



McGill  
University

Foundations & Philosophy of Science Unit

1979.12.18

Professor Roger Angel  
Concordia

Dear Roger

Thank you for your hand-written reply of November 30th, which I see upon my return.

Of course " $G \equiv 0$ " defines a number of spaces. The question is whether these are just mathematical spaces or have also an autonomous physical existence. My contention is that a semantical analysis of the formula--in accordance with the semantic theories formulated in Vols. 1 and 2 of my Treatise--shows it to be physically empty, for it describes a hollow "world": i.e. it fails to describe physical entities. (What is a physical entity is in turn elucidated in my Vol. 3.)

Nor do you answer the question of the empirical testability of your contention that spacetime has an autonomous existence. If you say "X exists" then you must (a) point out some of the substantial properties of X and (b) suggest possible tests of your existence hypothesis (e.g. in terms of interactions of spacetime with matter). In your letter you have done neither.

Mark that I have not said anywhere that GR requires a relational theory of spacetime. If you had taken the trouble of reading Ch. 6 of my Vol. 3 when preparing your report for the I.I.P. you would have realized that I state that GR states only that spacetime is modified by matter though not created by it. And I go on to say that a relational theory is required by philosophy not by physics--that is, by a philosophy that rejects Platonism and countenances physical entities only.

Concerning the dynamical inequivalence of a star rotating relative to a fixed earth, and an earth rotating relative to a fixed star, I fail to see the relevance of this to our discussion. In any case this has been known for 50 years and I quote it in my paper on simplicity in Phil. Sci. (1961), reprinted in The Myth of Simpl. (1963). (Reference to Cabras.)

By the way, I don't know what you mean by 'matter-energy'. No such thing. Energy is a property (of matter) not a thing, so it cannot be placed on the same footing with matter.

In short, I was disappointed by your letter, for it does not answer any of my objections.

I am not sad because you disagree with me: it is the duty of everyone to

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go beyond his teachers. I am sad because you have not done so. Instead, you skirt my objections and, in attempting to answer them, you continue to ignore everything I have written ever since I came to Canada although it is germane to your problem. How can you, under these circumstances, claim that you are my pupil?

Cordially

A handwritten signature consisting of a vertical line with a hook at the top and a horizontal line extending to the right from the middle of the vertical line.

Mario Bunge