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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G: Minkowski's World / Error No. 1

Minkowski maintains that "the notions of space and time I would like to develop for you are based on experimental physics. This is their strength."

The cited claim was made by Minkowski in his Cologne lecture (quoted in keeping with the 1923 reprint, p. 54). He provides no proof, however, of any "foundation in experimental physics". In the entire text of the lecture a single experimental result is named (p. 58); the Michelson-Morley experiment, its "negative result", and to explain the Lorentz contraction hypothesis. This is where its strength was thought to lie.

Apart from this Minkowski refers to a publication of his own (1908) and to the publications of W. Voigt (1887), A. Einstein (1905 and 1907), Max Planck (1906 and 1907), I. R. Schütz (1897), A. Liénard (1898), E. Wiechert (1900), and K. Schwarzschild (1903): Minkowski cites them all as sources of theoretical reflections, of mathematical relationships, of a "revision of the entire field of physics" (p. 62), of the "axiomatic development of Newtonian mechanics" (p. 64) and of proposed elementary laws, but not as the source of a single experimental finding.

So Minkowski (1908) rests his case on a single experimental result, the supposed null result, while already in 1904 and 1905 an ether drift of 7.5 km/sec was confirmed by Morley and Miller in Cleveland. - But even the assumed negative result supports none of Minkowski's farther-reaching claims - "based on experimental physics" - as to time and space, and fails to lend his mathematical constructions any physical "strength".

To maintain that the perceptions of space and time outlined are based on experimental physics is pure fantasy. Where in physical reality is there a fourth dimension that one can measure with measuring instruments? Where is a time coordinate with an imaginary value measured? Where in the three-dimensional space of our experience does a world line run? Can, for example, a "world line" run between London and Paris? How can a measurable body in our experience enter Minkowski's world? Everything can only take place - if at all - on the mathematician's/geometrician's millimetre paper.

Minkowski's notions are in fact only an illustration of Albert Einstein's special theory of relativity and have no more experimental basis than the theory itself, namely none at all. There is, here, no basis of experimental physics, and no strength, but only tolerant paper and a fleecy way of talking, such as a "gift from above" (p. 59), and "the mystical formula" (p. 64): 3 times 10[to the 5th] km = [root -1] secs.

Unfortunately Minkowski died too early (1909), so that we will never know whether and how he would have reacted to the new "basis of experimental physics" provided by the interferometry experiments of 1904, 1905, 1913, 1921 and 1925. - The fact, however, that Minkowski sees a "strong" physical basis solely and alone in a negative result obtained with a then newly - and still by no means fully - developed instrument of Michelson's (the interferometer), speaks against him.

Minkowski's randomly nonchalant handling of physical reality, as documented by his lecture, suggests that no serious argument, with experimental findings that are not expedient to his constructions and claims, is to be expected. One who can assume "endlessly many volumes of space", who can twist space around his "null point" (What could the null point of real space be? And what would happen to measurable bodies in

space in the event of the rotation of space?) and can make out length contraction, for which there is not the slightest trace of empirical evidence, to be a "gift from above" and can praise the equation km = secs as a mystical formula, proves that he has lost his path on the way from the mathematics to the physics.

Minkowski, Hermann: Raum und Zeit : Lecture, 80. Naturforscher-Vers., Köln 1908, 21st Sept. In: Naturforschende Gesellschaft, Cöln. Verhandlungen. 80. 1909, pp 4-9. Also in: Physikalische Zeitschrift. 20. 1909, pp 104-111. Reprinted in: "Das Relativitätsprinzip" Lorentz, Einstein, Minkowski. 5th edition. 1923, pp 54-66; Comments by A. Sommerfeld: pp 67-71.