Humanity and the Universe: Mirror of the Unknown

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Humanity and the Universe
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with 92 Illustrations

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Produced in Canada
ust as this book tries to look at man and the universe from new perspectives, its
front cover shows planet earth from an unconventional angle. Since there is no North, South, East or West in outer space and the terminator--the dividing line between night and day--is not perpendicular, our planet as seen by a cosmic wayfarer does not resemble a traditional globe in a library where the lands of the
northern hemisphere are always on top and the rest of the world is stuck to the bottom.
“In the whole universe, wherever we looked, the only bit of color was back
on earth. It was the most beautiful thing there was to see in all the
heavens. People down here don’t realize what they have.”
Astronaut James Lovell aboard Apollo 8 in his broadcast of December 24, 1968

The back cover image of the Andromeda Galaxy had travelled 2.5 million years
across inter-galactic space before it was captured by the camera of

astrophotographer Adam Evans of Toronto, Canada. Seen through a cloud of stars that
belong to our own ‘Milky Way Galaxy’, the image of our closest galactic neighbor demonstrates the immensity of space when light takes two and a half million years to arrive on earth, compared to 8 minutes from the Sun and a mere 1.3 seconds from the Moon.
This Book is dedicated to the memory of

Healer of body and helper of spirit,
who felt the harmony and saw the oneness in all things.
is a marvelous study
reminiscent of Adelbert Mühlschlegel’s own vision of a universal oneness and harmony in all things. It has always been his greatest wish to share these insights with his fellow men, but much to his regret there were countless other duties that took precedence. I therefore believe that he would be delighted to see this book published, because it carries on from where he left off.
Ein großartiges Buch und Adelbert Mühlschlegel ganz aus der Seele gesprochen, denn er sah in allen Dingen eine große universale Einheit und Harmonie. Immer war es sein Streben gewesen, diese hehre Einsicht seinen Mitmenschen anschaulicher zu machen, doch die Zeit hierfür musste häufig anderen
Pflichten geopfert werden. Umso mehr würde er deshalb die Veröffentlichung dieses Buches, das ihm gewidmet ist, begrüßen.

Ursula Mühlschlegel
Rhodos, Greece
he largest measure of my gratitude goes to my wife Gisele for her support and incredible patience while this book and its subsequent editions were in the making.
I gratefully acknowledge the assistance of the Research Department at the Bahá’í World Centre in confirming the authenticity of certain texts and the helpful review by Canada’s Baha’i center.
I am indebted to several scholars for their encouragement, critique and valuable suggestions: Ola Pavlowska who taught in Canada, Central Africa and Poland; Hubert Schuurmann, veteran film maker for Canada’s National Film Board, Suzanne Schuurmann, educator and author; Kay Ruthnum and Dr. Sam Ruthnum. I thank Brigitte Knaack, poet and writer, for her help in improving the book’s layout and for her permission to use her English translation of Adelbert Mühlschlegel’s poetry. My special thanks go to David Bowie who spent many hours reviewing the entire text and made numerous excellent suggestions to improve its clarity, and to my grandson Alexander Lawrence for CD formatting.
Finally, tribute must be paid to the growing number of people across the face of the planet who with global vision show courage

and commitment by word and by deed to set our world quite
irrevocably on a fresh, more enlightened and truly universal path.

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his book attempts to share a vision of an infinite and ever evolving universe
in which
humanity on one hand appears to be as insignificant as a sub-atomic particle,
but on the other
hand is endowed with all the powers that are present in this grand cosmic
creation.

The attempt, while admittedly bold, springs from a hope that a wider view and a more profound appreciation of the world of existence may spur us on to make greater use of our diverse talents in order to help transform this world into a better place.

My motive to share ideas and information was often challenged by a sense of inadequacy. How is it really possible to place the immensity of the universe neatly on a CD, when the sheer magnitude and mystery of it all will forever transcend the powers of mind and language.

In the end, the attempt was prompted by a realization that for many of us the vast tapestry of the universe has been lost despite unprecedented access to information, or perhaps just because of it. Today's knowledge explosion has forced on us a kind of specialization where minds are focused like microscopes on a single, tiny chip of creation's grand mosaic. This narrow preoccupation with the here and now has often diminished the awareness of our individual and collective roles in the larger scheme of things. Even when such awareness does exist, it is often split into competing factions of science and religion.

Those who favor the scientific approach tend to focus on physical phenomena and often look at religion as unscientific and therefore as not being relevant. Those who emphasize the importance of religion may just tolerate science as a useful tool to make their lives more pleasant and secure, but they may still distrust it as materialism's silent interloper and as a threat to their religious values.

This book seeks to widen the horizons in an effort to unify both avenues of thought and inquiry and to promote a more holistic view of our existence.

Caught up in the demands of daily living, we are taking our lives and the environment very much for granted, until something goes badly wrong. We pay little attention to the intelligence that surrounds us, and we do so at our peril when we disregard its laws. It controls the life cycles of galaxies that are far removed from our immediate surroundings both in terms of time as well as space; it regulates our sun's furnace; it maintains life's delicate balance on our home planet, and it is ultimately responsible for the existence of every stone, plant or animal.

Yet, even in its most
insignificant aspects it cannot be fully explained, let alone duplicated by
human intellect.
Nonetheless, for most of us the world of nature is something that simply
exists, presumably set to
run on autopilot.
Our own lives are often seen as little else but an inter-active game of
competition, hype and
self-gratification. Our flawed relationships are simply accepted as ‘human
nature that never
changes’. In fact, one is ill at ease at the very suggestion that humanity
may be the embodiment of
a great unknown power that is worshipped by different names and in many
different fashions; that
mankind is the design of a superior intelligence that has put us on this planet
to live by standards
that would make our present behavior look primitive and barbarian by
comparison.
The ready excuse for misbehavior has always been that the human race is merely
a higher
form of animal and is held hostage by its physical nature and therefore unable
to change long
established patterns of behavior. In curious contradiction to this claim, there
is no hesitation to
take full credit for our capacity to uncover, exploit, or even to change some
of nature’s laws as no

other creature can in order to gain control over our environment and to improve
our physical
condition.
We seek escape in visions of future extraterrestrial exploits, no matter how
unrealistic,
wishful that they may relieve us of nagging, unresolved problems here on earth.
We search for
moisture on Moon and Mars and hope to discover some sign of past life on
distant planets, even
while we continue to despoil our pristine oceans, imperil plants and animals,
and tolerate famine
and genocide.
It is evident that the 20th century has brought greater change than all of
recorded history
combined. Change continues at an accelerated pace into the new Millennium we
have just begun.
It has transformed human existence and promises unimaginable further progress.
But it also
threatens us with many unforeseen dangers. The dramatic gains of science have
suddenly

removed the veils that for millennia have kept most of the universe and its powers concealed from us. The new challenges along with wider perspectives this has brought should be sufficient reason to look with fresh eyes at this fascinating world of ours and to ponder the greater purpose of our own existence within the unfolding universe.

Precisely coinciding with the dramatic breakthroughs in science and technology, almost like a much needed counterweight to headlong technological advance, the call has been raised by Bahá'u'lláh, author of the Bahá'í Faith, for humanity to embrace a much broader universal vision and to establish planetary order to hasten the arrival of a peaceful and progressive global society.

For this to happen, science itself has been hard at work paving the way by developing the necessary tools to bring mankind together. But unless it does happen, and soon, our sciences could still be rendered precocious tools in our hands and their works could turn to ashes.

The writings of Bahá'u'lláh (1817-1892), and those of His eldest son 'Abdu'l-Bahá (1844-1921), Who was appointed in Bahá'u'lláh's Will and Testament as sole Interpreter of His teachings, attest to the advent of a new human cycle when science and religion in total harmony will raise up humanity to as yet unimagined heights.

This book does not claim to be an authoritative or comprehensive introduction to the Bahá'í writings. While the observations and views it presents are strictly those of the author, it does, however, provide a fresh look at both the outer and inner universe in light of startling new information some Bahá'í texts reveal. It should therefore be of interest to anybody who feels challenged, mystified, or just plain awed by our newly increased horizons, irrespective of his or her personal belief or persuasion.

In this regard, the agnostic need not feel offended when the book calls the unknowable essence of the universe God, or Creator. Nor should a devout believer take umbrage when God is referred to as an all-encompassing cosmic intelligence. The Fashioner, Maker, or Ruler of the universe has been invoked by many different names. None of these can adequately describe what

will forever remain the great unknown. However, all these appellations are essentially
synonymous. It would therefore be unworthy to make them a point of contention.
Some readers of the book's manuscript have suggested that the ground covered would justify
a much larger volume. The decision what to include and what to exclude is never easy. The book
was deliberately kept concise without sacrificing important contents, because there is a universal
reluctance to tackle a heavy volume, especially when it does not promise to be a light novel. The
many different facts and theories aired in these pages are presented in a manner to invite the
reader's continued investigation. There is never a pretense here to supply all the answers.
Besides, any currently held opinion is bound to be subject to an overhaul later.

I therefore trust that this study will not be shelved as a dull and heavy diet, but that it will turn
out to be as rewarding a journey of discovery as it has been for myself. As each chapter is a
separate essay, this new digital edition allows a reader to jump to any particular topic and the
program's search feature will quickly locate any topic or personality mentioned in the text. This is
especially handy when revisiting certain parts of the book. However, for an initial study I
recommend to resist the temptation to skip sections, but to follow the book's sequence and to
ponder each chapter in turn. It should make the unfolding story all the more fascinating and
plausible.
As the table of contents indicates, the first half of the book examines mainly the physical
universe within the limits of current science. The second half deals with the appearance of man,
that "gem-like being" without whose creation "the universe would be without result."
Throughout this book, the word 'man' refers of course to the human being, both masculine
and feminine. As is the case with the word 'God', the male gender does not ascribe sex, but is
purely an element of grammar.
For ease of reference, all quotations have their sources shown in footnotes. Wherever a
quotation is not used in its entirety, this is clearly indicated by ellipsis

points. Quotations are of a
version contained in the most recent editions of books that are cited. Where books have editions
with different page numbering, the reference may be made to chapters instead.
Finally, since we are still in a period of transition towards a global
standard, most measurements are in both kilometers and miles.

Harry Liedtke

Whoever has undergone the intense experience
of successful advances made in this domain is
moved by profound reverence for the rationality
made manifest in existence.
By way of the understanding he achieves a farreaching emancipation from the shackles of personal hopes and desires, and thereby attains that
attitude of mind towards the grandeur of reason
incarnate in existence, and which, in its profoundest depths, is inaccessible to man.

Albert Einstein

I believe with all my heart that the closer man comes to understand the universe, the closer he comes to understand himself; and this, after all, is the greatest gift bestowed on you and me and on all of mankind.
Wernher von Braun

cientists and philosophers alike have long puzzled over the origin and purpose of the
universe. At the same time they have looked for answers whether the universe had a
beginning and will have an end, or whether it is timeless, endless, and eternal.
There are two competing theories. One theory conceives the universe as being timeless and
without boundary, having neither a beginning nor an end. The other, more recent theory, claims
that the universe started off with a primordial explosion and is still expanding until in the fullness
of time it may either dissipate and dissolve into nothingness, or begin to contract and fall back,
implode, into itself. This latter theory implies both a beginning and an end.
It raises the question
what lay before the beginning and what will come after an end.
Operating within a finite environment, human intelligence cannot conceive of a state of total
non-existence, nor can it cope with the concept of an existence that has neither a beginning nor an
end. If one brings into this discussion the belief in a creative power, the
‘Big Bang’ becomes

much more attractive, because a beginning implies the presence of some creative force. On the other hand, how could there have been a maker of a universe that never had a beginning, but which has 'simply existed' all along.

Before we go much further with this examination, it would be useful to briefly describe the long and sometimes painful pilgrimage that has brought us to the present juncture in our understanding.

The long search for the realities of the universe shows no linear progression, but has alternated between bursts of sudden inspiration and prolonged periods of regression in man's understanding of the cosmos. Moreover, before people received education and became literate, new insights were shared only by a very small intellectual elite. Humanity as a whole continued in a fog of ignorance and superstition.

There are many indicators later chapters will examine that point to a highly advanced knowledge of earth and heavens by unknown civilizations of the remotest past. However, the earliest cosmological theories of known history go back to ca. 4000 BC, when the Mesopotamians thought that the earth was the center of the universe and that the sky moved around it.

It was Plato (ca. 428-347 B.C.), who in his book Timaeus, named after the legendary Timaeus of Locri, proposed revolutionary new insights in natural sciences and cosmology. In the Timaeus Plato constructs a geometric model of the cosmos. It eventually became the basis for the theories of Euclid, Archimedes, Copernicus, Galileo, Kepler, Newton and even Einstein. The question remains how much of Plato's wisdom should really be attributed to his famous teacher Socrates (ca. 470-399 B.C.), who unfortunately left no written legacy as he preferred to spend his days in dialogue and scholarly debate.

Bahá'u'lláh states that much of today's knowledge "…has been acquired from the sages of the past, for it is they who have laid the foundation of philosophy, reared its structure and reinforced its pillars."1

But He stresses, "The essence and the fundamentals of philosophy have

emanated from the
Prophets. That the people differ concerning the inner meaning and mysteries thereof is to be
attributed to the divergence of their views and minds."2
Some historians believe that Timaeus was an expounder of the books of Hermes, of whom
Bahá'u'lláh makes the following mention:
The first person who devoted himself to philosophy was Ídrís. Thus was he named.
Some called him also Hermes. In every tongue he hath a special name. [Historians
believe him to be Thoth of the ancient Egyptians, Enoch of the Hebrews, Hushang of the
Zoroastrians and Ídrís mentioned in Surah 19 of the Qur'án].
He it is who hath set forth in every branch of philosophy thorough and convincing
statements. After him Bálinus derived his knowledge and sciences from the Hermetic
Tablets and most of the philosophers who followed him made their philosophical and
scientific discoveries from his words and statements. In Surah 19 of the Qur'án, verse 57
and 58, is written: 'And commemorate Ídrís in the Book; for he was a man of truth, a
Prophet; And we uplifted him to a place on high.3
I will also mention for thee the invocation voiced by Bálinus who was familiar with
the theories put forward by the Father of Philosophy regarding the mysteries of
creation… This man hath said: 'I am Bálinus, the wise one, the performer of wonders, the
producer of talismans.' He surpassed everyone else in the diffusion of arts and sciences
and soared unto the loftiest heights of humility and supplication. Give ear unto that
which he hath said, entreating the All-Possessing, the Most Exalted: 'I stand in the
presence of my Lord, extolling His gifts and bounties and praising Him with that
wherewith He praiseth His Own Self, that I may become a source of blessing and
guidance unto such men as acknowledge my words.' It was this man of wisdom who
became informed of the mysteries of creation and discerned the subtleties which lie
enshrined in the Hermetic writings.4
Socrates, Plato and Aristotle receive equal high praise in the writings of Bahá'u'lláh:
What a penetrating vision into philosophy this eminent man [Socrates] had! He

is the
most distinguished of all philosophers and was highly versed in wisdom. We testify that
he is one of the heroes in this field and an outstanding champion dedicated unto it. He
had a profound knowledge of such sciences as were current amongst men as well as of
those which were veiled from their minds. Methinks he drank one draught when the Most
Great Ocean overflowed with gleaming and life-giving waters. He it is who

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perceived a unique, a tempered, and a pervasive nature in things, bearing the closest
likeness to the human spirit, and he discovered this nature to be distinct from the
substance of things in their refined form. He hath a special pronouncement on this
weighty theme. Wert thou to ask from the worldly wise of this generation about this
exposition, thou wouldst witness their incapacity to grasp it.
After Socrates came the divine Plato who was a pupil of the former and occupied the
chair of philosophy as his successor. He acknowledged his belief in God and in His signs
which pervade all that hath been and shall be. Then came Aristotle, the well-known man
of knowledge. He it is who discovered the power of gaseous matter. These men who stand
out as leaders of the people and are pre-eminent among them, one and all acknowledged
their belief in the immortal Being Who holdeth in His grasp the reins of all sciences.5
‘Abdu’l-Bahá writes:
…the philosophers of Greece… acquired the major part of their philosophy, both
divine and material, from the disciples of Solomon. And Socrates [Plato’s teacher] after
having eagerly journeyed to meet with some of Israel’s most illustrious scholars and

divines, on his return to Greece established the concept of the oneness of God and the
continuing life of the human soul after it has put off its elemental dust.6
Long before Einstein's unfulfilled quest for a Unified Field Theory that would explain the
workings of the cosmos, Greek philosophers of the Ionian School (ca. 580-540 B.C.) were
searching for a magic formula that would give the universe a unified structure. Unless there was
some unknown unifying power, so they reasoned, how could there be universal order throughout
the physical universe. Among the Ionians was Pythagoras (530 B.C.) who proposed that an
abstract mathematical formula and not some unknown material substance had to be that unifying
medium. Plato built on this concept and postulated that the abstract, metaphysical, or spiritual
world was in fact the true reality, whereas the physical world was a copy, an expression, of that
reality. The physical world, to be sure, was no mere illusion to Plato, but neither did he consider it
as being absolute and changeless. In the Timaeus he is describing the universe as being eternally
young, ever-changing and spherical in form.
This philosophy, however, was soon replaced by Aristotle (384-322 BC). He had studied at
Plato's academy for 20 years and later taught young Alexander, son of the King of Macedon, who
became famous as Alexander the Great. A physician's son, Aristotle placed more emphasis on
natural sciences such as biology than on abstract mathematics. This despite a sign Plato had
placed above the door to his academy: "Nobody untrained in geometry may enter my house."
Aristotle now theorized that the earth was the center of the universe and that the stars moved
across the sky on rotating spheres.
Ptolemy (100-170 A.D.), founder of the famed library at Alexandria, Egypt, later amended
Aristotle's theory. He taught that the moon, followed by the sun and the planets, were positioned
in a straight line and were moving around earth at the center. On account of Aristotle's and
Ptolemy's high reputations, this concept of the universe survived unchallenged for nearly 2,000
years until the year 1543, when the Polish physician and astronomer Nicolaus Copernicus died.

Only then could his theories Revolutionibus Orbium Coelestium (On the Revolutions of Celestial
Spheres) be made public.

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Secrets of Divine Civilizations, p. 77

Copernicus, born in 1473, had entered Cracow University at age 18 and became a doctor of
canon law at 30. Nine years later, in 1512, he proposed a system where the planets revolved in
circular orbits around the sun, which he now defined as the center of the universe. He correctly
attributed the rising and setting of the stars to the rotation of the earth axis. But on account of the
Inquisition against heresy mounted by the Church, an institution he had served with loyalty and
distinction, Copernicus decided it would be more prudent to have his findings published only
after his death. It was a wise move, because a whole century later, in 1633, the Inquisition still
insisted that Galileo (1564-1642) recant the revolutionary proposition of Copernicus.
Undeterred, the German astronomer Johannes Kepler (1571-1630) now worked out the laws
that governed planetary motion, and the English mathematician and physicist Sir Isaac Newton
(1642-1727) showed that Kepler’s laws could be derived from the general laws of motion and
gravitation that he himself had discovered. There was now final proof that the same physical laws
were valid both here on earth and in the heavens.

Socrates Plato

Euclid Archimedes

Nicholaus Copernicus Galileo Galilei

Johannes Kepler Isaac Newton

About a century later came the staggering discovery that our solar system actually belonged to
a vast island of stars, which soon was called the Milky Way. For a short while the Milky Way
was thought to be the extent of the universe, until several other ‘spiral nebulas’ of stars were
observed that appeared to exist outside the Milky Way as huge galaxies in their own right. The

question whether countless elliptical star clouds lay within or outside our galaxy was answered only as recently as 1924, when the American astronomer Edwin Hubble (1889-1953) proved that they were indeed far removed from our own galaxy. Today, a space telescope named after him is revealing images of thousands of millions of galaxies in what until very recently had been considered the infinite void of the universe.

In 1917, Albert Einstein (1879-1955) proposed a model of the universe that was based on his new theory of relativity. It pointed to a universe that was not static, but was either in a state of expansion or contraction. Since the expansion of the universe had not yet been discovered everyone assumed that it was static. Therefore, Einstein tried to make his formula fit this theory of the universe by assuming that repulsive forces existed between galaxies that would counteract the gravitational forces of attraction. With this expedient leap in logic, somewhat uncharacteristic of Einstein, he introduced the concept of a 'cosmological constant,' that made a static universe seem entirely plausible. But a few years later he admitted that it was "the biggest mistake of my life."

Five years earlier, in 1912, the American astronomer Vesto Slipher, who studied the light spectrum of galaxies, had discovered that their spectral lines were shifted toward longer wavelengths that showed up red. It was the Doppler effect, named after Austrian physicist Christian Doppler (1803-1853) who discovered that just as a train whistle sounded high on approach and lower when moving away, the spectrum of an approaching light source changes to violet and to red when moving away. This red shift in wavelength now indicated to Slipher that galaxies were receding from the Milky Way in all directions at near the speed of light. It proved that the universe was expanding like a giant balloon. Had Einstein stuck to his original formula he would have been first with this far-reaching discovery.

Non-static models of the universe were developed in 1917 by the Dutch astronomer Willem de Sitter, in 1922 by the Russian mathematician Alexander Friedmann, and in 1927 by the Belgian Georges Lemaître. Friedmann's solution was based on the density of

matter in the
universe and is the currently accepted model. Lemaître also worked out a solution to Einstein's
equation, but he is better known for his theory of the Primeval Atom. He stated that galaxies are
the fragments that were ejected by the explosion of this atom, resulting in the ongoing expansion
of the universe. This was the beginning of the Big Bang Theory for the origin of the universe.

Agnostics felt somewhat uncomfortable with the notion that the universe had started off with
a big bang, because it reminded them of the biblical moment of creation and therefore vaguely
conceded the presence of a creator. In 1951, the Catholic Church that once rejected Copernicus
and Galileo, declared that the Big Bang theory did not contradict Christian theology.
There could be a compromise answer to this cosmic enigma. The Big Bang with its exploding, then imploding universe, may not be a single event that started from nothing and will
end in nothing, but one of many cosmic cycles which follow each other in endless succession. If
the universe is limitless in terms of space, it must also be limitless in terms of time.
If everything obeys some great universal intelligence, why should the universe as a whole
behave any different from the many lesser cycles that function within it and which govern the
formation, disintegration and re-formation of galaxies and stars, all the way down to the
metabolic cycles of organic life forms, such as the cycle of inhaling and exhaling which lies at the
very core of our own physical existence. In that case the universe would be infinite in terms of
time as well as space, yet contained in ever recurring major cycles -- each one of them -- a Big
Bang with both a beginning and an end.
This model of the universe is called a pulsating or oscillating universe.

And what sort of time span might such a single 'breath' of the cosmos occupy? Present
estimates of the age of this universe range up to 20 billion years since the Big Bang. This seems
to tally with the age of the earliest galaxies seen through the Hubble telescope estimated at 16
billion years. If the current expansion, thought to be indicative of a still 'young' universe, were to

continue for another 20 billion years before it was followed by a gradual contraction of similar duration ending with the Big Crunch, a single breath of the universe could comprise 100 billion years or perhaps even more.
All such estimates are of course pure supposition but demonstrate how puny our own world and time frames are by comparison. We need to learn much more about the presence of so-called dark matter (p.43) to be able to estimate the total mass of the universe as this would have a definite bearing on the theoretical limits of any expansion which follows a Big Bang. Dark matter that remains largely undetected by current technology may by some theories account for over 90 per cent of the total mass. It would include failed ‘suns’ that never ignited, suns that have become extinct, so-called black holes, and other opaque galactic material beyond optic capture.

Today’s science believes that by taking a snapshot of the present state and behavior of the universe, from the smallest sub-atomic particle to the most distant galaxies, one may deduce the beginnings and extrapolate the far distant future of the system, almost like divining the plot of a movie by looking at a single frame.
One of the greatest aids in this inquiry are the current deep field studies through the Hubble space telescope that can look back across eons of time at galaxies as they once existed ten to fifteen billion years ago, long before our own galaxy and solar system formed. Quite unlike earthbound archaeologists whose efforts in piecing together the distant past are constantly being hampered by decay and erosion, today’s modern archaeologists of the cosmos are free to examine pristine evidence by looking at the computer printouts that report on the sightings of Hubble’s unobstructed celestial eye.

At this point, a brief outline of the Big Bang theory may be useful. This rather simplistic presentation might have offended Albert Einstein, but in order to remain reader-friendly it must be kept short.
In 1948 the Russian-American physicist George Gamow modified Lemaître’s theory of the

primeval atom into the Big Bang theory. He proposed that the universe was created in a gigantic explosion and that the various elements observed today were produced within the first few minutes when extremely high temperatures and densities fused subatomic particles into chemical elements. More recent calculations indicate that hydrogen and helium would have been the primary products of the big bang, with heavier elements being produced later within stars. This theory, however, provided a basis for understanding the earliest stages of the universe and its subsequent evolution. The extremely high density within the ‘primeval atom’ caused a rapid expansion of the universe, cooling hydrogen and helium to condense into stars and galaxies.

As this expansion took place, the residual radiation from the big bang continued to cool, until it reached the current temperature level of about -270° C or -454° F. This relic radiation was detected by radio astronomy in 1965, thereby providing what most astronomers consider to be confirmation of the big bang.

At the micro-millisecond of ‘The Beginning’, the entire universe would have been compressed to almost zero size at infinitely hot temperature. A mere second after the big bang, so the theory goes, the temperature would have fallen to 10,000 million degrees, which is still roughly a thousand times as hot as the sun’s interior. At this stage the universe contained only sub-atomic particles such as electrons, photons, protons and neutrons. The temperatures were still far too hot to allow atoms to form. But within scant minutes, due to the trillion-fold expansion of the young universe, temperatures had already dropped to 1,000 million degrees, a temperature that can still be found inside the hottest stars. Now protons and neutrons combined to produce heavy hydrogen (deuterium) and deuterium nuclei in turn combined with more protons and neutrons to form helium. In a rapidly expanding universe temperatures kept dropping and electrons joined nuclei to form atoms. In some regions atoms began to coalesce into rotating disk-like formations that became the future galaxies.

Over eons of time hydrogen and helium atoms in those embryonic galaxies were pulling
together and contracted into lesser clouds. As these collapsed into extreme densities, the mutual
bombardment of their atoms generated sufficiently high temperatures to start a nuclear fusion
process, igniting the ‘first generation’ of suns. They burned with great intensity and much more
quickly than our own sun as they were converting hydrogen into helium.
As this process heated up, these first stars converted some of the helium into heavier elements
like oxygen and carbon. At the end of their relatively ‘short’ life cycle of ‘only’ several hundred
million years (compared to an average life span of ten billion years for slower burning second
generation stars like our sun), some of these early stars then exploded and turned into spectacular
supernovas, spewing their newly created heavier elements back into the galaxy.
This galactic cauldron, now containing the debris of supernovas, once again began to gather
rotation and to contract. Eventually the core ignited. A second-generation star was born. This
time it also contained the heavier atoms that make up the various elements. It is estimated that
only two per cent of our sun’s mass is composed of the heavier elements, other than hydrogen and
helium. Also, just one per cent of the material in the galactic cloud that gave birth to the sun
stayed in a solar orbit and ultimately formed the planets as the mere remnants of this gigantic
star-forming process. Scientists believe that with the help of NASA’s Hubble space telescope we
can now observe within the Orion Nebula a similar ‘hatching’ of stars and forming of solar
systems. (see p. 163-164)

It is mind-boggling to contemplate that in order to arrive at today’s state of the universe, both
in the microcosm of its atoms and in the macrocosm of earth, sun and galaxies, all factors had to
be exactly right at the very outset. If the laws governing this grand spectacle belong to the mind
of a divinity, some scientists now reason that the blueprint for this entire process had already been
drawn up at the time of the Big Bang. Everything that followed evolved along preordained laws.
On a much smaller scale one could compare such a process with the predetermined

evolution
of a plant, animal, or human being. Here, too, its capacities, development and ultimate
refinements lie hidden within a tiny seed, and its slow evolution is being steered by some
inexorable ‘genetic blueprint’.

And what might be the purpose of it all? The preeminent British physicist Stephen Hawking
in his book A Brief History of Time ventures this opinion:
One possible answer is to say that God chose the initial configuration of the universe
for reasons that we cannot hope to understand. This would certainly have been within the
power of an omnipotent being, but if he had started it off in such an in-comprehensible
way, why did he choose to let it evolve according to laws that we can understand?
We must interrupt to again quote Albert Einstein:
The one incomprehensible thing about the world is that it is comprehensible.
Returning to Hawking:
The whole history of science has been the gradual realization that events do not
happen in an arbitrary manner, but that they reflect a certain underlying order, which
may or may not be divinely inspired. It would be only natural to suppose that this order
should apply not only to the laws, but also to the conditions ... that specified the initial
state of the universe. This means that the initial state of the universe must have been very
carefully chosen indeed if the hot Big Bang model was correct right back to the
beginning of time. It would be very difficult to explain why the universe should have
begun in just this way, except as the act of a God who intended to create beings like us.
Picking up on Einstein and Hawking, it is remarkable that human intelligence and the
intelligence manifested all around us correspond and are not in conflict. Could this be the case,
because we are in fact not dealing with several sets of intelligence, but only with one? Could it be
that our mind is drawing from the same single Source that has created and has ordered the
universe we live in?
As to the attributes and perfections such as will, knowledge, power and other ancient

attributes that we ascribe to that Divine Reality, these are the signs that reflect the existence of beings in the visible plane and not the absolute perfections of the Divine Essence that cannot be comprehended. For instance, as we consider created things we observe infinite perfections, and the created things being in the utmost regularity and perfection we infer that the Ancient Power on whom dependeth the existence of these things, cannot be ignorant; thus we say He is All-Knowing. It is certain that it is not impotent, it must then be All-Powerful. The purpose is to show that these attributes and perfections that we recount for that Universal Reality are only to deny imperfections, rather than to assert the perfections that the human mind can conceive. Thus we say His attributes are unknowable.7

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Albert Einstein Edwin Hubble

Vesto Slipher Christian Doppler

Georges Lemaître George Gamov

Willem de Sitter Alexander Friedmann

Stephen Hawking

The Hubble Space Telescope

reation and evolution are complementary and not at all mutually exclusive as the heading may suggest. Both function in perfect unison. The process of evolution is the physical manifestation of creation’s impetus and grand design. Without an awareness of this linkage, our view of the world of existence remains one-sided.

Before the advent of modern scientific research, religious belief held that the world and its creatures were made by God the Creator. According to the Book of Genesis in the Bible, the act of creation occurred “in the beginning” (Genesis 1:1) and transpired in a dramatic sequence of events until “the heavens and the earth were finished, and all the host of them” (Genesis 2:1). Nowhere is there any mention that God’s labor would continue or repeat itself. The

superlative handiwork, so
one believed, was completed in a single, magnificent act of will and power. Since the Bible tells
us that “God saw that it was good” (Genesis 1:10-25), many who believed the Bible considered it a
blasphemy to tinker with a creation which was divinely perfect.

It was this fervent belief in the finality of God’s handiwork that denounced all scientific
inquiry as downright evil, and which gave rise to the Inquisition and the witch hunts of the
Middle Ages. Since God’s creation was perfect, there was no room for change, except if God
intervened directly and brought about change through an authentic miracle. But unless such a
‘miracle’ was officially confirmed and sanctioned by the jealous guardians of religious dogma, it
stood automatically condemned as the work of the devil.
Fear of God and fear of dire retribution forced absolute compliance with this status quo.
Anybody who dared to question it by spreading new ideas, or even by healing the sick with new
herbal remedies, was accused of being in league with the devil. He was first tortured into
confession, then burned alive as a witch.
The English discovered a quicker, less messy method to determine guilt or innocence. The
accused was trussed up and thrown into the water. If he floated, he was a witch and was put to
death, but if he drowned, he had proven his innocence and was forgiven. It is estimated that in
Central Europe alone over a quarter of a million innocent and often deeply religious people
suffered hideous torture and martyrdom by fire.
Who would have guessed that only five centuries later this denial of evolution and the
fanatical obsession that creation had come to an end once and for all, would undergo a complete
reversal when the study of evolution would lead to great material progress, but at the same time
would erode the once hallowed beliefs in creation’s validity, mystery and wonder.

With the dawning of the age of reason came discoveries in geology, biology, chemistry and
physics which made us aware of changes in the earth and of evolutionary change that had taken

place over long periods of time in the structure of plants, animals, and in the human race itself.

Today we recognize the continuous evolutionary changes that have been going on ever since earth first began almost five billion, or 5,000 million years ago.

For the first 1,000 million years after the divine command “Let there be Light”8 made the sun ignite and dispel abysmal darkness, a slow chemical transformation was turning a red hot, radioactive earth into a cooler and much more benign celestial body that had water and atmosphere. Earth’s atmosphere, initially containing only traces of oxygen, allowed the emergence of single cell organisms.

During the next 3,000 million years, creation was kept busy evolving a rudimentary genetic system with increasingly complex mechanisms of inheritance. Cell life diversified into adaptations which later formed blue-green algae and cells with photo-synthetic abilities. The metabolic activity of these early life forms over many millions of years transformed the atmosphere and made it rich in oxygen.

It was about 700 million years ago that the first multi-cellular plants and animals appeared, and only 500 million years that the most basic body plans of what we now recognize as ‘animals’ developed. However, according to fossil finds those early creatures were mainly jellyfish and burrowing worms. Land plants appeared only 400 million years before our time, followed by freshwater fish and amphibians that were able to survive both in water and on dry land.

Beginning about 200 million years ago and lasting through the next 135 million years, dinosaurs shared the earth with small, mainly nocturnal mammals. When the dinosaurs suddenly vanished in a mass extinction 65 million years ago, the mammals inherited the earth and continued to evolve into today’s much larger and superior specimens.

At long last, dawn was breaking on the sixth day of Genesis to “let us make man in our image, after our likeness: and let them have dominion over the fish of the sea, and over the fowl of the air, and over the cattle, and over all the earth...”9

It was now almost 5,000 million years since creation had first begun on our planet.

What, then, should one call this vast development that has stretched across close to five billion years, that had continued through an endless progression of fifty million centuries as the earth was slowly preparing itself for human habitation? May one still call it creation, or must one call it evolution? Perhaps it would be entirely appropriate to call it by either name.

A tremendously large and complex body of knowledge has grown around the science of evolution, mutation and inheritance. While there is now wide acceptance that evolution is underlying all biological developments, the actual processes still leave many unanswered questions. Why, for example, does a new species appear abruptly, remain stable over long periods of time, then suddenly disappears again.
The debate is fueled by the paucity of fossil finds which, if they were more plentiful, could furnish a much clearer and unbroken record of evolution. Fossil formation depends on the presence of extremely rare environmental conditions that slow down decomposition and cause dead organisms to petrify or to leave their imprints in sediments and rock strata. Unfortunately,

Genesis 1:3
Genesis 1:26

the flora and fauna of the distant past, along with many traces of early man, have long been dissolved and metamorphosed into water and soil, or were even returned deep into earth's molten interior by the steady process of the subduction of earth's slowly moving crustal plates (see page 129, 130).
To fill in the jigsaw puzzle of the past and to establish linkages in the evolution of various species is therefore a time-consuming and somewhat inexact endeavor. Stephen Gould, an evolutionist at Harvard University, has advanced the theory of 'punctuated equilibrium.' It sees species remain stable over long periods, until an environmental change forces adaptation. This shows up as a 'punctuation' in a normal state of equilibrium. What all this means is that the principle of evolution is imbedded in all living things.

In 1953, James Watson and Francis Crick discovered that so-called genetic material is composed of two nucleic acids, known as DNA and RNA. Their molecules contain genetic codes that direct the biochemical pathways of an organism's development. These building codes that steer growth and development of all living things are passed on from one generation to the next.
They may lie dormant unimpaired for thousands of years, as did seeds of grain that were discovered in ancient Egyptian tombs. They came to life and began to sprout once they were planted into soil.

Francis Crick James Watson

As the inquiry into the evolution of earth, plants, and animals yielded greater insights, it soon began to include the development of our own species and the vast evolutionary processes taking place in the greater universe all around us. Evolution and life cycles here on earth have their counterparts among distant constellations where we can observe the birth of suns and the forming of new solar systems and witness their sudden demise in the flare-up of a super nova. There can no longer be any doubt that evolution continues as life's steady companion.

The freshly liberated spirit that now drives our modern quest for scientific discovery does not hesitate to cast the baby out with the bath water. In a giant leap of logic some people boldly suggest: "The universe and everything in it, earth, plants, animals and humanity all included, were not created. They have evolved."
This 'modern' denial of creation is a curious reversal of the mindset 500 years ago, when

those who clung to a simplistic view of God's work could not tolerate the very thought that creation might well be an ongoing and never ending evolutionary process. Perhaps we have greater tolerance today for the opinions of others, because no witches are threatened when it is suggested that creation may be an old wife's tale and evolution is the modern fact. Instead, we are allowed to debate the issue.
The outcome of such a discussion would be of purely academic interest, were it not for the

consequences. If everything in nature, humanity included, had somehow managed to create
within itself the entire blueprint for its existence and future development, everything and
everybody could rightly claim total sovereignty and independence from a higher authority. There
would be no need for one, because the highest power and authority in life would simply rest
within each individual. This may be of very little difference to a spider spinning its web, to bees
constructing their hive, or to any other animal, plant or mineral devoid of free will. All have been
programmed to obey and follow the laws that have made them. Their so-called freedom,
therefore, is in reality no freedom at all.
But when applied to the world of humanity, this kind of freedom would remove any vestige
of restraint. Man's unique gifts of intellect, inventiveness and free will, would all turn against
him, if he were to act in the belief that being his own 'evolver' he is solely responsible to himself
and therefore free to follow any 'healthy' urge or instinct that may come his way. In the Kitáb-I-
Aqdas, the Book of Laws, Bahá'u'lláh has left us with this warning and piece of advice:

> Liberty must, in the end, lead to sedition, whose flames none can quench. Thus warneth you He Who is the Reckoner, the All-Knowing. Know ye that the embodiment of
> liberty and its symbol is the animal. That which beseemeth man is submission unto such
> restraints as will protect him from his own ignorance, and guard him against the harm of
> the mischief-maker. Liberty causes man to overstep the bounds of propriety, and to
> infringe on the dignity of his station. It debaseth him to the level of extreme depravity and
> wickedness.10
>
> Say: True liberty consisteth in man's submission unto My commandments, little as ye
> know it.11

But is it at all possible to acknowledge and obey laws that lie beyond our own nature, without
getting into conflict with the very concept of evolution? It is not only possible, but it is necessary
for our own good.
In a universe that is infinite and timeless, without beginning and without end,

there can be no
center for either time or for space. For something that is infinite, the center lies everywhere. If
our imagination therefore requires the mental crutch of a ‘center’, such a center must be seen as
the here and now. In a universe that is both infinite and timeless, the force that governs it,
whether we call it creation or evolution, must of necessity be equally endless and timeless. It is
therefore at work here and now. The process cannot be separated from its physical manifestation.
It has been active without letup since time immemorial on the face of the earth, within every

Aqdas 123
Aqdas 125

species of plant or animal, in the human race, within the solar system, and far beyond. It shall
continue its onward march through eons of the future.
It would therefore be a fallacy to imagine creation’s immeasurable panorama as a single
event, as a one-time and never to be repeated ‘impulse’ that once set evolution into motion
billions of years ago, then stood idly by to simply let things happen along predetermined lines.
While individual organisms, large and small, are governed by definite laws, creation as a whole
continues throughout the universe where new stars and planets are constantly being formed.
Billions of years into the future, some of these planets may by God’s grace be elevated to become
‘His foot stool’ as Earth is today, and provide a physical home for waiting souls.
Here on earth, all processes?and they are as numerous and varied as there exist species and
systems?follow their own specific and ingenious programs towards optimum refinement and
perfection of the organisms and entities they serve. But at the same time they do not exist in a
mode of competitive isolation, but complement each other to evolve food chains and mutually
sustaining systems. Within this vast array, man occupies a rather unique position.
Being neither fish nor fowl, his physical makeup is primarily designed for life on dry land,
yet he is perfectly capable of making water and air his home as well. He is sharing the planet with

minerals, plants, and animals, taking sustenance from all three, who thus help build and maintain
his body.
While being taken absolutely for granted, it is noteworthy that the physical powers and
dimensions of insects, birds, and quadrupeds alike, are in the main small and harmless in relation
to man's own body size, thus lessening their impact on available resources needed for man's
survival, and virtually eliminating their threat as predators.
Mankind's versatile physical abilities, combined with an intellectual capacity to learn and to
pass its knowledge on to future generations, to adapt to the environment and to make nature serve
its purpose, have turned humanity into a kind of universal super being, entirely fit to assume the
role of pre-eminence promised in the Bible, "...to have dominion over all the earth..."12
Why is humanity's development so glaringly different from all other life on earth, unless it
actually does have something to do with a distinct purpose. No other creature on this planet is
endowed with the extraordinary universal potential that is present in the human being. The belief
that humanity's station is divinely ordained is sometimes decried as unscientific nonsense. There
are many who believe that we are merely an advanced species whose special talents came by
accident and not by design. One reason for this denial could be that it is disquieting to ponder that
along with our unique gifts, we have also been given moral laws from which all other life forms
are happily exempt. However, not to feel bound by laws that separate us from the animal world
places everyone's well-being in jeopardy, believers and non-believers alike.
With every respect for logic and mathematical rules of averages and probabilities, the human
condition, like that of any other creature, cannot be assumed to be accidental. It is most unlikely
for millions of independent, yet parallel 'development programs' to have come into perfect
existence independently by auto-design without common direction. Individually as well as
collectively they must have been in need of a universal denominator, an orchestrator, a motive
force, some outside trigger, in order to become activated and to embark on their long and

complex missions to culminate in the appearance of beings who can join hands and so advance
civilization into the far distant future.

Genesis 1:26

It is this hidden impulse, this ultimate and unfathomable source of all existence, that we read
about in Genesis, whose central attribute the Romans called ‘creare’ ? to bring into being? and
whose manifestation even modern man may unabashedly, and quite correctly it would seem, refer
to as creation.
The awareness of this eternal omnipresence of a superior intelligence will want us to live in
greater harmony with fellow humans, with all creatures, and with planet earth, their common
home.

Say: Nature in its essence is the embodiment of My Name,
the Maker, the Creator.
Its manifestations are diversified by varying causes,
and in this diversity there are signs for men of discernment.
Nature is God’s Will and is its expression in and through the
contingent world. It is a dispensation of Providence, ordained
by the Ordainer, the All-Wise.
Were anyone to affirm that it is the Will of God as manifested
in the world of being, no one should question this assertion. It
is endowed with a power whose reality men of learning fail to
grasp. Indeed, a man of insight can perceive naught therein
save the effulgent splendor of our Name, the Creator.
Say: This is an existence which knowest no decay, and Nature
itself is lost in bewilderment before its revelations, its compelling evidences and its effulgent glory which have
encompassed the universe.

Tablets of Bahá’u’lláh, p. 142

he many tantalizing clues that lie hidden in these few words should suffice to turn every
earth dweller into a keen observer of the world of nature and ought to stimulate an abiding
interest in the wonders of the universe.
Bahá’u’lláh tells us that everything that we call ‘nature’ has been called into being through
the operation of a supreme will and that the sole purpose of its appearance is to give physical
expression to the powers and attributes which are the innermost essence of the supremacy that

created the universe.
Despite the fact that throughout the ages religions have brought enlightenment and guidance to mankind, geographic isolation as well as the absence of the written word have often deprived large segments of humanity of access to the teachings revealed by the Founders of religion. In their quest for truth, people would turn to nature for reassurance and for signs of the Great Unknown. They used their observations of what they saw on earth and in the heavens to move closer to their Maker by being attuned to what they felt lay far beyond their ken and power and therefore had to be the attribute of some mysterious, unknown divinity.
Modern men and women tend to belittle such beliefs as primitive spirit worship. While busy making new discoveries almost on a daily basis, boastful of ‘creating a better world’ for themselves, they have sadly exchanged the ancient sense of wonderment and adoration for a coldly detached and purely intellectual acceptance of ‘the laws of nature’ as something that simply is there, waiting to be discovered and exploited exclusively for man’s comfort and material advantage. This strange blindness reminds one of a group of school children who visit an art gallery and do not appreciate the artistic genius behind the paintings and sculptures on display, or of kindergarten toddlers who have strayed into a university lecture room, unaware that the funny chalk marks they see on the blackboard represent an advanced mathematical formula.
The fact that we have appeared in this material realm should serve as a hint that the Creator’s hand can indeed be detected in the material universe, for He would never allow His creatures to be cast outside His Dominion. Thus we admire His handiwork in the endless variety of plants and animals and in the sheer wonder of their organisms, frequently emulated by modern technology.
We perceive an omnipresent genius in the rules of physics, chemistry and in the creative logic of mathematics, in the symmetry and vibrant colors of flowers and crystals, in the magnificent architecture of a beehive or snowflake and in the unique creation of the family of man.

The mathematician Leonardo Fibonacci lived in Pisa, Italy from 1170 to 1250. He spent his youth in North Africa where he soaked up mathematical science taught by Moslem scholars. He was later employed by Holy Roman Emperor Frederick II. His Fibonacci number sequence appears in cell formations of certain plants and marine life. In this sequence each succeeding number is the sum of the two previous numbers, i.e. 1,1,2,3,5,8,13,21,34,55 etc. When expressed in a curve, it results in these spiral patterns:

Number Sequence Curve Marine Shell

Cone Flower Pine Cone Cauliflower

Without getting lost in complex mathematics, we shall leave the example of plants and animals to take a brief look at the mineral. Here, too, certain shapes appear to be under an ironfisted control of what we call mathematical rules.
The ancient Greeks spoke of Platonic Solids of which they counted only five. A platonic solid is a polyhedron all of whose faces are congruent, or matching, regular polygons where the same number of faces meet at every vertex. The best known example is a cube, or hexahedron, whose faces are six congruent squares.

These five, and only five, shapes are:

There are many other examples in nature where we detect an underlying symmetry and order.
This is not the place to go into great detail of this fascinating domain of science, but just to raise a flag that an unknown intelligence seems to be in control of all aspects of existence.
A meditative study of the wondrous riddle of the universe should therefore help our quest to move closer to the Great and All-Wise Essence Who has fashioned it.
In the Bahá'í International Archives can be found an intriguing quote by Bahá'u'lláh that deals with the creation of the universe.

Know then, that God,
praised and glorified be He,
took a line, split it lengthwise into two,
rotated the one about the other,
and so made from them the Universe.
The line, however, formeth only from the point
when you move it. Conceive ye then

Our meaning.
In response to an inquiry by the author to the Universal House of Justice, the world
governing body of the Bahá'í Faith, their Research Department confirmed in a memorandum
dated 29 September 1999, that this utterance is contained in an authenticated Tablet of
Bahá'u'lláh. It was published in a collection entitled
Má'idiy-I-Ásimání (Heavenly Food),
compiled by the Iranian scholar Ishráq- Khavarí.13 A provisional English translation with minor
differences in format and punctuation is by Keven Brown in his paper A Bahá'í Perspective on

Volume 1, p. 52, Bahá'i Publishing Trust, Teheran, 1948

the Origin of Matter.14 We shall return to this quotation in a later chapter.
The writings revealed by Bahá'u'lláh offer increasingly deeper insights. Like breakthroughs
in science, they open up wider vistas of understanding which sooner or later will burst the
confines of previously held convictions. Yet, there are also many statements by Bahá'u'lláh that
the nature of God and His creation are beyond the reach of human understanding:

So perfect and comprehensive is His creation that no mind nor heart,
however keen or pure, can ever grasp the nature of the most insignificant
of His creatures.15

O Children of the Divine and Invisible Essence!
Ye shall be hindered from loving Me and souls shall be perturbed as they make mention
of Me. For minds cannot grasp Me nor hearts contain Me.16

O Son of Beauty!
By My spirit and by My favor! By My mercy and by My beauty!
All that I have revealed unto thee with the tongue of power
and have written for thee with the pen of might,
hath been in accordance with thy capacity and understanding,
not with My state and the melody of My voice.17

Consider the rays of the sun whose light hath encompassed the world.
The rays emanate from the sun and reveal its nature, but are not the sun itself.
Whatsoever can be discerned on earth amply demonstrateth the power of God,
His knowledge and the outpourings of His bounty,
while He Himself is immeasurably exalted above all creatures.18

How can I claim to have known Thee, when the entire creation is bewildered
by Thy mystery, and how can I confess not to have known Thee, when, lo,
the whole universe proclaimeth Thy Presence and testifieth to Thy truth?19

Other texts state that should the full reality of creation be revealed, the

force of such
disclosure would overwhelm us. Still, ‘Abdu’l-Bahá writes, “God has conferred and added to
man a distinctive power, the faculty of intellectual investigation into the secrets of creation.”20
And Bahá’u’lláh urges us to increase our knowledge through study and meditation. In sharp
contrast to religious dogma that often discourages open investigation and calls for blind
acceptance, Bahá’u’lláh emphatically gives humanity the mandate to pursue an independent
investigation of truth.
The explanation, allusion, or parable quoted on the previous page, along with its challenge to
“conceive ye then Our meaning,” is therefore no exception.
There are many such challenges in Bahá’í texts where Bahá’u’lláh either states that “none but
the pure in heart can comprehend”21, or where He repeatedly utters the wish, “Could ye but

The Journal of Bahá’i Studies, volume 2, number 3, p. 38, 1990
Gleanings, p. 62
Arabic Hidden Words No. 66
Arabic Hidden Words No. 67
Tablets of Bahá'u'lláh, p. 61
Gleanings, p. 63
Bahá’i World Faith, p. 244
Hidden Words, Pers. No. 41

comprehend.” Degrees of understanding and comprehension vary among individuals. Only a
person’s increased capacity will allow a deeper penetration into the mysteries of creation. The
balance of wisdom here seems to be that the greater the endowment to fathom a tiny piece of the
unfathomable, the greater the ability to cope with increased awareness.
Before we contemplate the great enigma contained in Bahá’u’lláh’s words, we shall study the
Bahá’i writings for other references to the cosmos and compare these with some of the most
recent scientific theories. In order not to become overwhelmed by cosmic dimensions of time and
distance, we shall first attempt to put these into some human perspective. Next, let us examine the
exceptional physical conditions, shrugged off by some observers as “mere coincidence,” that
were absolutely necessary before the miracle of life could happen.
Finally, having traversed eons of time and countless light years of space, we

shall eventually
come face to face with “the gem-like reality of man.” A reality destined to rise above all physical
limitations to fulfill its divine mandate on earth and so give true meaning to the existence of the
universe.
The study of these phenomena will offer us a clue of the metaphysical, or spiritual reality that
is ruling over every facet of creation. The writings of Bahá’u’lláh and ’Abdu’l-Bahá provide
proof that there has been revealed to this age a measure of divine knowledge of the universe
which is bound to exercise the minds of scientists and philosophers for generations to come. In
the end we may come to realize that the secrets and powers of the universe are not nearly as
remote as we had always imagined, but that they reside right within our own being.

Man spends his life trying to unlock the mysteries of the universe.
There was a Turkish Prisoner who had the key.
? attributed to Leo Tolstoy ?

rom the Bhagavad-Gita to the Bible and the Koran, little mention is made of the universe
and of man’s place within a cosmic master plan. One reason for this could be that
humanity’s mental and spiritual horizons have expanded. In bygone ages the earth was still flat
and our neighbor was the person who lived next door to us. Answers to questions that had not
even been asked would have caused great bewilderment 2000 years ago. Christ alluded to this
when He said,
“I have yet many things to say unto you, but ye cannot bear them now. Howbeit when
the Spirit of truth is come, he will guide you into all truth... and he will show you
things to come.”22
It would be of real interest to know how modern day questions about God, man and the
universe would be answered by the founders of the religions of the past. Since it is impossible to
get such an update, the next best thing is to study the writings of someone who many believe has
brought renewed spiritual guidance to humanity.
Bahá’u’lláh, Who lived from 1817 to 1892, announced in 1863 that He has brought renewal

to “...the changeless Faith of God, eternal in the past, eternal in the future...” “...to build anew the whole world.”23 Like the religions of the past, His teachings establish a personal code of conduct, but in addition they contain laws for a contemporary society with specific guidance for the eventual establishment of a world order. In keeping with raising humanity’s consciousness to a new and universal level, they also offer intriguing glimpses into the nature of the universe.

Historian Arnold Toynbee concluded in 1959 that the Bahá’í Faith “...is not a sect of some religion, but a separate religion on par with Islam, Christianity, and other world religions.”

St. John 16: 12,13
Gleanings Ch. XI.V

Whether or not one accepts Bahá’u’lláh’s stupendous claim for which He endured forty years of exile and imprisonment, many of His writings, now being studied in hundreds of languages around the world, deal with the origin and nature of the universe and our place in it. This should be of the greatest interest to everyone, but particularly to scientists and philosophers. These texts repeatedly draw our attention to the creative principles and powers that underlie and govern all phenomena. Before we embark on our study of the universe, a few brief quotations will set the stage.

Thou didst wish to make Thyself known unto men; therefore,
Thou didst, through a word of Thy mouth, bring creation
into being and fashion the universe.24

O Son of Man!
Veiled in My immemorial being and in the ancient eternity of My essence,
I knew My love for thee; therefore I created thee, have engraved on thee
Mine image and revealed to thee My beauty.25

O Son of Bounty!
Out of the wastes of nothingness, with the clay of My Command
I made thee to appear, and have ordained for thy training every atom
in existence and the essence of all created things.26

The whole universe is but a handful of clay in His grasp.27

It is in Our power, should We wish it, to enable a speck of floating dust
to generate, in less than the twinkling of an eye, suns of infinite,
of unimaginable splendor, to cause a dewdrop to develop into vast
and numberless oceans, to infuse into every letter such a force
as to empower it to unfold all the knowledge of past and future ages.28

The photographs in this chapter were taken inside the former Prison Fortress at Akka, Israel.

Prayers and Meditations, p. 6
Hidden Words, Arabic No. 3
Hidden Words, Persian No. 29
Gleanings, p. 293
Power of Divine Assistance, No. 11

t the beginning of the 20th century, ‘Abdu’l-Bahá (1844-1921), first-born son of Bahá’u’lláh,
carried the Teachings of the Bahá’í Faith to the western world. Having been appointed in
Bahá’u’lláh’s Will and Testament as the sole Interpreter of the
Bahá’í Writings, ‘Abdu’l-Bahá
visited the United States, Canada, England, Scotland, France, Germany and Hungary. He spoke to
many large gatherings attended by scientists, public figures and lay persons.

In a book entitled Some Answered Questions, He addresses a large variety of topics that deal
with religious questions, science, and future human development. His explanations in Chapter 47
concern the universe. They were kept plain and simple in order to be understood by readers who
lived long before the advent of the atomic age and long before many discoveries were made that
have by now become part of our daily routine. A slowly emerging consensus among scientists
seems to confirm ‘Abdu’l-Bahá’s words, except that He testified without ambiguity to the
existence of an all-knowing and all-powerful creator, instead of what some scientists vaguely
refer to as a universal, cosmic intelligence.
Know that it is one of the most abstruse spiritual truths that the world of existence,
that is to say, this endless universe, has no beginning... A creator without a creation is
impossible... If we could imagine a time when no beings existed, such imagination would
be the denial of the Divinity of God. Moreover, absolute non-existence cannot become
existence... Therefore, as the Essence of Unity, that is the existence of God, is everlasting
and eternal ? that is to say, it has neither beginning nor end? it is certain that this
world of existence, this endless universe, also has neither beginning nor end.
...It may be that one of the parts of the universe, one of the globes for

example, may
come into existence, or may be disintegrated, but the other innumerable globes
still exist;
the universe would not be disordered or destroyed; on the contrary, existence
is eternal
and perpetual. As each globe has a beginning, necessarily it has an end,
because every
composition, collective or particular, must of necessity be decomposed; the
only

difference is that some are quickly decomposed and others more slowly...
... In the beginning, the origin was one: the origin of all numbers is one and
not two...
In the beginning, matter was one. It appeared in each element in different
aspects. Thus,
various forms were produced and these various forms as they were produced
became
permanent and each element became specialized. But this permanence became not
defined and did not attain realization and perfect existence until after a very
long time.
Then these elements became composed, organized and combined in infinite forms;
or
rather from the composition and combination of these elements innumerable
beings
appeared. This composition and arrangement through the wisdom of God and His
preexistent might were produced from one natural organization which was
composed and
combined with the greatest strength, conformable to wisdom, and according to a
universal law. ... It is the creation of God and not a fortuitous composition
or
arrangement. This is why from every natural composition a being can come into
existence, but from an accidental composition no being can come into
existence...
... This terrestrial globe in its present form did not come into existence all
at once,
but the universal existence gradually passed through different phases until it
became
adorned with its present perfection... The smallest atoms in the universal
system are
similar to the greatest beings of the universe... They come into existence from
one
laboratory of might under one natural system and one universal law... This
terrestrial
globe having once found existence, grew and developed in the matrix of the
universe,
and came forth in different forms and conditions, until gradually it attained
this present

perfection, and became adorned with innumerable beings... Original matter in its
embryonic state and the mingled and composed elements which were its earliest forms,
gradually grew and developed during many ages and cycles, passing from one shape
and form to another, until they appeared in this perfection, this system, this
organization and establishment through the supreme wisdom of God.29

Thus, if there was a time when God did not manifest His qualities, then there was no
God, because the attributes of God presuppose the creation of phenomena. For example,
by present consideration we say that God is the creator. Then there must always have
been a creation?since the quality of creator cannot be limited to the moment when some
man or men realize this attribute. The attributes that we discover one by one?these
attributes themselves necessarily anticipated our discovery of them. Therefore, God has
no beginning and no ending; nor is His creation limited ever as to degree. Limitations of
time and degree pertain to things created, never to the creation as a whole. They pertain
to the forms of things, not to their realities. The effulgence of God cannot be suspended.
The sovereignty of God cannot be interrupted. As long as the sovereignty of God is
immemorial, therefore the creation of our world throughout infinity is presupposed.

When we look at the reality of this subject, we see that the bounties of God are infinite,
without beginning and without end.30

... Look into this endless universe: a universal power inevitably existeth, which
encompasseth all, directing and regulating all the parts of this infinite creation; and were
it not for this Director, this Coordinator, the universe would be flawed and deficient. It
would be even as a madman; whereas ye can see that this endless creation carrieth out

Some Answered Questions, p. 180-183
Foundations of World Unity, p. 53

its functions in perfect order, every separate part of it performing its own task with
complete reliability, nor is there any flaw to be found in all its workings.

Thus it is clear
that a Universal Power existeth, directing and regulating this infinite
universe. Every
rational mind can grasp this fact.31
Man all over the world is seeking for God. All that exists is God; but the
Reality of
Divinity is holy above all understanding.
The pictures of Divinity that come to our mind are the product of our fancy;
they
exist in the realm of our imagination. They are not adequate to the Truth;
truth in its
essence cannot be put into words. Divinity cannot be comprehended because it is
comprehending. Man, who has also a real existence, is comprehended by God;
therefore,
the Divinity which man can understand is partial; it is not complete. Divinity
is actual
Truth and real existence, and not any representation of it. Divinity itself
contains All, and
is not contained.
Although the mineral, vegetable, animal and man all have actual being, yet the
mineral has no knowledge of the vegetable. It cannot apprehend it. It cannot
imagine
nor understand it. It is the same with the vegetable. Any progress it may make,
however highly it may become developed, it will never apprehend the animal, nor
understand it...
It is the same with the animal. However much it may progress in its own
kingdom,
however refined its feelings may become, it will have no real notion of the
world of man
or of his special intellectual faculties. The animal cannot understand the
roundness of the
earth, nor its motion in space, nor the central position of the sun, nor can it
imagine such
a thing as the all-pervading ether. Although the mineral, vegetable, animal and
man
himself are actual beings, the difference between their kingdoms prevents
members of the
lower degree from comprehending the essence and nature of those of the superior
degree.
This being so, how can the temporal and phenomenal comprehend the Lord of
Hosts? ...
But the Essence of Divinity, the Sun of Truth, shines forth upon all horizons
and is
spreading its rays upon all things. Each creature is the recipient of some
portion of that
power, and man, who contains the perfection of the mineral, the vegetable and
animal, as

well as his own distinctive qualities, has become the noblest of created beings. It stands
written that he is made in the Image of God. Mysteries that were hidden he discovers;
and secrets that were concealed he brings into the light. By Science and by Art he brings
hidden powers into the region of the visible world. Man perceives the hidden law in
created things and co-operates with it. Lastly the perfect man, the Prophet, is one who is
transfigured, one who has the purity and clearness of a perfect mirror?one who reflects
the Sun of Truth. Of such a one?of such a Prophet and Messenger?we can say that
the Light of Divinity with the heavenly Perfections dwells in him.
If we claim that the sun is seen in the mirror, we do not mean that the sun itself has
descended from the holy heights of his heaven and entered into the mirror! This is
impossible. The Divine Nature is seen in the Manifestations and its Light and Splendor
are visible in extreme glory.
Therefore, men have always been taught and led by the Prophets of God. The Prophets of God are the Mediators of God. All the Prophets and Messengers have

Selections of writings of ‘Abdu’l-Bahá, pages 48-49

come from One Holy Spirit and bear the Message of God, fitted to the age in which
they appear. The One Light is in them and they are One with each other. But the Eternal does not become phenomenal; neither can the phenomenal become Eternal.
32

‘Abdu’l-Bahá in London, pages 22-24 Excerpt from a discourse at St. John’s, Westminster

ime and space are the two dimensions that dominate our existence. The more man uncovers
the mysteries of the universe, the more he tends to suspect that both may have neither
beginning nor end. Our own existence and that of the world around us are all governed by cycles
that have a beginning and an end. This makes it difficult, if not impossible, for our finite minds to
come to terms with the concept that something may have “neither beginning nor end.”
Our own existence occupies but a microscopic particle of the universe and only a millisecond
of time’s dimension. It allows us as full a grasp of time and space in the

universe, as it allows a microbe attached to a pebble on the seashore to be aware of air and ocean's vast expanse.

To make cosmic dimensions of time and distances meaningful, they must be reduced to fit into our human perspective. For example, it is quite useless to tell a friend that he is forty million millimeters from town, but forty kilometers he would understand. It means very little to him if you told him that you are just over two billion seconds old. Tell him instead that you have just turned 65 and gone into retirement.

How can one really grasp sun's diameter of 1,390,000 kilometers, or our planet's age of close to five billion years, not to mention the even more colossal distances and time frames of galaxies, or the elusive dimensions within the atom. Yet, as we straddle the worlds of micro and macrocosm, being a child of the stars and of the atoms alike, it behooves us to make the effort.

Since this book is the story of the universe, it would be profitable to shed all number numbness in order to feel more at home with those staggering dimensions of time and space.

Let us first try to put the immense cosmic distances into everyday perspective and let us start with our own solar system. We shall have to construct a mental image where the sun, its planets and their orbits, are reduced to the 1,000 millionth or one billionth part of the actual dimensions.

If we were to build our model on a scale any larger than that we would probably be unable to fully appreciate the comparative dimensions and distances. As we shall discover in chapter 15, even the builders of Egypt's Great Pyramid used a scale of 1:1,000,000,000.

According to science, the solar system evolved out of a cloud of gases and dust, remnants of an earlier star. Let us imagine a huge formation of cosmic dust roughly 7,500 kilometers across, which would be slightly more than half of earth's diameter. The particles in this cloud are moving through space at a constant rate of speed, but at the same time they follow a center-seeking, or centripetal force. The accelerated movement towards a center at right angles to the original motion results in a spiraling path of the mass. This merry- go-round gradually

flattens the ‘cloud’ into an elliptical shape. The heavier elements condense into a formation of just fifteen kilometers in diameter, the embryo of the solar system from Sun to Pluto. The circular motion flattens it into a pancake where the compressing atoms at the center continue to heat up until temperatures turn extreme and ignite a nuclear furnace. Our sun is born.

Out of the original cloud of atoms, 7,500 kilometers in diameter, the sun is now only a tiny nucleus of 1.4 meters (4.5 feet) in diameter. Small sections of the original cloud, perhaps one per cent, instead of spiraling towards the young sun, have separated and undergone centripetal processes of their own to form tiny, revolving spheres. Their orbits around the sun are in continuation of the circular motion of the cosmic cloud that has spawned them. They are the planets and appear as insignificant specks of matter, the ‘accidental’ remnants of this grand cosmic creation. There are nine of them. When applying the scale of the original gas cloud and our beach ball sized sun, we can see them in this mental image:

Mercury, 0.5 cm diameter, orbits between 45 and 70 meters* from the sun.
Venus, 1.2 cm diameter, orbits 108 m from the sun.
Earth, 1.2 cm diameter, orbits 147-152 m* from the sun.
(Our Moon is 3.5 mm in diameter and orbits 40 cm from earth)
Mars, 0.7 cm diameter, orbits 250 m from the sun.
Jupiter, 14.3 cm diameter, orbits between 741 and 815 m* from the sun.
Saturn, 12 cm diameter, orbits between 1,347 and 1,507 m* from the sun.
Uranus, 5.2 cm diameter, orbits between 2,735 and 3,004 m* from the sun.
Neptune, 4.5 cm diameter, orbits 4,500 m from the sun.
Pluto, 0.2 cm diameter, orbits between 4,424 and 7,375 m* from the sun.

* The solar distances of these planets vary on account of their elliptical orbits.

Of those nine ‘insignificant specks of matter’, the four nearest to the sun are called terrestrial planets, composed largely of metals and silica. The five outer planets beyond the orbit of Mars are made up mainly of gases such as hydrogen and helium. Four are giants that make the terrestrial planets look puny by comparison.

Jupiter, the ‘King of Planets’, justifiably named after the king of all Roman gods, has roughly twelve times earth’s diameter and 1,300 times its volume. Jupiter was well on its way to becoming our sun’s twin when the solar system was forming. It had ten times its present diameter of 143,000 km (88,000 miles) and was therefore almost exactly as large as the sun is today.
Heating up by gravitational contraction, Jupiter was on the verge of developing a selfsustaining nuclear reaction and turning into a blazing sun. There are many such double stars in our galaxy. The resulting cancellation of day and night cycles and the steady exposure to the light and heat of two suns beating from the sky, would have forced evolution on planet earth to take a totally different turn. After Jupiter failed as a star, it cooled and collapsed to its present size, but its average ‘body temperature’ of 30,000° F, equal to 17,000° C is still a reminder of past nuclear adventures.

To all appearances, the earth is solidly suspended in the heavens while the rest of the universe wheels around it. But the subtle proofs of science tell a different story. Our world, dragging its moon along, is awhirl in space in complex movements at fantastic speeds. A point at the equator rotates at 1,050 miles (1,690 Km) per hour, the earth travels around the sun at 1,100 miles (1,770 Km) a minute, and the sun orbits around the galactic center at 150 miles (241 km) a second. Only two of these movements have an immediate effect on humanity, namely earth’s rotation which results in night and day, and Earth’s solar orbit which in combination with its axis tilt or obliquity accounts for the changing seasons. Apart from these two basic motions, the earth exhibits still another movement called precession. It is not commonly known, despite the fact that it represents our planet’s own peculiar signature movement that has exercised minds since remote antiquity (p. 82) is expressed in many ancient legends and sacred architecture.
In a slow wobble earth’s tilted axis describes a tight circle at both its ends, thus tracing a double conical figure once every 25,776 years. Apart from any side effects that would still await

discovery, axis precession provides us with the longest observable time cycle attributable to
earth's motion. While this movement resembles the wobble of a spinning top, there is no need to
worry that earth may lose its spin and topple over on its side.
Since one year has 365.2 days, the 25,776 years of the precessional cycle contain no less than
9,413,395 days that translate into earth revolutions. This ratio resembles a spinning top that
exhibits an extremely slow, almost imperceptible careen just once every 24 hours, while spinning
on its axis with the speed of a gyro at 6,537 revolutions per minute.
The model and diagram shown on the next page illustrate the precession of earth's axis which
is tilted at ca. 23.5 ° to the vertical. The axis currently points towards Polaris, the polar star.
Roughly 13,000 years ago it pointed towards the star picture of Vega. It will do so again about
12,700 years from now.

Ca. 13,000 years ago current direction of axis

By Solar System we generally understand the sun and her planets. In our model it emerged
from the 15-kilometer disk of condensed gases. We have become quite familiar with it in school
and more recently through NASA's breathtaking photographs sent back by space probes. We talk
glibly about 'stars closest to our own sun', about our galaxy which we call the Milky Way, and
even about distant galaxies. But the realities of these celestial bodies and star formations and the
distances involved, are mind boggling.
Our planetary system has a known diameter of 7.34 billion miles (11.81 billion km). The
diameter of our galaxy is estimated at 600 million billion miles (965 million billion km). This
means the diameter of the Milky Way is roughly 82 million times that of our own vast solar
system. If, therefore, the original cloud of condensed gases out of which our sun and her planets
evolved had in our human imagination a diameter of just 15,000 meters, a model of our galaxy,
built to equal scale, would have a diameter of 15 kilometers multiplied by 82 million which
would be 1,230,000,000 kilometers. In the real world this is almost exactly the distance between
earth's orbit and the orbit of Saturn. In this model of our galaxy, reaching

from here all the way to
Saturn, our sun would only be 1.4 meters in diameter and planet earth would be a mere speck of
1.2 centimeters with its moon 40 cm distant.

Our sun's closest neighbor is the star Alpha Centauri, 'only' 4.3 light years away. But light
travels at 186,000 miles (300,000 km) per second. Since there are 31,536,000 seconds in a year,
4.3 years have 135.6 million seconds. Multiplying this figure by 186,000 equals 25,221 billion
miles or 40,608 billion kilometers. Reducing this to the size of our original model, the distance to
Alpha Centauri would be the billionth part, or 40,608 kilometers, which happens to be the length
of a journey around the earth at the equator.

How long would it take a NASA rocket to cover this distance? To blast out of earth orbit to
travel to the moon or to destinations far beyond, a rocket must attain a velocity of roughly 41,000
km (25,500 miles) per hour. In order to conform to the 1:1 billion scale of our cosmic model, this
velocity would also have to be reduced to its one billionth part, which would bring it down to
roughly four centimeters (1.57") per hour. Crawling along at this pace like some beetle that has
been captured on film in super-slow motion, it would take one of today's rockets one billion
hours, or 114,155 years, to bridge the imaginary distance of 40,606 km in our cosmic model in
order to reach our sun's closest neighbor.

In the larger context of the universe such distances are still mere neighborhood excursions.
The earlier mentioned star-forming cosmic cloud in the constellation Orion is 16 light years
across and 1,600 light years from earth. The diameter of our own galaxy is roughly 100,000 light
years, its closest galactic neighbor, the Andromeda galaxy, a whole 2.2 million light years away.
Astronomy has discovered the faintest evidence of countless galaxies at distances of over 14
billion light years. A fuzzy glimpse of the universe as it had existed then shows that these early
galaxies had little variety and were uniformly small and compact with much fewer stars than
those only a few hundred million light years away.

As we explore the deep recesses of space we encounter the strange phenomenon where time
and space have virtually become synonymous, for the greater the distance, the farther we reach
back into the past. Like some cosmic telegraph the light that arrives today from far-off galaxies
signals yesterday's information about the early evolution of the universe. However, such information is somewhat dated, a replay of the far distant past, so to speak.
Just as a high-flying jet startles the observer by having traveled on for several miles by the time
its thunderous exhaust reaches the ground, distant galaxies also have changed their positions or
have even become extinguished by the time their light finally hits our high-powered telescopes
several billion years later. The record of the cosmos we are trying to piece together is therefore a
record dating back to a time before even our own solar system had its beginning.
The unanswered question is what has transpired since. Have those far-off constellations been
swallowed up by black holes, have they turned into dark matter(p. 13), or have their galactic
remnants formed new galaxies whose light-born images are flooding through the cosmos even as
we speak until they will eventually arrive in our region of the universe several billion years hence
to deliver a belated update.
And who might then be the information's beneficiary and gain a still fuller understanding of
the evolution of the universe?

A deep field photograph taken by NASA's Hubble telescope, where every speck of light is a galaxy with hundreds of billions of star systems. This startling image was captured when the telescope was aimed at a point in the sky equal in size to a grain of sand held at arm's length. It had previously been thought to be "empty space."

cientists now believe that all their findings indicate that planet earth is the only celestial body
in the entire solar system which not only has intelligent life, but which harbors any form of
organic life at all. This has not always been the scientific opinion. While planet Mercury, without
atmosphere and three times nearer to the sun than earth, was recognized as a red-hot, barren
waste, Venus, romantic and beautiful, was believed to be inhabited. The discovery of Martian

‘canals’ in 1877 by the Italian astronomer Schiaparelli, set off a lively debate whether these were telltale signs of an advanced civilization. Not to be outdone, a few charlatans announced that they were in actual communication with flourishing civilizations on Jupiter, Saturn, Uranus and Neptune.

When our first lunar astronauts Armstrong, Aldrin and Collins returned from their “First small Step” on the moon, they donned protective clothing before being taken to an aircraft carrier. Once aboard, they entered a small isolation chamber where they were kept quarantined for a full 21 days. U.S. President Nixon waved through a window and talked into a microphone as he welcomed them back to earth. It all looked like a prison visit in the movies, except that this time everybody was celebrating. These extreme precautions were taken lest the trio contaminate the world with dangerous alien bacteria from the moon against which earthly organisms had no resistance. This safeguard, while prudent, turned out to be wholly unnecessary.

Today we know that the moon has neither germs nor bacteria. The same is probably true for the rest of our sister planets, despite a brief flurry of excitement in 1996, when during an examination of what was believed to be a small Martian meteorite which had come down over Antarctica, tiny inclusions were interpreted as petrified fossils of primitive marine life. This might indicate that there may have existed some form of life on Mars in the distant past. If there is at present no life in our solar system except on planet earth, a search for living worlds or intelligent beings like ourselves must necessarily take us to planets that orbit distant suns.

Following many millennia when man felt quite exclusive about his existence and believed to be alone in the universe, scientists once they became aware of the overwhelming number of stars and galaxies, began to think differently. They now speculated that the universe was “teeming with life.” There were some estimates that in our own galaxy alone there may exist many millions of earth-like planets with civilizations similar to our own. It offered the tantalizing prospect of

discovering a virgin planet where overcrowded earthlings could make a brave new start, along with the faint hope that some day in the future a far-advanced civilization may even assist us in overcoming our nagging earthly problems. We shall return to this topic in chapter 16.

While nobody really knows, all this seems a rather overoptimistic estimate, because one would probably have to exclude most stars in the galactic center from having planetary systems with regular orbits, which is a prerequisite for life's chemistry. The great majority of the estimated 200 billion stars in our galaxy are bunched together at its center, thousands of times closer to each other than the stars in the galaxy's nebulous spiral arms where our own sun is located. With several thousand suns inhabiting a volume of space, where in our own cosmic neighborhood there exist just two or three stars several light years apart from each other, stray matter would have little chance to form into planets, but would be captured and devoured by any number of surrounding suns. Should a planet form against such odds, the tug of competing gravitational forces within the incandescent inferno of a dense star cluster, would disrupt its orbit and also permanently expose its entire surface to the heat and radiation of several near-by suns. It would play havoc with temperatures and chemistry. As we shall see in a later chapter, such extreme conditions are not at all conducive to higher life forms.

An absence of organic life towards the center of a galaxy would seem perfectly consonant with life's greater purpose. As we have read earlier and will read again in chapter 15, the

underlying purpose of life is the emergence of the human intellect endowed with "the power of investigating and discovering the verities of the universe, the means by which man finds a pathway to God."33

It is solely our sun's fortuitous location in the far outer fringes of the galaxy that allows us to discover those verities of the universe. In our sun's realm, the skies are sufficiently clear for us to become aware of the endless panorama of distant galaxies. Had our own star been

much closer to
the galactic center, we would have been surrounded in all directions by layer upon layer of
billions of bright stars, entombing us like so many glowing grains of sand. Our world would have
been suspended as if in the center of a brightly lit fish bowl where the view to the outside was
blocked and the existence of inter-galactic space concealed forever. It would have made
recognition of the vast outer universe impossible and thus dead-ended man's pathway to a fuller
understanding of the world of existence.

A perfect example that organic life is extremely rare and not automatically present wherever
matter may exist in the universe can be found much closer to home, namely right here on planet
earth. Here organic life is also strictly confined to an extremely thin outer layer called
'biosphere'. It consists of the oceans, a paper-thin dusting of organic soil, surface water in lakes
and streams, and the thinnest envelope of oxygen-rich air in the lower atmosphere. Earth's entire,
vast, red-hot interior body and most of its gases are devoid of any living organisms. Just as planet
earth as an entity has given birth to its thin and vulnerable biosphere, the solar systems in the
outer fringes of our galaxy may also have been spawned by the vast galactic cauldron at the
center. Chapter 12 will examine in detail this preciously narrow spectrum in which organic life
actually can exist.
Nevertheless, the uniquely favorable conditions (p. 62, 163, 164) within our solar system that
brought about the formation of a planet like earth with a regular solar orbit and a benign night and
day cycle could occur many times, especially in the outer fringes of our galaxy where isolated
stars occupy their own sovereign domain that would allow them to keep a well-ordered reign over
their planets. Given a sufficiently large number of such solar systems we may by the sheer law of
averages come across one with a planet similar to earth that may even be home to an advanced
civilization.
However, as we daydream of finding and colonizing new worlds in search of fancied greener

pastures, two problems are looming large: one of distance and the other one of simultaneous
existence.

‘Abdu’l-Bahá, Promulgation of Universal Peace, p. 49

efore we look at the overriding consideration of simultaneous existence, we shall first
examine the problem of inter-stellar distances.
Our solar system lies close towards the edge of the “Milky Way” galaxy. When we look at
the night sky, we notice that we are not suspended in the middle of a star cluster whose incessant
light and radiation would completely eliminate nighttime and burn all living things to a crisp.
Instead, a faint dusting of stars, almost the shape of a ribbon, presents us with a side view of our
galaxy. There is nothing but darkness everywhere else. In our own stellar neighborhood near the
edge of the galaxy, stars are much farther apart from each other than at the galactic center where
they are crowded together in a cloud of incandescence at densities many thousand times as great.
It therefore comes as no surprise that there are only twenty stars within a dozen light years
from our sun. If one pictures the sun suspended in the center of a room, these twenty stars are
positioned around the sun in various directions. One would therefore hardly be able to leapfrog
from one of our neighboring solar systems to the next, as the distances between them are often
much greater than their distance to our sun. A visit to each one of them would mean a separate
expedition.
The stars closest to our sun are Proxima and Alpha in the constellation of Centaurus, 4.28
and 4.34 light years away. They are followed by Bernard’s Star at 6 light years, Wolf 359 at 7.7,
Lalonde at 8.2, Layton at 8.7 and Sirius at 8.7 light years.

It is easy to recite stellar distances in light years, but it is not quite so easy to come to terms
with this measurement. One light year contains 31,536,000 light seconds. Since sunlight takes
506 seconds (8 minutes, 26 seconds) to reach earth, one light year is 62,324 times the distance
from sun to earth.
If such dimensions threaten to overwhelm our comprehension, a simple comparison

might
help. Let us assume the distance from sun to earth, also known as one Astronomical Unit or A.U.,
equals the thickness of writing paper, one light year resembles the thickness of 62,324 sheets. As
a package of 500 sheets is typically 2.5 inches (6.35 cm) thick, the required 125 packages of
printing paper would stand about 26 feet (7.94 m) tall. In order to simulate the distance to
Proxima Centauri, sun's closest neighbor at 4.28 light years, the paper tower would reach to a
height of 111 feet (34 m), where the thickness of each single sheet represents one A.U., namely
the distance from planet earth to the sun.

A more elegant demonstration would be to shrink our entire solar system right down to the
size of this computer's CD-ROM disk with a diameter of 12 cm or 4 11/16 inches. Planets
Mercury, Venus, Earth and Mars would all orbit the sun within the CD's small hole at the center,

and the sun itself, with a real diameter of 1,400,000 km or 870,000 miles, would be only a
fraction in size of the tiny dot at the end of this sentence. The 70th part of a millimeter to be
precise.
Since Proxima Centauri is 25,221 billion miles away, roughly 3,436 times the solar system's
diameter of 7.34 billion miles, it would be 412 meters (1,352 feet) away from the CD-ROM disk
that represents our solar system. Sirius would be twice that distance.
More familiar to people of the northern hemisphere should be the Polar Star or Polaris, seen
in the vicinity of Ursa Major, commonly known as the Big Dipper. Its light originated 300 years
ago, perhaps just as Isaac Newton was observing this star. The faint light Newton saw had left its
source a further 300 years earlier at a time when Columbus made his first voyage of discovery.
How great a distance then are 300 light years when scaled down to our CD-ROM model of the
skies? About 29 kilometers or 18 miles as the crow flies!
When it comes to the size of our galaxy, its diameter when projected on that same mini-scale
would be 96,000 kilometers or 59,650 miles. That is 7½ times earth's diameter. Even the vastness
of the solar system, where space probes travel several years to reach our

sister planets, becomes
truly insignificant when compared to inter-stellar dimensions.

Any kind of journey to the nearest star is at present out of the question. For today's rockets to
gain the sufficient velocity would require totally unrealistic quantities of fuel for which no vehicle
large enough could be built. Future space probes may be propelled by atomic fusion or by other
far advanced methods to boost velocities to approach the speed of light. This may eventually
allow close-up inspections of neighboring solar systems, but the survival of such probes could be
jeopardized by the Oort Cloud, named after the Dutch astronomer Jan Hendrik Oort, who
theorized that it encloses the solar system like a vast shell and is seeded with giant chunks of
frozen gases. These relics of the formation of the solar system occasionally may collide, become
dislodged, then hurtle towards the sun where we can observe them as comets.

The outer rim of the Oort cloud is thought to lie 105 or 100,000 Astronomical Units (Earth's
solar distance) from the sun. If one were to adhere to the length of the first A.U. illustrated here at
ca. 8 millimeters, this diagram would have to have a radius of 8mm x 100,000 or 800 meters and
a diameter of 1,600 meters or one mile! Since Alpha Centauri is 266,746 A.U. from the sun, the
Oort cloud stretches nearly half way to our sun's closest neighbor. It is theorized that Centauri's
gravitational pull may sufficiently disturb ice particles in the cloud and trigger comets.

All such considerations hint at the utter futility of contemplating journeys to neighboring
solar systems in the foreseeable future. It seems that only radio signals traveling at the speed of
light hold any promise of bridging such chasms. Nevertheless, the elapsed time between sending
a query and receiving an immediate reply would be almost 9 years for Proxima Centauri and 18
years for Sirius.
Always pre-supposing that these stars have planets and that these planets harbor intelligent
life, should some dialogue develop, the most rudimentary exchange of information would involve
several generations, an undertaking almost as time-consuming in scope as was

the construction of
Europe’s great cathedrals.
In case one becomes discouraged by these few examples, they only touch on relatively short
distances to a handful of our sun’s most immediate neighbors. In order to sift through a much
larger number of promising solar systems in search of intelligence one would have to investigate
thousands of suns in our own galactic ‘outskirts’ at distances ranging from 50 to 5,000 light years
where the ‘response times’ to our signals would run anywhere from 100 to 10,000 years. Current
technological limits make it redundant to speculate on any attempts to communicate across even
greater distances, but two observations may serve to further illustrate the obstacles. Our galaxy
has a diameter of over 100,000 light years. Had Neanderthal Man sent out signals expecting some
reply, they would be arriving at the opposite edge of our galaxy any day now, except that they
would long have been lost in the magnetic turmoil of dense star clusters. Had brave members of
this ancient race left earth aboard a giant space ship, racing through the void at 41,000 Km/h
(25,500 m.p.h.), which is roughly the speed of today’s rockets when escaping earth’s gravity,
their distant offspring, a cosmic Noah’s Ark their forlorn home, would be arriving in the vicinity
of Proxima Centauri, sun’s closest cosmic neighbor, sometime within the next 20,000 years. Our
most ambitious exploration of space will have to be confined to the wispy veil of stars that make
up our sun’s own stellar neighborhood. Do such considerations then leave us much room for
optimism?
The next chapter may supply the answer.

he other problem, raised in the previous chapter, is simultaneous existence. If inter-stellar
distances seem daunting, this obstacle is a much greater one. It will never go away and
cannot be managed by science, even in the event that man’s technology is able to overcome the
staggering challenge of cosmic distances. In order to communicate with an extra-terrestrial
intelligence one must not only be able to bridge distance, but both civilizations must co-exist at a

similar level of evolution and at precisely the same instant within time's infinity.

The sun and her planets have been around for some 5,000 million years. Even if any extraterrestrial intelligence had sent signals our way or visited earth, what would they have heard or found? For millions, even billions of years, they would have been waiting in vain for an answer.

For the first couple of thousand million years, visitors to this planet would have found no trace of life whatsoever. Much later, after life had finally taken a foothold, our intrepid wayfarers during 135 million years of constant observation would have encountered nothing but fearsome dinosaurs. Earth would long have been catalogued and written off as an utterly hostile environment bearing no intelligent life, period. By the time homo sapiens finally did make a late appearance, their own race would have died out a long time ago.

Humanity may have been noticeable as an evolving species during the last 5,000,000 years, roughly the 1,000th part of earth's age. Man as a modern communicator may have been here only during the last 100,000 years, the 50,000th part, or, mathematically speaking, the 500th part of one per cent. If we were to limit this exercise to a time when man had finally developed today's high technology, the 5,000 million years of earth's existence would shrink to a microscopic bull's eye of a single century.

Since earth-like planets in other solar systems probably follow similar evolutionary time frames, evolution on earth and on planet X needs to have proceeded simultaneously and at fairly equal pace in order to arrive simultaneously at a juncture when both planets are inhabited by creatures of comparable technological capability.

During the next century astronomy plans to deploy vast refractive devices cart-wheeling through space beyond Jupiter's orbit to reduce the interference of sun light in an effort to seek out earth-like planets. Once detected these will be "listened to" and bombarded with signals, but chances are that we shall meet only silence. Our investigation will probably come too early or too late by several hundred million years.

When one considers that any species, our own included, has a biological clock that does not

tick forever, but may at best run several million years, it becomes a highly improbable
coincidence for two or more advanced civilizations to co-exist within the same narrow time frame
and in close enough proximity to establish some form of dialogue, let alone to achieve a physical
encounter.
Venus is a case in point. It is sometimes called earth's sister planet. Because of its strikingly
similar size, its diameter being 95% that of earth, it is sometimes even called earth's twin. But

Venus is not our twin by a long shot, because its development has not paralleled that of earth and
its present environment cannot sustain organic life. While there is speculation whether Venus
once had oceans and life in the distant past, or whether its environment may eventually change to
allow life to develop at some distant future, the only certainty seems to be that Venus will not
harbor an advanced civilization while our own flourishes here on Earth.
Notwithstanding any of these observations, it is in theory possible that humans have
populated this earth in cycles that long preceded our own, but whose traces have vanished
through geologic change. There may even have been extraterrestrial contact. It is equally possible
that such events may take place in a cycle of the distant future. It would be presumptuous to
assert that certain events cannot transpire just because we lack evidence they have occurred
before.
Part III of this book will introduce man as a spiritual being functioning on earth in a material
body which like any other living organism has slowly evolved to suit its physical environment.
On account of humanity's spiritual essence and origin, a human presence in the universe must of
necessity transcend physical boundaries of time and space. The emergence of man should
therefore neither be conceived as being limited to a single geologic cycle, nor restricted to a
single place in the universe. To quote 'Abdu'l-Bahá:
If man did not exist, the universe would be without result, for the object of existence
is the appearance of the perfections of God.34 Man, therefore, on the plane of the

contingent world is the most perfect being. By man is meant the perfect individual, who is
like unto a mirror in which the divine perfections are manifested and reflected.35
... it cannot be said there was a time when man was not. All we can say is that this
terrestrial globe at one time did not exist, and at its beginning man did not appear upon
it.36
...we say that God is the creator. Then there must always have been a creation --
since the quality of creator cannot be limited to the moment when some man or men
realize this attribute.
Therefore, God has no beginning and no ending; nor is His creation limited ever as
to degree. Limitations of time and degree pertain to things created, never to the creation
as a whole. They pertain to the forms of things, not to their realities. The effulgence of
God cannot be suspended. The sovereignty of God cannot be interrupted. As long as the
sovereignty of God is immemorial, therefore the creation of our world throughout infinity
is presupposed.37
Every single letter proceeding from Our mouth is endowed with such regenerative power as to enable it to bring into existence a new creation -- a creation the magnitude of
which is inscrutable to all save God.38

Some Answered Questions, p.196
Writings of ‘Abdu’l-Bahá, p.62
Some Answered Questions p. 196
‘Abdu’l-Bahá, Some Answered Questions, p. 180-183
Bahá’u’lláh, The Advent of Divine Justice, p. 80

t was only two centuries ago when astronomers discovered that the “Milky Way” spiral
nebula of stars, in whose outskirts our own sun and planets are located, was not the only
galaxy in the universe, but that there were countless others. Since then, modern astronomy, aided
by powerful optics and radio telescopes, has estimated that there are in excess of 200 billion, or
200,000 million, galaxies in the observable universe. It is entirely possible that a few years hence
this estimate will be outdated and replaced by a much higher number. It is equally staggering that

at present each galaxy is estimated to have on average 200 billion stars. Our own Milky Way and its closest galactic neighbor, the Andromeda galaxy, rank among the giants with close to 1,000 billion, which is a million million, stars each.

Once again we face the mental problem of digesting such numbers. For most of us, large quantities or dimensions mean very little. If they did we would be much more upset about multibillion budget deficits. I once listened to a news report by a respected TV network which reported that a certain strike was costing a local economy 100 million dollars a day, when the actual figure was one million. I am certain that most viewers were suffering from “number numbness” and never even questioned the report.

When I tried to comprehend the 200 billion figure of modern astronomy, I was somehow reminded of the knots in a finely woven Persian carpet. We own a small Persian rug that came from Na’in, near Isfahan. Its tight pattern, woven in wool and silk, looks like a delicate painting. I turned the rug over and with a magnifying glass counted 20 knots across the length of an inch.

This meant there were 400 tiny knots in each square inch, 57,600 knots in each square foot.

I was surprised to find that our small area rug measuring only 3.5 x 5.5 feet (about 1.05 x 1.70 meter) contained roughly 1,100,000 knots, almost a year’s work for a dedicated artisan.

Next, I imagined myself visiting an extravagant oriental palace with a very large reception hall measuring 100 by 100 feet (30 x 30 meter), its entire floor covered with my kind of carpet.

Its 10,000 square feet would contain no less than 576,000,000 knots. I piled 347 of such carpets on top of each other, like a rug merchant who had run out of storage space. Since a finely woven Na’in carpet is only a quarter of an inch thick, a pile of 347 of such rugs would be just over seven feet high. This carpet pile, covering an area of 100 x 100 feet and reaching above my head would contain roughly 200 billion knots. It would represent the life work of 5,000 artisans laboring long hours every day for 40 years. Such is the number of galaxies in the known universe.

But wait, every galaxy is estimated to contain some 200 billion stars. I tried

to stick to my
analogy by using a “mental microscope” to expand each tiny knot in my rug pile to represent a
similar carpet collection containing 200 billion knots. If you do not possess such a microscope,
try duplicating the reception hall, rugs and all, 200 billion times. Alas, you would only be able to
put up 170 billion of them before running out of space, because your 170 billion reception halls
with their 347 layers of Na’in carpets, would have occupied every single square kilometer of dry
land available on our planet, Antarctica included.

It may be difficult to follow such exercises in an attempt to come to grips with the immensity
of the cosmos. Our mind is overwhelmed, because our home planet is like a tiny electron circling
around the nucleus of a hydrogen atom belonging to a water molecule, which in turn is part of a
vast ocean whose existence will always remain totally incomprehensible to those who dwell on
the electron.

here are at present no scientific estimates about the eons it took for our sun to evolve out of
the original cosmic cloud. But today’s science believes that after the sun lit up, planet earth
formed some 4.5 billion years ago.
In order to make such time span at all comprehensible, it has sometimes been reduced to a
miniature time model which occupies just one solar year. When you shrink 4,500,000,000 years
into a single calendar year on earth, every second would represent 150 years of real time.
In our mini-model of earth’s age, the industrial era has therefore lasted just one second. The
American Revolution ended only 1.4 seconds ago and Columbus sailed the ocean blue in 1492,
which would be 3.3 seconds ago in our model. An Olympic 100-meter dash of 10.0 seconds
would take us back to Byzantine Emperor Tiberius II, and a slower sprinter who takes 13.3
seconds to complete his race would have started out at the birth of Christ 1999 years ago. The last
Ice Age would have ended just over one minute ago, 67 seconds to be exact.
After our planet had formed on the first day of January, it remained in a molten radioactive
state for roughly the next three months. From April through September it began

developing micro
organisms that brought about a very gradual change of atmosphere and oceans which allowed
higher life forms to develop starting in the month of November.
The long age of dinosaurs which lasted roughly 135 million years (reduced to a mere 10½
days in our model) began 195 million years ago and ended 60 million years before our time. In
our model the dinosaurs would therefore not appear before December 16, only 15 days ago, then
suddenly die out again, presumably in some holocaust, a mere 4½ days ago, namely in the
afternoon of December 27.
Some palaeo-anthropologists speculate that our species had its early beginnings some four
million years ago. In our time model, compressing 4.5 billion years into a single calendar year
like a vast computer program, this would be on December 31, just seven hours and 24 minutes
before midnight. But do a few minutes really matter? What this number game really means is that
planet earth had existed a full year, when a few hours before midnight on December 31 the spark
of human intellect lit up the world. However, only the last 41.6 seconds are referred to as
'recorded history', because the year 4241 B.C., 6,240 years ago, is the first exactly dated year as
it marked the beginning of the Egyptian calendar.
Far more significant is that within the very last second of our time log there occurred the
sudden explosion in science and technology, bringing the industrial revolution, the vast
consumption of fossil fuels and other non-renewable resources, the pollution of air and oceans,
the seemingly unstoppable degradation of our home planet, along with a population explosion
which despite wars and famines has seen humanity's numbers quadruple to six billion within a
single century.
It almost seems as if on New Year's Eve at the stroke of midnight an unseen hand had
suddenly reached out and lit a giant firecracker.

To celebrate our graduation into high tech with such reckless abandon is to court disaster.
The next chapter will tell that life on earth depends on a most delicate balance, established over

many millions of years in man's absence through the sovereign evolution of a living planet. No matter how clever we think we are, it would be folly to believe that human abuse may continue indefinitely and not threaten our existence.

Now that humanity has gained powers to interfere with nature, it should listen to James Lovelock, a Fellow of the Royal Society, who warned in his book Healing Gaia (Gaia meaning The Living Earth):

> The rules of Gaia are such that organisms that harm their environment do not long survive. We would do well to understand this rule, which may have fatal consequences for our species. Fortunately... we are able to learn. And nothing teaches better than a near miss. The essence ... of being citizens of Gaia is not a fretful Puritanism. If we can think of ourselves as part of a giant living organism ... then we may be guided to live within Gaia in a way that is seemly and healthy. Thinking this way is an antidote to the fatalism of accepting the Earth as dead with life as just a passenger. [One must] wonder whether we really are God's chosen species and whether we are not, instead, simply the most destructive event in Earth's biological history... If we lose our habitat, the system of life and its environment on Earth will go on. But humankind will no longer be part of it.39

The Bahá'í writings also contain many reminders that the earth is by no means our private property to be exploited and abused at will, but that it is the domain of a higher authority. Earth had its own life and had established an ingenious biological equilibrium long before man's late arrival. Being relative newcomers, we are required to respect its laws and to behave as earth's watchful guardians ever intent to build and to refine, never to despoil or to squander. Systematic deforestation, careless disposal of atomic waste, pollution of air and water, over-fishing, soil erosion, greenhouse gases, and depletion of earth's ozone envelope, combined with an unbridled population growth, ultimately threaten us with global famine and disease. Along with the dramatic warning in the last quotation on page 96, there is this appeal to

humanity to make an
effort and attain spiritual focus to alter its destructive course.

Ages have passed and your precious lives are well-nigh ended, yet not a single breath
of purity has reached Our court of holiness from you. Though immersed in the ocean of
misbelief, yet with your lips ye profess the one true faith of God. Him whom I abhor
ye have loved, and My foe ye have made a friend. Notwithstanding, ye walk on My earth
complacent and self- satisfied, heedless that My earth is weary of you and everything
within it shunneth you. Were ye but to open your eyes, ye would, in truth, prefer a
myriad griefs unto this joy, and would count death itself better than this life.

James Lovelock, Healing Gaia, 1991

Great is thy blessedness, O earth,
for thou hast been made the foot-stool of thy God,
and hast been chosen as the seat
of His mighty throne.
Bahá'u'lláh ? Gleanings, p. 30

ccording to the writings of Bahá'u'lláh, the natural world is intended as a learning academy
where man's soul can attain spiritual qualities that are needed for its growth and progression
in an afterlife. The following allusion can be found in a prayer by ‘Abdu'l- Bahá.
Familiarize us with the mysteries of life, so that the secrets of Thy Kingdom may become
revealed to us in this world of existence and we may confess Thy oneness.40
In view of this high purpose, it seems strange that life, including human life, should be the
exception and not the rule in the vastness of our solar system. A cosmic wayfarer in search of life
would have good reason to get bored and frustrated with his mission. As he investigates solar
system after solar system, sifting the endless void for some elusive planets, he repeatedly
discovers that they are only lifeless spheres of frozen gases or cratered rock, the sterile remnants
of a process that had once formed their star. Perchance, he may encounter a rare, blue diamond in
the darkness of space, where the laws of physics and chemistry achieved a most unlikely balance

that had allowed life to prosper.
Life’s perceived rarity has many parallels here on earth. Few seeds actually sprout, very few eggs will ever hatch, and a still smaller percentage of organisms will achieve maturity to renew life’s cycle. On much of earth’s deserts and frozen tundra few flowers come into bloom and not a single sweet fruit can be found. Similarly, not a single human being exists within the 300 million cubic miles of the world’s oceans. Even on dry land there are vast regions without a human presence. The incredible profusion of life springs from an even greater abundance of life’s dormant, yet ever present potential.
Any form of life therefore need not be present everywhere and all the time in order to confirm a higher purpose. But since God “loved thy creation”41, one can be certain that He will call man and other living creatures into being wherever and whenever He has caused physical conditions to exist that will sustain their existence.

Life is defined in most dictionaries as “the state of an animal or plant in which its organs are capable of performing their functions; animate existence.” We think of a plant, animal, or human being as living creatures. A rock on the other hand, a pile of sand, or a bucket of water are considered inanimate substances. All life forms have one important thing in common: they are made up mainly of water and they require water for their metabolism in order to perform their functions. This is true from the smallest microbe to the largest plant or animal. Without water there can be no organic life. While fruits and vegetables consist of water between 70% (Corn) and 95% (Tomato), the water content of most animals lies between 60% and 80%. In our own body it averages 65%, from 2% in tooth enamel to 83% in blood.
Water exists in liquid form only within a very narrow temperature range. Below zero degrees Centigrade, as measured under barometric conditions found at sea level, water turns into ice crystals. Above 100 degrees Centigrade it vaporizes and turns into gas. In either form, water cannot serve as the universal medium which gives form and substance to cell

tissue, carries
nutrients and disposes of waste. It is, therefore, only within this extremely narrow temperature
range of one hundred degrees Centigrade that ‘organic life’ can permanently exist. The Swedish
astronomer Anders Celsius chose this vital temperature difference between the freezing and
boiling points of water as the basis for our temperature scale. Each one hundredth part of this
difference is called one degree Centigrade. At the top of the scale sits the solar temperature of
atomic fusion which hovers around 12,000,000 degrees above freezing.
At the bottom of the scale lies the cold of interstellar space with a theoretical absolute
minimum of minus 273.16 Centigrade. It is also referred to as zero Kelvin after the British
mathematician William Thomson, the First Baron Kelvin, who deduced its value.

Bahá’u’lláh, Hidden Words, Arabic No. 4

Anders Celsius Baron Kelvin

If water is “The Element of Life”, what might have been its origin in the early stages of a
young and still lifeless earth? There seems to be a direct link to an even greater puzzle, the earth’s
origin. The very existence and nature of water is related to the size of our planet and its precise
location in the heavens.
As discussed earlier, today’s science believes that our sun evolved from a nebula of atoms
flung into inter stellar space in the explosion of a super nova. Scattered throughout this cloud as
microscopic particles, comprising no more than one per cent of the whole, were the elements
from which the planets were formed. Water in the form of hydrogen and oxygen atoms was just
one of these compounds. Gravitation caused a nucleus to form. Its contraction and increasing
density generated a heat of over twelve million degrees Centigrade. Thus was ignited the selfsustaining nuclear reaction of our sun.
The sun lit up long before it had drawn into itself all the molecules and particles of the
cosmic cloud. These remnants continued to whirl around the sun in vast disks of colliding
particles which began to form ever larger accretions of matter. Hundreds of millions, if not
billions of years, passed before they formed the sun’s planets. Water

molecules of the original
cloud became part of each planet, but their amount and condition depended on the planet's mass
and its distance from the sun. The planet's mass determined its gravitational pull, its distance
from the sun the planet's exposure to solar radiation.
Earth, rightly called the Water Planet, owes its fortuitous makeup to its mass, its air envelope,
and its solar distance. Its mass allowed gravitation to hold an atmosphere of water vapor and
other gases captive, instead of letting them drift off into outer space.
Earth's solar distance of 93
million miles placed it within an extremely narrow zone where sunshine warms the atmosphere,
allowing water to exist in all three of its manifestations, namely as liquid, as a solid, and as vapor.
In terms of cosmic distances this zone turns out to be an incredibly narrow band, only
seventy-five million miles (120 mill. km) wide, which is a mere two percent of the solar system's
radius. To illustrate this point, let's look at a long-play gramophone record. Its radius is 6 inches
or 15¼ centimeters. A band of 2% of this distance would be just three millimeters wide.
Moreover, using an LP record as a mini model of the solar system with the sun reduced to the size
of a needle point on top of the spindle, and Pluto's orbit following the rim, our imaginary band of
three millimeters would have to start right at the base of the spindle of our record player. It may
be instructive to look again at the solar system on page 40.

The best way to appreciate earth's favored position in the solar system is to look at its
immediate neighbors, Venus and Mars. The average surface temperature on Venus underneath its
dense cloud cover is said to be 867 degrees Fahrenheit or 464 Centigrade. Any water there would
be in form of superheated steam. On Mars, traces of water are believed to exist in all three forms.
A presence of water vapors and ice crystals has been detected, but traces only. Even should all of
the vapors precipitate, the moisture layer on the planet's surface would be less than a millimeter
thick and would instantly congeal into a film of ice.
The planet closest to the sun is Mercury. Its maximum day time surface temperature of 326

degrees Centigrade is enough to melt lead. Its minimum night time cold of minus 210 Centigrade
is enough to turn Hydrogen into a liquid. Mercury's small gravity allowed its gases and vapors to
escape into space. Beyond Mars, temperatures quickly drop to minus 185 degrees and much
lower as the distance from the sun increases. Beyond the orbit of Mars any water molecules
remain permanently frozen.
The water we are using today and which builds and maintains the bodies of all living
organisms was present in the original cosmic cloud of molecules which eventually formed the
solar system over five billion years ago. The current theory how these water molecules were
transformed into oceans and glaciers suggests the following evolution.
The earth heated up under the incessant bombardment of matter which was caught by earth's
steadily increasing gravitational pull. After hundreds of millions of years the earth became so hot
that it turned liquid. The heat caused its water to vaporize and chemically to 'decompose' into its
constituent parts of hydrogen and oxygen atoms. Eventually, the process of compaction slowed
and the earth and its cloud envelope cooled. Once temperatures fell below one hundred degrees
Centigrade water turned liquid and began to precipitate.

The resulting deluge lasted for a very long period. It filled the hollows and canyons on the
planet's surface and transformed them into oceans which on average are two miles (3,200 m or
10,000 feet) deep. This is five times the average elevation of the continents. While there is no
certainty how these ocean hollows formed, it is clear that without them the entire globe would
have been covered with oceans thousands of meters deep, leaving no possibility for land-borne
life. As it is, only 30 per cent of the earth surface is dry land which in many places is rising only a
few meters above sea level.

These diagrams illustrate the ratio between water and dry land and the preponderance of deep oceans versus mainly shallow continents.

But it is not just the fortunate presence of these deep ocean basins that gave life a chance to
develop in its rich variety. Had the planet's water volume been slightly

greater, even earth's huge
'hollows' could not have prevented a universal inundation.
Our planet's total water supply is calculated at 326,000,000 cubic miles. Of this unimaginable
volume, 317,000,000 cubic miles or 97.2% lie in the oceans. Every year less than the 3,000th part
of all this water, about 95,000 cubic miles, are estimated to rise as vapor into the air to form
clouds, later to precipitate as either rain or snow. Three quarters of this precipitation falls back
into the oceans and only some 24,000 cubic miles fall on land. But within days, weeks at most,
9,000 of these will drain right back into the oceans through streams and rivers. Only the
remaining 15,000 cubic miles will soak into the earth or fill the lakes and thereby each year
become the sustainer of all land-borne life. This volume is less than the 20,000th part of all the
water on our planet.
To illustrate this startling proportion, think of a swimming pool in your backyard 20 x 30 feet
(9 x 6 m) in size and 6 feet (1.80 m) deep. It would hold a whopping 22,000 imperial gallons
(100,000 liter) of water. Now scoop out just 1 gallon (4.5 liter) over a one-year period and you
get an idea of the relatively puny portion of earth's water supply that keeps all plants, land
animals and humans alive.
In a ceaseless metamorphosis from liquid to cloud to rain to snow and ice, and back to liquid,
water has been recycling itself since time immemorial. Its total volume has probably never
changed. Distasteful as it may be to a purist, the water that makes up our own body cells may
have been inside a dinosaur or in a Roman bath. The water on our dinner table could have been in
the wine at the Last Supper.

While water is an absolute prerequisite, its presence alone does not guarantee the existence of
life's rich variety on Earth. It is the changing temperatures at different ocean depths and in
different sea currents which offer suitable habitat to so many species of sea life. The constant
temperature changes between night and day which bring air and water currents, combined with an
endlessly varied topography cause precipitation to fall on dry land. The

seasons bring snowfall in

the winter and in the form of snow packs and glaciers on high mountain ranges provide for water
storage to irrigate next season’s crops.
This genial mechanism of global water distribution finds its subtle timing and rhythm in the
seasons and in the day and night cycle. The seasons, as we know, are caused by earth’s annual
journey around the sun with its rotational axis always pointing in the same direction at an angle of
23.45 degrees relative to its orbital plane. This allows for the northern hemisphere to gradually
warm over a six month period while the southern hemisphere enters a cooler period, then for the
process to reverse itself half a year later.
Change earth’s axle to stand upright at zero degrees of inclination like Mercury’s, or copy
Venus’ three degrees, and our seasons would disappear. Without axle tilt the sun always stands
right above the equator. This zone would be forever hot while the northern and southern sections
of the globe would live in eternal winter. To share Uranus’ fate would be even worse. With its
axle tilted at 82 degrees, almost lying on its side like a spent top, its poles rather than its
equatorial regions are alternately pointing at the sun. With such an extreme axle tilt we would
have no night and day, but six months of scorching sunlight in one hemisphere while the other
half of the globe would lie deep frozen in darkness.
Earth’s rotational period of 23.93 hours, to be exact, is equally fortuitous for life to flourish.
Try the rotational periods of Mercury of 59 earth days, or of Venus that takes 243 earth days to
revolve around its axis, not to mention Jupiter’s ten hours, and the beneficial functions of the daynight cycle would be lost. Mercury’s thirty days, let alone Venus’ 120 days of exposure to the
Sun would burn everything to a crisp, while an equal time of night would put creation into the
deep freeze. Jupiter’s five-hour snippets of daylight would be too short an interval to generate the
temperature changes that would allow ocean vapors to rise and clouds to precipitate to bring
moisture.
In the Qur’án is written:
Assuredly the creation of the heavens and the earth is a greater (matter) than

the
creation of men: Yet most men understand not.42
Behold! In the creation of the heavens and the earth; in the alternation of the night
and the day; in the sailing of the ships through the ocean for the profit of mankind; in the
rain which God Sends down from the skies, and the life He gives therewith to an earth
that is dead; in the beasts of all kinds that He scatters through the earth; in the change of
the winds, and the clouds which they Trail like slaves between the sky and the earth;?
(Here) indeed are Signs for a people that are wise.43

By repeatedly alluding to this miracle of nature, Bahá'u'lláh once again tries to make us
understand that the world of creation we live in is a reflection of its spiritual essence and origin.
By Thy Name through which the clouds have rained down their rain and the streams
have flowed...44
Through Thy Name, O my God, all created things were stirred up, and the heavens were spread, and the earth was established, and the clouds were raised and made to rain

S?rá 40-57
S?rá 2:164
Prayers and Meditations, p. 116

upon the earth. This, verily, is a token of Thy grace unto all Thy creatures.45
All this illustrates the preciously narrow spectrum in the vastness of our solar system where
life is actually possible. More of earth's exceptional condition is highlighted in Chapter 25. It
makes us realize how much our blue home planet has been favored as it orbits the sun within
those fixed precincts and how by its almost miraculous positioning and the timing of its motions
it was fashioned into a perfect environment for life to flourish in all its glory.
The past few chapters have shown that human existence, while creation's crown and ultimate
purpose, is by no means commonplace, but an extremely rare occurrence in the vastness of the
cosmos and through eons of time. A full appreciation of this fact should engender feelings of
profound wonder, if not reverence, and bring about a universal commitment to protect our living

planet from all harm, and to improve humanity's condition with each successive generation.

As someone once wrote, the most profound experience for modern man was not so much to be able to step on the Moon, but from far out in space to look back at his home planet.

How could one therefore ever forget the electrifying moment on Christmas Eve 1968, when astronaut James Lovell and crew of Apollo 8, the first humans to part from earth and swing around the Moon, sent us back this message:

"In the whole universe, the only bit of color is back on Earth. It is the most beautiful sight in all the heavens."

NASA photograph taken by crew of Apollo 11 July 20, 1969

Prayers and Meditations, p. 236

The inventiveness, technology, and teamwork that gave birth to man's new cosmic view, when applied with wisdom and diligence, can help us improve all aspects of human life, and at the same time safeguard the health of our planet for all future generations.

NASA Astronaut James Lovell

NASA Photograph 1994 by Lunar Mapper Clementine

f all these intricate environmental factors are absolutely essential for the existence of life on earth, then logic would dictate that without those conditions, maintained over hundreds of millions of years, the delicately balanced chemistry of water and air could not have evolved and life on this planet would never have had a chance to establish itself.

Apart from the fortuitous timing of our day and night cycle, the steady tilt and direction into space of earth's axis is, as we have seen, equally vital to maintain continuity to seasonal change.

Yet, latest scientific findings indicate that the stability of earth's axis is not at all the rule in our solar system, but rather a notable exception.

The orientation of the spin axis of planets tends to undergo significant changes. The Martian axis, for example, is believed to be the most unstable. Its tilt is estimated to have fluctuated by as much as fifty degrees. Uranus, as mentioned earlier, is currently lying on its side.

Why has planet earth not followed a similar pattern? What agent has prevented

it from
undergoing the same chaotic changes in axis tilt and gradually rolling over on its side which
would have doomed our planet to a mineral existence without a chance to develop and sustain
higher life forms.
Incredible as it may sound, it is now thought that we owe our existence to the stabilizing
influence of the moon. According to Dr. Jacques Laskar and his team of researchers at the Bureau

des Longitudes in Paris, earth's axis might have undergone changes of up to 85 degrees had it not
been for the moon's presence.
Because of its large size and its relative proximity to earth, the moon's gravitational pull does
not just cause the ocean tides, but according to Dr. Laskar it also provides a restraining torque on
our planet's propensity to tilt. This hypothesis is shared by Dr. Jack Wisdom, astronomer at the
Massachusetts Institute of Technology.
If this were true, the moon, itself a baffling anomaly as the only major satellite in the inner
solar system, would have played midwife at the birth of life on earth.

Amid many conflicting theories about the moon's origin, there seems to be one point of
agreement among scientists: the moon somehow does not belong where it is. Neither Mercury nor
Venus have moons and the two Martian moons are deformed asteroids just 18 miles (28 km) and
10 miles (16 km) in diameter. Only five moons of Jupiter and Saturn can compete in size with our
own, but in relation to their giant planets they are mere specks. Our own moon on the other hand
boasts more than a quarter of earth's diameter and makes its presence felt.
There are four competing theories about its origin: birth, wedlock, capture and collision, but
all four seem flawed. The oldest theory is that a young and still liquid earth, rotating much faster
than today, spun off some of its substance which subsequently congealed into a sphere and went
into earth orbit. The theory seems credible because 384 kilogram of moon rock brought back by
six Apollo missions show a similarity to the composition of earth's upper mantle. But the
problem is that the spun off mass had to attain a forward velocity of roughly 2,421 m.p.h. (3897

km/h) ? the moon's orbital speed ? in order to stay in earth orbit. Anything less and it would have fallen back to earth, anything in excess of it and it would have spiraled away from earth and wandered off into deep space.

The theory of wedlock claims that earth and moon formed as separate planets, but in close enough proximity to revolve around each other as is the case with some twin stars. The problem with this presumed nuptial embrace is that the marriage tie is decidedly one-sided. While the moon faithfully orbits earth, earth does not revolve around its much smaller neighbor, but follows its own sovereign orbit around the sun.

The proponents of the capture theory believe that the moon formed as a planet beyond Mars, but was knocked out of solar orbit when it collided with one or several celestial bodies. Its death spiral towards the sun and fiery oblivion came perilously close to earth where the moon was snared into orbit by earth's gravitational pull.

One is reminded here of the 'Apollo' space craft as it looped around the moon. Had its trajectory taken it too far from the moon it would have sailed straight on into space, never to return. But 'Apollo' actually had to fire its retro-rocket on the far side of the moon to slow down in order to ease into a lunar orbit. Without this braking maneuver the astronauts would have just swung around the moon and headed straight back in the general direction they had come from.

This maneuver without use of retro-rockets is exactly what saved the crew of Apollo XIII when an explosion forced them to abort their lunar mission and hurry home.

This law of astrophysics, where a lesser object swings around a much larger body and returns to its distant point of origin, is also demonstrated every time a comet swings around the sun and returns to deep space. Comets do not go into perfectly regular solar orbits. Their orbits around the sun are extremely elongated, and they return to where they came from, far beyond Pluto's orbit.

It therefore seems unlikely that the erring moon arrived in earth's vicinity at just the right angle and just the right speed to enter a perfect orbit, while earth was

hurtling through space in its
own sweep around the sun at a dizzy 67,000 miles per hour.
The latest and now most widely accepted theory is that in its earliest history a liquid earth
was struck by a very large celestial body, a so-called planetesimal. The impact blasted a huge
chunk of earth along with what was left of the planetesimal into earth orbit where the liquid
debris coalesced and formed the moon. Except for what caused earth to give up some of its
substance, this theory is very similar to the birth theory. It seems therefore similarly flawed.
It appears much more plausible that identical principles were at work to form the planets
around their sun, and the moons around their planets. It was fortuitous that the spiraling disc of
cosmic matter that was destined to become planet earth, ‘hatched’ a single major satellite as a
perfectly shaped entity in a perfectly regular earth orbit, instead of splitting itself up into several
small ‘moonlets’ as was the case with Mars, Jupiter, Uranus, Neptune, and especially with Saturn
and its complex system of over 20 moons. With the exception of Titan, Saturn’s moons are all of
insignificant size, and some traces of matter failed to form moons altogether, but instead
dissipated around the planet to form rings, Saturn’s unique trademark.
Whatever the truth of our neighbor’s origin, it seems that a rather ingenious guardian has
been posted at precisely the right distance to serve the development of organic life on this planet.
Much closer to earth, and the influence of lunar gravity would have been destructive. Instead of
just causing tides, its constant tug would have spilled the oceans across continents and would
have turned our planet’s crust into a vast roller coaster of earthquakes causing endless havoc.
On the other hand, had the moon been much farther away from us, its gravitational pull
would not have been strong enough to help stabilize earth’s axis and thereby to guarantee a steady
environment which is an absolute necessity for life to gain a foothold and to flourish in all its
breathtaking beauty and perfection.

wo dominant lamps in our sky have strangely conspired to delay man’s comprehension of

the mechanics of the heavens. Their respective dimensions and distances from earth, as well
as the motions of one of them, have for ages tricked our senses and blocked our path to recognize
the true nature of celestial bodies. If one were to try to conjure up a model of the heavens that
would make this sort of prolonged deception possible, everybody would have thought that such
coincidences were too far-fetched. We are, of course, referring to the sun and the moon.
The moon's so-called synchronous orbit around the earth is 27 days, 7 hours and 43 minutes.
It is almost precisely the same length of time that it takes the moon to rotate around its own axis.
As a result, virtually the same side of the moon is always turned towards earth and for the earth
dweller the moon's "face" never changes. For many millennia man regarded the moon as a "lamp
in the sky", but certainly not as a revolving sphere suspended in space.
We would have made different observations and drawn different conclusions had the moon's
orbit been slightly different. A closer orbit would have shortened its journey around our planet,
while a more distant one would have lengthened that journey. Similarly had the moon's rotation
around its axis been slightly faster or slower, the gradual disappearance and reappearance of lunar
features would have revealed earth's satellite as a revolving sphere.
Instead, this cosmic sleight of
hand concealed the secret from our understanding until our cerebral efforts and power of abstract
thought eventually uncovered reality.
The second utterly unlikely coincidence has to do with the way we observe sun and moon.
They seem to be two equals, because optically they are almost of equal dimension despite the fact
that the sun's diameter is 403 times larger than that of earth's relatively small satellite.
The reason for this second celestial charade is that the sun's distance from earth is 375 times
longer than earth's distance to the moon. Had the moon's size, or its distance from earth, been
just slightly different, we would not have fallen for this trick.
The first coincidence helped to conceal the fact that the moon was a celestial body. Had man
immediately recognized the moon as being a sphere that traveled through space, it would have

been easier for him to grasp the nature and mechanics of the heavens. The second coincidence
made the moon appear to be just as large and prominent as the sun. Ancient civilizations, therefore, had very good reason to be terrified when during a solar
eclipse the moon seemed to devour the sun, then set her free again thanks to the benevolence of
the gods.
Even in Genesis it is written:
And God made two great lights; the greater light to rule the day, and the lesser light to
rule the night...46

For ages nobody grasped the reality of the sun's huge size and of her vast distance from earth.
Nobody realized that the lesser light was no light at all, but a relatively small and lifeless body
that merely reflected the rays of the sun.

Genesis 1:16

Even after we recognized the moon as earth's satellite, its far side stubbornly clung to its
secrets. There was widespread speculation that an alien civilization was in hiding there. It was
only on October 7, 1959, after Soviet spacecraft "Luna 3" came back with photographic images
of "the dark side of the moon," that the facts about its hidden hemisphere were finally revealed.
This first image was taken at a distance of 63,500 kilometers after Luna had passed the moon and looked back at the sunlit far side. The photographs were very "noisy" and of low resolution, but many features could be recognized and, most important, it laid to rest all rumors that there were little green men.
It is not at all far-fetched to suggest that these two cases of extraordinary coincidence have delayed man's knowledge of the true nature of sun and moon. They also concealed the overall nature of celestial bodies, thereby slowing our discovery and comprehension of the physical universe. But of even greater consequence may have been the effect this had on man's outlook and attitude in general. Instead of developing
a cosmic consciousness by being instantly aware that he belonged to a much greater universe
surrounding his own small world, this blindfold only reinforced man's tendency to selfcenteredness. It left him with the false impression that the place where he lived was the center of

all creation with everything else revolving around it.

One can point to certain parallels between such cosmic handicaps that were placed into humanity's path to greater knowledge and the many challenges in our struggle to uncover the universe of the spirit. The following extracts from the Bahá'í writings are only a few of those texts bearing on this parallel and also on the almost enigmatic kinship between sun and moon.

Know of a certainty that in every Dispensation the light of Divine Revelation hath been vouchsafed to men in direct proportion to their spiritual capacity. Consider the sun. How feeble its rays the moment it appeareth above the horizon. How gradually its warmth and potency increase as it approaches its zenith, enabling meanwhile all created things to adapt themselves to the growing intensity of its light....

Were it, all of a sudden, to manifest the energies latent within it, it would, no doubt, cause injury to all created things. ... In like manner, if the Sun of Truth were suddenly to reveal ... the full measure of the potencies which the providence of the Almighty has bestowed upon it, the earth of human understanding would waste away and be consumed...47

By the terms "sun" and "moon," mentioned in the writings of the Prophets of God, is not meant solely the sun and moon of the visible universe... Thus, by the "sun" in one sense is meant those Suns of Truth... the universal Manifestations of God in the worlds of His attributes and names, even as the visible sun that assisteth... in the development of all earthly things....48

The measure of the revelation of the Prophets of God in this world, however, must differ. Each and every one of them has been the Bearer of a distinct Message. It is for this reason that they appear to differ in their greatness. Their revelation may be likened to the light of the moon that sheddeth its radiance upon the earth... any variation in the intensity of their light is not inherent in the light itself, but should rather be attributed to the varying receptivity of an ever-changing world."49

The foregoing explanations confer a very special symbolism on this rather

unique photographic composition of the phases of the moon. Observe how the light of the moon "…sheddeth
its radiance upon the earth... in ever increasing intensity…" as the lunar month progresses.
"…Any variation in the intensity of [its] light is not inherent in the light itself, but should rather
be attributed to the varying receptivity of an ever-changing world." For astronomers it is plain as
day that the mechanics of the heavens are the cause of our planet's "varying receptivity" to
receive the reflected sunlight which the moon casts on a darkened world. Half the moon's surface
is always exposed to the rays of the sun, but it is only when the earth stands between the sun and

Bahá'u'lláh ? Gleanings, p.87
Bahá'u'lláh ? Kitáb-I-Iquán, p.33
Bahá'u'lláh ? Gleanings, p.79

the moon that we have a "full moon."
It is common knowledge that Islam, the religion founded by the Prophet Muhammad, has the
lunar sickle as its symbol. Despite the fact that the Qur'án mentions sun and moon over twenty
times as the handiwork of an all-wise creator, there is no mention of this symbol.
The sun and the moon follow courses (exactly) computed.50
It is He Who created the Night and the Day, and the sun and the moon: all (the celestial bodies) swim along, each in its rounded course.51
He created the heavens and the earth in true (proportions): He makes the Night overlap the Day, and the Day overlap the Night: He has subjected the sun and the moon
(to His law): Each one follows a course for a time appointed. Is not He the Exalted in
Power… 52
He has made subject to you the Night and the Day; the sun and the moon; and the stars are in subjection by His Command: verily in this are Signs for men who are wise.53
He merges Night into Day, and he merges Day into Night, and he has subjected the
sun and the moon (to his Law): each one runs its course for a term appointed.54
This repeatedly expressed deep reverence for the creation of the heavens would have
prevented Muhammad from making the slender sickle of the moon a frivolous choice for
symbolizing the religion He had authored. On the contrary, its profound symbolism reminds us
that Muhammad's teachings are themselves reflecting the unchanging Sun of

Truth to a degree
that humanity was able to comprehend, and that this process of progressive divine revelation
would continue throughout ages of the future to gradually enlighten humanity in an ever
increasing measure in order to meet the changing needs of mankind’s spiritual and intellectual
evolution.
And may it not also be true that the changing phases of the moon are an apt symbol for the
cycles of religions and of the civilizations they bring forth. A tentative, almost imperceptible
beginning slowly gains strength and momentum until it reaches the full zenith of its splendor.
This period is followed by a gradual weakening and subsequent decline, until there is but a
vestige left of its former glory. Then, as the world lies in darkness, hope stirs and expectations
grow for the cycle to be renewed.

S?rá 55, verse 5
S?rá 21, verse 33
S?rá 39, verse 5
S?rá 16, verse 12
S?rá 35, verse 13

Having created the world and all that liveth
and moveth therein, He, through the direct
operation of His unconstrained and sovereign
Will, chose to confer upon man the unique
distinction and capacity to know Him and to
love Him -- a capacity that must needs be
regarded as the generating impulse and the
primary purpose underlying the whole of
creation. Upon the inmost reality of each and
every created thing He hath shed the light of
one of His names and made it the recipient of
the glory of one of His attributes. Upon the
reality of man, however, He hath focused the
radiance of all His names and attributes, and
made it the mirror of His own Self. Alone of all
created things man hath been singled out for so
great a favor, so enduring a bounty.
Bahá’u’lláh ? Gleanings, p. 65

umanity is creation’s crown and ultimate purpose. It magically appeared when near the
edge of our galaxy an average solar system gave birth to a tiny planet that

would in time
provide a perfect habitat for our species, and over a period of millions of years allow it to evolve
to its present condition. This breathtaking process has made our race so exceedingly rare in both
terms of time as well as space as to make a simple comparison with earthly gems downright
frivolous.

The human being is the pinnacle of life's grand pyramid whose building blocks are the
timeless atoms that are present throughout the universe. Below man, in ascending order, life is
layered into Mineral, Vegetable and Animal existence. It seems significant that the Bahá'í
writings refer to them as Kingdoms. This implies that they are ruled by a King who governs all
creation. In an infinite variety of manifestations, each Kingdom exhibits its very own degrees of
perfection.

The Mineral Kingdom excels in the cohesion and wedlock of its atoms to form a rich variety
of substances; in the mechanics of the heavens; in the power of the sun; and in the flow of water
and air.

Despite its humble nature, it is the very basis of all higher life forms. The Vegetable
Kingdom has the additional endowments of transforming inorganic into organic existence, as well
as growth, reproduction and inheritance. The Animal Kingdom has all of these attributes and in
addition it possesses the faculty of movement and sensory perception.

Chapter 24 will take a closer look at these kingdoms and their particular levels of perfection.

The ongoing interchange of their atoms is proof of their collaboration and interdependence where
the higher kingdoms cannot function without the support of the lower realms. Increasingly more
complex and refined, they all end up providing the means for human existence.

It is the human being at the top of life's pyramid who alone has the capacity to inquire into
the mysteries of life, to discover the verities of the universe and thereby to dimly discern the
wisdom and intelligence behind all phenomena. This intelligence has been around all along and
has made things happen long before we arrived and began to ponder the possibility of its
presence. As latecomers to life's stage, we can only worship the source of

this handiwork, but we
shall never be able to explain the genius behind our own creation.
So perfect and comprehensive is His creation that no mind nor heart, however keen
or pure, can ever grasp the nature of the most insignificant of His creatures; much less
fathom the mystery of Him Who is the Day Star of Truth, Who is the invisible and
unknowable Essence.55
Bahá'u'lláh alludes to earth's exclusive status when He writes:
Great is thy blessedness, O earth, for thou hast been made the footstool of thy God,

Bahá'u'lláh ? Gleanings, p.62

and hast been chosen as the seat of His mighty throne.56
However, He also informs us in the same book on page 163:
Know thou that every fixed star hath its own planets, and every planet its own creatures, whose number no man can compute.
These statements seem to contradict each other, but only when one defines 'creatures' in a narrow
sense and also takes a narrow view of evolution. As explained on the previous page, the mineral
kingdom, though not considered a live creature, is nevertheless very much part of creation. In
fact, all higher life forms could not exist without it. As to the present conditions of celestial
bodies, these are but a snapshot of time's infinity. Earth may at present offer the only habitat for
man in the solar system, but there may have been epochs, eons past, when other globes served as
God's footstool, or when in epochs, eons in the future, He may choose another celestial body as
His mighty throne.
To appreciate the omnipresence of evolutionary change, it should be remembered that Earth
itself was an impossible environment for life during several billion years after our planet formed.
For the first billion years it was enveloped in fiery violence. Like a celestial vacuum cleaner its
gravity sucked up huge chunks of debris, remnants of the formation of the solar system. The
intense bombardment turned earth into a highly radioactive furnace. During the next three billion
years bacterial life forms appeared and slowly developed into more complex organisms whose
metabolic activity changed earth's gaseous envelope from a deadly mix of nitrogen and carbon

dioxide into a life-sustaining atmosphere where today oxygen is over 20% and carbon dioxide
under 1 ‰ of volume.
Only then, some 700 million years ago, was the required chemical balance established to
allow the evolution of plants and animals. It then took nearly another 700 million years for man to
appear. Yet, throughout this almost endless and often violent process it was God’s Will all
along to fashion earth as “the seat of His mighty throne.”
From among all created things He has singled out for His special favor the pure, the
gem-like reality of man, and invested it with a unique capacity of knowing Him and
reflecting the greatness of His glory.57
When measured by our own shortsighted yardstick of time and space, this gem called man,
like any other gem, is not omnipresent, but extremely rare both in terms of traversed space and
elapsed time. Man is not found on each and every celestial body just as he does not inhabit the
ocean depths or every single square kilometer of the planet’s surface. Nor has he always been
present. It took billions of years for earth to develop its life-sustaining environment. Physical
conditions must be just right for man’s creation and survival. Mere absence of these conditions
does not invalidate creation’s purpose.
This terrestrial globe in its present form did not come into existence all at once, but
the universal existence gradually passed through different phases until it became
adorned with its present perfection.58

Bahá’u’lláh ? Gleanings, p.30
Bahá’u’lláh ? Gleanings, p.77
‘Abdu’l-Bahá ? Some Answered Questions, Ch. 47

Just as this planet, its chemistry, plants, and animals have evolved over long periods, so has
the human species, replacing fin and claw with hand and tongue, and raw brawn with the greater
endowment of brains. The nine-month period when the individual develops inside mother’s
womb could be compared to a time-lapse development of the species as a whole. Evolution’s
master plan lies hidden in the seed. Even at his origin man was equal to his destiny. ‘Abdu’l-Bahá

writes:
It is evident and confirmed that the development and growth of man on this earth,
until he reached his present perfection, resembled the growth and development of the
embryo in the womb of the mother.59
Man, from the beginning of his existence in the matrix of the world, is a distinct
species ... and has gradually evolved from one form to another.60

The time when our race first appeared on earth and the chronology of its evolution remain an
anthropological puzzle. It is difficult to arrive at definite answers due to the scarcity of human
fossil finds. The oldest date back some four million years. It may be significant that the Puranas
of Hindu scripture mention four ages of the earth called Yugas that make up a Mahayuga or Great
Age of 4,320,000* years, coming close to current estimates of the beginnings of our race. This
length of time has also a startling communality with other time frames and dimensions that are
marked on these pages by an asterisk.
The Puranas measure time in Divine Years of 360* days. Each of those ‘days’, suggestive of
a single degree of earth’s 360* degree annual orbit around the sun, symbolizes one year of the
mortals. Twelve thousand of such Divine Years that make up the Mahayuga or Great Age,
therefore equal 4,320,000* earth years.
The Yugas whose lengths successively decrease by 1,200 Divine Years, equal to 432,000*
earth years, seem to parallel different stages of human evolution as they are currently theorized by
anthropologists.
The Yugas are, starting close to 4,000,000 years before our time;
Krta Yuga = 4800 Divine Years = 1,728,000* earth years ? a time span associated with socalled hominids;
Treta Yuga = 3,600 Divine Years = 1,296,000* earth years ? a period where traces of the
early genus homo are found;
Dvapara Yuga = 2,400 Divine Years = 864,000* earth years archaic homo sapiens, Neandertals, homo sapiens sapiens.
Kali Yuga = 1,200 Divine Years = 432,000* earth years -- our own age beginning 3102 B.C.,
some 5,100 years ago. It will last for another 426,900 years. According to Hindu scripture, “In the

Kali Yuga shall decay flourish until humanity approaches annihilation."
At the end of each Mahayuga with its 4,320,000* years, physical humanity according to
Hindu scripture disappears and will after a period of quiescence be re-created.
(Note the last quotation on
p. 54)

Some Answered Questions, p. 183
Some Answered Questions, p.194

Two thousand Mahayugas comprise a Kalpa. It constitutes a basic cosmic cycle of 8,640,000,000* earth years. By this count earth may have arrived at the half-way point of its
existence as a living planet.
It is striking that all of the above-marked* time periods are without exception multiples of 72,
2160 and 4320 years, time frames that are linked to the precessional movement of earth's axis.
Abdu'l-Bahá's reference on page 83 to "cycles...whether for the heavens or for men..." may
therefore hint at an as yet unknown inter- relationship between earth's own rhythms and human
evolution.

One of the most puzzling circumstances is that there are no reliable records of man's long
history on earth. The significance of what presents itself to our inquiry often goes unrecognized
when the past is interpreted to fit accepted doctrine in faithful adherence to a scholarly status quo.
Its jealous guardians, just as it has been the case in the pursuit of physical sciences, will reject any
suggestion that current theories could be flawed. When one considers that we are dealing with an
intelligent, progressive being, it is extraordinary that historic knowledge of our ancestors should
only go back to the end of the last ice age, which is a scant 10,000 years ago. But even then the
records are shrouded in legend and conjecture. Nothing definite is known until we reach a period
roughly 4000 B.C., which is only 'yesterday' in geological terms. The academic consensus,
broadly speaking, is this:
A few million years ago humanity somehow managed to detach itself from its ape-like
ancestry. It continued in a primitive state until recent times. 'True civilization' sprang up
roundabout 4000 B.C. in the fertile regions of the Middle East, emerging 3000

B.C. as the earliest
Egyptian civilization, followed by those of the Indus Valley and China. Some 1500 years later it
began to blossom quite independently in the Americas. From then on civilization progressed to its
present high form. Compared to ours, ancient civilizations and their works were primitive.
This simplistic view is just as unenlightened and somewhat arrogant as was the earlier notion
that the world was flat and the center of the universe. Today's view of ancient history continues
with the same false sense of superiority, and thus presents a perfect alibi for beastly behavior. The
grotesque misconception of humanity's pedigree is far more harmful than is the desire to strut
about the world's stage like superman, because it perpetuates the myth that our moral
shortcomings, while not to be condoned altogether, are, nevertheless, something to be taken in
stride, since underneath civilization's paper thin veneer there always lurks the former animal.
However, the teachings of Bahá'u'lláh demolish both myth and comfortable alibi:
"...from the beginning of his existence in the matrix of the world man is a distinct
species..."
The archaic notion, therefore, that somewhere along the way the human soul was deposited
into a chosen line of apes which subsequently climbed off trees and began to walk upright, is
nothing but a fable. When the soul of man was first called into earthly existence, it did not have to
go searching for a suitable animal body to find a home, almost like a hermit crab in search for an
empty shell. It fashioned its own temple, the human body.

As regards the fog of amnesia that still shrouds the past, recent discoveries have helped to lift
it. In 1929, at Constantinople's old Imperial Palace, there was rediscovered an ancient map that
had been drawn on a gazelle skin by Admiral Piri Re'is of the Ottoman Empire. It was dated
1513, just 21 years after the first voyage of Columbus. While hard to believe, it shows the
Atlantic coasts of both Africa and South America, and part of Antarctica, a continent which was
not discovered until three centuries later in 1818, and not fully mapped until

1920.
The far greater mystery is that it shows Antarctica partially ice-free with mountain ranges and rivers, a condition going back at least to the end of the Ice Age in the northern hemisphere.
Similar detailed maps of Antarctica were drawn in 1531 by Oronteus Finnaeus (Oronce Fine, the French geographer) and by Gerard Kremer, a Flemish cartographer. Kremer, known as Gerardus Mercator, became the most famous cartographer of the 16th century. His projections are still in use today. All three map makers acknowledged that they had referred to very ancient source maps that are believed to have been originally copied at Alexandria's great library before it was put to the torch by the Romans in 272 A.D. These 'prehistoric' records indicate an advanced knowledge of global geography and spherical trigonometry. They are definitely not the work of primitive cave dwellers.

Admiral Piri Re'is Oronteus Finnaeus

Mercator Hipparchos

The second stunning discovery concerns ancient knowledge about the precession of the equinoxes. As the sun rises at spring equinox -- celebrated in ancient Persia as Naw-Rúz or New Day -- against the backdrop of the stars, this background picture changes ever so slightly with each passing year, until the sun has migrated through all twelve signs of the zodiac. It takes no less than 25,776 years to complete this grand cycle that is caused by the slow wobble of earth's tilted axis in a clockwise direction opposite to that of earth's spin. To calculate this exceedingly slow movement required many years of record keeping and a high degree of mathematical knowledge.
History teaches that precession was first discovered by the Greek scholar Hipparchos who died 127 B.C. on the island of Rhodes. He had compared his own careful observations with those by Timocharis of Alexandria made 150 years earlier, and with even much older Babylonian records. He came up with a minuscule precessional change of one degree of arc for every 80

years, or 28,800 years for the completion of an entire cycle. Modern astronomy has refined these numbers to 71.6 years and 25,776 years respectively. Hipparchos, therefore, was 3,000 years off the mark for the complete precessional cycle, but this does not in any way diminish the great achievement of his discovery.

What is astounding, however, is that ancient texts and structures all over the world ascribe special significance to the numbers 72, 2160, and 25920, the years it takes for the equinoxes to precess by one degree, by 30 degrees through a single house of the zodiac, and through the entire cycle. This figure of 25,920 is just 144 years (0.5%) more than the actual value due to the rounding of 71.6 to 72. This was probably necessary in order to express the number 72 in narrations and symbolisms. Java's famous Borobudur Temple, for example, has 72 bell-shaped stupas, instead of an impossible 71.6.

Wherever we look, we find these numbers repeated over and over again in sacred texts and temple structures all over the world like an ancient global legacy. They are embedded in the Osiris Myth of Egypt's Pyramid texts (2450 B.C.). They are woven into the sagas of the Norse, mentioned in records by Babylon's historian Berossus (3rd century B.C.), they appear in the myths of the Maya, are symbolized in the temple complex of Angkor in Kampuchea and are in Vedic and Chinese legend.

On page 96 we find the precessional value of 2160 doubled in the number of 4,320 ancient books of knowledge kept at China's Imperial library. More startling, on page 95 we shall find the

value of 43,200 embedded in the scale of the Great Pyramid on Egypt's Giza plateau.

All of these ancient texts and structures point collectively to a time of even greater antiquity.

It seems as though for some as yet unknown reason the astronomers and sages of a very remote past considered their knowledge of precession sufficiently important to be passed down to the unborn generations of a far distant future. At least in this department they were well ahead of Hipparchos and probably just as well informed as humanity of the 20th century.

All this leaves us facing a certain dilemma. To admit to the existence of a much earlier high civilization is also to admit to its demise. Aside from the humbling thought that we may not be quite as unique as we had always assumed, the idea is sobering. If a great civilization of the past can simply disappear, so could ours.

Viewed from whichever angle, does this inquiry really make all that much difference to our future prospects? Perhaps it does, because it rids us of a narrow notion that our knowledge came first and our attainments must surely be the crowning finale. We should instead be reminded that we are neither the center of the universe of space, nor the center of the universe of achievement. This wider perspective will open our minds to as yet unimagined future insights and discoveries.

In the Bahá'í writings Bahá'u'lláh Himself always refers to the Manifestations of God within the Adamic cycle, the religious cycle that started with Adam. He makes no mention of any of God's Messengers of the dim and distant past, but assures us:

> Know thou that the absence of any reference to them is no proof that they did not actually exist… That the names of some of them are forgotten and the records of their lives lost is to be attributed to the disturbances and changes that have overtaken the world... Mention has been made in certain books of a deluge which caused all that existed on earth...to be destroyed. Moreover, many Cataclysms have occurred which have effaced the traces of many events.61

'Abdu'l-Bahá explains in Ch. XLI of Some Answered Questions:

> For the whole universe, whether for the heavens or for men, there are cycles of great events, of important facts and occurrences. When a cycle is ended, a new cycle begins, and the old one, on account of the great events which take place, is completely forgotten, and not a trace or record of it will remain. As you see, we have no records of twenty thousand years ago, although ... life on earth is very ancient. It is not one hundred thousand, or two hundred thousand, or one million or two million years old; it is very

ancient, and the ancient records and traces are entirely obliterated.
The cataclysms mentioned by Bahá'u'lláh, and great events, of which at least one may have occurred within the last twenty thousand years, as implied in the previous utterance by 'Abdu'l-Bahá, do not appear to be slow-moving and gradual, but sudden and dramatic to obliterate all traces of history. Another quote by 'Abdu'l-Bahá can be found in O.Z. Whitehead's book entitled Some Early Bahá'is of the West. There, on page 74, Juliet Thompson describes a visit to New York's Museum of Natural History: "The Master looked up at the huge whale suspended from the ceiling. He said with much amusement, 'Fifty Jonahs could have gotten into that whale.' Then the

Gleanings, p. 172-174

guide showed us an exhibition of old Mexican art. The Master said: 'A great similarity between the art of Mexico and Egypt exists because at one time what is now Egypt and Mexico were joined together. A holocaust separated them.'
Regardless whether this remark referred to a geological or cultural breakup, there exist certain similarities between Mexico's Pyramid of the Sun at Teotihuacan and the Great Pyramid in Egypt. Both employ advanced mathematics transcending written language.

The Great Pyramid at Giza

Its Grand Gallery and the Sarcophagus in the King's Chamber

The Pyramid of the Sun at Teotihuacan in today's Mexico

These ancient structures draw our attention to earth's dimensions and to its location in space.
The Great Pyramid's height of 481.39 ft. (146.7 m) is almost exactly the one billionth part of 147,000,000 km, which is earth's solar distance at perihelion. As there are 5280 feet in a mile, its height is by the difference of a mere foot the 43200th part of earth's polar radius of 3949.92 miles.
Its perimeter of 3023.16 ft. is by an 'error' of ¾ of 1 per cent the 43200th part of earth's equator of 24,902.45 miles. With its perimeter representing the equator and its apex earth's pole, the Great Pyramid thus projects the northern hemisphere on four triangular surfaces

in an exact scale
of 1:43200. Apart from this astonishing feat of construction which modern builders would be
hard pressed to duplicate, the scale of 1:43200 again expresses a by now familiar precessional
value that is linked to our planet's own rotational clock.
Both pyramids also incorporate the mathematical value of pi. Pi is 3.141 forever and all time.
History credits Archimedes with pi's discovery, but he lived 287 to 212 B.C., long after the
building of the Great Pyramid whose perimeter divided into twice its height equals pi.
Teotihuacan's pyramid's height of 233.5 ft. stands in a deliberate relationship of 4 pi to its
perimeter of 2932.8 ft.
Since known history has no record of a holocaust as alluded to by 'Abdu'l-Bahá, these works
of great similarity on both sides of the Atlantic hint at a shared source of knowledge of the
remotest past. It certainly goes back much further than any of today's history books.

All over the world legends tell of floods and cataclysmic upheavals in the distant past. More
than 500 deluge legends exist. Dr. Richard Andree, a German anthropologist and geographer, has
studied 86 of these in detail (3 European, 7 African, 20 Asiatic, 10 from Australia and the Pacific,
46 from the Americas). He concluded that 62 were independent from the many Mesopotamian
and Hebrew accounts. Among the first Europeans to visit China, there were scholars who were
allowed into the Imperial library to study 4,320* volumes which were said to contain 'all

knowledge'. This record of ancient traditions told of the consequences when mankind rebelled
against the high gods and the system of the universe fell into disorder:
The planets altered their courses. The sky sank lower toward the north. Sun, moon
and stars changed their motions. The earth fell to pieces and the waters in its bosom
rushed upwards with violence and overflowed the earth.62
An allusion to such an event can also be found in the ancient Emerald Tablets of Hermes:
Deep in Earth's heart…the flower of fire that burns eternally, changing and shifting…. until that great fire changed its direction. Over the world then broke the great

waters, drowning and sinking, changing Earth's balance… some… were… saved from
the rush of the fountains.63
The Hopi (hopitu, 'the peaceful ones') of North America's Southwest, have a legend that
talks about the destruction of three earlier worlds and the dangers facing the fourth world, our
own. It warns in plain language:
The first world was destroyed as a punishment for human misdemeanors by an allconsuming fire that came from above and below. The second world ended when the
terrestrial globe toppled from its axis and everything was covered with ice. The third
world ended in a universal flood. The present world is the fourth. Its fate will depend on
whether or not its inhabitants behave in accordance with the Creator's plans.64
Buddhist texts also link nature's equilibrium to human behavior.
When people are happy and satisfied...good deeds are promoted, virtues are increased... then everyone prospers... the weather and temperature become normal, sun,
moon and stars shine naturally; rains and winds come timely; and all natural calamities
disappear.65

Of all flood legends it is the vivid story of Noah's Ark and its message of divine retribution for the wicked and salvation for those who obeyed God's word that has left the greatest impression on people of Judaic-Christian culture.
Astronaut James Irwin devoted much of his retirement years to a search for Noah's Ark on snow-capped Mount Ararat. Col. Irwin and I met in Ottawa in 1986. Fifteen years earlier he and his fellow astronaut, Col. David Scott, were the seventh and eighth humans to set foot on the Moon.

The Lost Ship of Noah, Chs. Berlitz, W.H. Allen, London, 1989, p. 126
The Emerald Tablets of Thot The Atlantean, Chapter 1
The Book of the Hopi, Penguin, London, 1977
The Teaching of Buddha, p.233, Bukko Dendo Kyokai

Irwin said that it was "a religious experience" he had while exploring the moon on the Apollo
15 mission in July 1971 that moved him to devote the rest of his life to "spreading the good news
of Jesus Christ." He resigned from the Astronaut Corps a year later and became the founding
president of the High Flight Foundation, an inter-denominational evangelical organization based

in Colorado Springs, Colorado. He often spoke of the lunar mission as an epiphany, declaring, “I
felt the power of God as I had never felt it before.”
On two occasions he led expeditions to Mount Ararat in Turkey in search of the Ark. In 1982,
he reached the 16,946-foot summit but fell on the glacier, suffering severe leg and face
lacerations. He had to be carried down on horseback. A year later, he surveyed the summit by
airplane, looking down for possible remains of the Ark, which according to the Book of
Genesis, came to rest on the mountain. “It’s easier to walk on the moon,” he said. “I’ve done all I
possibly can, but the Ark continues to elude us.”
To my sorrow, Jim died in 1991 at the young age of 61, his quest unfulfilled. I had asked him
what he expected would happen if the remnants of Noah’s Ark were ever found. He said it might
persuade people to take the words of the Bible more seriously. However, he agreed that it would
not result in an instant establishment of Peace on Earth.

Mount Ararat

Since then there have been several ambitious and costly expeditions on Mount Ararat. In
1988, the expedition by Dr. Charles Willis surveyed the eastern summit area at 16,500 feet. Willis
surmised that for the ark to survive into the modern era it must be buried high on the mountain in
a stationary ice pack. They were well-equipped with subsurface radar and polar ice drill. The
results of the survey convinced the expedition that the eastern summit held no remains. In 1989
the Aaron/Garbe/Corbin Expedition used a helicopter to do a radar scan of Ararat’s western
summit plateau with equally negative results. In 1990, Dr. Don Shockey’s team searched the
northeast glacier by helicopter, but was not permitted to do a ground search of the target area.

This theory may shock ark believers, but there is probably no ark to be found on Mount
Ararat. In 6,000 years or more, its rotting remnants would have been slowly ground into wood
fiber by shifting masses of ice and the decomposed particles would have been washed down the
mountainside in never-ending cycles of freeze-up and meltdown. There is also a

distinct
possibility that there never was an ark on Ararat in the first place. Only future high definition
sonar, or a melt of Ararat's ice cap through climate change, may put an end to speculation.

The somewhat disrespectful question if there ever really was a physical ark that was
captained by Noah and came to rest on Mount Ararat springs from a number of observations:
The story in all its traditional detail was not written by Noah himself as a personal account or
testimony, let alone as a divine revelation. It was set down by a biblical prophet and, like all Bible
accounts, was intended for the spiritual benefit of distant future generations. At the time these
sacred texts were written, virtually nobody could read or write. Everything was passed on by
word of mouth. This did not change until the 15th century when Gutenberg invented the printing
press. As the world greeted the third millennium, Gutenberg's feat was hailed as "The Invention
of the Second Millennium." At Gutenberg's time people were so starved for information. Within
one year of the invention over 10,000 printing presses sprang up in Europe alone.
Later born generations were now able to read for the first time the account of the Deluge and
Noah's Ark. Naturally, like all things written in the Bible, the story was taken literally. When
'Abdu'l- Bahá enlightens us that "…The divine words are not to be taken according to their outer
meaning… They are not to be taken literally…" it would appear that this may equally apply to the
biblical story of Noah's Flood. By not taking the story literally, one does in no wise lessen its
spiritual significance. On the contrary, instead of being mesmerized by false physical images, one
is free to focus on the message. No wonder, therefore, that a literal interpretation of the account
confronts modern readers with all kinds of conundrums, contradictions and unanswered
questions.

Starting with the Ark itself, it is described as being 300 cubits long, 50 cubits wide and 30
cubits high. Were these measurements God's random demand, or was there, is there, a deeper

meaning? Since God is believed to be all knowing and all wise, one has to conclude that these measurements conceal greater wisdom. How long was one cubit? We need to know the equivalent of a modern unit of measurement to gain an appreciation of size. It is generally accepted that at Noah's time the so-called Royal Cubit applied. It is approximately 21 inches long. In today's measurements, Noah's Ark would therefore have been 525 feet long, 87.5 feet wide and 52 feet tall, enclosing a staggering volume of 2,388,750 cubic feet, or 67,642 cubic meters. It must have taken a forest of mature trees to build this vessel. By today's technological standards its size exceeded the structural integrity of a wooden ship. Still, Noah, despite ridicule and opposition, finished his Ark that approached the size of the 'Titanic' in 120 days! 'Titanic' was 880 feet long with a beam of 92 feet. While all that heavy construction work was in progress,

he also had to organize the gathering and boarding of animals of every known species and lay in huge quantities of foodstuffs to last until the first harvest after the deluge. While believers may say that God can work such miracles, this is one instance where religious belief does not appear to correspond with reason.

Anyone who was able to read the account prior to the 19th century, must have been awed by the Ark's dimensions. There had never been a vessel like it. Only latter-day construction methods using iron and steel made giant ocean liners possible. All this leaves the impression that the story may have been tailored for future generations like ourselves. They would immediately be able to visualize Noah's Ark as it was almost identical in size to our own modern ocean liners.

Considering next that the Ark was intended as a giant lifeboat, certain instructions to Noah seem impractical: "A window shalt thou make to the ark, and in a cubit shalt thou finish it above; and the door of the ark shalt thou set in the side thereof; with lower, second, and third stories shalt thou make it." Granted, modern lifeboats have no windows, but one door and a single window seem claustrophobic for a vessel this size. As to giving a ship of 52 feet in

height only three
stories, each floor would have a ballroom ceiling of 17 feet. Moreover, the lack of bracing floors
would have made it impossible to build a vessel of this size without weakening its entire
structure. All this may point to a hidden meaning that still awaits decryption.

As to any symbolism that may or may not attach to the Ark's dimensions, it should be
pointed out that any metric measurements are meaningless, because the meter is a 19 th century
invention. It is arbitrarily based on the length of a pendulum that produces a one-second beat.
The inch on the other hand is very ancient. It is incorporated in the Great Pyramid, bears a
relationship to the dimensions of our planet, and is said to derive its name from the prophet
Enoch. The Ark's total volume of 2,388,750 cubic feet translates very roughly into
4,127,760,000 cubic inch. Since the sole purpose of the Ark was to save people from drowning,
one could speculate whether this number is intended to foretell that 4 billion souls of a densely
populated future planet shall be saved, while the rest must perish. If at a time of such future
cataclysm the world's population had reached 8 billion, this ratio would bear out the biblical
warning in Mathew: "At an hour we do not suspect the powers of heaven will be shaken… Then
shall two be in the field; the one shall be taken, the other left... Two women shall be grinding at
the mill; the one shall be taken, the other left…"

Some startling dimensions and proportions inside Egypt's Great Pyramid at Giza tend to
further fuel this sort of speculation. The Pyramid's maze of elaborate passageways end up in the
majestic but completely unadorned "King's Chamber." Not at its center as one would expect, but
strangely in a far corner of the room, there stands a lidless sarcophagus. Although believed by
Egyptologists to have contained a Pharaoh's mummy, neither a lid nor its fragments have ever
been found. This massive object is meticulously fashioned out of a single piece of dark chocolatecolored granite containing hard granules of feldspar, quartz and mica, an incredibly dense
material that is resistant to all but the most modern cutting tools. Its outside dimensions measure

89.62 inch long, 38.5 inch wide and 41.31 inch deep. These dimensions add up to a volume of

142,534 cubic inch. The inside dimensions of the sarcophagus are 78.6 inch long, 26.81 inch wide and 34.42 inch deep, a volume of 72,532 cubic inch. Considering the difficulties of achieving a 100% accurate measurement from this ancient block of material, the result is startling. The coffer's inner volume is half of its total size, 50.88 per cent to be exact. This mathematical game may to our sorrow have deeper significance. We are, after all, talking about a sarcophagus and a sarcophagus has but one purpose, namely to bury the dead. And since the Great Pyramid's many encryptions hint at the realities of the physical world [refer to pp. 22-23], the sarcophagus at the end of the road may signify mankind's future fate.

It must have been of truly "biblical proportions." Assuming that earth's basic topography of mountains, plains and ocean basins has not changed much since the days of Noah -- and there is no geological evidence that it has -- Mount Ararat stands out in the entire region like a sore thumb. Except for some lesser peaks in southern Turkey and northern Iran along the southern shore of the Caspian Sea, Ararat is the highest point in a vast area. Any flood, therefore, that drowned the surrounding lands, turning Ararat's summit into a forlorn little island engulfed in raging seas, must have covered the world from the Atlantic Ocean to the Himalayas, from the Alps deep into Africa, not to mention the low-lying plains of northern and eastern Europe. It could not have been some "regional disaster" as is sometimes suggested like "a flooding of the Tigris valley." Not even another popular scenario could have caused the havoc, namely the cataclysmic rupture at the Dardanelles that supposedly exposed a vast fertile plain to the waters of the Mediterranean and in the twinkling of an eye transformed it into today's Black Sea. Noah's Flood, as described in the Bible, had to be much, much bigger than that.
So where did this unimaginable volume of water suddenly come from? And to where could it eventually have receded? There can only be one logical answer: the world's oceans. As we shall

read in the Vedic legends from India, “the ocean rose and submerged everything.” But if it had anything to do with the world’s oceans, which in fact are a single body of water, such a flood must have had global repercussions. The event must have been much bigger than what the story of Noah lets us imagine. The devastation would have had to be so widespread and profound that it would have taken centuries for nature to recover. Since there is a total lack of historical records of such an event, the inundation may have occurred much earlier and would already have been a distant memory at Noah’s time. Unless, of course, Noah lived thousands of years earlier than is commonly assumed.

Did the prophets of old know that this ancient flood had once been visited on mankind as a divine punishment? Did they intend to warn future generations how terrifying God’s wrath can be to punish godless behavior by linking the tale of the flood to the story of Noah who endured constant persecution by unbelievers? Did they deliberately limit their account of the flood to the land of Noah, simply because for thousands of years to come the true nature of our planet would remain unknown and nobody would have grasped the meaning of a cataclysm that had ‘global’ proportions? Finally, did they in a most ingenious way make the many details of their chronicle fit their prophecies and construct a story line for ‘Noah’s Flood’ that had as its sole purpose the encoding of a timeline for the advent of a World Redeemer?

The startling similarities of legends from the Americas, the Middle and Far East, Africa, the Pacific and from the Norse, do not fit our modern world view. They are usually brushed aside as mere fairy tales dating back to a time when man was supposedly still a childlike and helpless creature, lacking our modern tools to take charge of his environment. There is an understandable reluctance to admit to forces well beyond our reach and understanding that could threaten the fruits of civilization. But despite this tendency to decry theories of sudden change as a sensational catastrophism, there are indicators of just that having taken place in the distant past.

Vast herds of Siberian Mammoth were wiped out, quick-frozen in water and mud, before
their carcasses had time to decay. Some were found with undigested buttercups still in their
stomachs. The scene suggested a tidal wave, followed by a sudden deep freeze.
These huge grasseating animals lost their habitat at the end of the ice age
when their world was transformed into
inhospitable tundra. The close of the last ice age saw an enormous mortality of animals in many
parts of the world. There are estimates that as many as 40,000,000 animals perished in North
America alone, including mammoths, mastodons, giant beaver, saber tooth cats, giant sloths,
woolly rhinoceroses, camels and horses. According to Prof. Paul Mayewsky of the University of
New Hampshire, core drillings of Greenland ice indicate that the last ice age ended about 10,000
years ago not in a gradual warming, but in a sudden climate shift that may have taken less than 20
years. (See also Prof. Claussen, p. 94)

Mammoth Tusks protrude from melting Arctic ice

Another riddle is a global preoccupation by ancient civilizations with precision-built stone
structures designed to track the sun's path. We find them in the American Southwest, in Central
and South America, in Egypt, the British Isles, on the Danish island of Bornholm, and in many
other places on earth. Anthropologists say that they were built for sun worship or even to tell
farmers when to plant. This latter explanation seems most unlikely since many such structures
stand in non-farming regions. Besides, any farmer knows when to plant and some of these highly
precise massive structures would have been too far away to confirm the right season. At Machu
Picchu in the Peruvian Andes tourists puzzle over a stone pillar called Intihuatana, The Sun's
Hitching Post. Priests are said to have attached to it a mystic cord to prevent the sun from
straying off its course. Why this strange anxiety. Why did people on all continents feel a similar
need to raise such ambitious structures, unless they point to a global event that was once

witnessed everywhere on earth. Interpreted as structures for sun worship, they may indeed have

been used to pray to the sun, but rather to stay its course after it underwent a disastrous shift. At the same time it may have served as a kind of high-tech early warning system against a renewed deviation of the courses of sun and moon, a deviation that was long remembered to have triggered worldwide destruction and upheaval.

Today's scientists much prefer to view 'terra firma' as being in a permanent state of safe equilibrium and quiet repose where change is not accepted to arrive with cataclysmic suddenness, but where any geologic movement is presumed to be slow and almost unnoticeable. Earth's continental plates are being pushed apart just a few centimeters each year by magma extruded along fracture lines on the ocean floors. This 'Continental Drift', or plate tectonics, was first deduced by the German geologist Alfred Wegener in 1915, but confirmed only in the 1960's. It alters earth's face over time spans of millions of years. The stresses of its creeping motion will find periodic release in earthquakes, but none of this movement can account for sudden climate and sea changes of the distant past, for an obliteration of past history, let alone for a holocaust which according to 'Abdu'l-Bahá once separated Mexico from Egypt.

While the answer to this puzzle is not yet known, it may have little to do with meteor impacts or the popular speculation of a shifting axis. As we read earlier, earth's axis appears to have always retained its vital stability. The answer may instead lurk deep inside earth's interior, a system of concentric shells that act as heat exchange and electric generator. It is perhaps our planet's least understood feature.

Use zoom feature when viewing this image

Earth's crust or lithosphere, which carries the continents and cradles in its bosom the ocean basins, stretches like a skin over the molten interior. With earth's diameter at 7,926 miles (12,756 km), the crust is only 2-50 miles (3-80 km) thick, on average less than half a per cent of earth's diameter. With earth likened to a beach ball 4 ft. (1.22 m) in diameter, the skin would be a mere 5 millimeters or one fifth of an inch thick. Earth has been compared to a fragile ceramic sphere

filled with hot molasses, spinning on its axis at 1,000 miles (1,600 km) p/hour, while racing around the sun at 18.5 miles (30 km) p/second, faster than any bullet. The thin crust adheres to an upper and lower mantle, 1,800 miles (2,900 km) deep. The mantle rides on a liquid outer core about 1,400 miles (2,200 km) deep and composed of nickel and iron. It surrounds a solid inner core of iron that is only 1,500 miles across, slightly smaller than the moon, but almost as hot as the sun's surface. Earth's rotation and heat convection are causing powerful tides within the liquid outer core, believed to be the dynamo that generates the electricity for earth's magnetic field.

The inner core, thought to be under a pressure 3.6 million times that at the surface, is seen as a gyro that anchors earth's spin axis.

But nothing is as stable and permanent as it may seem. In the summer of 2002 the Journal of Science reported: "A mysterious shift in Earth's gravity. Since 1997, Earth's gravitational field has been flattening out at the poles and bulging out at the equator and scientists don't know why. Earth's gravity field suddenly shifted gears and began getting flatter, reversing a course of centuries during which the planet and its gravity field grew rounder each year. Earth has never been completely spherical. It has a 0.3 percent bulge at the equator, partly as a result of the planet's rotational forces. This slight bulge seems to be on the increase."

"Sometime around 1998, something began to make the Earth's gravity field flatter," according to Christopher Cox of Raytheon Information Technology and Scientific Services. Some movement of mass must be making the gravity field flatter. This subtle change is only revealed by sensitive satellite measurements. But the shift is significant. According to Cox the effect is twice as large as the post-glacial rebound of arctic regions in terms of their effect on earth's gravitational field, and it is increasing in the opposite direction. "Whatever it is, it's big. …You have material moving inside," Cox explained. He and his colleague, Benjamin Chao of Goddard, were at first baffled by the sudden reversal and

flattening of the gravity field. They thought that ice melting at the poles and raising the overall sea level could be the culprit. Calculations showed, however, that “you would have to drop a 10-by-10-by-5 kilometer cube of ice into the ocean every year for the past five years.” Separate measurements of sea surface height from NASA’s TOPEX/Poseidon mission do not support the scenario of rising sea levels. Material in Earth’s crust cannot cause it either. The brittle crust does not move from the poles down to the equator. Molten rock flow in Earth’s core might be to blame, but supporting data are still lacking. So what then is the cause of this mystery?

There are theories that internal tides, perhaps a reversal of the magnetic field, could throw the centrifugal forces of earth’s rotation out of balance. Combined with gravitational pulls by sun, moon and sister planets it may even suffice to upset the planet’s internal equilibrium and cause a sudden movement of the entire shell across the liquid outer core. This would change the alignments of all continents.

Einstein called this phenomenon an earth-crust displacement in a foreword he wrote to a book by Charles Hutchins Hapgood entitled Earth’s Shifting Crust (Pantheon Books 1958). Hapgood, a professor of anthropology and history of science, was first to propound this theory. Like continental drift, which was discredited for half a century before it was finally accepted by science, it likewise suggests a movement of earth’s crust, except that it is triggered by an altogether different agent and at much greater depth. It is not slow and ongoing, but sudden and extremely rare. It would occur when earth’s outer shell is temporarily cast adrift on the planet’s rotating inner core before regaining its equilibrium and settling into a new position. It would cause massive earthquakes, eruptions and -- depending on the suddenness of its onset -- tempests and tidal waves when inertia forces air and oceans to continue to move at a speed and in the direction of earth’s original surface motion around the spin axis. It would temporarily slow, if not stop, sun’s movement across the sky, alter the celestial alignments of continents, change the motions of sun, moon and stars -- not to mention today’s

communications satellites -- in relation to any given point on earth. It would also create the illusion of ‘falling stars’, a ‘sinking sky’, or of ‘the globe toppling from its axis.’ Despite its many severe effects it would not affect earth’s obliquity, the planet’s vital axle tilt that is responsible for seasonal exposures to sunlight and for global conditions overall. However, it could bring climate change to many regions with all the dislocations this would entail.

According to Prof. Martin Claussen and his team at the Potsdam (Berlin) Institute for Climate Change, a sudden shift in the world’s climate occurred about 10,000 years ago. Their computer model suggests that around that time the globe underwent one of its periodic changes in surface orientation with profound effects on weather and vegetation. Within a short time the lush and fertile regions of the Sahara and the Arabian Peninsula were transformed into a parched desert and brought to an end flourishing ancient civilizations. Prof. Claussen predicts that such periodic changes will continue.

Scientific theories aside, we have read that “great events” occur at the end of universal cycles when man’s religion and ethics would presumably not stand at a zenith, but rather be in a state of decay. Bahá’u’lláh definitely links physical trials to the human condition of spiritual disobedience:

O heedless ones! Though the wonders of My mercy have encompassed all created things, both visible and invisible, and though the revelation of My grace and bounty have permeated every atom of the universe, yet the rod with which I can chastise the wicked is grievous, and the fierceness of My anger against them terrible.66

O ye peoples of the world! Know, verily, that an unforeseen calamity followeth you, and grievous retribution awaiteth you. Think not that which ye have committed hath been effaced in My sight. By My beauty! All your doings hath My pen graven with open characters upon tablets of chrysolite.67

The sudden breakthroughs of our time after countless centuries of relative quiescence in scientific progress, should be recognized as the physical precursors of spiritual renewal. They have delivered into our hands the tools to turn our planet first into a global village, then to establish a planetary order. Instead, we search for traces of water on Moon and

Mars while
despoiling earth’s living oceans, and we explore for extra-terrestrial life
while improving our

Gleanings, p.325
Hidden Words, Persian No. 63

latest killing machines and allowing millions of fellow human beings to live in ignorance and to
face starvation.
Should inventions entrap man in solely materialistic pursuits and make him neglect his true
mandate, the fruits of science will become a dangerously precocious possession in his hands and
the glittering infrastructure to which the world has barely become accustomed could, to our
sorrow, be temporarily suspended until we find our way. In the end, this may shield the human
race from its own worst follies.
Sobered up, his material circumstances considerably reduced, man may yet learn to be less
self-righteous and more God-fearing, less arrogant and more humble. Exchanging incessant
conflict for collaboration, less pre-occupied with power, profit and pleasure, he may yet discover
the larger purpose of his existence and seek an honest and modest life style where much greater
emphasis is placed on education and refinement, individual responsibility, initiative, and
inventiveness. It would seem certain that an all-powerful, loving Creator will never let the
perversity of a rebellious race place life on earth in jeopardy and put an end to His creation that
has been evolving over millions of years. This ultimate blasphemy would deny the gift of life to
countless unborn generations and frustrate the very purpose of creation, namely the perfection of
man. With spaceship earth in grave danger, its frightened occupants would for once forget their
petty rivalries and turn towards their common Maker for deliverance.
‘Abdu’l-Bahá explains further:
There were many universal cycles preceding this one in which we are living. They
were consummated, completed and their traces obliterated. The divine and creative
purpose in them was the evolution of spiritual man, just as it is in this cycle. The circle of
existence is the same circle; it returns. The tree of life has ever borne the

same heavenly
fruit.68
This explanation clarifies that human evolution is subdivided into recurring, self-contained
cycles. They neither make reference to previous cycles, nor do they build on earlier knowledge,
or make comparisons with laws and standards that prevailed in the distant past. It seems that the
dawn of every universal cycle opens up a new learning process for humanity. It brings its unique
challenges to those called into being in their particular season of existence.
For our own season it is decreed that old homo sapiens, the man of know-how and sagacity,
be transformed into a homo sentiens, a being of much deeper empathy, spirituality, perception
and consciousness. It signals a new beginning for mankind and calls for a totally new kind of
world order, a commonwealth of all people founded on justice, unity and peace. Since the
fulfillment of this ancient promise cannot tolerate any further delay without dire consequences for
humanity, all who are alive today are challenged to make this promise a reality. Warnings uttered
by Bahá'u'lláh are without ambiguity:
If God should chastise men for their perverse doings, He would not leave upon the
earth a moving thing! But to an appointed time doth He respite them.69
We have a fixed time for you, O peoples. If ye fail, at the appointed hour, to turn
towards God, He, verily, will lay violent hold on you... 70
... when the appointed hour is come, there shall suddenly appear that which will
'Abdu'l-Bahá, Promulgation of Universal Peace, p. 220
Kitab-i-Iquán, p. 170
Gleanings, p. 214

cause the limbs of mankind to quake...71
I swear by God! But for the divine Decree, and the inscrutable dispensation of
Providence, the earth itself would have utterly destroyed all this people! He will,
however, respite them until the appointed time of a known day.72
The earth itself, it would appear, our beautiful fragile home planet, may know cycles whose
timing and mechanism are not yet understood but which periodically could bring utter destruction
that only the hand of omnipotence can stay or mitigate to preserve a divine civilization where

humanity behaves in accordance with the Creator’s plans.
Let our own and future generations heed these warnings and avert impending pain and
privation by dedicating their lives to the pressing and noble task to which they were born.

Gleanings, Ch. LXI
Kitab-i-Iquán, p. 172

O Son of Man! Wert thou to speed through the immensity
of space and traverse the expanse of heaven, yet thou
wouldst find no rest save in submission to Our command
and humbleness before Our face.

Bahá’u’lláh ? Hidden Words, Arab. 40

e are told that Bahá’u’lláh revealed the Hidden Words in the 1860’s while walking along
the banks of the river Tigris at Baghdad. Fifty years before they saw their first airplane
and almost a century before the launch of the first space rocket, people must have been puzzled
by these words whose implications were then still concealed. When seen as prophecy they
seemed to promise future breakthroughs by alluding to a time when man had mastered the
problems of flight and space travel. But for our age this verse attains deeper meaning.
The great preoccupation of today’s society is speed and more speed to fabricate, to process,
and to move from A to B, all with the objective to conquer the barriers of time and space. This
quest for swifter travel and a desire for instant achievement of our objectives is frequently driven
by a restless discontent. When it comes to the exploration of space, there is hope that it will rid us
of the claustrophobic angst that humanity could be all alone, left to its own devices like a
shipwrecked party on a forlorn island. It offers a false optimism of escape from earthly problems,
that once the treasures of our globe are depleted we may go right ahead and exploit other planets,
and that eventual contact with an extra-terrestrial intelligence shall confer vast new knowledge to
guarantee us happiness and prosperity for all time.
Regardless of what future course human evolution may take, the above quote puts a damper
on all such expectations. No matter where, how fast, or how far we may travel, we shall ‘find no

rest' unless we pay attention to our inner life. There is a clear implication that in the end our restless search of the material realm will leave us unfulfilled.

In chapters eight and nine we have examined the problems of time and distance that appear to stand in the way of coming face to face with a cosmic counterpart. We shall pursue this topic a little further without getting lost in idle speculation, mindful of the counsel above. Like any unresolved question, this one brings different answers: There is extraterrestrial life; there is not; we do not know and shouldn't waste time over it, because the whole subject matter won't help us one bit to resolve our problems here on earth.

I am inclined to opt for the last opinion, but have decided nevertheless to give this topic its own chapter, because it is, after all, an intriguing part of the greater enigma that faces us.

Lack of knowledge always causes speculation and gives rise to preconceived ideas. They are in turn the worst enemies of any unbiased inquiry. This question in particular has been so sensationalized and exploited that some people would rather avoid the topic. Outright charlatans aside, serious E.T. proponents will give extra-terrestrials credit for many unexplained phenomena, while their 'down-to-earth' opponents are equally diligent to find logical explanations. Minds are firmly made up in both camps and sometimes they are even inclined to tamper with fact in an effort to derail any investigation that may cast doubt on their own theories.

While all such theories lie well outside the purview of this study, the UFO phenomenon deserves mention. Unidentified Flying Objects, descriptively called 'Flying Saucers', were first reported right after the end of World War II. Had they appeared during the war, intelligence agencies on both sides would have worked overtime to pin down this unknown 'secret weapon' of the enemy. One can imagine the panic they would have caused by their sudden appearance over American cities, presumably safe from incursion.

In the late forties and early fifties many of the sightings were in the southwestern U.S.A., but flying saucers gradually became a world-wide phenomenon of similar characteristics which need

no elaboration. Thousands of people all over the world risked ridicule to report their observations.
Among them were law enforcement officers, airline captains, radar observers and even fighter pilots. With no personal ax to grind it might have been a lot more prudent for them to just keep quiet. Official explanations ranged from weather balloons to heat inversions and high flying birds. Only much later did it become known that both U.S. Presidents Truman and Eisenhower were given regular ‘Eyes Only’ reports on UFO’s by their science advisors.
The determination was should UFO’s be real objects as they at least appeared to be since they had repeatedly shown on tracking radar, then they probably were of extra-terrestrial origin.
Assuming that they were no global delusion, it would be logical to ask what were they, where did they come from and what brought them here.
Distasteful as it may be to admit, such assumed visits would represent an intelligence and motive surpassing our own, since there was never an attempt to interfere in humanity’s affairs. It rather looked like circumspect observation avoiding panic, just causing bafflement and debate.
Last question would be their origin. If our own civilization were to mount similar missions, everybody would cry for ‘return on investment.’ However, these cosmic visitors, should they really exist, seem to march to a different drummer. Still, planet Earth and humanity would have to be of great interest to them and this for probably two reasons, we are either a rarity among the whirl of stars and planets, or we need to be watched.

In October 1992, 500 years to the month after the arrival of Columbus in the New World, NASA launched its Search for Extraterrestrial Intelligence. SETI focuses its search on 800 stars similar to our own sun which may therefore have planets. Another program runs a simultaneous scan of a billion radio channels. So far we have met only profound silence. Perhaps signals are trapped in the magnetic fields of suns, perhaps there are signals which are more advanced than radio, or at this moment in time we are indeed alone within the manageable environs of the

cosmos.
Scientists only try to receive, not to send signals, since any extraterrestrials already in communication with each other are thought to use methods farther advanced than ours. But when we remember our own elaborate precautions that went with Neil Armstrong's 'first small step' on the moon, we can imagine the extreme vigilance with which an outside civilization would approach the human race. Cynics say best proof of extraterrestrials is that they avoid contact.

Whenever he went exploring the 'outside' world, man has always assumed that what he was about to encounter would be 'foreign' and 'alien', certainly much inferior to himself, something to be feared and loathed. First encounters between different tribes and races have always brought bloodshed. Why would an imagined close encounter with extraterrestrials be any different, especially when in books and movies so-called 'aliens' are always portrayed as hideous monsters.
Are we not monsters ourselves? Any long-term observations of humanity would have revealed that here are creatures who are still infected with a bacillus to self-destruct. Instead of a universal recognition of the intelligence and power that has created them and the world they inhabit, their religions and ethics are either non-existent or corrupted and in conflict. The result of this spiritual void is that their sciences and much of their industry are focused on the development of more efficient weapons of destruction. In short, still an immature, self-righteous, irresponsible and unpredictable species, pathetically unable to live in peace among themselves and probably ill prepared to meet peacefully with extraterrestrial visitors.

The thought of an extraterrestrial intervention may horrify some and intrigue others. There is ample practical reason for such an encounter not to take place. It must be assumed that a more advanced civilization would discover the one that is less advanced and not the other way around.
Should therefore humanity be suddenly introduced to far advanced technologies, everything we possess today would become obsolete overnight by hundreds or even thousands of years of

normal development. Education would suffer a shock, factories would grind to a halt and much
of our mortgaged infrastructure would be scrapped long before it had become amortized. But a far
greater concern would be that this sudden possession of a far advanced technology would be
employed in man's favorite pastime of ongoing power struggle and may only hasten our doom.
Clearly, the time for contact, even if it were possible, has not yet arrived.
The real importance of this idle guessing game is not whether man considers himself ready
for an encounter, but what lies within creation's wisdom. The writings of Bahá'u'lláh stress that
human progress springs from the seminal teachings revealed by the founders of religions and that
it is conditional on man's obedience to divine laws. Nowhere is there any mention we should look
for intelligence from outer space to help us solve our problems.
Some popular books stir optimism for extraterrestrials.
They vividly explain how certain pre-historic sites were built under the guidance of visiting
'Gods' from outer space. They argue that our 'primitive' ancestors would not have been able to
put up those colossal, precision-built structures that often reveal a modern-day knowledge of
earth and heavens. Such claims fix our expectations on the possibility of once again getting help
from benevolent star travelers. It diverts our attention from a far more plausible likelihood that
those 'Gods' of pre-history were in reality the founders of great religions. According to
Bahá'u'lláh they have always been the fountainhead of human knowledge and progress through
the ages. Both for the sciences as well as in the realm of ethics, it remains a basic tenet that "all
men have been created to carry forward an ever-advancing civilization" (Bahá'u'lláh, Gleanings
p. 215) by heeding the word of God and not by embarking on a frantic but fruitless search to
find salvation in outer space. Whether it will ever come to an encounter between earthly
humanity and one on another planet belongs into the realm of conjecture and should not consume
our energies. But it is conceivable that once humanity has discovered peace within itself and has

established harmony and perfection in every aspect of its existence, a further

stage of
development could be fruitful intercourse with other civilizations, instead of spreading the
contagion of our shortcomings to other worlds. Such a rendezvous would challenge both parties
to expand their feelings of spiritual solidarity beyond their own planet. But in order to
maintain life's precious incentive to explore, to invent and to improve all things, both
civilizations may first have attained independent mastery of their spiritual and physical worlds
quite uninfluenced by each other. Only then could one envisage a coming together of
kindred beings in a great new enterprise bridging time and space to achieve a still higher
universal awareness and to establish a supra-planetary bond of spiritual brotherhood.

he immense discretionary power of free choice is a singularly unique attribute that
distinguishes man from the rest of creation. While everything in the universe follows
preordained laws or 'instincts', the soul of man has been given the freedom to choose.
From distant galaxies to the endless varieties of life on earth, right down to cells, molecules
and atoms, everything is forced to obey the laws of nature, as science prefers to call it. This even
holds true for the countless intricate functions of our own body, such as birth, growth,
metabolism, cell renewal, aging, death and decomposition.
Alone in his capacity as a spiritual being has man been granted a measure of free will, namely
the discretion in what direction and to what purpose he decides to employ the physical and
intellectual powers that are at his disposal. He is free to make an evil purpose his personal god
and to reject God as evil, and no earthly force or religious sermon can in the final analysis prevent
his decision.
It is by his own free choice that he will either become a servant of the divine and bring
positive change to the world, or that he elects to deny his mandate and to turn himself into an
agent of disorder and ruin. Whatever his decision, the greater his innate powers and capacities,
the larger the mark he will leave on the world for better or for worse.

There has always been a great deal of speculation whether we really do have a free will, or if everything is ultimately predestined. If the latter were the case, all our prayers and efforts would make very little difference. It would lend credence to the arguments of those who prefer to lump humanity into the category of a higher form of ape and who believe that humans, along with the rest of creation, are hopelessly caught in nature's web without the slightest prospect for positive change. It would also support the comfortable but dangerous notion that the future will merely be a replay of the past and that regardless of prayer, effort and sacrifice, the eventual outcome is foreordained and unalterable.

'Abdu'l-Bahá, when asked if man is a free agent in all his actions, or compelled and constrained, had this to say in Ch. LXX of Some Answered Questions:

This question is one of the most important and abstruse of divine problems... Some things are subject to the free will of man, such as justice, equity, tyranny and injustice, as well as all the good and evil actions; it is evident and clear that these actions are, for the most part, left to the will of man. But there are certain things to which man is forced and compelled: such as sleep, death, sickness, decline of power, injuries and misfortunes; these are not subject to the will of man, and he is not responsible for them, for he is compelled to endure them. But in the choice of good and bad actions he is free, and he commits them according to his own will... He can be an enkindled light through the fire of the love of God, and a philanthropist loving the world, or he can be a hater of mankind, and engrossed with material things. He can be just or cruel.

Now another question arises: Man is absolutely helpless and dependent, since might and power belong especially to God. Both exaltation and humiliation depend upon the good pleasure and the will of the Most High.

Also the inaction, or the movement of man, depends upon the assistance of God. If he is not aided, he is not able to do either good or evil; but if the help is cut off, he

remains absolutely helpless... This condition is like that of a ship, which is moved by the
power of wind or steam; if the power ceases, the ship cannot move at all. Nevertheless,
the rudder turns it to either side, and the power of the steam moves it in the desired
direction. If it is directed to the east, it goes to the east; or if it is directed to the west, it
goes to the west.... In the same way, in all the action or inaction of man, he receives
power from the help of God, but the choice of good or evil belongs to man himself.
Though the choice of good and evil belongs to man, under all circumstances he is
dependent upon the sustaining help of life, which comes from the Omnipotent.
Man cannot live up to his high calling without a conscious and sustained effort. It is by no
means automatic. If it were it would repeal the very foundation of human free will. On page 161
in the book Bahá'u'lláh and the New Era by Dr. J.E. Esslemont we read:
There is nothing to keep
men from forsaking religion if they wish to do so.
'Abdu'l-Bahá says:
God Himself does not compel the soul to become spiritual. The exercise of the free
human will is necessary.
O MOVING FORM OF DUST!
I desire communion with thee, but thou wouldst put no trust in Me. The sword of thy
rebellion hath felled the tree of thy hope. At all times I am near unto thee, but thou art
ever far from Me. Imperishable glory I have chosen for thee, yet boundless shame thou
hast chosen for thyself. While there is yet time, return, and lose not thy chance.73
From all this we learn that our free will operates within fixed precincts that have been
preordained by the Creator. He is the source of the animating force that sustains life, but the
direction and purpose this "neutral" force is channeled into depends very much on human
judgment and decision. The sublime structure of the universe, the miracle of creation, including
that of our own body, the purpose and ultimate goal of it all, are foreordained and not subject to
our will. Neither is our place in history, the time and place of our birth, our sex and racial origin,

the circumstances of our parents, culture, and upbringing, our inherited physical and intellectual characteristics, capacities and talents. All these are predestined and should be accepted as God's Will.

Be content, O people, with that which God has desired for you and predestined unto you.74

Let not thine heart grieve over what hath befallen thee. Wert thou to scan the pages of the Book of Life, thou wouldst, most certainly, discover that which would dissipate thy sorrows and dissolve thine anguish.75

What we do with what we have received is entirely up to us. Success or failure depends on our prayers and meditation, faith, effort, initiative, perseverance, prudence, and the many other noble qualities which we utilize -- or neglect to utilize -- as we exercise our free will in making

Bahá'u'lláh, The Hidden Words, Pers. 21
Bahá'u'lláh ,Gleanings, p.103
Bahá'u'lláh ,Gleanings, p.133

daily choices and decisions. This interaction between our preordained "inheritance" and our free will gradually evolves a character and leads to a destiny. Thus, our destiny is not foreordained in a restrictive sense, because it can at any time be influenced and altered for better or for worse by the operation of our free will.

Ralph Waldo Emerson, the American philosopher of the 19th century, wrote in his essay on spiritual laws:

Each man has his own vocation. The talent is the call. There is one direction in which all space is open to him... When he is true and faithful, his ambition is exactly proportioned to his powers. The height of the pinnacle is determined by the breadth of the base ... By doing his own work he unfolds himself. Every man should let out all the length of all the reins; should make a frank and hearty expression of what force and meaning is in him.

The awareness of this very positive and direct role we are called upon to play in the progression of human society and in our quest for personal growth and success, should enable us to accept our 'fate' with much greater equanimity. It is no accident, but a higher will and purpose that we are alive today.

While every fleeting moment within time's infinity is
unique, never to be repeated, the uniqueness of our time is
the sudden emergence of a vast new impulse for building a
mature global society the like of which has never before
been seen in known history. Among the numberless people
who have populated the earth in the past, or who will be
called into existence at some point in the future, only those
few of us who are alive today can exercise their free will to
hasten its arrival.

The beneficial use of our free will depends on free decision making based on free judgment
which in turn must spring from an unfettered personal inquiry. Even our technologically
advanced society with all kinds of knowledge at our fingertips is no guarantee for it. The process
is often subverted when a person's judgment is manipulated to a point where he surrenders his
free will and turns into a blind follower. Recent history is replete with many sorry examples when
humanity's unique capacity of free will was hijacked by ambitious politicians, or offered up to a
pantheon of false deities which had momentarily found aggressive worshippers who expected
others to fall in line. Such weak abdication of free will betrays the human spirit and can have
appalling consequences for the spiritual and material well-being of society. Hence this powerful
exhortation.

The best beloved of all things in My sight is Justice;
turn not away therefrom if thou desirest Me,
and neglect it not that I may confide in thee.
By its aid thou shalt see with thine own eyes
and not through the eyes of others,
and shalt know of thine own knowledge
and not through the knowledge of thy neighbor.
Ponder this in thy heart; how it behooveth thee to be.
Verily justice is My gift to thee
and the sign of My loving-kindness.
Set it then before thine eyes.

Bahá'u'lláh, Arab. Hidden Words, No 2

In the world of God there is no past,
no future, and no present; all are one.
'Abdu'l-Bahá, Some Answered Questions, p.156

ime is ephemeral and unlike distance it is difficult to define. Time is both a

gift and a
challenge, but it can easily become our adversary. Many great minds have puzzled over its
dimension and its meaning, yet it remains to this day an unconquered frontier.
“Nothing is ours except time,” wrote Rome’s philosopher statesman Lucius Seneca who lived
at the time of Christ.
“Dost thou love life? Then do not squander time for that’s the stuff life is made of,” urged
Benjamin Franklin.
“Time is itself an element,” wrote Goethe.
The ‘element’ we call time is according to Einstein’s theory not a physical constant, but is
relative. We shall examine this concept later.
But whenever we are conscious of time in our daily lives, we think in terms of future, past
and present. Most of us are far too preoccupied with the constant demands of the present to pay
much attention to the past and we often view the future with uncertainty, rarely with happy
anticipation.
“For yesterday is but a dream and tomorrow only a vision, but today well lived makes every
yesterday a dream of happiness and every tomorrow a vision of hope.”
When we make up our mind to do our best in all circumstances and to put time and resources
to good use, we should have fewer regrets about the past and can look towards the future with
much greater confidence.

The usual perception of time as an element composed of future, past and present is a mirage,
because future and past blend into a single, seamless infinity. The present is only a brief flash of
transition when according to our perception the future suddenly becomes the past. In our physical
environment any kind of process, be it movement, growth, transformation, even thought, occupies
a certain ‘duration of time.’ They continuously feed on the future and immediately move on into
the past. Still, we perceive any occurrence as being the present, despite the fact that it has already
crossed the magic threshold and has receded into the past. Whether we work, pray or play, our
activity emerges from future’s matrix and moves into the depositories of the past like an unending
computer program that awaits our personal input before it is stored in the

memory. Our lives are
in a state of constant transition from future to past. The future quite
literally hands us the ‘present’

of opportunity, while the past conserves what we have done with it.
Unlike the physical world which includes our own body, we should regard the inner reality of
our being as completely sovereign above and beyond the element of time. Time is not our prison,
but a mystic medium which allows our thoughts to form and to find their expression in words and
deeds. Time is being moved along by the clock of the universe from future’s endless reservoir
into the store houses of the past. This process can neither be slowed nor accelerated and every
single moment is gone again as soon as it arrives. It carries with it the indelible imprints of every
single thought, of every act of kindness or cruelty, honesty or deception, generosity or greed,
hatred or love; unalterable, irredeemable, continuing on forever as our personal contribution to
the unfolding universe of the spirit.
This is time’s real meaning and the true magnitude of the ‘here and now,’ where our
thoughts, words and actions will either bring us the satisfaction of achievement and the happiness
of fulfillment, or the sorrow of squandered opportunities.

We have managed to give time’s elusive nature a precise measure of substance by using the
movements of our planet as points of reference and have organized elapsed time into years,
months, days, hours, minutes, seconds, and fractions thereof. Although time knows no seasons,
earth’s day and night cycle has made it conveniently possible to compartmentalize events into
yesterday, today and tomorrow. As earth dwellers our lives and everything connected with them
are firmly embedded in time frames wholly governed by hours, days and years. Just as our bodies
have become fully adjusted to earth’s gravity and its many other physical conditions, the
dimension of time, as reflected by our most immediate environment, dominates our entire
existence. But therein may lie a certain psychological handicap, as we shall see.
The following examples should, therefore, not be taken as an esoteric digression of little

importance to our lives. They simply put our earthly existence into a proper time perspective.

An equal length of time has much different meaning to different things. A single day of summer fills the entire lifetime of a tiny insect; our own long and eventful life is but a heartbeat in the life of our planet and the existence of planet earth becomes an insignificant episode in the life cycles of galaxies. Throughout the cosmos there seems to exist a magical correlation between time and space. The time spans occupied by cyclical movements of any given body or entity are in direct proportion to how far these bodies are distant from the focal point of their particular orbits. Some examples may illustrate this observation.

Earth's solar distance of roughly 150 million kilometers dictates the length of time for our planet's orbit, namely a year of 365 days. Mercury's average solar distance of only 50 million kilometers shortens its year to just 88 earth days, while Neptune's solar distance of 4.5 billion kilometers lengthens its year to 165 earth years. On a much larger scale astronomy has calculated that the sun and its planets orbit around the center of our galaxy just once every 230 million years which works out to an insignificant 1.5 degrees of arc for every million years. To a stellar explorer who has been keeping a steady eye on our galaxy over a period of one hundred thousand years, it would appear as though the entire star system, our own sun included, had not moved a single inch in one thousand centuries of observation. But in those 100,000 years the sun and its planets, traveling at 241 kilometers per second, actually traversed 21 billion kilometers in their orbit around their galactic center. It is awesome to contemplate that our solar system has completed just twenty of such orbits since earth began 4.6 billion years ago.

At the opposite end of the cosmic spectrum the distances within an atom implode and the frequencies of orbital cycles proportionately explode until both become quite incomprehensible to our intelligence. Electrons are whirling around their atomic nucleus at trillions of times per second. It may help to point out here that one trillion is one million millions. Time's dimension therefore is

relative. What seems
like an eternity to us, is only a fleeting moment in the universe.

Returning to Einstein's theory, time is expanded, i.e. slowed, by velocity. If we could travel
at the speed of light time would stand still, dissolve, in relation to those left behind on earth for
whom time would continue to tick away. But at the speed of light time becomes non-existent and
all events transpire in a timeless third dimension.
According to the Big Bang theory, galaxies continue to move away from each other at the
speed of light, suggesting a uniform expansion of the universe comparable to a gas bubble that is
expanding due to a rise in temperature of its molecules. Except here the expansion is thought to
be in continuation of the Big Bang. Since it is proceeding at the speed of light it is timeless. Thus,
to follow logic, "today's" moment in time in the universe should be the same moment as it was at
the "beginning" and will remain the same throughout infinity.

Nature's other dimension is the dimension of space as manifested by distances. Just as we
feel challenged to overcome any other limitation by inventing tools, gadgets and computers to
augment the very limited powers of our senses, muscles, mind, and memory, the human spirit has
the urge to burst the confines of time and space.
The dimension of space, if not conquered entirely, has by now been thoroughly humiliated. Earthly distances are no longer held in awe. It is said that in the year 1841 when the English travel agent Thomas Cook arranged for his first excursion from London to a temperance meeting at Loughborough, Leicestershire, the average person on earth never traveled farther than fifty miles from his or her place of birth during an entire lifetime.
Today, we utter disregard for all geographic barriers and weather, tens of millions regularly criss-cross the globe in perfect comfort at ten miles a minute. A few explorers have even set foot on the moon and we send space probes to investigate every nook and cranny of the solar system. Should we be unable to go traveling ourselves, color television will make us an instant
witness.
The "element of time," however, remains an unseen and sometimes frustrating barrier to our
plans and ambitions. Forever intent to shrink space by simply applying greater speed, no device
or apparatus allows us to expand time, "the stuff life is made of." Since

the only answer to this problem is to extract more out of time's finite offering, time saving has become our major obsession. We have invented a host of labor saving devices, technical short cuts, computers and robots. We can program several gadgets or machines to go to work for us all at the same time so

we can busy ourselves with something entirely different. What used to take days or weeks to produce at the turn of this century is today punched out and assembled in minutes. The inexpensive quartz watch is perhaps a good example. If we tried to use the original technology to maintain today's global telephone network of instant access, it would literally require half of our work force to operate huge manual switchboards in every city, town and hamlet on earth.

Incredibly, we have even learned how to compound and then to preserve time's harvest and thereby accelerate most developments. Vast and constantly growing reference libraries of books, sound and video recordings, computerized memory banks and computer assisted design, give immediate global access to the time-ripened fruits of study, thought and talent of countless researchers, scientists, artists and authors. They multiply a million-fold the effect of a new invention or a perfect performance and eliminate much of the time heretofore wasted on trial and error, long searches and endless duplication of effort. Although we can already recognize these benefits, the full ramifications it will have on the future of education, science, technology and the arts is difficult to predict. It is without doubt one of the greatest advances that has occurred in our unending quest to master time.

However, the sudden and unforeseen technical breakthroughs of this century have conditioned us to now expect continued if not accelerated progress in all aspects of life. It has become a character trait of modern man that he must see quick and positive results in all his undertakings. This attitude goes hand in hand with a tendency to exert minimum effort and crave maximum leisure.
Our mental horizon is shaped by advertising slogans and the predictions of

promoters, all
trying to convince us that everything in life must be “instant” and as
quick and easy as fast food.
This attitude expects all projects to be accomplished over the short term,
certainly within our own
lifetime. No wonder that there is little enthusiasm for any project or idea
unless it guarantees sure
and profitable results in the foreseeable future. We are allowing ourselves to
be mesmerized by
the hourglass. The consequence is a growing reluctance to tackle long-term
problems that actually
do threaten the world’s tomorrow, along with an occasional lack of faith in
future’s golden
promise.
Here on earth time is usually equated with life cycles, growth, change and
transformation.
What is important to remember is that the “time element” is never fixed,
but is quite variable for
different events and developments. What is considered a normal time span for
one thing to occur
does not apply to everything else. It probably took many millions of years for
wind and weather
to grind down Australia’s ancient mountain ranges, but it only takes a
split-second for water to
turn into steam or to congeal into ice. It may only take a brief growing season
for a plant to
sprout, mature, and to bear fruit, but a farmer will give his walnut tree at
least a decade before
expecting the first small harvest. Meanwhile, aware of nature’s timetables,
he sticks to his chores
instead of losing faith in the outcome. The problem with this analogy is that
we are, of course,
well acquainted with such facts of nature and can, therefore, safely anticipate
the results. It is
altogether different when one is breaking new ground and can only hazard a
guess at the time

frames involved. Had our farmer, for example, only known of vegetables and
never seen a tall
walnut tree, he may have given up on the young sapling and burned it in the
fall along with the
rest of his dead vegetable plants, instead of nurturing it to maturity.

This brings us to an issue that concerns people everywhere, namely the hoped
for
improvement of humanity’s condition versus the painfully slow changes in
mankind’s psyche and
ethics. The continued presence of so many seemingly intractable problems

besetting society plays
into the hands of the pessimist and cynic who sees absolutely no hope for change and discourages
people from even trying.
One should really learn a lesson from the sudden, unexpected scientific developments of this
century. There is no ready explanation why after so many millennia of quiescence the breakthroughs in science and technology have suddenly and without prior warning so profoundly
transformed our entire earthly existence. They should, of course, be recognized as the immediate
and necessary precursors of a future planetary order that will require the unifying tools these
inventions have brought. The pessimistic argument, therefore, that change would surely have
come to humanity a long time ago, if change were at all possible, can be refuted by pointing out
that only a century ago most people also thought they had good reason to believe that the future
visions of a Jules Verne were nothing but the product of an overactive imagination and that his
predictions never would or even could become reality.
Then as today, human inventiveness and maturation march to the beat of their own mystic
drummer. If we allow clock and calendar to run our lives and typically link major progress to
timetables of our own making, we risk severe disappointment when goals are not reached and
cherished hopes remain unfulfilled by our own deadline. We may become pessimistic and
reluctant to tackle projects that seem too daunting in their challenge.
The great transformation of human society requires everybody to be fully engaged according
to his or her talents and capacities, oblivious to fame or fortune. Just as the drab, slow-moving,
earthbound caterpillar miraculously changes into a colorful, high-flying butterfly, so will
humanity eventually shed the last vestige of an earlier, less perfect, and far more restricted
existence.
Today’s breathtaking onward rush of science and technology that is following hard on the
heels of a millennial period of barren stagnation, should not be regarded as some unaccountably
sudden development in the life of humanity, but ought to be an indication that the time we live in
has been charged with a rare and very special potency:

O My friend, listen with heart and soul to the songs of the spirit, and treasure them as thine own eyes. For the heavenly wisdoms, like the clouds of spring, will not rain down on the earth of men's hearts forever; and though the grace of the All-Bounteous One is never stilled and never ceasing, yet to each time and era a portion is allotted and a bounty set apart, this in a given measure...
The cloud of the Loved One's mercy raineth only on the garden of the spirit, and bestoweth this bounty only in the season of spring. The other seasons have no share in this greatest grace, and barren lands no portion of this favor.
O Brother! Not every sea hath pearls; not every branch will flower, nor will the

nightingale sing thereon. Then, ere the nightingale of the mystic paradise repair to the garden of God, and the rays of the heavenly morning return to the Sun of Truth -- make thou an effort, that haply in this dust heap of the mortal world thou mayest catch a fragrance from the everlasting garden, and live forever in the shadow of the peoples of this city.76
Now is the time to take advantage of these bestowals, and benefit therefrom. Know ye the value of this time, let not this chance escape you.77

Bahá'u'lláh ,Seven Valleys and Four Valleys, pages 37-38
'Abdu'l-Bahá, Selection of writings, p. 12

Mind is the Master-power that molds and makes,
and Man is Mind, and evermore he takes
the tool of Thought, and, shaping what he wills,
brings forth a thousand joys, a thousand ills: ?
He thinks in secret, and it comes to pass:
Environment is but his looking-glass.
James Allen

t seems strange that our earthly existence and quest for 'truth' should have been so handicapped by our very limited sensory perception. The five narrow gateways of sight, hearing, touch, smell and taste cannot accurately communicate to our intellect the totality of the physical world, because of their limitations that filter out and sometimes even distort reality. This

tends to trick us into elevating many a superficial observation to the level of ‘truth’ that in the
fullness of time is destined to be proven false.
The senses link the physical world to the world of thought. Alas, all five of them are severely
flawed. Even though touch and taste come into actual contact with an observed object, they still
transmit only an inexact sampling that results in different interpretation. A surface may feel hot
and smooth to one person, warm and slightly uneven to another, the same aroma can be found
pleasant or offensive.
The remaining three senses only work in conjunction with a medium to transmit the
information. The sense of sight requires the presence of light, while smell and hearing need the
presence of air or a similar gaseous medium. We can’t see a thing in the dark and there is no use
shouting in an airless environment.
We can also get fed misinformation about the actual time of an event, since both light and
sound waves take time to travel.
Lightning strikes, but we hear it only several seconds later, or we observe the flare-up of a
super nova in the sky when the event may have occurred many thousands of years ago. In the
case of lightning, we ourselves, and in the case of a super nova our distant ancestors, were quite
unaware of the event when it took place.
Because our vision, hearing and other sensory functions are much inferior when compared to
those of certain animals, we have invented microscopes, telescopes, communications aides and
countless other tools to compensate for the shortcomings of our senses. Yet, we are still enslaved
by two old habits that were acquired when any investigation had its limits set by what our senses
could perceive. These two negatives are the tendency to deny the existence of anything that
escapes capture by our senses, along with the assertion that anything once accepted as ‘truth’
becomes an immutable fact which precludes future revision.
Only after we developed sophisticated scientific tools which aided to expand the horizon of
the known did we become more open-minded and willing to let go of preconceived ideas. We
embraced the concept of ‘research and development’ when it became clear

that our knowledge of
the universe will never be complete. It shall increase as new technology
enables us to extend the

limited power of our senses even further.
According to ‘Abdu’l-Bahá, our five senses interact with an equal number
of spiritual, or
inner powers.
In man five outer powers exist which are the agents of perception ... through
these
five powers man perceives material things.... Man has also spiritual powers:
imagination,
which conceives things; thought, which reflects upon realities; comprehension,
which
comprehends realities; memory, which retains whatever man imagines, thinks and
comprehends. The intermediary between the five outward powers and the inward
powers,
is the sense which they possess in common, the sense which acts between the
outer and
inner powers, conveys to the inner powers whatever the outer powers discern. It
is
termed the common faculty ... 78
While not yet fully understood, it is generally recognized that the human mind
has access to
powers which earlier centuries would have labeled supernatural. People
sometimes talk of
miracles, because they understand so little of the power of the mind. It is
still difficult at the
moment to offer any logical explanation of the phenomena of parapsychology,
second sight,
telepathy, etc. However, it must be equally difficult for humans who are
isolated from the rest of
the world and still live under stone age conditions to comprehend the miracle
of a Polaroid
photograph as it develops before their eyes or the instant playback of sights
and sounds by a
video camera. Nor can they fully grasp the reality of a jetliner traversing the
sky above them. Yet,
all these products of human science, completely unknown only a few generations
ago, function
along ancient and immutable laws of the physical universe that have always
existed and that have
never changed, but which were only recently discovered by man’s focused mind,
then made to
serve his purpose.
None of our modern implements can therefore be said to have been ‘created’
by man. They

are only the end product of man's ability to discover the pre-existing laws of gravity, electronics,
chemistry, atoms, genes and many others and of his ingenuity to harness and to exploit these laws
for a specific purpose.
In 1913 the Austrian physicist-astronomer-philosopher
Edmund Husserl published a paper on an important new
insight: 'simple perception' is something that almost never
occurs. As we look around, it may seem as if we simply see
and hear whatever presents itself to our senses. But the fact
is that our mind is continuously selecting, filtering,
interpreting and coloring the information it receives. Sometimes the mind is playing tricks on us. It can distort and
even misinform. Every waking minute of our lives presents
a challenge to separate the real from the imagined.
Under ordinary circumstances it is difficult to catch the
mind at selecting and distorting. There are optical illusions
that can be produced by certain patterns. Two straight lines
appear to curve because transversal lines have been drawn
across, two lines curved inwards appear shorter than two
lines curved outwards. All this shows how our mind relies

on shorthand, on taking things for granted. Husserl invented techniques for studying the mind's
distorting powers. He called it phenomenology. It is a double-edged sword. It teaches us to take
everything with a grain of salt. Whatever we observe may not be exactly the way we see or hear
it. Whatever our current understanding, reality may still be different.
It would be sufficiently difficult for man were such disparities between perception and reality
strictly confined to the material realm, but they exist equally in the realm of ideas, attitudes,
standards and conventions. It threatens to trap us in a maze of our own mind. It is sometimes
called prejudice. It prevents us in an insidious yet subtle way from exploring new avenues and to
accepting a larger measure of truth whenever it comes our way.
There are forces lying below the threshold of consciousness that constantly interfere with the
way we see the world. We could compare ourselves to a nation that believes it has a completely
free press when in fact there are hidden guardians who censor what is printed or broadcast.
Seeing things without distortion and prejudice is not simply a matter of opening our eyes, it is

also a matter of rigorous self-discipline.

Husserl called the assumption of simple perception the natural standpoint. Many of our assumptions and commentaries written on life and the world around us are based on the natural standpoint, on what we accept to be the obvious, without any attempt to take into account the subliminal forces of the mind. To believe in simple perception is, therefore, a fallacy. Besides our conscious prejudices which we impose on the world, there are countless subconscious prejudices which we accept as reality. Some of them are nurtured by the daily barrage of sights and sounds delivered in the mass media.

There is an even more basic coloring that our mind adds to the world. It is often called the 'outlook on life' and can be either very positive or depressingly negative depending on the coloring of our glasses. It is difficult to pinpoint where we are on this scale of perception, since we drift in the envelope of our moods as a ship rides on changing currents. The philosopher William Blake has said that although man lives in the cavern of his five senses, he can "pass out what time he will," open "the doors of perception" and become aware of external reality. It isn't quite as easy as it sounds. It requires mental discipline, but it is possible once we realize that the 'natural standpoint' is only an accepted convention and not ultimate reality.

'Abdu'l-Bahá explains that there are four methods of comprehension: by the senses, by reason, by tradition, and by the bounty of the Holy Spirit.

> Today [the first method] is considered the most perfect by all the European philosophers, they say that the principle method of gaining knowledge is through the senses; they consider it supreme, although it is imperfect, for it commits errors. The second is the method of reason, which was that of the ancient philosophers, the pillars of wisdom. They proved things by reason, and held firmly to logical proofs. Notwithstanding this, they differed greatly and their opinions were contradictory. They even changed their views ... Plato at first logically proved the immobility of the earth and the movement of the sun; later by logical arguments he proved that the sun

was the stationary center, and the earth was moving. Afterwards the Ptolemaic theory
was spread abroad, and the idea of Plato was entirely forgotten, until at last a new
observer again called it to life. The third method of understanding is by tradition, that is,
through the text of the Holy Scriptures. This method equally is not perfect, because the
traditions are understood by the reason. As the reason itself is liable to err, how can it be
said that in interpreting the meaning of the traditions it will not err...

The reason is like a balance and the meanings contained in the Holy Books are like
the thing which is weighed. If the balance is untrue, how can the weight be ascertained?
But the bounty of the Holy Spirit gives the true method of comprehension which is
infallible and indubitable. This is through the Holy Spirit which comes to man, and this is
the condition in which certainty can alone be attained.79
You cannot apply the name ‘man’ to any being void of the faculty of meditation.
Through it he attains to eternal life [and] receives the breath of the Holy Spirit ... Affairs
of which man knew nothing are unfolded before his view ... Meditation is the key for
opening the doors of mysteries. In that state man abstracts himself; in that state man
withdraws himself from all outside objects; in that subjective mood he is immersed in the
ocean of spiritual life and can unfold the secrets of things ... This faculty brings forth
from the invisible plane the sciences and arts ... inventions are made possible, colossal
undertakings are carried out.80
The subtle intercourse between our senses and our inner faculties, delicate and tenuous as it
may be, will let us open doors to greater wisdom and undreamed of discoveries. The sublime
nature and unlimited potential of this act lies far beyond a frivolous comparison with the
controlled and predictable interaction between sophisticated computer hardware and advanced
software applications. While computers, no matter how fast and ingenious, will always be a
lifeless man-made working tool, the former is a creative gift to man from the

Maker of the
universe. The human mind has unimagined powers to remove the veils from the unknown, to
educate future generations, to improve life and to build a peaceful and progressive society. These
benefits will be ours when we free ourselves from the narrow gateways of our physical senses.

The following words of Bahá'u'lláh will bring these various observations into focus. They
will remind us of the humble and perceptive testimony at the very beginning of this book which
sprang from the genius and vision of Albert Einstein.

Consider the rational faculty with which God hath endowed the essence of man. Examine thine own self, and behold how thy motion and stillness, thy will and purpose,
thy sight and hearing, thy sense of smell and power of speech, and whatever else is
related to, or transcendeth, thy physical senses or spiritual perceptions, all proceed from,
and owe their existence to, this same faculty. So closely are they related unto it, that if in
less than the twinkling of an eye its relationship to the human body be severed, each and
every one of these senses will cease immediately to exercise its function, and will be
deprived of the power to manifest the evidences of its activity. It is indubitably clear and
evident that each of these afore-mentioned instruments has depended, and will ever
continue to depend, for its proper functioning on this rational faculty, which should be
regarded as a sign of the revelation of Him Who is the sovereign Lord of all. Through its
manifestation all these names and attributes have been revealed, and by the suspension of
its action they are all destroyed and perish. It would be wholly untrue to maintain that
this faculty is the same as the power of vision, inasmuch as the power of vision is derived
from it and acteth in dependence upon it. It would, likewise, be idle to contend that this
faculty can be identified with the sense of hearing, as the sense of hearing receiveth from
the rational faculty the requisite energy for performing its functions.

Some Answered Questions, Ch. LXXXIII
Paris Talks, p. 174-175

This same relationship bindeth this faculty with whatsoever hath been the recipient of these names and attributes within the human temple. These diverse names and revealed attributes have been generated through the agency of this sign of God. Immeasurably exalted is this sign, in its essence and reality, above all such names and attributes. Nay, all else besides it will, when compared with its glory, fade into utter nothingness and become a thing forgotten.

Wert thou to ponder in thine heart, from now until the end that hath no end, and with all the concentrated intelligence and understanding which the greatest minds have attained in the past or will attain in the future, this divinely ordained and subtle Reality, this sign of the revelation of the All-Abiding, All-Glorious God, thou wilt fail to comprehend its mystery or to appraise its virtue. Having recognized thy powerlessness to attain to an adequate understanding of that Reality which abideth within thee, thou wilt readily admit the futility of such efforts as may be attempted by thee, or by any of the created things, to fathom the mystery of the Living God, the Day Star of unfading glory, the Ancient of everlasting days. This confession of helplessness which mature contemplation must eventually impel every mind to make is in itself the acme of human understanding, and marketh the culmination of man’s development.81

God is, in His Essence, holy above ascent and descent, entrance and exit; He hath through all eternity been free of the attributes of human creatures, and ever will remain so. No man hath ever known Him; no soul hath ever found the pathway to His Being. Every mystic knower hath wandered far astray in the valley of the knowledge of Him; every saint hath lost his way in seeking to comprehend His Essence. Sanctified is He above the understanding of the wise; exalted is He above the knowledge of the knowing! The way is barred and to seek it is impiety; His proof is His signs; His being is His evidence.82

Gleanings, Ch. LXXXIII
Seven Valleys and Four Valleys, p. 22-23

The virtues of humanity are many, but science is the most noble of them all... It is a bestowal of God; it is not material; it is divine.83
‘Abdu’l-Bahá

The unexamined life is not worth living.
Socrates

The true test of civilization is not the census, nor the size of cities, but the kind of man the country turns out.
Ralph Waldo Emerson ? Essay VII

mong the most puzzling anomalies of our age is the insistence to see science and religion as opposites. Modern perception has it that the two are disconnected and frequently at odds.
While science is considered to deal with ‘hard fact’, religion is thought of as something mystical and mainly a matter of ‘faith’. But closer scrutiny will show that this observation is rather superficial and therefore misleading.
Science makes it its business to explore the physical world, to measure and quantify its components and to uncover its laws beyond any doubt. The purpose of religion is to study divine commandment and to follow its precepts in order to elevate human character and so to build the kind of society that is capable of using the forces unleashed by science for man’s benefit, instead of his downfall. A civilization that prospers and endures is likely to be the fruit of both science and religion and not the progeny of either one of them alone. If one accepts the premise that God as maker and sole ruler of the universe is also the ultimate source of all religions, then religion and science can no longer be opposites, but should form a close and vital partnership. One investigates the world of matter, while the other recognizes its Source and seeks to obey its laws of justice and morality to advance and to protect civilization.
Just as the universe is not carved up into competing factions, our efforts to uncover its yet unknown physical and spiritual verities must likewise be unified, not fragmented or competitive.
Logic should therefore dictate that the study of science and that of religion

ought to go hand in
hand.
The knowledge explosion in the field of physical sciences has encouraged an attitude that
demands clear scientific proof before anything can be accepted. This approach tends to be very
skeptical towards religion on the grounds that religion's supra-sensory realm is far too vague and

speculative as it cannot be proven scientifically.
But to claim that anything that cannot be fully explained by today's science must either be
suspect or cannot be real, is to claim that science has full knowledge of everything there is,
whether seen or unseen. If this were true, it would imply that we have reached the limits of
scientific inquiry and that nothing remains to be discovered. It is precisely the confession that
science does have limits today and in future, just as it had limits in the past, and that many
realities and laws may still lie concealed, awaiting their discovery by human intellect, that makes
open-minded investigation of the unknown at all possible and so unlock the doors to greater
knowledge.

For numerous reasons the notion of a partnership between science and religion seems far less
revolutionary at century's end than it was at its beginning. The successive fall of long-held
theories and doctrines has taught that both science and belief are not static but evolutionary. The
knowledge explosion in both macrocosm and microcosm has opened new vistas that prove not
how much, but how very little we know. We have progressed to the point when our scientific
inquiries demonstrate that an apparently solid material substance actually consists of fields of
energy. This has prompted visionaries like Einstein, Hawking and other scientists to ask the
question whether all matter and all phenomena may not be the emanation of a supreme, albeit
unknowable intelligence.
The computer age has helped to demonstrate this union by further blurring the boundaries
that separate the physical from the meta-physical, by letting disembodied

electrons replicate
intelligence, by giving abstract commands a power to create virtual reality. It lets the arcane
knowledge of fractal geometry84, developed by Polish-born mathematician Benoit Mandelbrot85,
show similar and self-perpetuating properties endlessly repeated in nature. It may hint at laws that
govern all propagation and growth on any scale of existence from the smallest particle to the
largest entity (See page 151). Without question, we are standing at the threshold of an age when the
application of these new sciences may develop tools and implements that will make the pentium
processor look antique by comparison.

Fractal geometry is not simply an abstract development. A coastline, if measured down to its least irregularity, would tend
toward infinite length just as does the “snowflake” curve. Mandelbrot has suggested that mountains, clouds, aggregates, galaxy
clusters, and other natural phenomena are similarly fractal in nature, and fractal geometry’s application in the sciences has
become a rapidly expanding field. In addition, the beauty of fractals has made them an element in computer graphics.
Professor of Mathematics at Yale University

Benoit Mandelbrot, the discoverer of Fractal Geometry

Throughout the Bahá’í writings we find copious references to the importance of science.
While the scope of this book does not permit a fully exhaustive exposition of these texts, the
following excerpts will sufficiently demonstrate that science, far from being a separate discipline,
is actually an integral part of man’s religious experience.
During His visit to America in 1912, ‘Abdu’l-Bahá spoke at New York’s Columbia
University and other institutions of higher learning. Here are some of the insights shared with
these audiences:
All the powers and attributes of man are human and hereditary in origin -- outcomes
of nature’s processes -- except the intellect, which is supernatural. Through intellectual
and intelligent inquiry science is the discoverer of all things. It unites present and past,
reveals the history of bygone nations and events, and confers upon man today the essence
of all human knowledge and attainment throughout the ages.

By intellectual processes and logical deductions of reason this superpower in man
can penetrate the mysteries of the future and anticipate its happenings.
Science is the first emanation from God toward man. All created beings embody the
potentiality of material perfection, but the power of intellectual investigation and
scientific acquisition is a higher virtue specialized to man alone. Other beings and
organisms are deprived of this potentiality and attainment. God has created or deposited
this love of reality in man. The development and progress of a nation is according to the
measure and degree of that nation's scientific attainments. Through this means its
greatness is continually increased, and day by day the welfare and prosperity of its
people are assured.
The man of science is perceiving and endowed with vision, whereas he who is
ignorant and neglectful of this development is blind. The investigating mind is attentive,
alive; the callous and indifferent mind is deaf and dead. A scientific man is a true index
and representative of humanity, for through processes of inductive reasoning and
research he is informed of all that appertains to humanity, its status, conditions and
happenings. He studies the human body politic, understands social problems and weaves
the web and texture of civilization. In fact, science may be likened to a mirror wherein the

infinite forms and images of existing things are revealed and reflected. It is the very
foundation of all individual and national development. Without this basis of investigation,
development is impossible. Therefore, seek with diligent endeavor the knowledge and
attainment of all that lies within the power of this wonderful bestowal.86
There are certain pillars which have been established as the unshakable supports of
the Faith of God. The mightiest of these is learning and the use of the mind, the
expansion of consciousness, and insight into the realities of the universe and the hidden
mysteries of Almighty God.87
One of the greatest benefits of modern science is the protection and

preservation of
life. Despite repeated allusions to the transitory nature of our physical
existence,
Bahá'u'lláh does emphasize its transcendent importance and exhorts us to
use every
precaution and to avail ourselves of all modern methods to stay in good health
in order
to live a long and useful life. He writes in the Kitáb-I-Aqdas,88

Resort ye, in times of sickness, to competent physicians; We have not set aside
the use
of material means, rather have We confirmed it through this Pen, which God hath
made
to be the Dawning-place of His shining and glorious Cause.

Whatever competent physicians or surgeons prescribe for a patient should be
accepted and complied with... Well is it with the physician who cureth ailments
in My
hallowed and dearly -- cherished Name. Do not neglect medical treatment when it
is
necessary, but leave it off when health has been restored.... Treat disease
through diet, by
preference, refraining from the use of drugs; and if you find what is required
in a single
herb, do not resort to a compounded medicament. Abstain from drugs when the
health is
good, but administer them when necessary.

Verily the most necessary thing is contentment under all circumstances; by this
one is
preserved from morbid conditions and from lassitude. Yield not to grief and
sorrow: they
cause the greatest misery. Jealousy consumeth the body and anger doth burn the
liver:
avoid these two as you would a lion.89

In all our scientific endeavors we take great pride in knowing and adhering to
certain laws. These laws are universally recognized as "laws of nature,"
never to be
ignored or to be fooled around with if we want progress. By science and by art
[man]
brings hidden powers into the region of the visible world. Man perceives the
hidden law
in created things and co-operates with it.90

"Nature is not democratic, nor limited-monarchical, but despotic, and will
not be
fooled or abated of any jot of her authority by the pertest of her sons
..."91

Perhaps we treat nature's laws with a very special respect, because we know
that they are
not man-made and therefore free of error or deceitful design. Another good

reason for our
unreserved obedience is that strict compliance alone can avoid disaster and assure success. We
wouldn't dream of rebelling against this sort of 'restraint', because we value scientific success. It
enhances our physical comforts and security, it protects our health, gratifies our senses, and

Promulgation of Universal Peace, p. 49-51
Selections of the writings of 'Abdu'l-Bahá, p. 126
Kitáb-i-Aqdas, p. 60
Health and Healing, p. 459-460
'Abdu'l-Bahá in London, p. 22-24
Ralph Waldo Emerson, Essay VII

helps to fulfill our fondest dreams in shorter time and with less and less effort.
Appeals for spiritual progress, on the other hand, are not nearly as popular, because they call
for change in attitudes and behavior through conscious effort and personal commitment.
Moreover, any beneficial results of such spiritual exertions are not immediately evident. The
pursuit of physical sciences, by contrast, may appear to bring more immediate and tangible
results, but their true fruits will only be seen when they deliver prosperity or ruin, depending on
the inventor's or user's spiritual focus. In the meantime, it is, of course, less painful and more
convenient to treat both secular and religious laws as a smorgasbord of options from which to
pick and choose according to personal preference.
But once again, the realities we see in the physical world are a dramatic reflection of those of
the world of the spirit: The same hard rules that assure the success of science and technology also
govern the spiritual well-being of humanity. Both rules absolutely reject prejudice and
preconceived ideas. Both call for thorough, open- minded investigation, and ultimately demand
humility and complete obedience to an existing higher law.
There is really no reason to assume that humanity should on the one hand be gifted to
uncover the physical realities, but on the other hand be doomed to remain forever deaf and blind
to the salutary influence of spiritual laws. The human being is perfectly equipped to access both
sources of truth in order to benefit from the combined powers and wisdom

present in a universe
where spirit and matter are tightly interwoven.
Every scientific discovery, therefore, and every advance, should buoy our confidence that the
triumphs of the human mind can indeed find a noble counterpart and a necessary balance in the
attainment of a deeper awareness of spiritual laws and, through their observance, in the
refinement of human nature.
...Until material achievements, physical accomplishments and human virtues are reinforced by spiritual perfections, luminous qualities and characteristics of mercy, no
fruit or result shall issue therefrom, nor will the happiness of the world of humanity,
which is the ultimate aim, be attained. For although, on the one hand, material achievements and the development of the physical world produce prosperity, which exquisitely
manifests its intended aims, on the other hand dangers, severe calamities and violent
afflictions are imminent.
...When thou lookest at the orderly pattern of kingdoms, cities and villages, with the
attractiveness of their adornments, the freshness of their natural resources, the refinement of their appliances, the ease of their means of travel, the extent of knowledge
available about the world of nature, the great inventions, the colossal enterprises, the
noble discoveries and scientific researches, thou wouldst conclude that civilization
conduceth to the happiness and the progress of the human world.
Yet shouldst thou turn thine eye to the discovery of destructive and infernal machines,
to the development of forces of demolition and the invention of fiery implements, which
uproot the tree of life, it would become evident and manifest unto thee that civilization is
conjoined with barbarism. Progress and barbarism go hand in hand, unless material
civilization be confirmed by Divine Guidance...92

‘Abdu’l-Bahá, Selected Writings, p. 283-284

Of all the wonders that I yet have heard,
it seems to me most strange that men should
fear, seeing that death, a necessary end,
will come when it will come.”
William Shakespeare in “Julius Caesar”

t is, indeed, most strange that the culmination of man's earthly existence and his return to the world of his origin should be called 'death' and that it should be feared. There could be good reasons.

A current dictionary defines death as "the act or fact of dying; the total and permanent cessation of all the vital functions of an animal or plant; the state of being dead; loss or absence of spiritual life; loss or deprivation of civil life; extinction or destruction; bloodshed or murder; a pestilence; the annihilating power usually personified by a skeleton."

This rich definition does not offer us a scintilla of evidence that death brings anything but total oblivion. Taken at face value, there is, therefore, every good reason to fear death, instead of welcoming it as a cosmic breakthrough to a much wider existence in our never-ending odyssey.

Throughout the ages, the death of a person was always regarded as something shockingly similar to the death of a plant or an animal, or the utter destruction of some material object. It has always meant the unwelcome end of our existence and of cherished relationships. Even Shakespeare, writing about the topic of death with a kind of philosophical detachment, still calls it 'a necessary end' and certainly not a rebirth. The very word 'death' conveys a world view that became firmly grafted to man's consciousness in ages past when the experience of someone's sudden transition from a living person to an inanimate form was as bewildering and mysterious to the ancients as were the signs of nature and of the heavens above.

So it came about that the usage of the word 'death' and its forever negative connotation has been bequeathed to us by our ancestors. Death will continue to haunt us until we understand the much greater reality of human existence and realize that the word 'death' has been a curious misnomer.

The state commonly called death relates only to the end of our physical existence and the subsequent decomposition of the body. Just as the unborn child is quite unaware of the vast world that awaits outside the confinement of the womb, neither can we, unaided,

understand the realm
which lies beyond this physical existence. The promise of a timeless and deathless reality beyond

this earthly life is repeated in all the world's religions. Nature also provides us with many
analogies of the eternal character of life's processes.
Man's transformation that is wrongly called death is in reality an act of metamorphosis that
should be recognized as being part of the normal functioning of the universe. Death releases the
soul, a person's innermost reality, which animated the body composed of atoms and molecules, to
the world of its origin. From that unseen world it had once been summoned to its earthly vessel in
order to contribute to human advancement for the benefit of future generations and for its own
redemption. Just as the unborn child develops body functions that are required for the next and
still unknown stage of its existence, the attainment of spiritual qualities prepares us for a further
unknown stage in life which transcends the physical body, time and space.
This transformation cannot be regarded as extinction. Man's return to his original spiritual
abode should rather be viewed as a confirmation of the oneness of the world of matter and of the
spirit. Our dependency on the intellectual perception of our senses blinds us to the life of the
spirit. This causes a reversal of reality.
Our body seems to be so much more real to us than is our soul, because the soul can neither
be seen nor measured as an object. As a consequence, whatever one imagines the soul to be it
must surely be in need of body and brain to be able to exist and to express itself. There is ongoing
debate at what point the soul 'enters' the human fetus to transform a mere glob of protoplasm into
a 'real little person.' Laboring under this misconception one naturally dreads the body's demise,
because where would the poor soul go and how could it manage once it has been evicted from a
dysfunctional body?
The question gets answered by turning this puzzle around. The soul, a divine property, has
always existed in a dormant state until summoned to attend the body's conception. It then
animated and governed the slow evolution of its own earthly vessel within

mother’s womb and
beyond. Here one is reminded of the unknown forces that somehow watch over the formation of
crystals, or of the mysterious intelligence which slowly develops a tiny seed into a fruit-laden
tree.
Just as in nature’s larger evolutionary cycles everything remains in a state of constant change
and transformation, the development of the human body and the simultaneous renewal of all of its
cells also never rests. Within less than a decade every last cell in our body, our bones included,
will have been replaced by new cell tissue. Not a single atom of the body that once carried us
through childhood remains with us as an adult. Without it being noticed, our body is constantly
‘dying’ so it can be rebuilt by fresh atoms and molecules, and this according to a fixed blueprint
that is uniquely our own. This unseen intelligence keeps re-building the body’s intricate mosaic
by having an absolute control over the arrangement of its trillions of cells. Thus, our stature and
general appearance, our physical traits, the flavor of our voice, the pigmentation of our skin, the
color of our eyes, even the odd scar, will stay with us for life. The potencies of this remarkable
scheme are sovereign over anything that we may wish to describe as something ‘material.’ It will
continue to harness the atoms to mold our temple until the mechanics are exhausted or destroyed.
Such awareness, combined with a new appreciation of the almost de-materialized nature of
our building blocks, namely the atoms that consist mainly of ‘empty space’ except for their
intrinsic intelligence and their elemental powers of attraction (page 153), helps us better understand
the intriguing verse in the Buddhist Dhammapada:
“Seeing the foamlike nature of the body and awakening to its mirage-like quality,
one can escape the sight of the King of Death.”

The material body and its inherited physical attributes allow the soul to experience this
earthly life, to develop knowledge and character, to educate and refine future generations, and ...
to know and to worship its creator. Whenever the body fails, the soul continues in a state in which

it is aware of itself and those loved ones and friends who have ‘died’ before him. Although the details of this ‘after-death’ existence have not been made clear to us, religious teachings promise that we will be free of all physical limitations and encumbrances.

‘Abdu’l-Bahá confirms in chapter LXVI of the Book Some Answered Questions:

Some think that the body is the substance and exists by itself, and that the spirit is accidental, and depends upon the substance of the body, although, on the contrary, the rational soul is the substance, and the body depends upon it. If the accident, that is to say the body, is destroyed, the substance, the spirit, remains.

Secondly, the rational soul, meaning the human spirit, does not descend into the body, it does not enter it, for descent and entrance are characteristic of bodies, and the rational soul is exempt from this. The spirit never entered the body, so in quitting it, it will not be in need of an abiding place: no, the spirit is connected with the body, as ... light is with the mirror. When the mirror is clear and perfect, the light of the lamp will be apparent in it, and when the mirror becomes covered with dust or breaks, the light will disappear.

The rational soul ... has neither entered this body nor existed through it; so after the disintegration of the composition of this body, how should it [the soul] be in need of a substance through which it may exist? On the contrary, the rational soul is the substance through which the body exists. The personality of the rational soul is from its beginning; it is not due to the instrumentality of the body, but the state and personality of the rational soul may be strengthened in this world; it will make progress and will attain the degrees of perfection, or it will remain in the lowest abyss of ignorance, veiled and deprived from beholding the signs of God.

Through his ignorance, man fears death, but the death he shrinks from is imaginary and absolutely unreal; it is only human imagination.93

O Son of the Supreme!
I have made death a messenger of joy to thee.
Wherefore dost thou grieve?

I have made the light to shed on thee its splendor.
Why dost thou veil thyself therefrom?94
Know thou that every hearing ear, if kept pure and undefiled, must, at all times
and from every direction, hearken to the voice that uttereth these holy words: ‘Verily,
we are God’s and to Him shall we return.’
The mysteries of man’s physical death and of his return have not been divulged, and
still remain unread. By the righteousness of God! Were they to be revealed, they would
evoke such fear and sorrow that some would perish, while others would be so filled with
gladness as to wish for death, and beseech, with unceasing longing, the one true God,
exalted be His glory, to hasten their end.

‘Abdu’l-Bahá, Bahá’I World Faith, p. 264
Bahá’u’lláh, Hidden Words, Arabic No. 32

.... Death proffereth unto every confident believer the cup that is life indeed. It
bestoweth joy, and is the bearer of gladness. It conferreth the gift of everlasting life. As to
those who have tasted of the fruit of man’s earthly existence, which is the recognition of
the one true God, exalted be His glory, their life hereafter is such as We are unable to
describe.
The knowledge thereof is with God, alone, the Lord of the worlds.95
...He, verily, has willed for you that which is yet beyond your knowledge, but which
shall be known to you when, after this fleeting life, your souls soar heavenwards and the
trappings of your earthly joys are folded up... 96
O Son of My Handmaid!
Didst thou behold immortal sovereignty,
thou wouldst strive to pass from this fleeting world.
But to conceal the one from thee and to reveal the other
is a mystery which none but the pure in heart
can comprehend. 97

In a ceaseless metamorphosis the earth is bringing forth new plants and animals, and new
generations of humanity along with all their inventions and their handiwork, while the old withers
and dies and is returned to dust, thus giving way to a new cycle of life.
As we look about and take stock, there is hardly a creature or object to be

seen that was
present only a short century ago. 100 years ago, all of the people on earth, their material wealth,
the countless modern gadgets they own, their homes and their furnishings, factories, office
buildings, highways, cars, ships, trains and airplanes, along with today's individual trees, plants
and animals, were then, with the rarest exception, non-existent.
Their bodies were still unborn, even the seeds for their existence were yet unformed. The
methods and mechanics of most of our cherished possessions had not even been invented!
The substance of their cells and fibers still lay dormant in water and soil, their metals and
chemical components were still locked inside ore, air and oil. Difficult as it may be to visualize,
most of the atoms that have made today's world appear, including those that make up our own
body, were then still part of the mineral kingdom, waiting in readiness to build the world of
tomorrow, the world in which we live today.
Observing this phenomenon from a reverse perspective, the people and large crowds that we
can see in old photographs or early movies, their buildings, their wealth, the vegetation and
animals, all of it has mainly vanished and has been replaced by new generations who today
populate a brand new and vastly different world ...
And a mere century hence, someone will come to precisely the same insight by viewing the
photographs and videos of ourselves and of all the exciting images of the world we presently

Bahá'u'lláh, Gleanings, Ch. CLXIV
Bahá'u'lláh, Kitáb-i-Aqdas, p. 55
Bahá'u'lláh, Hidden Words, Pers. No. 41

inhabit.
It is dramatic proof that all creatures, all material things, all earthly gifts, no matter how
precious or august, are never permanent. They are extremely transient and are destined to vanish
again sooner rather than later.
Such is the manifestation here on earth of the eternal powers of transformation and renewal
that pervade the universe.
Earth, water, flame, air, ether, life, and mind, and individuality –
Those eight make up the showing of Me, Manifest.

These be my lower Nature; learn the higher,
Whereby this Universe is, by its principle of life, produced;
Whereby the worlds of visible things are born as from a Yoni.
I am that womb: I make and unmake this Universe.98

The Bhagavad-Gita

All praise to the unity of God, and all honor to Him,
the sovereign Lord, the incomparable and all-glorious Ruler
of the universe, Who, out of utter nothingness,
hath created the reality of all things, Who, from naught,
hath brought into being the most refined and subtle elements
of His creation, and Who, rescuing His creatures
from the abasement of remoteness and the perils of ultimate extinction,
hath received them into His kingdom of incorruptible glory.
Nothing short of His all-encompassing grace, His all-pervading mercy,
could have possibly achieved it. How could it, otherwise,
have been possible for sheer nothingness to have acquired by itself
the worthiness and capacity to emerge from its state of non-existence
into the realm of being?

Bahá'u'lláh, Gleanings p. 64-65

e have now reviewed some Bahá'í texts dealing with God and creation and with man and
his universe. We have examined various theories of science and have looked at fruits of
meditation. We shall now return to one of the motivating factors behind the writing of this book,
namely Bahá'u'lláh's enigmatic utterance that was first mentioned in Chapter 3.
Its deceptive simplicity may conceal the fact that here is an almost elegant formula to explain
the birth of the universe, an enigma that seems to lie beyond the capacity of physical science to
solve. The accompanying commentaries are intended to stimulate, rather than to influence or to
limit the reader's own study and reflection on its hidden meaning.
Know then, that God,
praised and glorified be He,
took a line, split it lengthwise into two,
rotated the one about the other,
and so made from them the Universe.
The line, however, only formeth
from the point when you move it.
Conceive ye then Our meaning.
Wrapped within the brevity of the actual explanation, just twenty-seven key words in the
English translation, there may either lie an allusion to an as yet unknown

physical reality, or an
esoteric reference to a profoundly spiritual truth, or perhaps both. As future generations of
thinkers and scientists peel back layer upon shroud layer concealing the unknown, they shall
venture ever closer towards an innermost reality, yet they shall remain unable to penetrate and
describe the realm of absolute truth on account of the limits which have been set to human
understanding and language.
Bahá'u'lláh's explanation, like so many of His other writings about the universe, should not
be understood as a chronological account of creation, leaving us with the impression that there
may have been a 'time' when the universe did not exist. However, since an existence without
beginning or end transcends human comprehension, Bahá'u'láh has left us with this physical
parallel to a meta-physical reality.
"God... took a line ..."
If God is the creator of all things, seen or unseen, detected or undetected by our senses or by
our scientific instruments, nothing whatsoever exists unless it was created by God. If this were
not so, the Supreme Power we worship as God, or accept as an unknown Universal Mind, would
not be all-knowing, all-mighty, and all-encompassing. It would merely share these attributes with
other powers and deities. This would totally contradict the belief in the oneness of God as taught
by all of the world's religions. It would also make the existence of an ordered universe
impossible.

When "God... took a line," this line should therefore not be imagined as having pre-existed,
waiting for God to 'take it.' The line was itself conceived by the Creator. A line is a fitting
symbol to express infinity. As defined by geometry, a line has neither beginning nor end. It is also
defined as a section of an infinite circle. Think of a straight and level road as being a section of
earth's circumference, except that the earth is finite in size. Thus, an endless line that has neither
width nor volume, is no tangible object, but is strictly notional. One might think of a line as being
a delineation, a direction, an intended progression, or even a will.

It is noteworthy that according to current theory, the universe at the moment of the Big Bang
was compressed into zero size. Both a point or a line are of zero volume and therefore in a
physical sense absolute nothingness. However, a point like ‘a point of origin’, or ‘a point in time’,
lacks continuity and future direction. A line, on the other hand, exists in its entirety and projects
itself from infinity to infinity without beginning or end. Like ‘a line of reasoning’ it does intimate
a concept, a direction, a progression, whereas a point does not.
What then is the meaning of this line? Why does it have to be split into two, its two sections
braided like a rope, then given movement, before the universe could come into being? I found it
quite fruitless to try to unlock this puzzle, until I discovered several quotations in the Bahá’í
writings, the Bible, the Qur’án, and in ancient philosophical texts that promised to hold the keys
to a possible explanation.
The following quotations stress that the universal power we call God and by many other
names, exists outside the order of creation. God called creation into being through His Word.
Creation is therefore totally dependent on its creator, while God, the ultimate power, is sovereign
over all things and exists independently. It is of interest to note that Plato (p. 7) has written in the
Timaeus that the Divine Craftsman exists separate from the universe he has fashioned.

God was alone; there was none else besides Him. So lofty is this station that no
testimony can bear it witness, neither evidence do justice to its truth.99

In the beginning was the Word,
and the Word was with God,
and the Word was God.100

The same was in the beginning with God.101

All things were made by him; and without him
was not any thing made that was made.102

Every thing must needs have an origin and every building a builder. Verily, the Word
of God is the Cause which hath preceeded [emphasis added] the contingent world.103

This Word transcendeth the limitations of known elements and is exalted above all the essential and recognized substances. It became manifest without any

syllable
or sound and is none but the Command of God which pervadeth all created things. It
hath never been withheld from the world of being.

Bahá'u'lláh, The Kitab-i-Iqan, p. 91
John 1:1
John 1:2
John 1:3
Bahá'u'lláh, Tablets, p. 141

The first emanation from God is the bounty of the Kingdom, which emanates and is
reflected in the reality of the creatures, like the light which emanates from the sun and is
resplendent in creatures; and this bounty, which is the light, is reflected in infinite forms
in the reality of all things, and specifies and individualizes itself according to the
capacity, the worthiness and the intrinsic value of things.104
As regards thine assertions about the beginning of creation, this is a matter on which
conceptions vary by reason of the divergences in men's thoughts and opinions. Wert thou
to assert that it hath ever existed and shall continue to exist, it would be true; or wert
thou to affirm the same concept as is mentioned in the sacred Scriptures, no doubt would
there be about it, for it hath been revealed by God, the Lord of the worlds. Indeed He was
a hidden treasure. This is a station that can never be described nor even alluded to. And
in the station of 'I did wish to make Myself known', God was, and His creation had ever
existed beneath His shelter from the beginning that hath no beginning, apart from its
being preceded by a Firstness which cannot be regarded as firstness and originated by a
Cause inscrutable even unto all men of learning.105
This 'Cause inscrutable even unto all men of learning', is the Will of God. The Bahá'í
writings also refer to it as The Primal Will or The First Emanation. It finds expression in The
Word of God, or in His Command which called creation into being. This was the timeless
moment when 'God took a line …'
"... Split it lengthwise into two..."
A metaphysical line of zero width and zero thickness cannot be "split ...

lengthwise" in a
physical sense. The act of splitting should therefore be understood as an act of duplication in
order to establish a certain duality that is necessary to bring creation into being.
However, Bahá'u'lláh's choice of the word split seems to make it clear that the second line is
in reality a part of the original line, definitely a chip off the old block, if one is allowed here the
use of the vernacular. It would therefore have the same qualities and attributes as the original line.
Where there was a single line of unmanifested Divine Will, there is now a second line to
make manifest -- or to mirror -- divine purpose, namely creation. Without creation and its
creatures the existence of God and His attributes would remain unknown and unadored. Without
this duplication, the original line would have no effect or purpose.
Throughout nature can be observed dualities which alone can bring about certain realities:
There could be no system of numbers without the even and uneven values; a magnetic field needs
positive and negative poles; without the male and the female there can be no procreation; without
darkness, light would not be apparent; without chaos, order would not be in evidence; and many
more. The following quotation explains the necessary duality between a vessel and its contents,
between God, the active Donor, and creation, the recipient.
The world of existence came into being through the heat generated from the interaction between the active force and that which is its recipient. These two are the
same, yet they are different [Emphasis added]. Thus doth the Great Announcement inform thee about this glorious structure. Such as communicate the generating influence and such as receive its impact are indeed created through the irresistible

'Abdu'l- Bahá, Some Answered Questions, p. 295
Bahá'u'lláh, Tablets, p. 140

Word of God which is the Cause of the entire creation, while all else besides His
Word are but the creatures and the effects thereof. 106
In the vision of Hermes (p. 8, 9), The Poimandres, he witnesses the Universal Mind which he
calls The Light.
I saw in my mind that the Light consisted of innumerable Powers, and had come to be

an ordered world, but a world without bounds.107
All things are but two, that which is made and that which makes. And the one cannot
be separated from the other; the Maker cannot exist apart from the thing made, nor the
thing made apart from the Maker.108
The object of existence is the appearance of the perfections of God.109
Nature is God’s Will and is its expression in and through the contingent world.110
By His Wish, which is the Primal Will itself, all have stepped out of utter nothingness,
into the realm of being, the world of the Visible.111
If this explanation seems hard to comprehend, we should ask ourselves how people before the
invention of photography would have reacted to our present new magic when a blank sheet of
paper put into a chemical solution yields images of events that happened long ago, or shows the
panorama of far-off places.
“...Rotated the one about the other ...”
There is wisdom in this analogy of a braided rope. If one accepts the interpretation of the
original line being of the essence, and its twin being the receptacle, the mold for the universe and
all its creatures, both would be complementary and would function in perfect unison while still
being distinct. A comparison of the sperm and the egg comes to mind. What better analogy could
there be than the strands of a rope to express a state of inseparable cohesion while still being
separate from each other in a sense of being distinct.
Another mental image that emerges is this: A line, whether single, split, or intertwined,
proceeds unbroken from infinity to infinity. This parable, therefore, makes it quite clear that the
act of creation was not a single, one-time event that took place at some point in the imagined
distant past, but that the process actually continues here and now (p. 22). Throughout eternity, the
divine will continues to shape and to control the physical manifestation of divinity. Hence Plato’s
assertion of an ‘eternally young’ universe (p. 9). Our earthbound intellect observes this ongoing
drama as an ever-changing physical environment, confined within the dimensions of time and
space.
A further analogy of two lines rotating “one about the other” is the

spatial image of what
mathematicians and physicists call a moving or traveling spiral. Such a spiral may give the
illusion of forward movement through time and space, but it is in reality in a state of cyclical
rotation that knows no beginning and no end.

Bahá'u'lláh, Tablets of Bahá'u'lláh, p. 140
Libellus 1:7
Libellus 14:5
'Abdu'l- Bahá, Some Answered Questions, p.196
Bahá'u'lláh, Tablets, p.142
Bahá'u'lláh, Kitáb-i-Iqán, p. 98

"The line, however, only formeth from the point when you move it."
A line, whether single, split, or braided, is pure abstraction. It may be a concept, a direction, a
will, but in a physical sense it is completely non-existent. It remains a non-object, something
latent or dormant, unless it is set in motion "by His Wish which is the Primal Will itself".112 Only
through movement will it take on form and attain physical substance. Wherever we look, motion
is paramount in the physical universe. Without it there can be no corporeal existence, because
without motion within and between the atoms, matter would have neither substance nor cohesion.
There would be no light and no sound. Unless it remained in motion our planet could neither
maintain its balance, nor stay in solar orbit. Without forward movement an aircraft would have no
lift. Without the steady flow of electrons computers would shut down. Without constant
movement of blood and nutrients, organisms would die.
The "you" in the sentence "...when you move it..." does of course not allude to man to whom
this tablet is addressed, but it is explaining the process. Apart from this being obvious, the
sentence would otherwise have been phrased "when ye move it."
Moreover, "the point when" (not "the point where") the line was moved out of its latent state
denotes a point in time rather than a location. But this wording is again a crutch for our finite
mind, because this particular 'point in time' has absolutely nothing to do with our earthly
understanding of the time element. The movement occurred at God's bidding when the two lines
fused and the atomic building blocks for the universe and for man's eventual

physical existence
were formed and endowed with their primordial motion. Physicist Gary Zukav writes about this
motion in his book The dancing Wu Li Masters:
“Subatomic particles spin around a theoretical axis like a spinning top. The big
difference [between the two] is that a top can spin faster or slower, but a subatomic
particle always spins exactly at the same rate. Every electron… spins at exactly the same
rate as every other electron. If the spin of a particle were to be altered, it no longer could
be considered an electron, or a proton, or whatever it is… This makes us wonder
whether all the different particles might not be just different states of motion of some
underlying structure or substance. This is the basic question of particle physics.”
[Emphasis added]
We shall address the atom in Chapter 24.
Hermes (p. 8) says:
“Everything which exists in the cosmos is in motion; and that which is in motion must be
alive.”113
And he states further:
“Wherever there is life there is soul, but in the irrational animal the soul is devoid of mind.”
The companion of motion throughout the universe, from the atom to the galaxies, is constant
change. It affects every creature and every last particle. It can therefore be said that wherever
there is life, whether animate or inanimate, there is motion, and there is change.
Physical bodies are transferred past one barrier after another, from one life to

another, and all things are subject to transformation and change, save only the essence of
existence itself -- since it is constant and immutable, and upon it is founded the life of
every species and kind, of every contingent reality throughout the whole of creation.114
The forever recurring cycles that can be observed throughout the universe have neither
beginning nor end and are in their unending advance reminiscent of a great

cosmic spiral in both
their dimensions of time and space. Only within the 20th century has our awareness of the
universe been enlarged and given us a cosmic perspective of creation's awe inspiring panorama.
This increased capacity virtually amounts to a new endowment. It is slowly dissolving the haze
that has shrouded man's spirit and intellect through countless earlier centuries. It seems destined
to lead to a paradigm shift in all human affairs. The full ramifications this will have for our future
existence can only be dimly envisioned by those who are here to witness its dawn.
All theories and explanations of the previous pages require this important addendum: Any
serious meditation about the mystic parable this chapter has attempted to explore must eventually
lead us to the realization that we are unable to fathom the unfathomable. Instead, we will readily
testify to the truth of these words:
To every discerning and illuminated heart it is evident that God, the unknowable
Essence, the Divine Being, is immensely exalted beyond every human attribute, such as
corporeal existence, ascent and descent, egress and regress. Far be it from His glory that
human tongue should adequately recount His praise, or that human heart comprehend
His fathomless mystery. He is, and hath ever been, veiled in the ancient eternity of His
Essence, and will remain in His Reality everlastingly hidden from the sight of men. "No
vision taketh in Him, but He taketh in all vision…"
The door of the knowledge of the Ancient of Days being thus closed in the face of all
beings, the Source of infinite grace, according to His saying, "His grace hath
transcended all things; My grace hath encompassed them all," hath caused those
luminous Gems of Holiness to appear out of the realm of the spirit, in the noble form of
the human temple, and be made manifest unto all men, that they may impart unto the
world the mysteries of the unchangeable Being, and tell of the subtleties of His
imperishable Essence. These sanctified Mirrors, these Day Springs of ancient glory, are,

one and all, the Exponents on earth of Him Who is the central Orb of the universe, its
Essence and ultimate Purpose.115

‘Abdu’l- Bahá, Selections from the Writings, p. 157
Bahá’u’lláh, Gleanings, p. 47

This is a new cycle of human power. All the horizons of the world are luminous, and the
world will become indeed as a garden and a paradise. It is the hour of unity of the sons of
men and of the drawing together of all races and all classes. You are loosed from ancient
superstitions which have kept men ignorant, destroying the foundation of true humanity.
The gift of God to this enlightened age is the knowledge of the oneness of mankind and of
the fundamental oneness of religion.
War shall cease between nations, and by the will of God the Most Great Peace shall
come; the world will be seen as a new world, and all men will live as brothers.

‘Abdu’l-Bahá in London, p. 19-20

t the dawn of the twentieth century, our awareness of the universe extended from cells and
molecules to the stars of the Milky Way. Man’s broadening knowledge encompassed mainly
those objects and cycles within creation’s cosmic spectrum that lay closest to the realm of our
own physical existence; our body and its rhythms, the earth and its cycles, the life cycles of
earth’s flora and fauna, the sun and its planets. Almost in parallel to these physical outer
boundaries of our understanding, the horizon of thought and conduct remained similarly confined
to the mental mold of the past.
At the end of the century all this had changed. We have suddenly discovered the atoms and
galaxies, entities and their cycles that belong to the inner and outer universe. Because their scale
and their time frames are so infinitely larger, or smaller, than those of our own immediate
environment, they had for the longest time eluded our senses and intelligence. As to the realm of
thought, we now realize that many cherished ideas of the past concerning our origin, history and
future potential were equally limited and sometimes distorted.
There exists yet another universal reality, this one beyond capture by

telescope or microscope: our spiritual lifeline to our Maker, the Ruler of the universe. The significance of this link is
becoming more apparent just as we arrive at a critical crossroads on our path of development. It
brings to our modern age, blessed with great material progress whilst beset by many ominous
forces, the hitherto unknown endowment of global vision. Undeterred by apathy and skepticism it
is destined to unite our strife-torn race, raise up in the fullness of time a world civilization and so
avert incalculable dangers that are threatening our existence.

Perhaps the most striking feature in human history is that for countless centuries there was
very little scientific progress or technological advance. Throughout many millennia fire remained
the greatest force available to man, and wind and muscle power were his only means of
locomotion.
Not until the year 1000 A.D. did the Chinese mix charcoal, sulfur and potassium nitrate into

gunpowder and initially used it for harmless fireworks displays. One hundred years later they
constructed the first clock. Amazingly it was water-driven.
The pace of scientific discovery was slow compared to our present experience. Nevertheless,
the significant advances made in mathematics, astronomy, geographic exploration and medicine
laid the basis for our modern science. Without Gutenberg's invention of the printing press in 1450
universal education would have remained impossible. Similarly, James Watt's perfection of the
steam engine paved the way for faster transportation and mechanized manufacturing. However,
another century had to pass before electricity and the internal combustion engine made their debut
and raised the curtain on the modern era of industry and transportation.
Viewed from today's vantage point, man's discoveries of the physical world were therefore
few and far between. Social development moved at a similar snail pace. It evolved in painful
progression from family to tribal unit, to nation building. This process was one of constant
conflict where wars determined the course of history and decided who would be master and who
would be slave. Because of the slow pace of developments, often bridging several generations,

the minute increments in knowledge and progress were virtually unnoticeable during the lifetime
of an individual.
One can therefore appreciate why the average person viewed the world as a place without
change and why he sought refuge in old traditions and accepted norms of behavior, instead of
venturing into dangerous new avenues of thought and conduct for which there seemed no urgent
requirement. Those who dared to pioneer new ideas were either ignored, ridiculed or persecuted.
Today they are venerated as saints, philosophers, explorers and early scientists. Thanks to their
courage of convictions human ethics improved and many wonderful things were invented which
today we take entirely for granted.

Then, suddenly, in this twentieth century, the old and comfortable balance between zero
advance in science and technology and zero change in behavior patterns was seriously upset.
Already in the 17th century the philosopher René Descartes had made this prescient statement,
“There is nothing so far removed from us as to be beyond our reach, or so hidden that we
cannot discover it.” His bold forecast of three centuries ago which must have puzzled many of
his contemporaries, took a giant step closer to reality when in the 1930’s both macrocosm and
microcosm were opened up as never before.
Thousands of galaxies were discovered beyond the Milky Way, long thought to be the largest
entity in all the heavens. At the other extreme of the cosmic spectrum several physicists now
began to uncover the mysteries of the smallest building blocks of the universe, the atoms. As if by
magic the intellectual veils were rent asunder and the age of modern science was suddenly upon
us. Except for a ban of free inquiry as was practiced in the Middle Ages nothing could have
prevented the latter-day emergence of atomic science.

This abrupt enlargement of our scientific and physical horizon without a corresponding
widening of our moral and spiritual ones has created a potential doomsday scenario. All we had
to do to hasten its arrival was to continue an age-old habit of using the latest inventions for

waging war to resolve conflicts with our neighbors, just as Hannibal used elephants to surprise
the Romans, Rome wielded catapults and Gengis Khan employed bombs.
Well before the turn of the last century Bahá'u'lláh warned of the looming crisis and taught
humanity how to avoid it.
... Civilization, so often vaunted by the learned exponents of arts and sciences, will, if
allowed to overleap the bounds of moderation, bring great evil upon men. Thus warneth
you He Who is the All-Knowing. If carried to excess, civilization will prove as prolific a
source of evil as it had been of goodness when kept within the restraints of moderation.
....The day is approaching when its flame will devour the cities...116
Strange and astonishing things exist in the earth but they are hidden from the minds
and the understanding of men. These things are capable of changing the whole atmosphere of the earth and their contamination would prove lethal. Great God! We have
observed an amazing thing. Lightning or a force similar to it is controlled by an operator
and moveth at his command.
An infernal engine hath been devised, and hath proved so cruel a weapon of destruction that its like none hath ever witnessed or heard. The purging of such deeplyrooted and overwhelming corruptions cannot be effected unless the peoples of the world
unite in pursuit of one common aim and embrace one universal faith.117
These warnings, written in the present tense, seem to allude to the splitting of atoms and its
dreadful consequences which still lay over half a century in the future. Bahá'u'lláh knew of the
powers hidden inside the atom, clearly foresaw their discovery and release by man, and predicted
the dire consequences this would have on a world which was still torn by unchecked rivalries.

Hiroshima devoured by the Flame of Civilization

Bahá'ulláh, Gleanings, pages 342-343
Tables of Bahá'ulláh, page 69

The 'infernal engines' named "Little Boy" and "Fat Man"

=

Split the atom's heart, and lo within it
thou wilt find a sun.
Bahá'u'lláh -- The Seven Valleys, p.12

The very notion that matter could one day become a source of vast energy stemmed from Einstein's law of mass-energy equivalence, a theory he had formulated back in 1905 at the ripe old age of 26. It had put him hopelessly at odds with established science. According to Einstein, E = mc2, the amount of energy locked inside a mass equals this mass multiplied by the square of the velocity of light. In graphic language, one pound of any substance completely converted into energy would produce some ten billion kilowatt hours or drive a cruise ship roughly 500 times around the world. According to Einstein's biographer Peter Michelmore, his only defense of this seemingly preposterous theory was, "Physics is a logical system of thought in evolution. Its basis cannot be obtained merely by experiment and experience. Its progress depends on free invention... I haven't the faintest doubt that I am right," adding pessimistically, "There is not the slightest indication that the energy will ever be obtainable. It would mean that the atom would have to be shattered at will..."
For the next thirty years, scientists were unable to discover how mass could be converted into energy, although they now recognized that some such process was taking place inside stars, including our own sun. Afterwards it only took another ten years of intensive effort to prove that Einstein was right after all and to bring down sun's fire on mother earth at a place called Hiroshima.

Since inventions can never be pushed back into Pandora's Box, the only way to avert Armageddon is a change in behavior. There is every reason to hope that this more cheerful alternative will come to pass. The discoveries about the evolution of the universe hint at a reality that has so far eluded our intelligence. Wherever we look, from the most distant galaxies to the smallest known particle, we are constantly reminded of the wisdom of Heraclitus who wrote two millennia ago that "there is nothing permanent except change."

But in nature's realm change follows a well-ordered plan. Today we know that the conditions that have made our existence possible on this planet have been evolving in our absence in what

appears to have been a premeditated development going back billions of years. It may therefore
not be too extravagant to suggest that the life of the human species follows a similar well-ordered
process of maturation. Since any kind of process that ends in self-destruction defeats its very
purpose and contradicts its innate wisdom, logic should make us anticipate an impending change
in humanity's behavior. A change that will restore the vital harmony between his intellect and
his emotions. This would regain the earlier mentioned critical balance which stands watch over
the fortunes of the human race. As a matter of fact, there are many indicators that this process is
already well on its way.
In this divine age see what development has been attained in the world of minds and
thoughts, and it is only the beginning of the dawn. Before long you will see that new
bounties and divine teachings will illuminate this dark world and will transform these sad
regions into the paradise of Eden.118

Half a century has passed since that day at Hiroshima. Two new generations have been
raised. The vast majority of people living today were not even born then and to them those years
long ago appear as remote as ancient history. Anybody who grew up in this century's second half
has no recollection of what the world was then really like, and the daily barrage of news reports
which always focus our attention on current trouble spots tend to make us overlook the truly
wondrous progress the world has witnessed within the short span of a lifetime. Such progress can
be discerned not only in the fields of science, but also in the realms of social conscience and
international relations.
It is a pity that our lives and sometimes our memories are too short to fully appreciate or even
to notice such change. Such lack of awareness can be harmful, because it supports the claim that
things never change. Along with this notion comes an irrational adherence to old standards and
conventions, regardless how outdated they may be.
A brief examination of yesterday's world conditions will not only show the huge difference

half a century has made, but will make a sanguine anticipation of future changes all the more credible.

When the world was moving inexorably towards the precipice of World War I and after 21 years of respite towards World War II, the physical conditions on this planet along with the 'mind set' of its people could not have formed a greater contrast to what they are now. Viewed by today's standards they were downright primitive and unenlightened. They made up the dry tinder which the smallest spark could ignite.
Right up to the 1930's people the world over lived 'apart' from each other. They knew very little about other countries and cultures, except what slanted school books and nationalist

'Abdu'l- Bahá, Some Answered Questions, p. 163

propaganda allowed them to know. There was of course no television, fax or e-mail. Very few people had a telephone and only the affluent in a handful of developed countries owned radios strong enough to pull in foreign broadcasts. But even this did not help much because even fewer people could understand the language.
Travel was equally slow and cumbersome. No matter what the emergency it took at least seven days to travel from Berlin to Washington and almost a month to travel from Washington to Tokyo.

RMS Cedric of the Whitestar Line on which 'Abdu'l-Bahá came to America.

It carried 365 Passengers 1st Class, 160 2nd Class and 2,350 in Steerage. 15,000 H.P. made it cruise at just 16 knots. In service from 1902 to 1932 it was typical for slow ocean crossings in the first half of the 20th century.

Apart from such physical handicap, a babel of tongues impeded any fruitful dialogue. Only a very small elite knew other than their own language.
A deep isolation caused people to distrust their neighbors and to be ever suspicious of their motives. It spawned a zealous nationalism which rejected the idea of cooperative world trade, advocating instead adversarial competition to the point of conquest. Only the occupation of other people's lands would guarantee access to resources and gain supremacy

over a perceived
enemy.
Contact between nations was never on a broad people-to-people basis, but limited to
diplomatic niceties and double-speak by a handful of statesmen and their emissaries whose own
prejudices and misunderstandings soon colored public opinion.
Policies and attitudes were almost always shaped and controlled by men alone and with few
exceptions so were most business enterprises. Women remained uninformed and uninvolved, tied
down to home and hearth from dawn to dusk. Instead of bringing a kinder, gentler touch to life,
loyalty required a woman to be a passive bystander and to back her man.

The strange new word ‘internationalism’ which was first introduced into the English
language in the year 1780 by the philosopher and jurist Jeremy Bentham, was limited in its
meaning to relationships between two nations or members of a small alliance.

It never was used in today’s concept as something universal in scope. Right up to the start of
World War II the only thing that could have passed for a global effort were shipping schedules,
the telegraph and the International Postal Union. There were no global undertakings in today’s
sense, no global consultation on common problems affecting all nations, no global megaprojects. Action was almost always taken by individual nations that occasionally banded together
in the pursuit of some narrow common interest, but there never was global participation. The socalled ‘weaker’ nations who always made up the majority of humanity, remained locked out
without any say in the decision making process, despite the fact that many decisions affected their
own welfare and security.
Whenever misfortune befell a far-away country, such as floods, earthquakes, or famine, very
few took notice and fewer still offered aid. Whenever a potentate assumed power to tyrannize his
people, few showed indignation and nobody thought of sending a ‘peace keeping force’ to protect
‘human rights’. Neither term was then listed in any current dictionary.
Strained relations between
countries were nobody’s concern unless, of course, they did affect one’s own security.
Aggression brought little sense of collectivity and even lesser readiness for collective

response. In 1935, the near-defunct League of Nations merely ‘condemned’ Italy for marching
into Abyssinia, but never intervened. Before the outbreak of World War II Britain’s Prime
Minister Chamberlain found it “horrible, fantastic, that we should be digging ditches and trying
on gas masks here, because of trouble in a far-away land...” He was referring to Czechoslovakia,
today a two-hour plane ride from London. Nothing was in place to facilitate an ongoing dialogue
between all nations of the world, to help in negotiations, to arbitrate differences, and to avoid
armed conflict. By the time a crisis broke it was usually too late to stop the slide into war.
Such were the conditions right up to the outbreak of World War II and because similar
conditions had prevailed throughout modern history there seemed absolutely no grounds for
optimism that the world would ever be any different.

In the end the soothsayers were all proven wrong: Humanity has completely rebuilt its house
and has moreover laid the foundations for even more spectacular future progress.
Global institutions such as the United Nations and its many agencies, instant global reporting

on color television via satellite, linkage by phone, fax and e-mail, highway networks and jumbo
jets, interlocking global manufacture, trade and distribution, all of these, aided by powerful
computers and robotics, have suddenly changed the world as no one would have thought possible
just a few decades ago.
Hand in hand with these innovations, people more and more think globally while acting
locally. Here as elsewhere, the medium of the Internet promotes a free exchange of ideas. It
frustrates censorship and the machinations by whatever interest group to ‘manage’ news or
thoughts in a futile effort to sway public opinion.
Young people by the millions study abroad, work abroad to help the less fortunate, and marry
into families who until recently were snubbed as foreigners or considered blood enemies. Tens of
millions more roam the planet as tourists or on business. Largely unhindered, they are free to
make their own observations and form their own opinion.

To further this world-wide process of learning and exchange of ideas in all aspects of human endeavor, the number of languages used for dialogue has shrunk to just a few. Taught to school children of the world's most populous nations, their universal usage makes a translation of science literature increasingly redundant.

Today, the term Global Village is no longer just a catch phrase but an established fact. There has taken root a sense that the entire planet is our common home and that we are its custodians.

This awareness that has never existed in the past, lies also at the core of international efforts to protect the global environment. By contrast, 50 years ago the terms pollution and environmental protection were not known. As was said earlier, the most profound experience for modern man was not so much to step on the Moon, but to look back at his small living planet suspended in the dark emptiness of space.

Since technology influences society, improvements of this magnitude in the world's physical condition should be seen as harbingers of an impending and far-reaching change in the relationships between peoples and nations. Once the breakthroughs in transportation and communication had shrunk the world into a village one could envision a gradual development towards a new global order. On the other hand, such expectations had to be unrealistic for people still living in the horse and buggy age. However, it now presents humanity with this stark equation:

Global governance is made feasible through the world's shrinkage, which in turn demands global governance for its survival.

Even prior to these monumental shifts taking place, Bahá'u'lláh addressed clear warnings to the rulers of Europe and America. Queen Victoria, Napoleon III, Kaiser Wilhelm I, Czar Nicholas of Russia, the Emperor of Austria and the Sultán of Turkey were among those to whom He wrote.

Take ye counsel together, and let your concern be only for that which profiteth mankind and bettereth the condition thereof... Regard the world as the human body which, though at its creation whole and perfect, hath been afflicted, through various causes, with grave disorders and maladies. Not for one day did it gain ease,

nay, its

sickness waxed more severe, as it fell under the treatment of ignorant physicians, who gave full rein to their personal desires, and have erred grievously. And if at one time, through the care of an able physician, a member of that body was healed, the rest remained afflicted as before. Thus informeth you the All-Knowing, the All-Wise. We behold it, in this day, at the mercy of rulers, so drunk with pride that they cannot discern clearly their own best advantage, much less recognize a Revelation so bewildering and challenging as this.

...That which God hath ordained as the sovereign remedy and mightiest instrument for the healing of the world is the union of all its peoples in one universal Cause, one common Faith. This can in no wise be achieved except through the power of a skilled, an all-powerful, and inspired Physician. By My life! This is the truth, and all else naught but error.119

O banks of the Rhine! We have seen you covered with gore, inasmuch as the swords of retribution were drawn against you; and you shall have another turn. And We hear the lamentations of Berlin, though she be today in conspicuous glory.120

Hearken ye, O Rulers of America and the Presidents of the Republics therein... Adorn ye the temple of dominion with the ornament of justice and of the fear of God, and its head with the crown of the remembrance of your Lord, the Creator of the heavens... Take ye advantage of the Day of God.... Bind ye the broken with the hands of justice, and crush the oppressor who flourisheth with the rod of the commandments of your Lord, the Ordainer, the All-Wise.121

Ere long shall clamorous voices be raised in most lands. Shun them, O My people, and follow not the iniquitous and evil-hearted.122

In his essay VII on politics Ralph Waldo Emerson warned the world to be on guard against the excesses of a highly motivated few:

The boundaries of personal influence, it is impossible to fix, as persons are

organs of
moral or supernatural force. Under the dominion of an idea, which possesses the minds
of multitudes..., the powers of persons are no longer subjects of calculation. A nation of
men, unanimously bent on freedom, or conquest, can easily confound the arithmetic of
statists [sic.], and achieve extravagant actions, out of all proportion to their means...
All warnings went unheeded, thus allowing a moribund order to tenaciously take its toll
around the globe amid orgies of slaughter. It stained the past century with the blood of well over
200 million human beings. Each single day of the 20th century has claimed in excess of 5,000
victims. Only hindsight would recognize the cause of this obscene national, racial, tribal and
religious mania, namely the baffling incarceration of man's spirit in obsolete ideologies and
values that had lost all legitimacy and currency for this new age.

Epistle to the Son of the Wolf, p.57-63
The Kitab-i-Aqdas, p. 53
The Kitab-i-Aqdas, p. 51-52
The Kitab-i-Aqdas, p.32

A new life is, in this age, stirring within all the peoples of the earth; and yet none
hath discovered its cause or perceived its motive.123
20th century science is the child of a new age. Increased knowledge is not to blame for today's
dangers. The real culprits are the time-hardened habits of national, racial, and religious rivalry.
These destructive products of the past resulted from people living in isolation and regularly
claiming superiority over others.
Historically, in all parts of the world organized religions have tended to divide people instead
of bringing them together as urged by their founders. Unfortunately, even today religious
prejudices often cause mistrust, aversion, and animosity. Since science and religion spring from
the same universal source, the great impetus of renewal is destined to come not just to science
alone, but to religion as well.
From every standpoint the world of humanity is undergoing a re-formation. The laws
of former governments and civilizations are in a process of revision,

scientific ideas and theories are developing and advancing to meet a new range of phenomena; invention and discovery are penetrating hitherto unknown fields revealing new wonders and hidden secrets of the material universe; industries have vastly wider scope and production; everywhere the world of mankind is in the throes of evolutionary activity indicating the passing of the old conditions and advent of the new age of re-formation. Old trees yield no fruitage; old ideas and methods are obsolete and worthless now. Old standards of ethics, moral codes and methods of living in the past will not suffice for the present age of advancement and progress.

This is the cycle of maturity and re-formation in religion as well. Dogmatic imitations of ancestral beliefs are passing. They have been the axis around which religion revolved but now are no longer fruitful; on the contrary, in this day they have become the cause of human degradation and hindrance. Bigotry and dogmatic adherence to ancient beliefs have become the central and fundamental source of animosity among men, the obstacle to human progress, the cause of warfare and strife, the destroyer of peace, composure and welfare in the world. Consider conditions in the Balkans today [in 1912]; fathers, mothers, children in grief and lamentation, the foundations of life overturned, cities laid waste and fertile lands made desolate by the ravages of war. These conditions are the outcome of hostility and hatred between nations and peoples of religion who imitate and adhere to the forms and violate the spirit and reality of divine teachings.

The Lord of mankind has bestowed infinite bounties upon the world in this century of maturity and consummation. The ocean of divine mercy is surging, the vernal showers are descending, the Sun of Reality is shining gloriously. Heavenly teachings applicable to the advancement of human conditions have been revealed in this merciful age. The re-formation and renewal of the fundamental reality of religion constitute the true and

outworking spirit of modernism, the unmistakable light of the world, the manifest
effulgence of the Word of God, the divine remedy for all human ailment and the bounty
of eternal life to all mankind.124

Bahá'u'lláh – Gleanings, p. 196
'Abdu'l-Bahá, Foundations of World Unity, p.10

Once we realize that the universe has only one Maker, we must accept that there can be no
contradiction between the rules that govern both the physical and spiritual realms. Whenever
science and religion appear to differ we may be sure that one or both of them are out of step with
cosmic reality. While science must not overleap the bounds of moderation in regard to moral law,
religion must be kept free of man-made dogma that brings it into conflict with science.
Once humanity pays as much attention to divine rules governing its inner life as it obeys the
laws of physics and chemistry, its inventions will be constructive, instead of destructive,
regardless of the magnitude of physical power they may place into our hands. Only then shall we
banish danger and become true stewards of our planet's future welfare.
he Great Being, wishing to reveal the prerequisites of the peace and tranquility of
the world and the advancement of its peoples, hath written:
The time must come when the imperative necessity for the holding of a vast, an
allembracing assemblage of men will be universally realized. The rulers and kings of the
earth must needs attend it, and, participating in its deliberations, must consider such
ways and means as will lay the foundations of the world's Great Peace amongst men.
Such a peace demandeth that the Great Powers should resolve, for the sake of the
tranquility of the peoples of the earth, to be fully reconciled among themselves. Should
any king take up arms against another, all should unitedly arise and prevent him. If this
be done, the nations of the world will no longer require any armaments, except for the
purpose of preserving the security of their realms and of maintaining internal order
within their territories. This will ensure the peace and composure of every people,

government and nation. We fain would hope that the kings and rulers of the earth, the
mirrors of the gracious and almighty name of God, may attain unto this station, and
shield mankind from the onslaught of tyranny.
...The day is approaching when all the peoples of the world will have adopted one
universal language and one common script. When this is achieved, to whatsoever city a
man may journey, it shall be as if he were entering his own home. These things are
obligatory and absolutely essential.
It is incumbent upon every man of insight and understanding to strive to translate
that which hath been written into reality and action.... That one indeed is a man who,
today, dedicateth himself to the service of the entire human race. The Great Being saith:
Blessed and happy is he that ariseth to promote the best interests of the peoples and
kindreds of the earth. In another passage He hath proclaimed: It is not for him to pride
himself who loveth his own country, but rather for him who loveth the whole world. The
earth is but one country, and mankind its citizens.125

Bahá'ulláh, Gleanings Ch. CXVII, pages 249-250

His eye itself turns into light,
sees light in all design,
and truth, so simple, clear and bright,
grows one with him, its shrine.
And all and none, begun and done,
and big and small, and stone and sun,
are now his own, and all is One.

Dr. Adelbert Mühlschlegel, "The Seven Valleys"

he force that binds together the particles that make up an atomic nucleus is the glue of the
universe. When released it is 'atomic energy', the greatest force known to man. Strange as it
may seem to post-Hiroshima generations, this energy that dwells within the atom is truly divine.
It has been around since the dawn of creation. It is the innermost cohesive force of all things and
from a safe distance like the Sun's surface, its fire is the giver of life to all things. Only when
used to destroy and poison life does it become an abomination. It is a tragedy

that a force that is
responsible for all existence, a force which one day may very well become the guarantor of
humanity's long term survival prospects on this planet, should have earned such an odious
reputation through man's folly.
According to Bahá'u'lláh the atom proclaims ultimate wisdom.
Not a single atom in the entire universe can be found which does not declare the
evidences of His might, which does not glorify His holy Name, or is not expressive of the
effulgent light of His unity.126
How resplendent the luminaries of knowledge that shine in an atom and how vast the
oceans of wisdom that surge within a drop.127

The smallest atoms in this universal system are similar to the
greatest entities in the universe.128
There exists an extraordinary similarity between a single atom and our vast solar system.
Both consist mainly of what we call empty space and of various constituent particles that are so
minute in size that one could almost lose faith in the 'reality' of matter.
Picture the atom's nucleus as the sun around which at great distance circle the electrons like
disembodied planets. Just as our sun contains 99 per cent of all matter present in the solar system,
so does the nucleus of an atom, leaving the electrons, like the planets, circling the core as
seemingly insignificant particles.

Gleanings, p. 62
Gleanings, p. 177
'Abdu'l-Bahá, Some Answered Questions, Ch. 47

According to present-day science, the atomic nucleus occupies only the 100 trillionth part
(minus 14th power of ten) of an atom. Such a number, a 1 followed by 14 zeros, is difficult to
grasp. In order to come to grips with this cosmic dimension, one has to think of an atom as being
a large sphere of 46 meters (150 feet) in diameter. Its nucleus would then be no larger than a tiny
ball of buckshot, one millimeter across. The electrons would be whirling around this nucleus
along the sphere's surface, all pursuing different "orbits" at the speed of light. If we were to
transfer these proportions to the solar system, where the sun's diameter is

1,400,000 kilometers
instead of the one millimeter of the nucleus in our atomic model, the electrons would circle the
sun at a distance of 6.5 billion kilometers. Does it come as any surprise that this distance roughly
corresponds to the orbit of Pluto, our sun's outermost planet.
Apart from the fact that the smallness of the atom eludes any attempt to capture its image
even by using an electron microscope, it is difficult to create atomic models that show the atomic
nucleus and circling electrons in proper proportion to their respective size and their distance from
each other. An early attempt to popularize the atom was made at the 1958 World Fair in Brussels
where visitors admired a rudimentary model and could climb it as observation tower. Other
depictions on the next page are slightly more realistic, but still miss the mark.

An atomic nucleus consists of an equal number of positively charged protons and neutrons
that carry no charge, but have roughly the same mass as the protons. Around the nucleus circle at
speeds of trillions of revolutions per second a like number of electrons with a negative charge and
practically zero mass. Electrons bond with the nucleus in various proportions to form the many
atomic species that are unique and changeless for each of the elements. The number of electrons
and their complex orbits around the nucleus determine the chemical responses that atoms have
towards their neighbors. Given the right kind of affinity, temperature range and pressures, atoms
will enter into wedlock with each other to form much larger structures, the molecules. This will
happen when they either share or even transfer their electrons whose 'orbits' then intertwine with
one or more neighboring atoms. It is this tremendous adhesion of electrons to other atoms that is
the sole cause of what we see as 'form', or feel as 'substance', be it hard, soft, liquid or gaseous,

or anything in between. This modern grasp of the atom's character is confirmed by 'Abdu'l-Bahá:
If the atoms which compose the kingdom of the minerals were formed without affinity
for each other, the earth would never have been formed, the universe could not have been

created.129

Today we are aware of the cyclical existence and progressive composition of suns and solar systems, including that of our sun, as well as the formation, disintegration and re-birth of entire galaxies.

All these cycles, large and small, confirm ‘Abdu’l-Bahá’s words that “every composition, collective or particular, must of necessity decompose.” However, there is one particle in the universe, timeless and everlasting, which rises above these cycles of formation and decay, as if it was its intention to offer us a tiny physical proof of an everlasting Dominion, namely the atom. In the writings of Bahá’u’lláh we find these thought-provoking statements.

Gazing with the eye of God he will perceive within every atom a door that leadeth him to the stations of absolute certitude. He will discover in all things the mysteries of divine revelation and the evidences of an everlasting manifestation.130

Every mineral can be made to acquire the density, form, and substance of each and every other mineral...131

Its secret, however, lies hidden in Our Knowledge. We will reveal it unto whom We will.132

Here seems confirmation that all atoms are made up of the same ‘stuff’, namely the protons and neutrons of the nucleus plus the circling electrons. The one important difference in their makeup is the number of these particles present. It alone determines the atom’s property, whether it is oxygen, carbon, copper, or gold. Perhaps at some point in the future our race may be found mature enough for possessing the power to alter atoms at will, just as we are manipulating molecules today to produce many synthetic materials.

In verse 189 of the Kitáb-I-Aqdas Bahá’u’lláh calls this divine knowledge “the most firm foundation” and one of the two signs “We have appointed for the coming of age of the human race,” the second sign being the adoption of a universal language and script. This breakthrough would turn the planet into a limitless resource to fill every human need for all time to come. No longer would dwindling ‘non-renewable resources’ cast a shadow on our long-term prospects, nor

would we be forced to go burrowing deep underground in search of minerals. While hard to
imagine, no substance would then be coveted any longer because it was deemed ‘precious’ on
account of its scarcity. Anything and everything necessary for our existence would be fashioned
at will from the rich mother lode that are the atoms of the planet itself. Man shall probably
discover the key to this divine alchemy once he has conquered his craving for material wealth.

While all creatures and plants eventually must die and decompose, while rocks will erode,

Promulgation of Universal Peace, p. 4
Kitáb-I-Iqán, p. 196
Gleanings, p. 198
Gleanings, p. 197

oceans will eventually evaporate, suns turn into supernovae or become burned out cinders, and
while even the galaxies will at some stage come to an end, to be replaced by new constellations,
the atom lives through it all, always ready when called upon to provide the building blocks for a
never ending creation. We find these further explanations by ‘Abdu’l-Bahá.
Every atom in the universe possesses or reflects all the virtues of life, the manifestation of which is effected through change and transformation.133
When we ponder over the conditions of phenomena, we observe that all phenomena are composed of single elements. This singular cell-element travels and has its coursings
through all the grades of existence. I wish you to ponder carefully over this. This cellular
element has at some time been in the mineral kingdom. While staying in the mineral
kingdom it has had its coursings and transformations through myriads of images and
forms. Having perfected its journey in the mineral kingdom, it has ascended to the
vegetable kingdom; and in the vegetable kingdom it has again had journeys and transformations through myriads of conditions. Having accomplished its functions in the
vegetable kingdom, the cellular element ascends to the animal kingdom.
In the animal kingdom again it goes through the composition of myriads of images,
and then we have it in the human kingdom. In the human kingdom likewise it has its
transformations and coursings through multitudes of forms. In short, this

single
primordial atom has had its great journeys through every stage of life, and in every
stage it was endowed with a special and particular virtue or characteristic.
Consequently, the great divine philosophers have had the following epigram: All things are
involved in all things. For every single phenomenon has enjoyed the postulates of God,
and in every form of these infinite electrons it has had its characteristics of perfection.
Thus this flower once upon a time was of the soil. The animal eats the flower or its
fruit, and it thereby ascends to the animal kingdom. Man eats the meat of the animal,
and there you have its ascent into the human kingdom, because all phenomena are
divided into that which eats and that which is eaten. Therefore, every primordial atom of
these atoms, singly and indivisible, has had its coursings throughout all the sentient
creation, going constantly into the aggregation of the various elements. Hence do you
have the conservation of energy and the infinity of phenomena, the indestructibility of
phenomena, changeless and immutable, because life cannot suffer annihilation but only
change. The apparent annihilation is this: that the form, the outward image, goes
through all these changes and transformations. Let us again take the example of this
flower. The flower is indestructible. The only thing that we can see, this outer form, is
indeed destroyed, but the elements, the indivisible elements which have gone into the
composition of this flower are eternal and changeless. Therefore the realities of all
phenomena are immutable. Extinction or mortality is nothing but the transformation of
pictures and images, so to speak -- the reality back of these images is eternal. And every
reality of the realities is one of the bounties of God.134
The atom testifies to the oneness and endurance of God’s creation. All created things,
including man, merely “borrow” atoms from the wellspring of the universe for the duration of
their physical existence. Were they to “own” the atoms that make up their body cells, the atom

Foundations of World Unity, p. 51-52

itself would be subject to the cycle of birth, death and decomposition. But it is not.

A seed, with the help of water and sun's energy, requisitions the atoms of the minerals in the soil in order to grow new cells and to develop into a grass or into a mighty redwood tree. When the plant dies, be it at the end of only one short season or after hundreds of years, the atoms that once made up its fibers are returned fully intact to soil, water, or air. They do not decompose along with the plant.

The atoms making up our own body tissue have once lived in oceans or belonged to plants and animals we took for nourishment. Long before, the very same atoms had traveled through the food chain innumerable times. They helped form vegetation and countless creatures, including in all probability some of our distant ancestors. A similar recycling process has been taking place with water and air. But unlike molecules that are subject to transformation, the wandering atom has been moving unchanged through the cycles of creation for millions and billions of years.

It may have been part of a blazing sun when the universe was still young. Then, much later, it helped form our own planet.

It may have dwelled in the oceans or in a marine animal. At some other time it rose in water vapors to form a cloud and later was precipitated onto dry land where it entered the soil.

There it helped nurture a plant and was perhaps ingested by an ancient dinosaur.

It may have formed a grain of sand, a tree, a flower, an insect, a meadow, or an animal.

Along with trillions upon trillions of fellow atoms, it then was magically summoned to give form and substance to an amazing new galaxy, known as the human body.

Now human hands would soon press it into service to erect stately cathedrals, or to put up abject prisons, to bring warmth and comfort, or to let fires and explosions wreak havoc, to destroy or to build.

At every single moment the atom offers itself up to our free will. Would that we could read

the great lessons written for us throughout the universe by using the atom wisely in work for
progress and refinement, and in a ceaseless quest for a better tomorrow.
It once made up the vibrant colors used by Michelangelo.
It produces the delicate hues and sweet fragrance of a fresh rose.
It has brought hurt by carrying many a harsh word, but it has also gladdened the soul through
a consoling voice, by the sound of music, in a loving face, or a magnificent sunset.
Alone through its omnipresence are we allowed to experience this world of existence.
From here, the wandering atom will continue on its endless journey, alternating through eons
of time between inorganic and organic existence as an ever-faithful building block of God's
physical universe.
The startling reality is that the eternal wisdom and primordial powers of cohesion and
attraction that rest within the atom have remained undiminished throughout countless cycles of
earthly and celestial upheaval and transformation, just as have the attributes of a universal
omnipotence that called it into being. The atom is, indeed, a sign to man of the undisputed
existence of everlasting life.
To know, therefore, that every single cell in our body is made up of timeless atoms that
consist mainly of coursing energy and information, unmasks the sorry superstition of materialism.
It finally does make us realize that we carry within ourselves all the ancient powers of the
universe and that our body is as one with the Creator.
Also this day, there has been revealed to man yet another cycle of the universe, a reality of
the spirit which is forever interwoven with tangible existence. In an endless unfolding of greater

knowledge, we are just beginning to understand the phenomenon of birth, growth, maturation,
and ultimate decline and decay of man's religion. Along with this knowledge, a new certainty has
been vouchsafed; the promise of successive and progressive renewal, thus duplicating exactly in
the cosmos of the spirit what we can perceive throughout the physical realm.

Know thou, moreover, that the Word of God -- exalted be

His glory -- is higher and far superior to that which the senses can perceive, for it is sanctified from any property or substance. It transcendeth the limitations of known elements and is exalted above all the essential and recognized substances.
It became manifest without any syllable or sound and is none but the Command of God which pervadeth all created things...
Verily, the Word of God is the cause which hath preceded the contingent world -- a world which is adorned with the splendors of the Ancient of Days, yet is being renewed and regenerated at all times.
Immeasurably exalted is the God of Wisdom Who hath raised this sublime structure.

Tablets of Bahá'u'lláh p. 140-141

Seen through the eye of the universe, our earthly existence is insignificant, our body
infinitely minuscule, a mere handful of atomic dust, feeble and ephemeral. –

Compared to creation's own eternity, our time on earth is but a flashing ember, yet
it awakens and illumines the mind and thereby bestows conscious existence which is able to burst material bounds despite the frailty and transience of our body. –

This lets us fathom, perceive, and sometimes even penetrate the Great and Holy Enigma as we stand in awe of a creation which gave us the powers of comprehension and free will. In return for these unique gifts, we are challenged to
renounce prejudice, apathy and sloth, and so be able to accept a larger measure of
truth, to expand the realm of the known, and thereby to improve humanity's condition as our personal offering to an unfolding universe. –

Deliberately placed at the center of the realm, where the worlds of micro- and macrocosm meet, our so singularly favored and rare position allows us a glimpse into God's cosmic mirror, the sublime spectrum from galaxies of the distant past to
the atom's innermost secrets. –

This majestic fabric is interwoven and synonymous with time's endless and allencompassing spiral, from ancient beginnings which knew no begin to an end without end, a rebirth akin…

H. L.

he universe hasn't really changed in the dozen years since this book was first
written, but many new scientific developments have brought new discoveries

and have refined measurements that have vastly increased our knowledge. Aided by entire fleets of satellites we are scanning planet earth, the sun, our sister planets and the stars. We are probing the cosmos to the outermost limits of the observable universe. Here are some of NASA's satellites that are serving modern earth science and those who are employed for the exploration of the cosmos.

At the beginning of the 20th century 'Abdu'l-Bahá spoke of "Seven Candles of Unity" that will change the world:

Behold how its light is now dawning upon the world's darkened horizon. The first candle is unity in the political realm, the early glimmerings of which can now be discerned. The second candle is unity of thought in world undertakings, the consummation of which will ere long be witnessed. The third candle is unity in freedom which will surely come to pass. The fourth candle is unity in religion which is the cornerstone of the foundation itself, and which, by the power of God, will be revealed in all its splendor. The fifth candle is the unity of nations… causing all the peoples of the world to regard themselves as citizens of one common fatherland. The sixth candle is unity of

races, making of all that dwell on earth peoples and kindreds of one race. The seventh candle is unity of language, i.e., the choice of a universal tongue in which all peoples will be instructed and converse. Each and every one of these will inevitably come to pass, inasmuch as the power of the Kingdom of God will aid and assist in their realization.

It is this unity of thought in world undertakings that has made the latest breakthroughs in science and cosmology possible. The best example of truly global cooperation is the world's largest and most powerful particle collider at Cern on the Swiss-French border. It is the largest and most complex experimental facility and the largest single machine in the world. It was built between 1998 and 2008 in collaboration with over 10,000 scientists and engineers from over 100 countries, as well as hundreds of universities and laboratories. Linked by computer networks, their work proceeds unencumbered by national objectives and rivalries.

This international consortium of researchers has been at work to isolate and identify nature's
smallest building blocks in an effort to replicate the mechanics of the 'Big Bang'. They are using
as a tool the world's most powerful particle accelerator, the Large Hadron Collider near Lake
Geneva. It consists of a 27-kilometre underground ring of superconducting magnets that boost
particle beams to the speed of light before they collide and disintegrate.

The Large Hadron Collider is the world's most powerful particle accelerator

Thousands of magnets direct beams around the accelerator in a vacuum as thin as inter-stellar
space and at minus 270 degrees Centigrade which slows the movement of atoms. The particles
are so tiny that achieving their collision is akin to firing two needles 10 kilometers apart with
such precision that they will meet head on. The collisions produce a variety of hitherto unknown
subatomic particles, such as the "Bosun" discovered as recently as 2012. Another top contender
for 'most wanted particle' is one that would explain so-called 'Dark Matter'. About 80 percent of
the universe is thought to be composed of such invisible matter. While exerting a gravitational
pull on ordinary matter, it does not interact with light and is invisible. For an average person all
such costly experiments, employing thousands of scientists from around the world, seem
frivolous, but physicists believe that they may open doors to unimagined breakthroughs, such as
the earlier mentioned prospect of being able to alter atoms at will. (p. 153)
Within just three generations, man's knowledge of the universe has become sufficiently
robust to describe its characteristics with 95 per cent accuracy.

The Age of the universe, the time elapsed since the Big Bang, is currently estimated at
13.799 plus or minus 0.021 billion years. This is roughly three times the age of our own planet.
The Size of the observable universe, also known as the Hubble Volume, is 13.799 billion
light years in all directions as measured from an observer.
Expansion between any given two points in the system -- based on studies using the
Hubble Space Telescope -- is 67.15 ± 1.2 kilometers per second per parsec. One parsec is about

30 trillion kilometers, or just over three light years, a little less than the distance to our sun's closest neighbor Alpha Centauri. For every million parsecs distance from an observer, the rate of expansion increases by about 67 kilometers per second. This expansion should not be visualized as progressing outward from a "center", but as an expansion between any given two points, like raisins separating from each other in a rising dough.

The Light Horizon is the distance from an observer to a point where the thus compounded speed of expansion eventually exceeds the speed of light. From this distance on, light can no longer 'telegraph' back to earth the receding images of stars and galaxies that lie beyond the observable 'edge of the universe.' Hence the recurring cautionary reference to an 'observable universe.'

The Current actual size of the universe remains theory and conjecture.

The Hubble Volume, or Hubble Sphere, is a spherical region of the Universe surrounding an observer beyond which objects recede from that observer at a rate greater than the speed of light due to the expansion of the Universe. The Hubble volume is approximately 1031 cubic light years.

"Time" (Chapter 18) is a relative quantity and should perhaps be viewed as being linked to a relativity of space, always maintaining the same ratio between these two dimensions. An intuitive hypothesis presented here for the first time still requires validation:

'The element of time' as described in Chapter 18 may be firmly wedded to 'The element of space': Time slows down as space expands, while time accelerates as space shrinks. When one applies this formula to the processes connected with an evolving universe it would suggest that at a time when the universe was infinitely small, compared to its present volume, everything would have evolved infinitely faster when compared to our present perception and measurement of time.

Changes that are occurring today in the universe, after it has expanded a trillion-fold since the Big Bang, would be trillions of times slower than they would have been in an infinitely small embryonic universe when applying today's element of 'time'. Thus linked

to the dimension of
space, the ‘element of time’ may never have changed, but has remained a constant, as it will
through eons of the future.
The Birth of the Universe is explained by Charles Choi in a ‘user friendly’ presentation that
was published on the website Space com. While the time frames he is citing for the early stages
of the universe may exceed our comprehension, they could be visualized as having transpired in a
minuscule, embryonic universe as explained in the previous section.
“The universe was born with the Big Bang as an unimaginably hot, dense point. When the

universe was just 10-34 of a second or so old — that is, a hundredth of a billionth of a trillionth of
a trillionth of a second in age — it experienced an incredible burst of expansion known as
inflation, in which space itself expanded faster than the speed of light. During this period, the
universe doubled in size at least 90 times, going instantaneously from a subatomic size to the size
of a golf ball.
According to NASA, after this inflation the growth of the universe continued, but at a slower
rate. As space expanded, the universe cooled and matter formed. One second after the Big Bang,
the universe was filled with neutrons, protons, electrons, anti-electrons, photons and neutrinos.
During the first three minutes of the universe, the light elements were born during a process
known as Big Bang nucleosynthesis. Temperatures cooled from 100 nonillion (1032) Kelvin to 1
billion (109) Kelvin, and protons and neutrons collided to make deuterium, an isotope of
hydrogen. Most of the deuterium combined to make helium, and trace amounts of lithium were
also generated. For the first 380,000 years or so, the universe was essentially too hot for light to
shine, according to France’s National Center of Space Research (Centre National d’Etudes
Spatiales, or CNES). The heat of creation smashed atoms together with enough force to break
them up into a dense plasma, an opaque soup of protons, neutrons and electrons that scattered
light like fog.
Roughly 380,000 years after the Big Bang, matter cooled enough for atoms to

form during
the era of recombination, resulting in a transparent, electrically neutral gas, according to NASA.
This set loose the initial flash of light created during the Big Bang, which is detectable today as
cosmic microwave background radiation. However, after this point, the universe was plunged
into darkness, since no stars or any other bright objects had formed yet.
“About 400 million years
after the Big Bang, the universe began to emerge from the cosmic dark ages during the epoch of
re-ionization. During this time, which lasted more than a half-billion years, clumps of gas
collapsed enough to form the first stars and galaxies, whose energetic ultraviolet light ionized and
destroyed most of the neutral hydrogen.
Although the expansion of the universe gradually slowed down as matter in the universe
pulled on itself via gravity, about 5 or 6 billion years after the Big Bang, according to NASA, a
mysterious force now called dark energy began speeding up the expansion of the universe again,
a phenomenon that continues to this day. A little after nine billion years after the Big Bang, our
solar system was born.”
Latest insights have revealed the key role that stars are playing as Solar breeding furnaces
of Atoms. They have laid the very foundation for our material existence. A fuller understanding
of this process may play a pivotal role for future life on earth (p.173). The table below shows the
elements ordered by their atomic number, i.e. the number of protons present in their atomic
nucleus. As we shall see there exists on earth a rare variety of 118 known elements. This has
predetermined every aspect of inorganic and organic existence.

Everything around us, our own bodies very much included, are intricately composed of
these elements whose atoms form the grand mosaic of creation. How large are these atoms? If
atoms were the size of a grape, a baseball would then be the size of planet earth and the baseball
player would tower as high as the Moon. How small is their nucleus? If atoms were the size of a
football stadium, their nucleus would be no larger than buck shot, the circling electrons smaller

than dust particles. Atoms, therefore, are mainly ‘empty space,’ kept together and bound into molecules by the ‘Strong Force.’ As ‘Abdu’l-Bahá said, “If the atoms which compose the kingdom of the minerals were formed without affinity for each other, the earth would never have been formed, the universe could not have been created” (p. 153)

Could life on earth have emerged with fewer elements? Perhaps, but it would have had to be organized entirely differently. With few exceptions, everything we see on earth has drawn from the full palette of elements to grow and to develop. The human body cells consist 65–90% of water (H2O), and much of the remainder is composed of carbon-containing organic molecules.

Oxygen contributes a majority of human body’s mass, followed by carbon. Almost 99% of our body is made up of six elements: oxygen, carbon, hydrogen, nitrogen, calcium, and phosphorus.

The next 0.75% is made up of potassium, sulfur, chlorine, sodium, and magnesium. The reader is encouraged to pursue this subject further to discover how even a negligible presence of so-called trace elements plays an important role in keeping our bodies healthy and intact.

Ninety-two of the elements, from Hydrogen to Uranium, are found “in nature.” Some scientists say that there are actually 98. Elements No. 93-98, like neptunium, plutonium, americium, curium, berkelium and californium, were first artificially synthesized and isolated in the Berkeley Radiation Laboratory of the University of California. A few others have only been detected in laboratories and in nuclear accelerators.

All these complexities are accepted as something that simply exists. Rarely does one inquire how it has all come about, how incredibly rare and fortuitous the presence is of all these different minerals on our insignificant little planet which itself appears to be no more than a tiny lost grain

in the vast mosaic of our galaxy.

Our so-called Milky Way Galaxy is a star disk ca. 100,000 light years across and 1,000 light years thick, containing ca. 300-400 billion suns. They are like glowing dust particles cartwheeling through space. Our solar system, located 30,000 light years away from the galactic

center, orbits the galaxy at a dizzy speed of 515,000 miles (828,000 km/h), which is a little more
than twice the distance to the moon. Nevertheless, it takes our solar system 230 million years to
complete a single circuit around the galactic center.
The solar system evolved from a vast cosmic cloud of atoms that were the ‘ashes’ of an
exploded supernova. Obeying the universal law of gravity, this atomic dust gathered in circular
motion and through centripetal force compacted into a point where extreme heat ignited an
atomic fusion process, our sun. About 99 % of all particles in this inter-stellar cloud of atoms
were swallowed up by the sun’s immense gravitational pull. Only 1% of matter somehow
managed to form into small spheres of their own that went into a solar orbit, the planets.
Science has worked out that a Supernova is a very rare and exceptional event. At most two
per cent of all stars explode at the end of their life cycle and spew their atoms back into space
where over billions of years they form new solar systems. In order for this to happen, it is
calculated that a star would have to have at least 8.5 times the mass of our sun. All the rest of the
stars, including our own, gradually burn out and turn into white dwarfs. Spectral analysis
confirms that as a consequence of so few stars turning into supernovas much of the universe is to
this day still dominated by its original hydrogen and helium components and not by an abundant
blend of lighter and heavier elements such as we are having here on earth.
This requirement for a star to be of much greater mass in order to end up exploding as a
supernova, delivers the happy by-product of a rich harvest of ‘heavy’ elements that will give birth
to the next solar system. A brief and therefore a simplified explanation of this process is that giant
stars have much higher internal temperatures and pressures to cause ‘light’ atoms such as
hydrogen and helium, to fuse into increasingly larger atomic structures, such as carbon, iron or
uranium. The first ‘embryonic’ atoms of the infant universe had as their core only one proton and
one neutron, plus a single electron in orbit. This was the hydrogen atom. The immense heat and
pressure inside first generation stars then fused hydrogen atoms into atoms

which had two
protons, two neutrons and two electrons, the helium atom. From here, over time, larger stars,
called red giants, forged ever larger atomic structures, until half way back to the time of the Big
Bang a colossal star turned into a supernova and became the progenitor of our own solar system.
Earth may be a rare exception. It is therefore most unlikely that our planet's rare mineral
composition which is a prerequisite for life on earth, would be exactly duplicated in earth-like
exoplanets that circle distant stars. The supernova that once gave birth to those solar systems may
have 'incubated' an entirely different, or a much smaller variety of minerals. Such a different
composition of matter would render an earthlike existence impossible, regardless how similar an
exoplanet may be to earth in its size or in its distance to a star. Their alien composition would be
lethal to man, because our body is composed of the very dust of mother earth and is designed to
function in earth's unique environment which was determined by its elements, earth's diurnal
cycle and its gravity.
Even the extremely rare event of a supernova was by no means a guarantee that there would
be forming a planet such as planet earth. Almost the entire cloud of the supernova's atomic dust
was either ejected far out into inter-stellar space, or was devoured by the gravity of the newly
forming star, our sun. Less than one per cent of the atomic dust of the supernova that formed our

solar system became planets. In order to contain the full spectrum of elements created by the
exploded giant star, these planets had to form near the center of the atomic cloud where gravity
had coalesced the heavier elements, instead of farther away from the new sun where the lighter
elements had gone into orbit. At the same time such a planet had to be far enough away from the
sun not to be incinerated. It was a most unlikely balancing act.
Thus, as we look at our solar system today, the outer planets became gargantuan accumulations of gases and only four relatively tiny terrestrial planets -- Mercury, Venus, Earth
and Mars -- formed in the so-called inner solar system to carry the rich load of heavy elements

inherited from the supernova. The total mass of these terrestrial inner planets is only the 445th part
or 0.22% of the total mass of the outer planets which themselves make up less than 1% of the
solar system. Since our earth is roughly half the mass of the four terrestrial planets, it is only the
100,000th part of all matter that makes up the solar system.
Earth's extreme rarity is further underscored by the fact that among those four insignificant
terrestrial planets the earth alone had the improbable pre-conditions to harbor life. Mercury had
far too little gravity to prevent oxygen, hydrogen, and other vital gases from venting off into
space. Venus has been too hot and poisonous and Mars, far removed from the warming rays of
the sun, has revealed itself as an inhospitable frozen desert.
The infinite expansion of human knowledge is a worthy counterpart of micro- and macrocosm's own infinity. As was suggested in the introduction, many theories and observations
presented in this book are bound to be subject to a future update. The next important date on the
discovery calendar may be the year 2018 when the James Webb Space Telescope will become
one of the greatest tools in humanity's quest to understand the cosmos. After eight years of
development, the technology comprising the heart of the telescope — an ultra-sophisticated
beryllium mirror system — is complete.

The JWST Telescope, as it is called, is designed to explore the farthest reaches of the
observable universe. Its mirrors may allow us to observe the birth of the universe and the
formation of the first suns and galaxies to further validate cosmological theories. Its powerful eye
may also give us a direct optical look at planets that orbit suns in our 'neighborhood'.
Astronomers and astrophysicists are confident that the vastly superior capabilities of this new

telescope will move our understanding of the cosmos well beyond the point where 22 years of
successful exploration with the Hubble Telescope have left off.

One of the impending updates may be a reassessment of the number of galaxies in the
observable universe. The latest estimate was that there were between 100 and 200 billion

galaxies. This number was based on ‘Deep Field’ studies by the Hubble Telescope when it was
aimed at a point in the sky equal in size to a grain of sand held at arm’s length that was previously
thought to be ‘empty space.’ The number of galaxies captured in this tiny image was then
multiplied by the number of such segments of ‘grains of sand held at arm’s length’ that it would
require to cover the entire celestial shell surrounding earth.
Since JWST is anticipated to reveal even earlier galaxies that were beyond Hubble’s reach, it
is estimated that their total number may exceed two trillion, i.e. two thousand billion. This
staggering estimate is based on the mathematical fact that the greater the distance, the larger the
volume of the so-called Hubble sphere, and because in the embryonic universe fewer stars than
today were forming smaller galaxies, thus increasing their number.
Such number explosion of galaxies will call for mature estimates of how many of those
galaxies that sent their light on its way over ten billion years ago do actually still exist today, or
have long turned into supernovae or dead white dwarf stars. There will come a point when our
most powerful optics will capture images of star formations which at the time that we discover
them do no longer exist, or, driven by the expansion of the universe, will have moved beyond the
light horizon to escape our enquiring eyes forever.

From harmony, from Heav’nly harmony
This universal frame began.
When Nature underneath a heap
Of jarring atoms lay,
And could not heave her head,
The tuneful voice was heard from high,
Arise ye more than dead.
Then cold, and hot, and moist, and dry,
In order to their stations leap,
And music’s pow’r obey.
From harmony, from Heav’nly harmony
This universal frame began:
From harmony to harmony through all the compass
of the notes it ran,
The diapason closing full in man.

John Dryden
England's Poet Laureate, 1687
A contemporary of Isaac Newton

The empires of the future are empires of the mind.
Sir Winston Churchill

he coming together of the human race whose early and painful steps we now are witnessing,
shall bear fruit in the emergence of a world-wide science that shall be entirely oriented
towards human progress. One of the most life changing consequences of this new world culture
will be the abolition of armed conflict and a corresponding reduction of armaments and armed
forces. According to latest statistics they currently number close to 100 million able bodied
people in active duty, paramilitary service, or in armed forces reserves. Moral issues aside, this is
a wanton waste of men and material that has bankrupted nations in the past and will probably do
so again. According to the Stockholm International Peace Research Institute in the year 2008
alone the world has spent the equivalent of $ 1,470,000,000,000 on 'defense,' meaning on
military manpower, infrastructure, armaments and munitions. This translates roughly into $ 226
for every single human being on earth. It is especially tragic that most of this treasure is being
squandered by the 'developed world' on which much of humanity's welfare and future
development must depend.
It requires little intelligence to imagine the blessings that will result from an end to this
obscene hemorrhaging of the planet's lifeblood: Universal education, better nutrition, housing
and healthcare, a cleaner environment and further improvements in communication, commerce,
and most other aspects of daily life. It shall all come about as a direct result of the current
evolutionary surge towards a planetary fusion of the minds of men which will for the first time in
recorded history create a single consciousness that is shared by all people. It will generate an unfragmented spiritual and intellectual power that has never existed before and which will have the
most far reaching consequences not just for our species, but for all life on this planet.
Bahá'u'lláh has announced that the human world is now entering its

evolutionary stage of
maturity. One should imagine this stage in the development of our species to be as different from
past human existence as adulthood is different from infancy. He writes in Verse189 of the Kitáb-
I-Aqdas, the Book of Laws:
We have appointed two signs for the coming of age of the human race: the first, which is the most firm foundation, We have set down in other of Our Tablets, while the
second hath been revealed in this wondrous Book.
The Second Sign is explained in the Kitáb-I-Aqdas, footnote No 193:
Bahá'u'lláh enjoins the adoption of a universal language and script. His Writings
envisage two stages in this process. The first stage is to consist of the selection of an
existing language or an invented one which would then be taught in all the schools of the
world as an auxiliary to the mother tongues. The governments of the world through their
parliaments are called upon to effect this momentous enactment. The second stage, in the
distant future, would be the eventual adoption of one single language and common script
for all on earth.

When one combines such future scenario with the already existing technical means of instant
global communications, one appreciates the enormous benefits this will bring to human activity.
Without international agreements in place, English is currently a first, second, or third language
of over one third of the human race. In countries like China and India, English is no longer taught
merely as 'a foreign language,' but as 'a basic universal skill.'
The 'First Sign' is explained in footnote No 194 of the Book of Laws:
The first sign of the coming of age of humanity referred to in the Writings of Bahá'u'lláh is the emergence of a science which is described as a 'divine philosophy'
which will include the discovery of a radical approach to the transmutation of elements.
This is an indication of the splendors of the future stupendous expansion of knowledge. The coming of age of the human race has been associated by Shoghi Effendi
with the unification of the whole of mankind, the establishment of a world commonwealth, and an unprecedented stimulus to the intellectual, the moral and spiritual life of the entire human race.
One of the texts dealing with the transmutation of elements is in chapter XCVII

of the Book
of Gleanings of the Writings of Bahá'u'lláh:
…Is it ever possible, they ask… for copper to be transmuted into Gold? Say, Yes, by
my Lord, it is possible. Its secret, however, lieth hidden in Our Knowledge. We will
reveal it unto whom We will…. Every mineral can be made to acquire the density, form,
and substance of each and every other mineral. The knowledge thereof is with Us in the
Hidden Book.
It is significant that Bahá'u'lláh calls this future discovery the First Sign of the coming of age
of humanity. At the same time He calls it "The most firm foundation," because it has, after all,
the most far reaching consequences for man's long term survival prospects on this planet. While
the 'Second Sign', the adoption of a world language, is very clearly spelled out in the Kitáb-I-
Aqdas, the transmutation of minerals is not. It cannot be a Law that needs to be followed, because
its eventual discovery is entirely subject to God's grace. "We will reveal it unto whom We will."
Here seems confirmation of what modern cosmology has discovered towards the end of the
20th century: All atoms are essentially made of the same 'stuff', namely the protons and neutrons
that form their nucleus, and the circling electrons. The one important difference in their makeup
is the number of these particles present. It determines the atom's property, whether it is oxygen,
carbon, copper, or gold. At some point in the future our race may be found mature enough to be
given the knowledge to 'produce' or to 'alter' atoms at will and to use the discovery for
constructive rather than for destructive purposes. This breakthrough would turn our planet into a
limitless resource to fill every human need for all time to come. No longer would dwindling 'nonrenewable resources' cast a shadow on our long-term prospects, nor would we be forced to go
burrowing deep underground in search of certain minerals. While hard to imagine, no substance
would then be coveted any longer because it was scarce and therefore deemed precious. No
longer would mineral deposits determine the so-called 'Have and Have Not Nations'. Anything
and everything necessary for our existence would be fashioned at will from the

rich mother lode
contained in the atoms of our planet. Man may eventually be given the keys to this divine
alchemy once he has conquered his craving for material wealth. In the meantime, such material
cravings may be cured by looming shortages that are brought on by unbridled consumerism.
Anybody who is inclined to decry such forecast as being wildly far-fetched and medieval

quackery, ought to consider that already today many of our manufactured articles are mass
produced by using artificial compounds that did not exist less than a lifetime ago. By
manipulating and designing new molecular structures we are actually ‘creating’ a whole new
variety of so-called ‘man-made substances’ such as paints, bonding agents, miracle fibers and
plastics that are frequently more durable and heat resistant than anything that can be found ‘in
nature.’ We produce synthetic fuels that store many times the energy of wood or coal, ceramic
cutting tools sharper than steel and space age compounds that relegate steel and aluminum back
to the Bronze Age. Having thus attained the knowledge of creating new molecular structures, the
next logical advance is the ability to alter the structure of the atom.
All such startling forecasts may seem utopian to those who happen to live at the early dawn
of this process, but it does in fact follow certain familiar rules of evolution that we can see in
nature and which we accept without much argument. The birth of a global sphere of human
consciousness may be compared to the birth of earth’s biosphere long ago when it transformed a
dead globe into a living planet. This transformation took place after a long and barren period
when the earth was a lifeless, radioactive furnace. No observer would have held out the slightest
hope for our planet to change some day into a Garden of Eden and to harbor life in all its rich
beauty and diversity.
Nevertheless, over the course of several billion years plant and animal life cooperated to
create the necessary preconditions that allowed the appearance of man “...in our image, after our
likeness: and let them have dominion over the fish of the sea, and over the

fowl of the air, and
over the cattle, and over all the earth...” For the next several million
years an infant humanity
dispersed to every corner of the globe and lost all contact with the original
tribe. Conditioned by
environment, available food sources and to a degree also by in-breeding,
man’s physical
appearance gradually changed. Living in pockets of deep isolation he developed
languages that
no outsider would later be able to understand.
The woes began just as soon as man’s innate spirit of exploration brought
fragments of the
original family back together again to meet face to face. With the rarest of
exceptions such
encounters never resulted in happy reunions. On the contrary, people everywhere
felt threatened
by the ‘foreigner’ and were racially intolerant and xenophobic towards each
other. They saw in
their strange counterpart the devil himself who either had to be exterminated
or kept enslaved.
And as if this difference of race and language was not enough to feed aversion
and hatred, man
made his faith in God, a faith he was convinced to be the one and only true
religion, a
justification for violence against the perceived infidel.
The new global paradigm of human solidarity will for the first time bring order
to this ancient
chaos and fuse the hitherto scattered and antagonistic pockets of human thought
and worship into
a single force that will be entirely focused on tending the planet, refining
human nature, and
raising the life of humanity to levels we cannot even imagine. Considering how
the forces of a
mutually supportive plant and animal life once created earth’s biosphere, and
how man’s
conflicting efforts and misguided ambitions are now threatening its health, the
promised
emergence of a global consciousness will not only put a stop to this
degradation, but its unified
intellectual powers will completely reshape the world’s environment.
How far we have travelled in less than two centuries on this road towards a
fusion of
humanity’s intellectual powers is demonstrated by today’s hand-held devices
that allow instant
access to just about anything that has ever been invented, thought or written
by millions of
experts, scientists, philosophers and dreamers in whatever country and in

whatever language.

Nothing needs to be invented twice any more. Time wasted on fruitless repetition is constantly shrinking. Also, for the first time in human evolution everybody now has access to the religious teachings of everybody else to foster mutual awareness and understanding. Self-perfecting applications allow translations into all major languages. “This earth is one country and mankind its citizens” is instantly translated into Mandarin, Swahili, Malay or Czech, often with a clear audio one can listen to. Try it out yourself.

Despite wars and upheaval, the 20th century has given us a tiny taste of our future potential. In the social sphere humanity has been struggling to deal with the challenge of a suddenly shrunken planet where we are crowded together in a small interconnected and interdependent neighborhood in which outdated paradigms of isolation and prejudice can no longer find a place to hide. Despite many setbacks and terror tactics, much progress has been achieved to foster global dialogue and to put into place many organizations and innovative practices for knitting together integrated systems of global education, health care, research, manufacture and transport. Some of these efforts reach well beyond the horizon of immediate necessity.

For example, it would have been quite inconceivable a mere generation ago for 119 heads of government to jet across the globe in order to sit down together as they did at Copenhagen in 2009 and consult on potential future dangers that are looming for earth’s environment.

Apart from the many inventions that were mentioned here earlier, ambitious waterways, canals, long submarine tunnels, bridges and ocean causeways, have shortened the routes for trade and travel. It lies within the realm of the possible for high speed magnetic trains to traverse tunnel systems linking major cities, even continents. There is the concept of a future tunnel underneath the Bering Strait linking Eurasia with the Americas. Rivers have been dammed to control endemic flooding, irrigate vast stretches of countryside and generate energy. Genetic science has developed new plant varieties that thrive in colder climates, have shorter

growing seasons and are
more blight resistant. Huge strides are also in progress in medicine to improve the quality of life
and to increase longevity. A revolutionary new biotechnology promises the growing of human
tissues and replacement organs. Organ transplants may eventually become a thing of the past.
This would eliminate waiting lists for transplants and by using a patient's own stem cells the risk
of organ rejection will be reduced. When America's 'seer' Edgar Cayce first described such
possibilities in the 1930's he was roundly ridiculed. Global efforts are underway to cut down on
pollution. A seemingly unstoppable science and technology will lend further impetus to many
such mega projects. Difficult as it is to visualize at a time when much of our national treasure still
finances huge armaments and maintains opposing armies, the world's deserts will eventually
disappear and so will the extremes of climate. Inexhaustible sources of energy will desalinate
ocean water and pump it where there are no natural fresh water supplies. The resulting greening
of the planet will bring a gradual return to normal cycles of precipitation.
We shall probably populate this happy land in much smaller numbers and exchange an
unworthy existence in overcrowded mega cities for a much healthier and more tranquil environment. Man will no longer seek relief from the pressures of work in idle diversion, sex, drugs and
alcohol, but he will instead reorient his life where work is elevated to a form of worship and
where much of his leisure time will be spent on expanding his knowledge and talents, on healthful recreation, on the arts and human refinement. Wanton procreation will yield to recognizing the
blessings and responsibilities of parenthood. It will make the nurture and education of the young a
focal point of our existence. In short, man will eventually become aware that not only is he
today's torchbearer for those who toiled and struggled ahead of him while preparing the way, but
also a guarantor for humanity's future.

The earth itself, once made habitable for man by the emergence of a biosphere, shall
eventually be transformed into a state of the greatest physical perfection through the intervention
of man's divinely gifted intellect.

The question which at the beginning of the third millennium presses on everybody's
conscience, but which ought not to interfere with our cheerful commitment to positive change, is
whether man's ordained ascent towards his sublime destiny shall proceed steadily, if slowly, but
nevertheless uninterrupted, or if a fateful alliance of unbelief, rebellion and apathy will force a
painful detour on his grand itinerary.

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The author has a journalistic background and feels at ease with the unconventional. Not hampered by doctrine, he believes that whatever we encounter deserves full and objective investigation to the limits of our capacity.

Harry Liedtke was born in Berlin in 1927. His universal upbringing and education were in sharp contrast to the narrow nationalism that surrounded his youth.

His studies point to a seamless and harmonious universality of all physical and metaphysical phenomena, where humanity has virtually been handed the keys to the powers of the universe. Used wisely and with restraint, he believes that they promise a future when our descendants will look back to our own time as the first tentative, if painful, steps towards a planetary order and an enduring world civilization.

He discovered an early interest in history, philosophy and the physical sciences, and received a degree in journalism. Before joining the Associated Press he worked in the public information office at Frankfurt's Rhein-Main airport where he interviewed world leaders and became known for his reports on the development of post-war aviation, a field he later chose as a career.

While still in his teens, he began a study of Bahá'í texts that stress the importance of independent investigation of truth and affirm the inherent harmony between science and religion. The insights gained by his studies form the basis for the essays in this book. His training enables him to write about it in clear, understandable language. Quite unlike his former experience as a journalist, this work has escaped the insidious pressures of deadlines. It took the better part of

four
years to research, write, edit, and then to double-check the many quotations and
mathematical presentations found in its text.
Other books and essays by the author range from a collection of light-hearted stories about “Fellow Travelers” whom he encountered on his many journeys to a
book entitled “Dawn at Hiroshima”, a penetrating historical review written on the
50th anniversary of this earth-shaking event.
The author and his wife, the former Gisele Mühlschlegel, live near Kelowna, British Columbia, Canada.

— Humanity and the Universe: Mirror of the Unknown (Used by permission of the curator)