Brain and Cosmology

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Abstract

In this paper it is presented the hypothesis of cosmological memory in the brain. When we observe galaxies and stars through a telescope the different shapes we see are the result of our brain activity. Would it be possible to carefully study cosmology and search the answers to the wonderful and big questions of the universe by looking inside ourselves?

How much information on the history of the universe has already been lost forever? Will the increasing speed of the expansion of the Universe lead galaxies to disappear forever from our view? These are some of the questions found in the article "*The End of Cosmology*" published in the March 2008 issue of Scientific American Magazine. In this article it is assumed that cosmologists of the future will probably have fewer evidences in relation to the formation of the universe and cosmology will be doomed by cosmological forgetting.

But when we look at galaxies and stars through a telescope, we fail to remember that everything that we see is visible thanks to the properties of our small eyes and of our brain that process information and offer different shapes. The latest developments of neuroscience considers the brain not only as an organ in charge of collecting and transferring information, but also as an organ that is actively involved in the recognition of the outside world and provides directions to this recognition. For example, we are used to a colorful world. Anything in this world has a color. The sky is blue, the Sun is yellow and fields are green during the spring. But the real world is a mixture of colorless particles and waves. Could the perception of these colors be the result of our mind? This is not an easy issue to reject and leads to the assumption that our theories about the universe may be the result of the physiology of our brain and not of the reality of the outside world.

But, if the brain is greatly involved in the recognition of the outside world, can it also have a cosmological memory, i.e. a memory which derives from the formation of the universe? Could we search in our brain (which weights 1,400 grams) the answers to the main questions of the universe, such as the Big Bang? I know that this claim resembles science fiction, but let us consider the possibility that the evolution of the brain, during the last 200 million years, might contain memories related to 14 billion years ago, the estimated date of the Big Bang. This possibility introduces the issue of cosmological memory in the brain.

In "*The blind watchmaker*" Richard Dawkins states that: "*The analogy between telescope and eye, between watch and living organism, is false. All appearances to the contrary the only watchmaker in nature is the blind forces of physics, albeit deployed in a very special way. A true watchmaker has foresight: he designs his cogs and springs, and plans their interconnections, with a future purpose in his mind's eye. Natural selection, the blind, unconscious, automatic process which Darwin discovered, and which we now know is the explanation for the existence and apparently purposeful form of all life, has no purpose in mind. It has no mind and no mind's eye. It*

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does not plan for the future. It has no vision, no foresight, no sight at all. If it can be said to play the role of watchmaker in nature, it is the blind watchmaker." According to Dawkins evolution requires long periods of time. At the beginning genes evolution has ruled for 3.5 billion years and this process reached its climax with the production of the organ named brain. Brain is now ruling but it will soon lose its predominance against its most important product, i.e. computers. Computers will rule over humanity and a new age of evolution will start. An important question that Dawkins raised is if computer will understand that everything originated from the DNA. This knowledge could be forgotten due to the fact that circuits and processing systems rule computers. This question can be reformulated in the following way: *will computers be able to remember their origin based on genes*?

It is worth noting that before brain evolution there were more than 3.5 billion years of gene evolution and, before, 10 billion years of physical evolution. Are we now similar to computers that have forgot their origins? But since the brain uses the laws of physics and applies them, it is natural to assume that it holds within its structure the cosmological evolution of the last 14 billion years and that this can be referred to as cosmological memory.

In the article "*Does the brain model Newton's law?*" McIntyre et.al. investigate how the brain arranges movements during a play of catch (3). Holding a ball seems to be an easy task, however holding a ball in a game can become a very complicated process, due to the influence of gravity and the speed of the ball which is continuously changing. The brain needs to determine the exact time and place to move hands in order to catch a ball. All these functions can be performed if gravity itself is qualified within the brain. The brain is aware of Newton's law of gravity and this knowledge existed thousand of years before the discovery of Newtonian's gravitation. Now, was Newton's discovery the result of the fact that the law of gravitation is present in our brain? This question assumes that the evolution of the universe is integrated and consequential and that the human brain cannot neglect cosmology and gravity.

But, when general relativity is taken into account the hypothesis of cosmological memory seems to fail. However, it is possible to note that general relativity is based on mathematics and mathematics is an abstract science which is originated from mental processes which are wonderfully compatible with the outside world per se. Before Einstein's theory of general relativity, George Kantor provided an understanding of infiniteness and non-Euclid geometry offered suitable patterns for the theory of relativity. All this abstract thinking and mathematics does not come from physical evidences and experiments, but from the activity of the brain. If human brain is able to introduce such advanced mathematical and abstract models in relation to space, time and its nature, it is easy to conclude that general relativity is part of our cosmological memory.

Now, how can we devise experiments that can test the hypothesis of cosmological memory and offer real and tangible evidences? In 1965 Arno Penzias and Robert Wilson discovered the cosmological microwave background radiation that remains from the Big Bang. This radiation has accompanied the evolution of life for billions of years. Does this cosmological microwave background radiation have hidden properties that attract the attention of the mind and brain of humans, a wonderful sound which has accompanied million of years of evolution, similarly to the heart beat of the mother which accompanies embryos in the uterus? Could it be possible to expose the brain of animals to this radiation and study its properties through different responses? Could this be a test of cosmological memory and offer a possibility for neuroscientists and cosmologists to work together in the common study of evolution and cosmology?

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