Translation into English: Chapter 2 - Catalogue of Errors for Both Theories of Relativity

from the German documentation of G.O. Mueller

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C: Space / Error No. 4

The space of the GTR is supposed to be curved

Albert Einstein declares (in 1916, cited from the 1923 reprint), with respect to the previous opinion that Euclidean geometry describes the relative locations of bodies in space (p. 81): "that the general theory of relativity cannot retain this simple physical explanation of space and time". Previously (p. 84): "the coordinates of space and time have had a direct physical meaning." He wants to show that this view (p. 84) "must be abandoned and replaced by a more general concept". He wants to express the laws of nature as general covariant equations. This targeted general covariance removes (p. 86) "the last remnants of physical concreteness from space and time".

This last remnant of concreteness vanishes with the mathematical construction of a four-dimensional geometry. In this mathematical construction the coordinates of space and time are no longer constants, but functions, i.e. dependent on space-time. (p. 88): "At the same time the motion of the free point of mass in the new coordinates will appear as curvilinear, irregular, ... independent ... of the nature of the point of mass in motion. We will interpret this motion as being similar to motion under the influence of a gravitational field. We see the presence of a gravitational field bound up with a space-time variability of the [function]". (p.89): "According to the general theory of relativity, then, gravitation plays an exceptional role as compared with the other ... forces."

With this the program of the GTR is outlined: gravitation determines the space coordinates, though without any concreteness, because everything has to take place in a non-Euclidean geometry (p. 122). "So Euclidean geometry does not apply in the gravitational field even in close approximation, if one wishes to understand the very same rod as a realization of the same path, independent of its place and its orientation." Free points of mass depict curvilinear motion, as does light (p. 123): "One easily recognizes that the beams of light have to travel a curvilinear path with respect to the coordinate system ..."

A critical analysis has no great difficulty with this concept of space, because the inventor of the theory himself concedes that it is a mathematical construction that is without any physical concreteness.

Already in 1930, Forsyth diagnoses in the Foreword, that the alleged curvature of space is a mathematical abstraction and its existence is not proven by anything. Nothing has altered here right up to the present day. - In an abstract presentation of space the mathematicians can construct as many different geometries as they want. All of these created geometries can be worked with, provided they are not self-contradictory. This is the basis of the conventionality of geometry.

The user can select a geometry ad lib and according to convenience. All processes in space can be depicted with each geometry. In selecting a non-Euclidean geometry only curved lines are available instead of straight lines. In principle, such constructions of non-Euclidean geometries, if they are not self-contradictory, are also neither more true nor more false than other geometries. Their choice in order to describe processes in real space does not, however, give proof that space has taken on the properties of one of the many geometries.

Albert Einstein goes a grotesque step further and maintains that (p. 84): "one can 'create' a gravitational field by merely changing the coordinate system" (the inverted commas for "create" are from Albert Einstein). If one can create a gravitational field by changing coordinates, then one thereby alters, according to Albert

Einstein's own teachings, the curvature of space. But how does space know which coordinates Albert Einstein has just selected on his paper?

The critic can here mainly restrict himself to quotes from Albert Einstein, because he himself openly admits that he is only working with fictions. The change of coordinates is completely arbitrary and only a figment of the imagination of the relativists, and this is said to create a gravitational field that can only be fictitious, but that supposedly immediately changes the only true geometry of space. Nobody will claim the physical concreteness of this physics, and it waives all effort to do so itself.

When the relativists speak of curved space, they merely attribute characteristics of physical phenomena or processes (bodies, fields, radiation) to space, something which, in the case of primitive people, is described as magic and fetishism (writing the name of the enemy on a piece of paper and then burning the paper as a means of destroying the enemy).

Albert Einstein's magic even goes so far as to create fields of gravity through a pure selection of coordinates. Here, everyone is permitted to build his very own world. - The relativists thus observe a gravitational field with curved field lines (the same gravitation) and maintain that this is the reason why space is curved. Here they forget that, according to their own logic, a different - e.g. rectilinear or differently curved - appearance at the same point in space does not imply that space must either lose its curvature or must assume a different curvature. Space, therefore, must continuously alter its geometric structure to accommodate its appearance or process. What speaks against this standpoint is (1) the applicability of completely different geometries to the same processes in space, (2) the complete lack of any proof of the validity of only one specific geometry in space, (3) for the practical application of a non-Euclidean geometry, the necessity of the Euclidean geometry for the definition of the measurement of curvature, without which a non-Euclidean geometry is unable to be implemented, and (4) the complete lack of proof as to certain special properties of true space that go beyond the two known characteristics of its extension and the possibility of motion within it.

For the relativists space is a sort of dump for rubbish, everything that we cannot understand being added on to it as a property of space and then regarded as having been explained. Space is said to be curved. It is said to alter its properties continuously in dependence on existing mass. Space itself is said (since 1920) to be the ether. It is further said to permit only one specific (non-Euclidean) geometry, though which non-Euclidean geometry in particular holds at any given time alters, depending on one's opinion. Since we know nothing about space, we can claim to know everything about it: that's seeing better in the dark. - There are simple reflections that allegedly show the supposed properties of space as physically being caused by characteristics of bodies or fields. A rigidly stretched thread can form almost a straight line, even in a gravitational field, and it is only the difference with respect to this rigidly stretched thread (the line of Euclidean geometry) that allows one to recognize and to measure a curvature. If a ray of light travelling parallel to the thread is curved by the gravitation, it is not space that is curved, but the path taken by the light, this being due to a familiar cause, and not to space.

A. Einstein: Die Grundlage der allgemeinen Relativitätstheorie. In: Annalen der Physik. Ser. 4, 49. 1916, pp 769-822. Reprint in: Das Relativitätsprinzip. Collected Works from Abh. 5th edition, 1923. - A. R. Forsyth: Geometry of four dimensions. 1930, S. X-XIII.