

A Different Way

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Abstract: Einstein's strategy regarding local action will be analysed and a loophole will be demonstrated. A different method will be proposed and this alternative will be applied to the theory of relativity, aiming to clear some of the discrepancies within science. [New York Science Journal. 2008;1(4):1-3]. (ISSN: 1554-0200).

Key words: local action; contradiction; paradox; principle; thesis; antithesis

Introduction: There is quite some controversy between quantum mechanics and the theory of relativity and the question remains open whether and if so where the mind slipped. A good starting point for clearing this muddle is to analyse how Albert Einstein chased quantum mechanics up a tree. The strategy he used can be found in his article "Quantum Mechanics and Reality" [1]:

The following idea characterises the relative independence of objects far apart in space (A and B): external influence on A has no direct influence on B; this is known as the Principle of Local Action, which is used consistently only in field theory. If this axiom were to be completely abolished, the idea of the existence of quasiclosed systems, and thereby the postulation of laws which can be checked empirically in the accepted sense, would become impossible.

It is important to realise that in science the word principle (from *primus* "first" + *capere* "to take" [2]) has lost its original significance ("Scientific sense of "general law of nature" is recorded from 1802." [3]). According to its primary meaning a principle is the ultimate origin, source or cause of something [2]. This origin or source takes first place and everything that stems from this root comes afterwards and can be seen as being true. Hence there is a difference between "a principle" and "being true". This paper will only use this primary significance of the word principle.

Einstein defines local action by denying (from *de-* intensifier + *negare* "to say "no", refuse" [2]) the opposite: "external influence on A has no direct influence on B". This strategy is based on the assumption that local action is a principle because one can reason that if the opposite of local action would also be true (i.e. external influence on A has direct influence on B) then this opposite would speak against a principle and therefore contradict (from *contra* "against" + *dicere* "to speak" [2]) this principle. Hence local action as a principle implies: "external influence on A has no direct influence on B".

Einstein's strategy of defining local action by denying the opposite fails if local action turns out to be true without being a principle. In this case it would be possible for the opposite of local action to also be true as long as this opposite avoids contradicting any principle. One can then consider local action and its opposite as complements in the same way that particles and antiparticles complement each other without any contradiction. In other words, defining a proposition in a complete system can be achieved by denying the opposite because the denial of the opposite and the opposite of the opposite are both equal. This method, though, becomes invalid within an incomplete system because the complete denial of the opposite also includes that which lies outside this incomplete system. Hence complete denial within an incomplete system remains undefined (from *un-* "not" + *de-* "completely" + *finire* "to bound, limit" [3]) and here there remains a difference between the denial of the opposite and the opposite of the opposite. Incompleteness of a system can be caused due to failure of including its source (principle).

A more open and logical method would be as follows: translate the idea that characterises the relative independence of objects into a proposition or thesis. Let this thesis define local action by what it includes (from *in* "in" + *claudere* "to shut, close" [2]), whether local action is a principle will be left open. This way there would still be room for a counter proposition or antithesis to arise. If both thesis and antithesis would turn out to be true, then thesis and antithesis can be considered as complements. This method therefore demands restating local action by proposing what it actually includes instead of proposing what it does not include. Accordingly, the first sentence of Einstein's fragment would have to be restated as follows:

The following idea characterises objects far apart in space (A and B): external influence on A has *indirect* influence on B; this is known as the *thesis* of Local Action, which is used consistently in field theory. (*External influence on A has direct influence on B is known as the antithesis of Local Action.*)

If one is willing to take this step backwards and let go of the idea of relative independence being a principle one avoids the abolishment of local action. The last part of Einstein's fragment can now be stated as follows:

If this *thesis* were to be *complemented with its antithesis*, the idea of the existence of quasienclosed systems, and thereby the postulation of laws which can be checked empirically in the accepted sense, would become *incomplete*.

If the universe (and mind) is open enough and non-discriminating, there would be room for both thesis and antithesis to be true. Together they could synthesize (from *syn*- "together" + *tithenai* "to place" [2]) into a paradox (from *para*- "beyond" + *doxa* "opinion" [2]) taking the scientist beyond the self-evident opinion of relative independence.

Discussion: In 1957 Geoffrey Builder published an article in which he criticised Einstein's interpretation of the theory of relativity concerning the mechanism of time dilation. Builder's critique arises because Einstein's explanation incorporates a homogeneous gravitational field that appears and disappears instantaneously:

"A homogenous gravitational field appears, that is directed towards the positive x-axis. Clock U1 is accelerated in the direction of the positive x-axis until it has reached the velocity v, then the gravitational field disappears again. An external force, acting upon U2 in the negative direction of the x-axis prevents U2 from being set in motion by the gravitational field."[4]

Builder comments on this as follows:

"The concept of such a field is completely incompatible with the limited value c for all velocities [...], so that the specified field would have to be created simultaneously at all points in S' and be destroyed simultaneously at all points in S0. Thus the principle of equivalence can contribute nothing of physical significance to the analysis."[5]

One can see how Builder uses the same strategy towards relativity as Einstein did towards quantum mechanics. Builder's rejection of Einstein's clarification is based on regarding these "spooky" gravitational fields as a contradiction instead of a possible complement of local action, creating a paradox. The thesis of local action is considered to be a principle and therefore automatically contradicts any sign of its antithesis i.e. direct influence created by an "unlocal" gravitational field. Builder is unaware of the possibility that the thesis of local action might be true without being a principle and his critique on Einstein's perception of relativity might therefore be based on an invalid premise.

Conclusion: The rigorous sideways strategy of proposing a thesis by denying its antithesis (clearly translated into words by Albert Einstein in his article "Quantum Mechanics and Reality") contains a loophole if the thesis turns out to be true without being a principle. To close this loophole the thesis needs to define what it includes, instead of saying "NO" to its opposite. This method avoids forcing a self-evident proposition into a principle (or fundament) and leaves room for a counter proposition to arise. This non-fundamentalising way might merit further exploration.

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