

INSTITUTE FOR THE HISTORY AND PHILOSOPHY OF SCIENCE AND TECHNOLOGY

UNIVERSITY OF TORONTO



191 College Street, Toronto 2B, Ontario, Canada

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Professor Mario Bunge
Foundations and Philosophy of Science Unit
McGILL UNIVERSITY
Montreal, P.Q.

Dear Professor Bunge:

In answer to your "two crazy questions":

1 This is fairly evident to someone familiar with modern abstract algebra. However, I do not think that he intended to write something on abstract algebra. He wanted to develop an algebra to describe space. There exists no in-depth study of Grassmann written in the last half-century, and my impression is that there never has been a really thorough and insightful study of his work by an historian or a philosopher. Of course it is true that most mathematicians don't read the classics, or anything else much!

2 I find it very difficult to know what is meant by asking why physical space is three-dimensional. It seems to be a fact that it is, and I feel satisfied with that. If you are willing to accept certain physical laws as the explanation of why it must be at least three-dimensional, then I do not see why you would not be willing to accept the fact that the ^{real} parameters are sufficient to describe the location of bodies as evidence that it is not more than three-dimensional. If you say the issue is not what is, but rather what is logically possible, then it is certainly logically possible that space might be of only two dimensions, or of one and one-third dimensions. I do not see why the world as it exists must be the only logically possible world, and therefore I do not see why we should require a logical or mathematical explanation of tri-dimensionality. Probably I have misunderstood the meaning of your question. You might find something relevant to this question by studying the branch of mathematics known as dimension theory. I do not mean, of course, the theory of dimensional units, but rather the whole study of dimensionality, beginning with the most elementary concepts of the dimensionality of a linear space but extending much beyond that and including fractional dimensions.

Perhaps we can discuss this further at the meetings.

Cordially


Kenneth O. May
Director

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