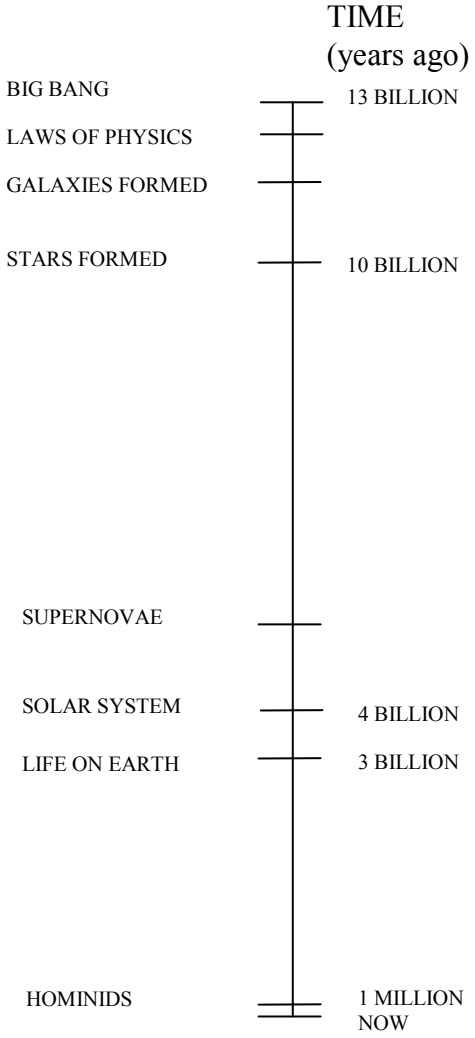
OUR WORLD

Part 2 The current view

To get the full impact of our two teachings on the creation of the universe we have to assess the state of our own knowledge and experience and also try to understand contemporary thought. The latter can be summarised as follows:



Before the universe started there was a different space-time, maybe a void, maybe another universe. By chance a "bubble" of energy arose at some point, as it were, the egg cell of the universe. At this stage the universe was truly one: there was essentially one particle the size of an atom containing all the matter of the universe. An unknown force came into action, which caused the matter to expand – and expansion continues to this day. As expansion proceeded the major laws of particle physics came into being. At first the universe was a great cloud of hydrogen gas, but this condensed into galaxies. Later, within galaxies the gas condensed into stars. The higher elements were formed in these early stars, some of which exploded forming a local mixture of dust and gas. This condensed to form new stars surrounded by planets, some solid, some gaseous. Our sun was born 4 billion years ago, together with the earth, and soon after, the moon. Life appeared 3 billion years ago, at first in some simple form and then cells, multi-cellular organisms, and so on. The first hominid appeared about 3 million years ago, and our species only about 100,000 years ago.

The Anthropic Principle tells us that in our universe things had to be just right for us to be evolved. This means that the basic materials, atoms and so on, and the forces between them had to have the right values or creation would have petered out. One example was given last week about gravity. Another example is carbon, which is the basis of biochemistry and which was formed in early stars. There is a force in the nucleus of atoms which determines how fast carbon is made, and this force had to be right to a few percent to make enough carbon.

Further, there are numerous steps with a low probability that had to happen to produce advanced life forms on Earth. For example, we and other animals and plants are made of cells that have two particular structures (the nucleus and the mitochondrion) which allow us to be quite large and complex. But this seems to have happened by a complete fluke, by one early type of cell

engulfing two others and incorporating them into its own structure. There are probably dozens of crucial steps of this kind which had to be taken in the course of evolution from simple cells to beings like us with a consciousness that can describe the universe.

We can summarise the complexities of creation and evolution by saying that there are *laws* which determine what happens. Of course laws are human constructions; it is not at all clear what is the equivalent in nature itself.

At the beginning of the universe there were few laws, just the laws to do with fundamental particles. As organisation became more complex, especially on earth, more laws 'emerged'. For example there is the law of natural selection in evolution, and there are the Mendelian Laws to do with how the characteristics of offspring are determined by the genes of the parents. It might in principle be possible to predict these laws from the fundamental laws of physics, but in practice they amount to new laws.

At the level of human society, there are the laws of the land, but there are also other laws or rules that need to be applied. We have just seen what happens when the rules of good banking practice are flouted, and we are beginning to see the consequences of flouting the laws of the biosphere.

Seen from the viewpoint of human evolution, the Western scientific story is of creation and evolution of matter leading to consciousness. This has to be contrasted with the predominant Eastern philosophical view that consciousness was primary and led to the creation of matter.

Lastly, Dr Roles pointed out that if one draws a downward pointing arrow on the figure like the one above showing the creation process:

> . . . the whole of Science in all its branches can only measure, devise experiments and evolve its theories in this one direction, the downward pointing arrow. It is impossible for the scientist to proceed in the opposite (the upward) direction and to picture a causal universe. [66/9]

What did he mean?

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Practical work

If anyone has not yet found a saying to learn, a number of these have been suggested, so please ask for a list. At the end of the term we might collect together the ones that have been learned.

To make the teaching about creation practical, try to think of how in practice whether we have a real relationship with the universe at any level. This could be quite simple, for example when we see the moon, do we feel it, and what does that mean?

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