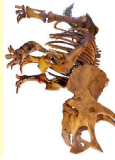


The omphalos hypothesis has never been very popular, either because it makes the creator of the Universe a deceiver or because it is not a scientific idea.



Ammonites are extinct mollusks that lived more than 60 million years ago. Image by Ondrej Synek.

Triceratops skeleton (Los Angeles Museum of Natural History). Triceratops became extinct 66 million years ago. Image by Alle Caulfield processed by MarkKnight.



The idea that the Universe was created five minutes ago was discussed by the philosopher and mathematician B. Russell. It can be considered an extrapolation of the omphalos hypothesis.

The omphalos hypothesis (P. H. Gosse, 1857) reconciles the age of the Earth implied by the Bible with the much longer age deduced from geological evidence and fossils by proposing that the Earth was created with all that evidence in place.

An Infinity of Universes?

An infinite number of universes, a multiverse, is predicted to occur by several crazy theories.

Quantum mechanics, one of our more successful theories, has counterintuitive implications, like particles that seem to exist in several places at the same time and that can communicate with other particles instantaneously. The many-worlds interpretation of this theory proposes that every time a particle interacts, the Universe splits into different universes, each with a different outcome for the interaction.

Other tentative theories that predict a multiverse are: string theory, eternal inflation, and the mathematical universes of Tegmark.

Our current knowledge does not allow us to disprove this idea.

We cannot disprove this idea now (but we could prove it right by finding a message from the programmers).

This idea can be disproved by finding any clear evidence of life outside the Earth. However, it can never be proved to be right.

This idea is impossible to disprove.

Some people think that there is no paradox, that the aliens are already here. As evidence, they might point out the many sightings of UFOs (Unidentified Flying Objects), the crop circles that have been found in several parts of the world, or the reports of persons claiming they have been abducted by aliens.

As depicted in many movies and books, our first contact with an extraterrestrial civilization would be momentous. Hence, the aphorism made popular by the astronomer C. Sagan applies: 'Extraordinary claims require extraordinary evidence'.

All the claims of contact with aliens that provide enough information to be investigated have resulted in explanations involving natural phenomena or hoaxes.

We also tend to believe in interesting things. Wouldn't it be nice if aliens were already here and willing to help us fix our problems?

To learn more about this series and about the topics presented in this booklet, please visit <http://www.tuimp.org>

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The Universe in my pocket No. 16

This booklet was written in 2019 by Mónica Rodríguez, from Instituto Nacional de Astrofísica, Óptica y Electrónica, Mexico and revised by Stan Kurtz, from UNAM, Mexico. For current scientific theories of the Universe, see TUIMPs 12 and 13.

Is the Universe full of aliens?

In the last three decades, we have discovered thousands of planets orbiting nearby stars (see TUIMP 8). There might be billions of planets just in our Galaxy. And some of them were probably born a few billion years before the formation of the Earth. Even if just a tiny fraction of these planets develop life and civilizations with technological capabilities, the Galaxy should be teeming with extraterrestrial civilizations. So, where is everybody?

This was the question posed by E. Fermi in 1950, and it led to the most popular name for this problem (previously discussed in 1933 by K. Tsiolkovsky): the Fermi paradox. Many explanations of the paradox, also known as the Great Silence, have been proposed, but it is difficult to find an explanation that will work for all possible civilizations.

A Five-Minute Universe?

You probably remember getting out of bed this morning and what you had for breakfast. You might also remember your first kiss or the joy of your first ride on a bike.

According to this idea, these things never happened. You were created five minutes ago, along with all your memories and, for that matter, along with the rest of the Universe.

There is absolutely no way in which this idea can be disproved. And there is no way at all to prove that it is true. Moreover, the idea does not provide any useful knowledge about the Universe.

Therefore, this idea is not a scientific theory. Scientific theories must be fruitful, and it must be possible to disprove them.

The Souls of Millions of Light Years Away; the work of Y. Kusama illustrates beautifully the concept of infinity. Image taken by Adam Fagen.

Eternal inflation predicts that quantum fluctuations are continually spawning new universes at different regions of space. String theory proposes that our Universe coexists with infinite universes that have all possible physical laws. The mathematical Universe of Tegmark posits that reality is mathematics and that all possible mathematical structures exist somewhere in the multiverse.

Close-up of a region in the Mandelbrot set, a mathematical structure created with the function $f(z) = z^2 + c$ (B. Inettie228).