

UNDERSTANDING ਕਾਲ (KAL - DEATH)

ACCORDING TO SCIENCE AND GURBANI *

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ABSTRACT

To understand ਕਾਲ (Kal - death) it is important to understand what is life and how did it originate? About 15 billion years ago Big Bang occurred. And about 4.6 billion years ago our solar system was formed. Thereafter about 3.9 billion years ago the atmosphere around and on earth had right conditions for the formation of a genetic code – the DNA (Deoxyribonucleic acid) which gave rise to the first unicellular life. Continuous biological evolution of this first life gave rise to many species culminating to the highest and super species - the man. Although everybody is aware of the death phenomenon but still it is difficult to define it. Therefore, to define human death, the crucial point is to define the function that provides the essential human properties. It is the consciousness, the most integrative function of the body, which characterizes human existence. The irreversible loss of consciousness defines human death. The present article deals with the origin of life and evolution of man, the consciousness as an integrated function of life, and irreversible loss of consciousness as death in human. This article also shows that Science helps to understand the theme of Gurbani in its real perspective.

INTRODUCTION

Many theologians of various religions are of the opinion that science has nothing to do with religion since religion is beyond the comprehension of scientists. The real hatred against science started during the Period of Renaissance (between 14th and 17th centuries) in Europe when scientists started to challenge the wrong concepts in religion. There is no doubt that great conflict between Science and Christianity is going on since many centuries and this conflict is still active especially on the Theory of Evolution of man. However, my study of Gurbani clearly indicates that it has its base in Science and logic, therefore, the Sikh theologians have nothing to worry about the conflict between Science and Gurbani (Nanakian Philosophy) [2, 3, 4, 5, 6]. The present study demonstrates how the use of Science and logic helps to understand 'ਕਾਲ' (Kal/Death) in Nanakian Philosophy embodied in the Bani of Guru Nanak, which is incorporated in the Aad Guru Granth Sahib (AGGS) [1].

The word 'ਕਾਲ' (Kal) has been used with different spellings with different meanings in Gurbani:

1. ਕਾਲ: Meaning ਆਤਮਕ ਮੌਤ: Death of conscience,
2. ਕਾਲ, ਕਾਲੁ, ਕਾਲਾ, ਕਾਲੋ: Meaning ਮੌਤ: Death of consciousness – the real death,
3. ਕਾਲ: Meaning ਸਮਾਂ: Time, and
4. ਅਕਾਲ (Akal): Timeless or without any effect of time and space.

These different forms of ਕਾਲ are further scientifically and logically explained according to Gurbani as follows:

1. ਕਾਲ: Meaning ਆਤਮਕ ਮੌਤ: Death of Conscience

ਖਾਵੈ ਭੋਗੈ ਸੁਣਿ ਸੁਣਿ ਦੇਖੈ ਪਹਿਰਿ ਦਿਖਾਵੈ ਕਾਲ ਘਰੇ ॥

ਬਿਨੁ ਗੁਰ ਸਬਦ ਨ ਆਪੁ ਪਛਾਣੈ ਬਿਨੁ ਹਰਿ ਨਾਮ ਨ ਕਾਲੁ* ਟਰੇ ॥੫॥

ਅਗਗਸ, ਮ ੧, ੫-੧੦੧੪ [1].

One is entrapped in conscience death by engrossing oneself in acts of eating, listening of evil talks, showing own good clothes and looking at the others.

However, without understanding one-self and sense of right and wrong, moral judgment, and with an urge to do right through the teachings of the Guru (Nanakian Philosophy) and realization of God one cannot get rid of the death of conscience.*

AGGS, M 1, p 1014 [1] (Note # 1.).

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2. ਕਾਲ, ਕਾਲ, ਕਾਲ, ਕਾਲੋ: Meaning ਮੌਤ: Death of consciousness – the real death (Note # 2)

ਨੈਨੀ ਦ੍ਰਿਸ਼ਟਿ ਨਹੀ, ਤਨੁ ਹੀਨਾ, ਜਚਿ ਜੀਤਿਆ, ਸਿਚਿ ਕਾਲੋ ॥
ਰੂਪੁ ਰੰਗੁ ਰਹਸੁ ਨਹੀ ਸਾਚਾ ਕਿਉ ਛੋਡੈ ਜਮ ਜਾਲੋ ॥੧॥

ਅਗਗਸ, ਮ 1, ਪ-੧੧੨੬.

You have lost most of the power of seeing from your eyes, your body has become weak, the old age has overcome you and the death of consciousness (real death) is approaching.

There is neither spiritual glow on your face nor any sign of contentment in your mind since you left the path of righteousness.

AGGS, M 1, p 1126.

3. ਕਾਲ: Meaning ਸਮਾਂ: Time

ਖੋਟੇ ਕਉ ਖਰਾ ਕਹੈ ਖਰੇ ਸਾਰ ਨ ਜਾਣੈ ॥

ਅੰਧੇ ਕਾ ਨਾਉ ਪਾਰਖੁ ਕਲੀ ਕਾਲ ਵਿਡਾਣੈ ॥੩॥

ਅਗਗਸ, ਮ ੧, ਪ-੨੨੯.

In the current era of time (Kali Age) the fake article is considered as genuine and people are not aware of the genuine one;

And the blind man is praised as the great researcher/ investigator.

AGGS, M 1, p 229.

4. ਅਕਾਲ (AKAL): Meaning Timeless or no effect of time and space

...ਅਕਾਲ ਮੂਰਤਿ... ॥

ਅਗਗਸ, ਮੰਗਲਾਚਰਨ, ਪ-੧.

...the body on which there is no effect of time and space (Timeless - Ever-existing)...

AGGS, Commencing Verse, p 1.

(Meaning 'no growth; no wear and tear due to the effect of weather; no effect of time and space; Ever-existing)

The above word 'Akal' used in the *Manglacharan* (Commencing Verse of the AGGS) has further been explained by Guru Nanak as follows:

ਤੂ ਅਕਾਲ ਪੁਰਖੁ ਨਾਹੀ ਸਿਚਿ ਕਾਲਾ ॥

ਅਗਗਸ, ਮ ੧, ਪ-੧੦੩੮.

Oh God! There is neither any effect of time and space (to indicate growth or, wear-tear due to weathering agencies) on You nor any law of death is applicable on You.

AGGS, M 1, p 1038.

In both cases ਮੂਰਤਿ (body) and ਪੁਰਖੁ (person) have been used metaphorically. These words are not to be taken in their literal meanings. In reality the 'Akal' can neither be represented with any Name nor in an anthropomorphic or in any other form.

The main topic, ਕਾਲ (*Kal* – Death), has been discussed in

detail under Discussion:

DISCUSSION

ਕਾਲ (KAL- DEATH)

To understand ਕਾਲ (*Kal* – Death) it is important to understand what is life and how did it originate?

a. Origin of Life

(<http://www.physicalgeography.net/fundamentals/9a.html>)

About 15 billion years ago our universe originated from a very minute highly concentrated form of energy through big bang, now known as Big Bang Theory. The sun and its planets were formed between 5 and 4.6 billion years ago when matter in our solar system began to coalesce because of gravitational pull. By about 3.9 billion years ago, one of its planets, the Earth, had an atmosphere that contained the right mix of Hydrogen, Oxygen, Carbon, Phosphorous, and Nitrogen to allow for the creation of life. Scientifically these are the five elements which gave rise to the life instead of mythical five elements (ਪੰਜ ਤੱਤ), e.g. earth, sky, water, air and fire (*agni*). In fact these are not elements. Chemically speaking they are either compounds (water - Hydrogen and Oxygen) or mixtures (air – many different gases; earth - many different minerals); 'fire' is the product of burning of matter; and 'sky' is a space, which is neither an element nor a compound nor a mixture.

Scientists believe that the energy from heat, lightning, or radioactive elements caused the formation of complex proteins and nucleic acids into strands of replicating genetic code (DNA - Deoxyribonucleic acid). These molecules organized and evolved to form the first simple forms of life. About 3.8 billion years ago, conditions became right for the fossilization of the Earth's early cellular life forms. These fossilized cells resemble present day Cyanobacteria. Such cells are known as *prokaryotes*. Prokaryote cells are very simple, containing few specialized cellular structures and their DNA is not surrounded by a membranous envelope. The more complex cells of animals and plants, known as *eukaryotes*, first showed up about 2.1 billion year ago. Eukaryotes have a membrane-bound nucleus and many specialized structures located within their cell boundary.

By 680 million years ago, eukaryotic cells were beginning to organize themselves into multicellular organisms. Starting at about 570 million years ago an enormous diversification of multicellular life occurred known as the Cambrian explosion. During this period all but one modern phylum of animal life made its first appearance on the Earth. The lineage of animal leading to the formation of man is described chronologically as follows:

The ancestor of man, the primate, appeared about

40,000,000 years ago.

Ramapithecus, who walked on his two feet, appeared about 14,000,000 years ago.

Homo erectus, the new genus, **Homo**, appeared about 500,000 years ago.

Homo sapiens, the first form of wise man, appeared about 250,000 years ago.

Homo sapiens sapiens, the current species of wise man, appeared about 35,000 ago [2, 5].

Evolution of man in Gurbani

Based on basic principles of Nanakian Philosophy embodied in the Bani of Guru Nanak, Guru Amardas has explained the origin of man from *Jot* (energy) the first step of evolution of life. He has also mentioned that knowledge about the origin of man helps to understand life and death:

ਮਨ ¹ ਤੂੰ ਜੋਤਿ ² ਸਰੂਪ ³ ਹੈ ਅਪਣਾ ਮੂਲ ⁴ ਪਛਾਣ ⁵ ॥
 ਮਨ ਹਰਿ ⁶ ਜੀ ਤੇਰੈ ਨਾਲਿ ਹੈ ਗੁਰਮਤੀ ⁷ ਰੰਗੁ ⁸ ਮਾਣੁ ⁹ ॥
 ਮੂਲੁ ਪਛਾਣਹਿ ਤਾਂ ਸਹੁ ¹⁰ ਜਾਣਹਿ ਮਰਣ ਜੀਵਣ ਕੀ ਸੋਈ ਹੋਈ ॥
 ਗੁਰ ਪਰਸਾਦੀ ਏਕੋ ਜਾਣਹਿ ਤਾਂ ਦੂਜਾ ਭਾਉ ਨ ਹੋਈ ॥
 ਮਨਿ ਸਾਂਤਿ ਆਈ ਵਜੀ ਵਧਾਈ ¹¹ ਤਾ ਹੋਆ ਪਰਵਾਣੁ ¹² ॥
 ਇਉ ਕਹੈ ਨਾਨਕੁ ¹³ ਮਨ ਤੂੰ ਜੋਤਿ ਸਰੂਪੁ ਹੈ ਅਪਣਾ ਮੂਲੁ ਪਛਾਣੁ ॥ ਪ ॥
 ਅਗਗਸ, ਮ ੩, ਪ-੪੪੧.

For proper interpretation of this verse it is important to understand in which context allegories and metaphors have been used in this verse:

1. 'Mann' in general means the mind but actually it is the brain, which is a place for origin of conscience and consciousness, and all thoughts. 'Mann' also represents man.
2. 'Jot' means energy, flame, light, spiritual illumination, enlightenment. Here energy is more suitable meaning.
3. 'Sarup' means embodiment.
4. 'Mool' means the roots, origin.
5. 'Aeyoh kahae Nanak' Here Nanak is not a pen name of Guru Amardas as is for all the other Sikh Gurus. Here Nanak is the Guru Nanak himself, whose philosophy was preached and taught by the Sikh Gurus, who succeeded to the 'House of Nanak'. According to Dr Sahib Singh's grammar 'Nanak' with 'onkar' to 'kaka' means Nanak himself not as a pen name (*Nom de Plume*), although in some cases the 'kaka' is without 'onkar' in 'Nanak' even then it means Guru Nanak himself.

Therefore, 'Aeyoh kahae Nanak' is interpreted as 'Guru Nanak says this philosophy'. It means it is the philosophy of Guru Nanak, i. e. *Nanakian Philosophy*, being represented by Guru Amardas. But most of the interpreters, except Dr Sahib Singh, translate 'Nanak' as

a pen name for Guru Amardas (*Mahla* 3). If it is so then it becomes the philosophy of Guru Amardas. In fact it is the philosophy of Guru Nanak being represented by Guru Amardas.

Keeping in view the above explanation and scientific information available and by the use of logic, the above verse has been interpreted as follows:

"Hey mind¹ (man)! You are the embodiment³ of energy², try to trace out⁵ your roots⁴ (origin).

Hey man! The Almighty⁶ is with you; enjoy⁹ and imbibe⁸ the philosophy⁷ of the Guru (Nanak).

When you have traced out your roots (origin) then you will understand about death and life.

With the grace of the Almighty¹⁰ you would realize that there is no other than the One (the God). Then mind attains peace (contentment) and success¹², (Then everybody) congratulates¹¹ you.

Guru Amardas says:

It is the Nanakian Philosophy¹³ (Literal meaning = Nanak says this philosophy): Hey mind (man)! You are the embodiment of energy. Try to trace out your roots (origin)."

AGGS, M 3, p 441.

Most of the time, ਮਨ ਤੂੰ ਜੋਤਿ ਸਰੂਪੁ ਹੈ ਅਪਣਾ ਮੂਲੁ ਪਛਾਣੁ ॥, is interpreted by many scholars as "Oh my soul, you have emanated from the light of God, know your true essence.", which is quite far away from the real theme of Nanakian Philosophy.

In the above verse Guru Amardas advises the man that you have originated from the primordial energy, which is called ਸੁੱਨ (*Sunn* = Nothingness or everything in highly concentrated form of energy) in the Bani of Guru Nanak (Nanakian Philosophy). This state of ਸੁੱਨ (*Sunn*) has already been discussed in details by Chahal, Dhaliwal, and Virk [6, 7, 13]. Now it is well understood as explained previously that basic unit of life (DNA) originated from five elements (Hydrogen, Oxygen, Carbon, Nitrogen, and Phosphorus), which originated from the primordial energy form, ਸੁੱਨ (*Sunn*), described by Guru Nanak and as described in Big Bang Theory.

Since some portion of the genome (DNA) of the human resembles with the smallest organism, like yeasts, molds, slimes, worms, and lettuce (plant); 90% resembles with mice, and 98% with chimpanzees, therefore, it clearly indicates that we can trace back our roots (*mool*) to primate (chimpanzees) to mice to plants (lettuce) to microorganisms (yeasts, molds, slimes) and then ultimately to the primordial source (*Jot*), the Energy, as explained in the above verse [2, 6].

Further evolution of man through different stages starting from *Sunn* to Energy to DNA to single-celled organisms to multicellular organisms to simple to complex animal and finally to the highly evolved man is explained in the modern theory of evolution. However, before Darwin Guru Arjan has described evolution of man as follows:

ਕਈ ਜਨਮ ਭਏ ਕੀਟ ਪਤੰਗਾ ॥ ਕਈ ਜਨਮ ਗਜ਼ ਮੀਨ ਕੁਰੰਗਾ ॥
ਕਈ ਜਨਮ ਪੰਥੀ ਸਰਪ ਹੋਇਓ ॥ ਕਈ ਜਨਮ ਹੈਵਰ ਬ੍ਰਿਖ ਜੋਇਓ ॥੧॥

ਮਿਲੁ ਜਗਦੀਸ ਮਿਲਨ ਕੀ ਬਰੀਆ ॥ ਚਿਰੰਕਾਲ ਇਹ ਦੇਹ ਸੰਜਰੀਆ ॥੧॥
ਰਹਾਉ ॥

ਕਈ ਜਨਮ ਸੈਲ ਗਿਰਿ ਕਰਿਆ ॥ ਕਈ ਜਨਮ ਗਰਭ ਹਿਰਿ ਖਰਿਆ ॥
ਕਈ ਜਨਮ ਸਾਖ ਕਰਿ ਉਪਾਇਆ ॥ ਲਖ ਚਉਰਾਸੀਹ ਜੋਨਿ ਭ੍ਰਮਾਇਆ ॥੨॥

ਸਾਧਸੰਗਿ ਭਇਓ ਜਨਮੁ ਪਰਾਪਤਿ ॥ ਕਰਿ ਸੇਵਾ ਭਜੁ ਹਰਿ ਹਰਿ ਗੁਰਮਤਿ ॥
ਤਿਆਗਿ ਮਾਨੁ ਤੂਠੁ ਅਭਿਮਾਨੁ ॥ ਜੀਵਤ ਮਰਹਿ ਦਰਗਹ ਪਰਵਾਨੁ ॥੩॥
ਜੋ ਕਿਛੁ ਹੋਆ ਸੁ ਤੁਝ ਤੇ ਹੋਗੁ ॥ ਅਵਰੁ ਨ ਦੂਜਾ ਕਰਣੈ ਜੋਗੁ ॥
ਅਗਗਸ, ਮ ਪ, ਪ-੧੭੫.

*You passed through many generations as (microorganisms) a worm and an insect;
You passed through many generations as an elephant, a fish, and a deer.
You passed through many generations as a bird, and a snake.
You passed through many generations as a yoked ox, and a horse.1.*

*Now is the time to comprehend the God.
Since after so very long time, this human body was evolved. 1. Pause.*

You passed through many generations as rocks and mountains;
Your many generations were aborted** in the womb;
You passed through many generations as branches and leaves (vegetative states);
You (man) passed through 8.4 million (tentative mythical figure) of generations of evolution.2.*

Since you (man) have attained this human life, now is the time to serve the humanity (noble people) and comprehend God.

Abandon the pride and falsehood and ego. If you kill these vices then you will be accepted by God. 3.

Whatever is happening (evolution) is happening under the Laws of Nature and nothing is happening otherwise.

AGGS, M 5, p 176.

*Although rocks and mountains are inanimate like, Carbon, Hydrogen, Oxygen, Phosphorous, and Nitrogen, however, these inanimate elements gave rise to DNA, which ultimately gave rise to life (animates).

** 'Abort' mean the unfavourable mutations are either aborted in the womb or die after birth who cannot survive the prevalent environment.

This verse is explaining the evolution of man although the sequence of evolution is not the same as explained in the Darwin's Theory of Evolution. Guru Arjan has further mentioned that evolution of man is at the highest level of evolution and he is the commander of all the living beings:

ਅਵਰ ਜੋਨਿ ਤੇਰੀ ਪਨਿਹਾਰੀ ॥
ਇਸੁ ਧਰਤੀ ਮੀਹ ਤੇਰੀ ਸਿਕਦਾਰੀ ॥
ਅਗਗਸ, ਮ ਪ, ਪ-੩੭੪.

*All the other beings (excluding human) are at your service.
You are the commander on this earth.
AGGS, M 5, p 374.*

Then next question is: What is life

(<http://newton.dep.anl.gov/askasci/bio99/bio99171.htm>)

In general the following criteria make the object has life:

- 1. Motion** -- does it move under its own power? Does it move with some discernible purpose? (Toward food, away from heat, etc)
- 2. Reproduction** -- does it have some way of making more of itself, either through sexual reproduction or by budding or fissioning?
- 3. Consumption** -- does it eat or drink? Does it take in nutrients in one way or another in order to survive, grow, and eventually multiply?
- 4. Growth** -- does the organism develop over time, increase in complexity, until it reaches a mature stage?
- 5. Stimulus Response** -- does the organism respond to external stimuli, i.e. has a nervous system of some sort to detect external conditions?

On the other hand crystals grow in solution, and take on more material from the surrounding solution in order to do so, but do not respond neurologically if you poke them with a pin. Do they have life?

Similarly, some think since trees do not move on the street, therefore, they do not have life. But they grow and reproduce; and some plants (single-celled) in water do move; and every plant try to move towards sun for energy to synthesize their food; and some plant do respond to external stimuli. In that respect although they do not move on road that does not mean they do not have life.

Even when all the criteria are met, it may be difficult to determine if something is alive or not. Take a virus. It is a strand of either DNA (Deoxyribonucleic acid) or RNA (Ribonucleic acid), which is a pure chemical and

cannot grow or move on its own power. Yet when it attaches itself to a receptive host, it inserts itself into the cell and forces the host to make more of the virus, a clear reproductive plan. It utilizes the host's cellular processes to do so, in a sense taking in "nutrients" in order to survive and multiply. Is it alive?

Nevertheless, these chemicals, i.e. DNA and RNA govern all the characteristics of all living beings.

b. Death in Science

Machado [8] has surveyed literature about death as follows:

For many centuries people were deemed dead when they stopped breathing and when their hearts stopped beating. But during the era of Intensive Care, cessation of brain functions began to be considered the main reason for diagnosing death. Medical concern over making safe and appropriate diagnosis of death in respirator-supported patients led to the elaboration of criteria, which reliably established irreversible loss of brain function. This was an operational way of determining that death had occurred.

Veatch has proposed to search for the essential property that characterizes life in humans. "What is it about human life, and that its loss is so essential, that the individual who loses it ought to be called dead?" I (Machado) would complete this question as follows: What is it about human life, which is irreplaceable by any artifice, and that its loss is so essential, that the individual who loses it ought to be called dead?

According to Shewmon there are two basic schools about the definition of human death: Those referring to the "loss of specifically human properties" and those arguing the "loss of integrative unity of the body".

Bernat has also proposed to "define death as the permanent cessation of functioning of the organism as a whole". Some authors combine both schools when presenting their definitions of human death.

Machado [8] says that consciousness is the most integrative function of the organism and that it provides the essential human characteristics. Nonetheless, it is fundamental to consider both components of consciousness: arousal and awareness."

Therefore, to define human death, the crucial point is to define the function that provides the essential human properties. Machado [8] has no doubts to affirm that consciousness characterizes human existence and that the irreversible loss of consciousness defines human death (considering its two components - arousal and awareness). Moreover, he also considers that at the same time,

consciousness is the most integrative function of the body. No other function could integrate as consciousness, the functioning of the organism as a whole, when it is possible.

Traditionally, death has been defined as the cessation of all body functions, including respiration and heartbeat. Since it became possible to revive some people after a period without respiration, heartbeat, or other visible signs of life, as well as to maintain respiration and blood flow artificially using life support treatments, an alternative definition for death was needed. In recent decades, the concept of "**brain death**" has emerged. By brain-death criteria, a person can be pronounced legally dead even if the heart continues to beat due to life support measures. The first nation in the world to adopt the 'brain death' as the definition of legal death was Finland in 1971. In the United States, Kansas had made a similar law at an even earlier date. (Randell T. (2004) *Acta Anaesthesiol Scand.* 48(2): 139–44.)

A brain-dead individual has no electrical activities and no clinical evidence of brain function on neurological examination. It is important to distinguish between 'brain death' and states that mimic 'brain death' (e.g. barbiturate intoxication, alcohol intoxication, sedation overdose, hypothermia, hypoglycemia, coma or chronic vegetative states.). Some comatose patients can recover, and some patients with severe irreversible neurological dysfunction will nonetheless retain some brain functions, is generally not considered 'brain death', although it is certainly an irreversible condition in which it may be appropriate to withdraw life support.

Note that brain electrical activity can stop completely, or apparently completely (a "flat EEG") for some time in deep anesthesia or during cardiac arrest before being restored. 'Brain death' refers only to the permanent cessation of electrical activity. Numerous people who have experienced such "flat line" have reported near-death experience, the nature of which is controversial. It is understood that a permanent cessation of electrical activity indicates the end of consciousness.

Instant Death

Many sudden and quick causes of death are actually processes lasting a noticeable length of time. For instance, a broken femur that severs the femoral artery and also produces an open wound in the thigh is likely to cause death in less than a minute, since virtually complete loss of blood would be rapid. Eventually inadequate blood flow to the brain causes loss of consciousness. Causes of death that involve death without noticeable delay would involve immediate disruption of brain function. Where a firearm is fired with several inches of its barrel inside a person's mouth

and oriented straight into the mouth cavity, immediate death by destruction of the brain stem is extremely likely. Other forms of death where the brain is destroyed "faster than a thought" would include exposure to radiant energy so intense (in proximity to a nuclear explosion) that vaporization of the skull and brain would occur in a time far less than a second, and very rapid crushing of the skull, which can occur in falls (especially head first) from sufficient heights, and horizontal impacts at typical speeds of motor vehicles.

c. Consciousness

i) What is Consciousness? (<http://en.wikipedia.org/wiki/Consciousness>)

Consciousness is a quality of the mind generally regarded to comprise qualities such as subjectivity, self-awareness, sentience, sapience, and the ability to perceive the relationship between oneself and one's environment. It is a subject of much research in philosophy of mind, psychology, neurology, and cognitive science.

Many cultures and religious traditions place the seat of consciousness in a soul separate from the body. In contrast, many scientists and philosophers consider consciousness to be intimately linked to the neural functioning of the brain, dictating the way by which the world is experienced.

Humans (and often other animals, as well) are variously said to possess consciousness, self-awareness, and a mind that contains our sensations, perceptions, dream, lucid dreams, inner speech and imagination etc. Each of us has a subjective view. There are many debates about the extent to which the mind constructs or experiences the outer world, the passage of time, and free will.

Non-consciousness exists when consciousness is not present. There is speculation, especially among religious groups, that consciousness may exist after death or before birth.

ii) Consciousness in Science

The Interactions of neurons in the brain generate consciousness [9]. The human brain is the most advanced structure known, and its most complicated attribute is consciousness. The human brain is composed of neurons and glia cells (neuroglia). The estimates of the number of neurons in the brain differ, but they reach values of up to 100 billion. Each neuron may be affected by as many as 10,000 other neurons at one time, usually through synapses. The number of synapses is enormous, estimated at 300,000 billion in the cerebral cortex. In the cerebral cortex, at least one quadrillion of nerve cell transactions are executed each second. The function of the central nervous system depends on many serial and parallel interactions of masses of individual neurons. In the brain,

we may observe convergence and divergence, feedbacks, reverberations and circulating nerve impulses. The reverberating neuronal circuits may be rather long, lasting up to one second or more. All these events participate in the functioning of neuronal networks, which contain millions of neurons and billions of synapses. Such sequences of neuronal firing are required to respond to the environment in a real, sufficiently short time.

A system of neuronal and submicroscopic actions is produced which we call RHS, Real Human Self. It is called "real" because it is derived from real relations within the brain. It is called "human" because the human brain is the main object of our study even though it is probable that the same or similar mechanism functions in the brains of at least some higher animals. It is called "self" because it resembles the highest controlling systems proposed. It is possible that it controls all the activities of the brain. It is composed, in our view, of firing neurons associated with the generation of quantum waves of particles with subsequent de-coherence. It renews itself continuously, always when a new particle enters or leaves it.

It is possible that a part of this RHS produces a state of consciousness which may be built on the fact that the particles, especially electrons, communicate with one another by "proto-consciousness" which does not contain too specific information or energy transfer but in cooperation with the functioning neurons it may contain and handle a considerable amount of information. Not everything in the RHS produces consciousness; there are many unconscious processes, which are also necessary for the brain function. The consciousness, therefore, forms only a part of the functions of RHS.

iii) Consciousness in Gurbani

Guru Nanak explains 'consciousness' as follows:

ਏਕਾ ਸੁਰਤਿ ਜੇਤੇ ਹੈ ਜੀਅ ॥ ਸੁਰਤਿ ਵਿਹੂਣਾ ਕੋਇ ਨ ਕੀਅ ॥
ਜੇਹੀ ਸੁਰਤਿ ਤੇਹਾ ਤਿਨ ਰਾਹੁ ॥ ਲੇਖਾ ਇਕੋ ਆਵਹੁ ਜਾਹੁ ॥੧॥
ਕਾਹੇ ਜੀਅ ਕਰਹਿ ਚਤੁਰਾਈ ॥ ਲੇਵੈ ਦੇਵੈ ਢਿਲ ਨ ਪਾਈ ॥੧॥ ਰਹਾਉ ॥

AGGS, M 1, p 24.

There is same consciousness in every being.

None has been created without consciousness.

As is their consciousness, so their mind and body work.

There is one rule for everybody (Same Laws of Nature) under which every being is born and die. 1.

Cleverness (cheating) does not work (since every thing is going on according to the Laws of Nature) and there is no delay (in their reaction). 1. Pause.

Guru Nanak's following verse explains that seat of consciousness is in brain, mentioned metaphorically as *Dasam Duar*:

ਪਉਣੈ ਪਾਣੀ ਅਗਨੀ ਕਾ ਮੇਲੁ ॥ ਚੰਚਲ ਚਪਲ ਬੁਧਿ ਕਾ ਖੇਲੁ ॥
ਨਉ ਦਰਵਾਜੇ ਦਸਵਾ ਦੁਆਰੁ* ॥ ਬੁਝੁ ਰੇ ਗਿਆਨੀ ਏਹੁ ਬੀਚਾਰੁ ॥੧॥
ਕਥਤਾ ਬਕਤਾ ਸੁਨਤਾ ਸੋਈ ॥ ਆਪੁ ਬੀਚਾਰੇ ਸੁ ਗਿਆਨੀ ਹੋਈ ॥੧॥
ਰਹਾਉ ॥

ਅਗਗਸ, ਮ ੧, ਪ-੧੫੨.

The combination of air, water, and energy (various elements) make the body and brain (intellect) to work.

There are nine openings in this body and the tenth is the brain (Dasam Duar*) without any opening.*

Reflect upon and understand this system, O wise one. 1. One teaches, speaks, and listens by the use of this brain (Dasam Duar).

One, who contemplates of his own on this system, is truly a wise person. 1. Pause.

AGGS, M 1, p 152.

* 'Dasam Duar' = It is mythical term for brain, which is the seat of consciousness but understood differently in various religions. Although there is no opening for outside environment still it is aware of everything inside the body as well as outside and around the body through the actions of billions of neurons in the brain with its extensive nervous system throughout the body.

Death of Consciousness in Gurbani

The following verse is repeated here again to further explain the stages which lead to death of consciousness:

ਨੈਨੀ ਦ੍ਰਿਸ਼ਟਿ ਨਹੀ, ਤਨੁ ਗੀਨਾ, ਜਰਿ ਜੀਤਿਆ, ਸਿਰਿ ਕਾਲੇ ॥
ਰੂਪੁ ਰੰਗੁ ਰਹਸੁ ਨਹੀ ਸਾਚਾ ਕਿਉ ਛੋਡੈ ਜਮ ਜਾਲੇ ॥੧॥

ਅਗਗਸ, ਮ 1, ਪ-1126.

You have lost most of the power of seeing from your eyes, your body has become weak, the old age has overcome you and the death of consciousness (real death) is approaching.

There is neither spiritual glow on your face nor any sign of contentment in your mind since you left the path of righteousness.

AGGS, M 1, p 1126.

Nanakian Philosophy in the above stanza clearly indicates that the senility of various organs and body as a whole will leads to the senility of brain and consciousness, and ultimately a death. There is no information in the above stanza if the 'consciousness' is connected with so-called 'soul' as is accepted in other religions and cultures. It is the degeneration of integrative functions explained in the above stanza that leads to the death of consciousness – the real death. There is clearly no mention of loss of soul that leads to death in the above stanza.

Similarly, nowhere Machado has mentioned any loss of soul as the cause of death in his study. Death is because of the loss of consciousness which is the product of

neurons in the brain and through these neurons and the intensive nervous system of the body the whole integrated physiological processes of life are going on in order.

Although in Gurbani there is extensive use of word 'soul' under different Names, e.g. *Jio* (ਜੀਉ), *Jot* (ਜੋਤਿ), and *Atma* (ਆਤਮਾ) [7]. These words have been used allegorically and metaphorically to explain integrated functions of various physiological processes controlled by the consciousness generated by the complex reactions in neurons in the brain [5]. However, many Sikh theologians interpret Gurbani under the influence of Vedantic philosophy in which the death of consciousness is compared with the loss of soul which leaves the body either to enter into the cycle of reincarnation or to heaven or hell. For further information about 'soul' consult Chahal [5] and Dhaliwal [7].

Now Guru Nanak explains real death as the death of consciousness as follows:

ਦੇਹੀ ਮਾਟੀ ਬੋਲੈ ਪਉਣੁ ॥ ਬੁਝੁ ਰੇ ਗਿਆਨੀ ਮੁਆ ਹੈ ਕਉਣੁ ॥
ਮੁਈ ਸੁਚਤਿ ਬਾਦੁ ਅਹੰਕਾਰੁ ॥ ਓਹੁ ਨ ਮੁਆ ਜੋ ਦੇਖਣਹਾਰੁ ॥੨॥

ਅਗਗਸ, ਮ ੧, ਪ-੧੫੨.

The body is made of earth (various elements) through which one speaks is the vibration of wind.

Try to understand, O wise one, who has died?

It is the death of consciousness with which the whole body functions have died. With this the egoistic nature, a product of consciousness, has also died.

What you see the body is not dead, in fact, it was the consciousness - the brain, which has stopped working. 2.

AGGS, M 1, p 152.

Medically the death is that the consciousness becomes un-functional. The consciousness is the product of billions of neurons in the brain. Therefore, when brain is dead then consciousness becomes dead later on the body's physiology stops. However, after the death of the brain the body can be kept functional for some days or months with the respirators, which helps to circulate blood in the body.

Here again Guru Nanak has not mentioned anything about the fate of soul in the body that what happened to it after death.

Does any special treatment of body decide the future of so-called soul after death?

Guru Nanak has explained in the following verse that whatever the respect or treatment is given to the (dead) body, it does not make any difference whether the so-called soul of that body will go to heaven or is free from cycle of re-birth:

ਇਕ ਦਝਹਿ ਇਕ ਦਬੀਅਹਿ ਇਕਨਾ ਕੁਤੇ ਖਾਹਿ ॥
ਇਕਿ ਪਾਣੀ ਵਿਚਿ ਉਸਟੀਅਹਿ ਇਕਿ ਭੀ ਫਿਰਿ ਹਸਣਿ ਪਾਹਿ ॥
ਨਾਨਕ ਏਵ ਨ ਜਾਪਈ ਕਿਥੈ ਜਾਇ ਸਮਾਹਿ ॥੨॥

AGGS, M 1, p 648.

Nanak Says:

"After death some bodies are burnt, some are buried and some are left to be eaten by dogs (and vultures). Some are thrown in water, while others are thrown in dried well. (Whatever the method of disposal may be) There is no evidence where one (so-called soul) goes after death."

Guru Nanak again states that there is no world after death where one will reap the benefits/punishments of Karma of this life:

ਮਤੁ ਕੇ ਜਾਣੇ ਜਾਇ ਅਗੈ ਪਾਇਸੀ ॥
ਜੇਹੇ ਕਰਮ ਕਮਾਇ ਤੇਹਾ ਹੋਇਸੀ ॥

AGGS, M1, p 729-730.

Nanak Says:

"One must not understand that the karmas (good or bad) of the current life are rewarded in the next world. It is here in this world 'what you sow so shall you reap'."

Guru Nanak further explains that it is not known where does one (soul) come from and where does one (soul) go after the death:

ਜਾਤੋ ਜਾਇ ਕਹਾ ਤੇ ਆਵੈ ॥ ਕਹ ਉਪਜੈ ਕਹ ਜਾਇ ਸਮਾਵੈ ॥
ਕਿਉ ਬਾਧਿਓ ਕਿਉ ਮੁਕਤੀ ਪਾਵੈ ॥ ਕਿਉ ਅਬਿਨਾਸੀ ਸਹਜਿ ਸਮਾਵੈ ॥੧॥
ਨਾਮੁ ਰਿਦੈ ਅੰਮ੍ਰਿਤੁ ਮੁਖਿ ਨਾਮੁ
ਨਰਹਰ ਨਾਮੁ ਨਰਹਰ ਨਿਹਕਾਮੁ ॥੧॥ ਰਹਾਉ ॥
ਸਹਜੇ* ਆਵੈ ਸਹਜੇ ਜਾਇ ॥ ਮਨ ਤੇ ਉਪਜੈ ਮਨ ਮਾਹਿ ਸਮਾਇ ॥
ਗੁਰਮੁਖਿ ਮੁਕਤੋ ਬੰਧੁ ਨ ਪਾਇ ॥ ਸਬਦੁ ਬੀਚਾਰਿ ਛੁਟੈ ਹਰਿ ਨਾਇ ॥੨॥

AGGS, M 1, p 152.

How can we know where did we come from?

Where did we originate, and where will we go or merge into?

How are we bound, and how are we liberated?

How do we merge with Indestructible Entity with ease? 1. The Naam in the heart (comprehension of God) is the elixir (Amrit) of life, The Naam is God, and God is free from any desire. 1. Pause.

Under the Laws of Nature one comes (born) and under the same laws one goes away (die).

Consciousness arises in the mind (with neurons in the brain) and is destroyed in the brain.

Through the comprehension of wisdom (philosophy) in the Sabd (Nanakian Philosophy) the Guru-oriented is liberated and does not fall into any bondage. 2.

**Sehj, Sejay*, etc has many meanings. It is to be seen in which context it has been used. It means easily, wisdom, tranquility, etc. and according to Dr Sahib Singh it means 'According to Laws of Nature' at page 11, Volume II. [10].

Finally, Guru Arjan sums up Nanakian Philosophy about ਕਾਲ (Kal – Death) as follows:

ਪਵਨੈ ਮਹਿ ਪਵਨੁ ਸਮਾਇਆ ॥ ਜੋਤੀ ਮਹਿ ਜੋਤਿ ਰਲਿ ਜਾਇਆ ॥
ਮਾਟੀ ਮਾਟੀ ਹੋਈ ਏਕ ॥ ਰੋਵਨਹਾਰੇ ਕੀ ਕਵਨ ਟੇਕ ॥ ੧ ॥
ਕਉਨੁ ਮੂਆ ਰੇ ਕਉਨੁ ਮੂਆ ॥
ਬ੍ਰਹਮ ਗਿਆਨੀ ਮਿਲਿ ਕਰਹੁ ਬੀਚਾਰਾ ਇਹੁ ਤਉ ਚਲਤੁ ਭਇਆ ॥ ੧ ॥
ਰਹਾਉ ॥
ਅਗਲੀ ਕਿਛੁ ਖਬਰਿ ਨ ਪਾਈ ॥ ਰੋਵਨਹਾਰੁ ਭਿ ਉਠਿ ਸਿਧਾਈ ॥
ਭਰਮ ਮੋਹ ਕੇ ਬਾਂਧੇ ਬੰਧ ॥ ਸੁਪਨੁ ਭਇਆ ਭਖਲਾਏ ਅੰਧ ॥ ੨ ॥
ਇਹੁ ਤਉ ਰਚਨੁ ਰਚਿਆ ਕਰਤਾਰਿ ॥ ਆਵਤ ਜਾਵਤ ਹੁਕਮਿ ਅਪਾਰਿ ॥
ਨਹ ਕੇ ਮੂਆ ਨ ਮਰਣੈ ਜੋਗੁ ॥ ਨਹ ਬਿਨਸੈ ਅਬਿਨਾਸੀ ਹੋਗੁ ॥ ੩ ॥
ਜੇ ਇਹੁ ਜਾਣਹੁ ਸੇ ਇਹੁ ਨਾਹਿ ॥ ਜਾਨਣਹਾਰੇ ਕਉ ਬਲਿ ਜਾਉ ॥
ਕਹੁ ਨਾਨਕ ਗੁਰਿ ਭਰਮੁ ਚੁਕਾਇਆ ॥ ਨਾ ਕੋਈ ਮਰੈ ਨ ਆਵੈ
ਜਾਇਆ ॥ ੪ ॥

ਅਗਗਸ, ਮ ਪ, ਪ-੮੮੫.

The air (gases) merges into the air.

The energy is amalgamated with energy.

The minerals (of body) become part of the soil.

Who will take care of those who are lamenting? 1

(Since the lamenting persons will also be dying.)

O wise men try to comprehend together who has died? Oh spiritually wise men! Sit together and comprehend that in fact (a person came and now) that person has gone (back to its elemental form). 1 (Pause)

(Actually) no one knows what happens after death.

The one who is lamenting will also depart.

Mortal beings are bound by superstitions and attachments.

The ignorant person (blind) is baffled as if it is dream. 2 Everybody is born and dies according to the Laws of Nature, the system developed by the Creator.

(In fact) No one dies; no one is capable of dying, since the matter, with which, the being come into existence is indestructible. 3*

What the people think it is not like that.

I am a sacrifice to the one who knows this.

Nanak says:

The Guru has dispelled my doubt that in fact no one dies and no one is born or dies. (It is just the change of matter into different forms.) 4. 10.

*Matter is also considered as energy.

AGGS, M 5, p 885.

The above verse emphasizes that to understand life and death it is important to know your own roots (origin) where did man come from on this earth. The origin of man is directly related to evolution theory as has been explained earlier by Guru Amardas and Guru Arjan (See Note # 4). According to the theory of origin of life the elements, i. e. Carbon, Oxygen, Hydrogen, Phosphorus,

Nitrogen, etc, combined into complex molecule called DNA - the thread of life. From the DNA came the single-celled organism, which gave rise to multicellular organism and ultimately man, the most complex and advanced stage of evolution.

Guru Arjan finally sums up Nanakian Philosophy about the life and death to get the best out of this life since there is no life after death:

ਅਗਾਹਾ ਕੂ ਤ੍ਰਾਪਿ ਪਿਛਾ ਫੇਰਿ ਨ ਮੁਹਡੜਾ ॥
ਨਾਨਕ ਸਿਭਿ ਇਵੇਹਾ ਵਾਰ ਬਹੁੜਿ ਨ ਹੋਵੀ ਜਨਮੜਾ ॥੧॥
ਅਗਗਸ, ਮ ੫, ੫-੧੦੯੬.

Nanak says:

"Think about the future, look not on the past.

Make the present life a great success since there is no birth again."

AGGS, M 5, p 1096.

CONCLUSIONS

- To understand 'death' it is important to understand 'life' and its origin and 'evolution of man'.
- The evolution of man from *Jot* (energy), starting from the time of Big Bang and formation of DNA (Deoxyribonucleic acid), is well explained in Gurbani and also in Science – origin of universe, origin of life, and Darwin's Theory of Evolution.
- It is the consciousness generated in the brain due to physical and chemical action of billions of neurons and every physical and chemical reaction in the body is controlled by this consciousness (brain).
- Every part of the body inside as well as the environment outside and around the body is in contact with consciousness (brain) through its extensive nervous system in the body.
- There are two types of deaths in Nanakian Philosophy:
 - Death of Conscience (See Note # 1), and
 - Death of Consciousness (See Note # 2).
- The death of consciousness (the brain) is the real death.
- The information about ਕਾਲ (Kal – Death) given in Nanakian Philosophy embodied in the Bani of Guru Nanak, which is incorporated in the Aad Guru Granth Sahib, is exactly the same as is being described by scientists in these days.
- This study also proves that application of scientific information and logic helps to understand Nanakian Philosophy embodied in Gurbani in its real perspective.

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Notes

1. **Conscience** (Webster's Dictionary): Knowledge or sense of right and wrong, with an urge to do right; moral judgment that opposes the violation of a previously recognized ethical principle and that leads to feelings of guilt if one violates such a principle.

2. **Consciousness** (Webster's Dictionary):

1. the state of being conscious; awareness of one's own feelings, what is happening around one, etc.

(Continued on page 8)

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(Continued from page 17)

2 the totality of one's thoughts, feelings, and impressions; conscious mind.

3. The English renderings in this study are explaining scientifically and logically the main theme of Nanakian Philosophy embodied in every phrase or stanza or Sloka or Sabd or *Pauri* of Gurbani. Therefore, one may find my interpretations in this study quite different from that of literal and traditional translations found in the literature.

4. Nanakian Philosophy embodied in the Bani of Guru Nanak has been further explained by himself (Guru Nanak) in his Bani and also by the Sikh Gurus who succeeded to the House of Nanak and whose Bani is incorporated in the AGGS. This fact has been pointed out by Dr Taran Singh [11] and which has been confirmed in this article quoting appropriate phrases and verses of the Sikh Gurus. This fact is being further expanded in another detailed article.
