

Letter to the Editor of

Historia Mathematica

In response to book review by David Rowe on:

**“zwei wirkliche Kerle”**: Neues zur Entdeckung der Gravitationsgleichungen der Allgemeinen Relativitätstheorie durch Albert Einstein und David Hilbert” by Daniela Wuensch. Goettingen (Termessos). 2005. ISBN 3-938016-04-3, 126 pp.

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At the end of his 10 page long, largely polemical, book review, Mr. Rowe makes the following irresponsible statement regarding the motivation of Mrs. Wuensch’s pioneering work on the discovery of the gravitational field equations:

*“Presumably that was never her real intent, nor was it mine to dwell on the motives that led her to make such reckless and baseless charges. Personally, I regret that a book of this caliber could ever appear in print...”*

And on page two of his review Mr. Rowe gives me the honor that I, “a single physicist”, had stirred up the entire controversy with my conjecture that Hilbert’s page proofs were mutilated by a forger to settle the priority dispute in favor of Einstein. Prior to the paper by Corry, Renn and Stachel, published in 1997 in **Science** (following the discovery of Hilbert’s page proofs by Corry in the library of the Goettingen University), the generally accepted view of the scientific community was that Hilbert had obtained the correct form of the gravitational field equations before Einstein, an opinion shared by celebrity physicist Steven Hawking in his article published in the special *Time Magazine* issue, “Einstein Man of the Century”.

What Mr. Rowe does not seem to understand is that by not mentioning the cut out part in Hilbert's page proofs, in a paper which claims to have finally settled the priority dispute in favor of Einstein, Corry, Renn and Stachel committed an act of scientific misconduct. On page 2 of his review, Mr. Rowe complains that Mrs. Wuensch did not consult the Einstein biography by Foelsing. Therefore, let us see that Mr. Foelsing had to say about the failure by Corry, Renn and Stachel to mention the cut out part in an interview he gave to the Sueddeutsche Zeitung on Sept. 18, 2005:

*“This behavior is for me comparable to the behavior of an experimental physicist who in his publication suppresses undesired data” [my translation].*

On page 5, Mr. Rowe claims that the cut out part, which is about 1/3 of a page, is just a “small gap”, and that the “Winterberg – Wuensch version” could have not been raised if Corry, Renn and Stachel had mentioned the cut out part. What Mr. Rowe fails here to see is that if these authors had mentioned the cut out part, they would have been unable to make their deceptive claim.

However, quite independent of the question of whether Hilbert's proofs were manipulated by a forger in favor of Einstein, there can be no doubt about Hilbert's priority, because the proofs still contain Hilbert's correct Lagrangian of the gravitational field, not known to Einstein and also Hilbert's variational principle, both of which the suspected forger forgot to cut out.

What Mr. Rowe also does not seem to understand is that with Hilbert's choice of the Ricci invariant  $R$  as the gravitational field Lagrangian for his variational principle:

$$\delta \int R \sqrt{g} d\tau = 0 \quad (1)$$

The whole game is over, because (1) is mathematically equivalent to:

$$R_{ik} - \frac{1}{2} g_{ik} R = 0 \quad (2)$$

This is also the opinion of Logunov, an internationally recognized authority on the general theory of relativity, who in a paper published with other Russian scientists attest Corry, Renn and Stachel a lack of scientific expertise [1]. Mr. Rowe conveniently does not quote these Russian scientists, perhaps because in doing so would have undermined his claim that only a “single physicist” (that is me), is involved in this priority dispute.

In a now withdrawn reply to my paper, which was published on the website of the Max Planck Institute for the History of Science, Corry, Renn and Stachel make the ridiculous claim that the evaluation of the variational derivative for (1) to obtain (2), which would have been a simple exercise for Hilbert, is comparable to the computation of the billionth digit of pi, something which would require a supercomputer. That it can, as Hilbert claims, be obtained almost without any calculation, can be seen as follows: The variation of the integrand of (1), with  $R = g^{ik} R_{ik}$ , gives three terms:

$$\delta (R\sqrt{g}) = \sqrt{g} \left( g^{ik} \delta R_{ik} + R_{ik} \delta g^{ik} \right) + R \delta \sqrt{g} \quad (3)$$

Since the first term inside the bracket of the right hand side of (3) leads to a surface integral vanishing at  $\infty$ , and since the differentiation of  $\sqrt{g}$  leads to the factor  $1/2\sqrt{g}$ , one sees that with the rule for the differentiation of a determinant  $\delta g = -g_{ik} g \delta g^{ik}$ , (3) immediately leads to (2). This fact must have been obvious to Einstein, even if Hilbert’s page proofs did not contain (2). Since Einstein does not explain how he had arrived at (2), it can be assumed that he had appropriated this result from Hilbert.

The problem is that Einstein was not always honest in quoting other scientists, like his failure to quote Lorentz and Poincaré, who had anticipated Einstein in the special theory of relativity. Einstein's failure to quote Hilbert in his November 25, 1915 paper to the Prussian Academy, explains why Hilbert may have felt justified to make changes in his published version, but also explains his desire to carefully save his page proofs to document his priority.

[1] A. A. Logunov, M. A. Mestvirishvili, V. A. Petrov, arXiv:physics/0405075 v3.

16, June 2004.

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