McGill University
Foundations & Philosophy of Science Unit

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Professor Abner Shimony
Boston University

Dear Shimony

I am most grateful to you for having sent me an impressive batch of offprints. I have just finished studying your careful review, with Clauser, of Bell's theorem. One rarely encounters such thoroughness, critical finesse, and honesty, together with clarity and good English. It is a model.

Only one point in that splendid paper annoyed me, namely your (and Einstein's) very idiosyncratic use of the term 'realism'. In fact in your opening sentence you conjoin two different theses which are actually independent from one another, and you keep this conflation throughout your paper. (D'Espagnat does the same, so you are in good company.)

The first thesis is that of the reality of the external world. The second, that of the definiteness (or sharpness) of all the properties of real things at all times. In my view only the first thesis is essential to all kinds of realism. The second thesis is tacitly assumed in classical physics but it has nothing to do with philosophical realism. Hidden variable theories espouse both theses and some of them also a third independent thesis, namely that of determinism (stricto sensu).

So far as quantum realists like myself are concerned, reality may be fuzzy in certain respects rather than having sharp contours. Electrons, though existing outside our minds, need not have precise positions, hence precise trajectories. They are normally in some superposition of states or other. ~~(In Dirac's theory this holds not only for the dynamical variables but also for the electric charge.)~~ In short reality is mostly fuzzy at the microlevel--but it does possess autonomous existence: its existence does not depend on the whim of The Observer--hence ultimately on the US Budget Office.

Since the two theses conflated in your paper are actually mutually independent, one may assert one of them while rejecting the other. Consequently the experiments refuting Bell's theorems prove the falsity of theories that are at the same time nonfuzzy and "local" (or rather separable). But they do not touch realism.

Realism has come out unscathed (a) because there is not a single formula in QM or QED that includes psychological variables concerning The Observer, and (b) because every well designed experiment provides for a careful detachment of the human observer from the apparatus, as well as for a clear distinction between the latter and the measured object. In short, both theory and experiment presuppose realism lato sensu (the first thesis). Experiment confirms once more a theory that happens to regard reality as fuzzy rather than definite.

Cordially

Mario Bunge

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