 – 4.620 Gyr	0.07 Gyr
Iodine/Xenon	4.561 – <b>4.565</b> Gyr	0.004 Gyr
Lead/Lead	<b>4.565</b> – 4.568 Gyr	0,003 Gyr
<b>Our approach</b>	<b>4.565706</b> Gyr	-

The result of this analysis is that the two methods, the Iodine/Xenon and Lead/Lead methods respectively, which are known to be the most precise, provide different age intervals for the Earth. An acceptable estimation would have to be found in the intersection of the two intervals. This estimation reduces in fact to one single value (i.e., **4.565** Gyr). It is this same value that we were able to deduce from the Qur'anic text.

### Evaluation of the Methods of Dating the Age of the Universe

There exist several methods for estimating the age of the Universe. They can be classified into three categories [8].

The first category includes two methods which are based on a cosmological model of six parameters, called: "Power Law  $\Lambda$ CDM Model".

For the first method, the  $\Lambda$ CDM model was applied to the data collected by the WMAP satellite (WMAP data). The second method uses the same principle, while taking into account the analysis of the spectra of quasars and the active nuclei of galaxies (WMAPext+LSS).

The second category is composed of three methods: the method known as that of the Globular Cluster Ages, the method of the White Dwarfs and finally, the method known as OGLEGC-17.

The third category is based on radioactive dating.

(\*) Gap between the two extreme values

The ages which were obtained through these different methods are summarized in the table below (Table 3). The details of these methods are to be found in [8].

**Table 3 : Cosmic Age**

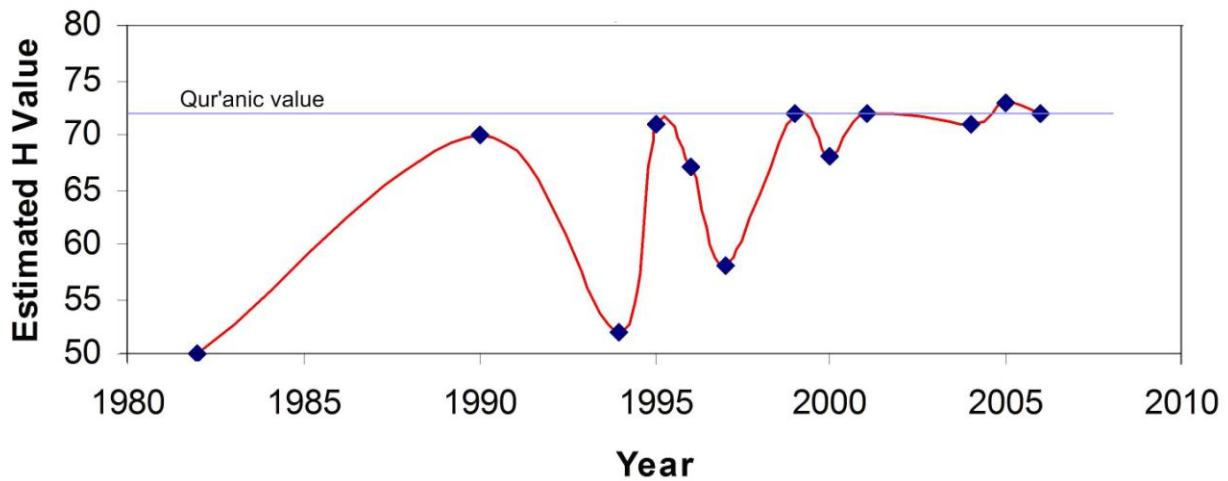
Method	Obtained Age	Uncertainty
WMAP data ( $\Lambda$ CDM)	13,4 Gyr	$\pm 0,3$ Gyr
WMAPext+ LSS	13,7 Gyr	$\pm 0,2$ Gyr
Globular Cluster Ages	11 – 16 Gyr	-
White Dwarf	12.7 Gyr	$\pm 0,7$ Gyr
OGLEGC-17	10,4 – 12,8 Gyr	-
Radioactive dating	9,5 – 20 Gyr	-
Our approach	<b>13,697115</b> Gyr	-

The result of this analysis is that the **WMAPext+ LSS** is the one which provides the closest estimation to our own.

### A New Re-evaluation of the Hubble Coefficient

Hubble's H coefficient (expressing the inverse of the age of the Universe) has undergone several re-evaluations these last few years. We can find in [13] the different estimates of this parameter which varied between  $50 \pm 7$  km/sec/Mpc and  $73 \pm 4$  km/sec/Mpc. Some authors even advanced the number  $77.6 \pm 5$  km/s/Mpc [4].

The graph below illustrates the variations of the H estimate for the 1982 - 2006 period. It is established starting from the different estimates of the value stated in [13]. For those cases where there is more than one estimate in the course of the same year, we retained the greatest value.



**Figure 3:** Variations of the Estimation of the Hubble Coefficient in the Course of Time.

Since we found out, according to our computations, that the age of the Universe is equal to **13.697115 Gys**, and taking into account the fact that the Hubble coefficient is expressed by the inverse of the age of the Universe, we deduce the following value for H (in km/s/Mpc):

$$H = 1/13.697115 = 73.3008075058142 \text{ km/sec/Mpc}$$

Let's note that since access to the WMAP satellite data was made possible in 2003, and in the framework of the standard model of cosmology, " $\Lambda$ CDM Model", this value has started to be refined. Thus, in 2003 the estimation of this coefficient was  $H = 72 \pm 5$  km/sec/Mpc. Let's note that the last obtained value (in 2007) was  $73.2 \pm 0.31$  km/sec/Mpc [9].

## CONCLUSION

According to our study, we can safely assert that numerous questions, of the deepest and most attractive nature regarding the Universe, originate in a purely religious quest. Denying the links between the scientific and the religious approaches regarding the nature of the Universe appears inconceivable to us. The Biblical and Qur'anic creation theses seem to diverge. The Biblical thesis supposes that Creation was instantaneous as we saw above (cf. Creation According to the Biblical Thesis section), whereas the Qur'anic thesis supposes that there is a command for Creation, then an achievement which will happen in time.

The traditional claim that a given theology has monopoly over the Divine Grace and Salvation, is morally unacceptable, and must make room for a conception which admits that God also acts in the other religious traditions.

### - Sura 3, verse 84

"Say (O Muhammad) : "We believe in God, and in what has been revealed to us and what was revealed to Abraham, Isma'il, Isaac, Jacob, and the Tribes, and in (the Books) given to Moses, Jesus, and the Prophets, from their Lord : We make no distinction between one and another among them, and to Him (God) we have submitted"."

On another plane, some Western thinkers claim that the Qur'an could be the work of a person endowed with an exceptional intelligence, thereby targeting the Prophet of Islam. The question to pose is the following: is it possible for someone who lived in an epoch (6<sup>th</sup> and 7<sup>th</sup> centuries AD) and in a place (Arabia) characterized by ignorance and obscurantism, to imagine that there will be a swelling of the Sun, which will have as one consequence the boiling of the seas and oceans?

### - Sura 52, verses 5- 6

"(I Swear)... By the Canopy Raised High, And by the boiling sea."

The Qur'an, as a religious book whose aim it is to guide men, tells only about the major events that will occur in our Universe, so that the reader (not necessarily an erudite) will be led to think and meditate. The discovery of accurate facts on phenomena is reserved for men of Science and

for the specialists, precisely because a sacred book is not a scientific book.

Indeed, as Professor Maurice Bucaille asserted [6]: "...We cannot accept the fact that many Qur'anic statements which have a scientific appearance, would have been the work of a man, given the state of knowledge at the time of Muhammad. Therefore, it is perfectly legitimate not only to consider the Qur'an as the expression of a revelation, but also to give to the Qur'anic Revelation a completely outstanding place, due to the guarantee of authenticity it offers, and the presence of scientific statements which, once they are examined in our time, appear as a challenge to human explanation."

*"Do they not then consider the Qur'an carefully? Had it been from other than God, they would surely have found therein many a contradiction. "* (Qur'an 4:82)

+ + + + +

*"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 in vain, glory to You! "* (Qur'an 3 :190-191)

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For the quotations from the Qur'anic text, we particularly relied on the translations made by M. Hamidullah (in French) and Youssef Ali (in English) as well as on the translation by Maurice Bucaille (in his book: *The Bible, the Qur'an and Science*). In some translations, we find that the word God is translated by *Allâh* which means in Arabic *the unique God* of Abraham, ..., of Moses and Jesus.

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