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Black holes or black stars? Big Bang or first incognoscible cause?

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Abstract.-This brief article denounces two scientific expressions, black holes and Big Bang, as popular as they are inappropriate. The first because it designates objects that are the opposite of what their name means. The second because it indicates a wrong direction in the reflection of the origin of the universe.

Keywords: black holes, black stars, Big Bang, Principle of Directional Evolution of the Universe, Theorem of Formal Dependence, Theorem of the First Cause.

1. The perversion of the ordinary language of physics

In the previous article of this series of articles I denounced the already unsustainable situation that contemporary physics maintains with ordinary language. A language that, together with mathematical formalism, must necessarily be used in the construction of all physical theories. This situation has also been harshly criticized by other authors, e.g. T. Maudlin, although so far without any consequences. The same, and a fortiori, that will be the case with my own denunciations.

This penultimate article of the series deals with two really untenable cases of the misuse of ordinary language in contemporary physics: the case of black holes and the case of the Big Bang. These are two expressions that are already part of popular culture and will therefore be very difficult to eradicate. Although taking into account the deep relationships between thought and language, both expressions should be eradicated because they could not be more inappropriate to reach a correct explanation of the physical world.

2. The case of the black holes

The existence of physical objects so massive that not even light can escape from them was already proposed at the end of the XVIII century, and independently, by J. Mitchell and P. S. de Laplace, although more than super-dense objects they would be super-large objects [13]. As is well known, the existence of black holes is deduced from the general theory of relativity [2] and is nowadays fully confirmed in empirical terms. It is also known that they are formed by gravitational collapse of both massive stars and gas clouds of sufficient mass.

But it happens that black holes are not holes, but quite the opposite. Indeed, and leaving aside other meanings unrelated to material objects, a hole is a gap in a solid mass; a space in a material object in which its matter is missing. Therefore black holes, if they are to have a name descriptive of what they are, and not of the opposite of what they are, would have to be called either black stars (for those originated by gravitational collapses of stars) or black nuclei (for those originated by gravitational collapses of gas clouds); but never black holes, because they are the opposite of holes.

3. The case of the Big Bang

Another popular and regrettable case of scientific misnomer is that of the Big Bang, for the most widely accepted theory of the origin of the universe. As everybody knows, it is the jocular name with which F. Hoyle baptized (year 1949) the recent theory of A. Friedman and G. Lamâitre on the origin of the universe [3, 4, 5, 6, 7, 8, 9], at that time considered as eternal. An origin of the universe made one think of a creator God, something unacceptable for scientific and political materialism.

But for there to be an explosion, something that can explode must previously exist, and

the origin of the universe would then be the origin of that something that can explode, since what does not yet exist cannot explode, precisely because it does not yet exist. Moreover, it is possible to formally demonstrate that the universe had to have an origin and that this origin is unknowable for our science, because our science has to be constructed with the knowledge extracted from within the observable universe. To demonstrate that this is the case, it is only necessary to assume, in addition to the laws of logic, the Principle of Directional Evolution of the universe:

Principle 1 (of Directional Evolution) *The observable universe always evolves independently of its observers and in the same direction of increasing its global entropy.*

where the term entropy could be replaced by the term isotropy [10]. It is immediate to recognize in the statement of the above principle a universal generalization of the Second Law of Thermodynamics, a law that was not initially well received, although it was eventually declared by A. Einstein to be *the first law of all the sciences* [1]. On the other hand, declaring that the evolution of the observable universe is independent of its observers is a logical consequence of the fact that, for most of the history of the observable universe, that evolution has occurred without observers to observe it.

From the Principle 1 of Direction Evolution, it is almost immediate to formally obtain the following [11, 12]:

> **Theorem 6 [of Formal Dependence]**.-*No concept defines itself; no statement proves itself; no physical object is the cause of itself; and no cause is the cause of itself.*
>
> **Theorem [of the First Cause]**.-*The observable universe had an origin whose cause is external to the universe itself and scientifically unknowable.*

I conclude this brief reflection on the scientific misuse of ordinary language by reminding you that such misuse can lead to serious logical, and therefore scientific, inconsistencies. Indeed, "black holes" and "Big Bang", are a good representation of the immaturity in the use of ordinary language by contemporary physicists.

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