

John Bell on Subject and Object

Hans Halvorson

July 3, 2020

It's quite amazing that in the span of four short pages, John Bell can make the pioneers of quantum mechanics seem collectively like just so many addle-brains. I'm speaking here of Bell's article "Subject and object" (1987). I cannot deny the rhetorical effectiveness of this article. In fact, I consider it a model for how one can — with the effective application of insinuation and rhetorical question — render a view seemingly unworthy of serious consideration. Nonetheless, I cannot hold Bell's paper up as a paradigm of philosophical inquiry, because he gives so little effort to understanding what others were saying. We can do better, and we must do better, if we're ever going to make progress with the foundations of quantum physics.

Bell begins his article by claiming that:

1. Quantum mechanics is fundamentally about the results of 'measurements'.
2. The subject-object distinction is needed for quantum mechanics, but
3. "Exactly *where* or *when* to make it [i.e. the subject-object distinction] is not prescribed." (p 40)

Bell then says that (3) is a serious defect that makes quantum mechanics "vague" and "intrinsically ambiguous" and "only approximately self-consistent."

Let me begin by saying that I simply deny (1), i.e. that quantum mechanics is fundamentally about the results of measurements. I'm afraid that Bell has himself made a logical leap from "the quantum mechanical formalism needs a user" to "quantum mechanics is fundamentally about the results of measurements." There is a wide range of possibilities between these two extremes — e.g. that the quantum-mechanical formalism provides a means for

translating facts about subatomic reality into a language that human beings can understand.

I will grant that Bell is correct about (2), that the subject-object distinction is needed for quantum mechanics, but unfortunately, Bell has misunderstood the sense in which it is needed. He seems to think that quantum mechanics must describe the world as bifurcated into two parts — subject and object. If that were correct, then I would completely understand Bell’s unease with the distinction. If the theory describes a world with two parts, then the theory should offer some guidance about what belongs to each part.

But if you think about the meaning the word “subject”, it quickly becomes obvious that it’s not supposed to play the role of a predicate in the theory (unlike, say, “electron”). Rather, the idea is that a subject uses the theory to describe objects — and in the case at hand, these objects fall under the laws of quantum mechanics. The theory sees no subjects, it sees only objects, and so it has no need for specifying *where* and *when* the subject-object split occurs. Such a split is a necessary prerequisite to physical theorizing, when a subject decides to use a theory to try to say something true about the world.

Now what about the complaint that quantum mechanics does not specify who the subject is, or when and where and how she decides to use the theory? But wait a minute. Is there any theory that does that? What an amazing theory it would be! Indeed, such a theory would fulfill Hegel’s aspiration of finally unifying the subject and object. In other words, such a theory would “theorize itself.” Is Bell suggesting that quantum mechanics is defective because it doesn’t yet achieve the Hegelian *Aufhebung* of the subject-object distinction?

So, in short, Bell is correct that quantum mechanics, as it stands, needs a subject. But that is true of every theory that has ever appeared in physics — i.e. these theories need subjects to decide when and where and how to describe things.

Bell’s subsequent rhetoric in the article is effective only against the backdrop of his false assumption that the subject must appear *in* the quantum-mechanical description. For example, Bell raises a question for which quantum mechanics doesn’t appear to have an answer.

“Now must this subject include a person? Or was there already some such subject-object distinction before the appearance of life in the universe?” (p 40)

But quantum mechanics is simply not interested in the question of what counts as a subject. If you ask me what counts as a subject, then my answer is that anyone who can use a theory to describe things is a subject — no other qualifications are necessary! If your dog can theorize, then he is a subject, and if an artificial intelligence could theorize, then it would also be a subject. And to Bell’s second question, I suspect that before the appearance of “life” in the universe, there were no things that could describe other things, and hence no subjects. But that doesn’t mean that we subjects, living today, cannot describe the universe as it was before the existence of any subjects. In fact, the entire point of the subject-object distinction is that when a subject S is treating some X as an object, then it is indifferent to S whether X is also a subject — because as far as S is concerned, X is merely an object.

If you now ask me, but is X *really* a subject or an object? Here I say that the question is misguided. Those two categories are not mutually exclusive. Without a doubt, each subject in our world can be an object of some subject’s description. So perhaps what you want is a more comprehensive theory that answers the question of who or what can be a subject. But then who would be the subject who uses that theory, and must she wait for the theory to tell her that she is a subject before she can make use of it? I feel that we have now swum into deep metaphysical waters. For the business of physics, is it not enough that the subjects know who they are?

Due to misunderstanding the role of the subject in quantum mechanics, Bell also falsely accuses quantum mechanics of being “*intrinsically* ambiguous and approximate” (p 41, emphasis in original). If quantum mechanics does not describe a world split into subject and object, then where is the ambiguity supposed to appear? If Bell says that the ambiguity arises in what quantum mechanics is intended to describe — i.e. what counts as the object — then I would ask how that is different from any other physical theory. Take one of Bell’s favorite theories: Bohmian mechanics. What is Bohmian mechanics supposed to describe? You might say: it describes particles following deterministic trajectories. But then I would ask: which particles, and which trajectories? You see, even in Bohmian mechanics, it’s left to the discrimination of the theoretical physicist to decide how many particles, which Hamiltonian, when the interaction turns on and off, etc.¹ So, if stan-

¹Consider, for example, the Bohmian description of a momentum measurement: According to Norsen, “one could ‘turn off’ the potential energy $V(x)$ which confines the electron to the vicinity of the origin . . .” (Norsen, 2017, p 196). To echo Bell’s question, exactly *where* and *when* is the potential energy turned off?

standard quantum mechanics is “*intrinsically* ambiguous and approximate” how is that not also the case for Bohmian mechanics?

In “Subject and object”, Bell slices and dices his opponent — a straw person of Bell’s own making. The real problem, I think, is that Bell wants a theory that has no need for a subject.

References

Bell, J. S. (1987). Subject and object. In *Speakable and unspeakable in quantum mechanics*, pp. 40–44. Cambridge University Press.

Norsen, T. (2017). *Foundations of quantum mechanics*. Springer.