

The Problem of the Observer (related to some current research positions)

“Why do subatomic particles never let us catch them in the act of being in many places at once, but instead collapse into a single position as soon as we observe them?”

This question is stated at the start of an article in *New Scientist* 2836 entitled “**Begone, Quantum Voyeur!**”, and the question is both very simple to respond to, yet very difficult to counter with a new theory, especially one that can be shoe-horned into some sort of all-embracing equation.

The easy answer is that the “theory” is obviously wrong, when it attempts to ascribe phenomena to properties of the particle *alone*, but also a comprehensive and replacing theory is more difficult to provide, and the reason is that what we now call “theories” are merely extracted predictive patterns: they deliver answers and not explanations. [*“Obeys this equation”*, is certainly NOT a Theory]

Once upon a time, there would be a simply explanatory response such as, “You are talking about two closely integrated things – one dispersed and the other entirely concentrated into a tiny, moveable entity.

The dispersed phenomenon could be encapsulated in a wave-like formulation, while the concentrated element would be like a traditional idea of a particle, and have its sorts of governing equations.

Yet, these would have to be more than mere bedfellows: they must be intrinsically linked: they must significantly affect one another, and even reciprocally change one another: they are not as the pluralists always insist – *separable!*

For the Double Slit Experiment with Electrons, this author proposed an undetectable yet universal “paving” of intra-Universe space of what he termed Empty Photons – literally the “empty” husks of once-filed entities, now empty, or seemingly so, but still wholly capable of both holding and delivering gobbets of energy (quanta) of E-M radiation, so that as such a continuous paving it could then effectively propagate that radiation.

Significantly, when “empty” (their now normal state), they would be undetectable, but on receiving energy from (say) a passing negatively charged electron, they could be set into internal oscillation, and then, by induction, such disturbances could be easily propagated.

On reaching and passing through the Double Slit arrangement, they would emerge as two emanations, which would then interfere, and they would do this well ahead of the much slower causing electrons, and would be constantly being replenished as the electrons regularly encountered more Empty Photons in their continuing trajectories.

So when an electron finally arrived, and passed through one slit or another, it would then encounter their own-caused interference pattern in the post slit empty Photon paving, and be directed (or not) depending on their particular passages through the interference pattern.

The Theory explained things, but could NOT rise sufficiently to satisfy the new physicists.

First, “*Where were the equations?*”, and second, “*Why could we not detect the waves and their proposed interference pattern?*”, were their responses. For that kind of technologist/scientist, the lack of answers to both these questions immediately termination any further consideration of the validity of the ideas involved.

And to put the final kybosh of that Theory, they would always bring up the perennial problem of the observer. Bring an observer into the Double Slit Experiment and the whole phenomenon would disappear. A given electron could be both traced back to a particular slit, and would carry on exactly as an unaffected particle, to produce part of a very different pattern at the final detection screen.

The giant, “Why?”, with the equally deafening Silence as an answer, again ended the discussion.

All such “Yes...but..” type arguments were considered sufficient. It was like arguing with a bunch of Tory politicians. They, a priori, “knew” they were right, and no attempts at a better *explanation* would ever move them a single inch.

In my animation (on YouTube) the number one complaint was that my theory did not cover Photons, Photons-one-at-a-time, atoms and even molecules, and this was clearly because they expected a **single equation** to cover all these cases. The number two complaint was (you have probably guessed it) the Observer: *“Why did any attempt to measure these phenomena cause them to collapse into straightforward particulate behaviour?”*

Now, to where these closely allied opponents are coming from, you have to correctly place them as standing in their own long conquered valley, which they knew awfully well, and could go to all its interesting localities, and find what they already knew was there.

The magic of the observer-caused collapse has become an essential part of their pragmatic, “working (read as useable)” theory, but the electron was, and still is, a Particle. It is just that, somehow, **your** intervention has broken up the interference pattern. Your “muddy boots” have dispersed the delicate wave patterns in the puddle, which can, therefore, no longer gently channel our tiny electrons into their previous pattern of trajectories.

To put the observer problem to rest, we have to state why any sort of intervention destroyed the accompanying and affecting wave patterns in the Empty Photon paving.

Now, the first “help” in answering this conundrum came from the Copenhagenists themselves.

Heisenberg with his **Uncertainty Principle** made it impossible to find accurately **both** the **Position** and the **Momentum** of any moving subatomic particle. Bringing up Planck’s hallowed constant **h**, he defined a minimal goblet involving these two quantities, so that if we found one of them very accurately, it meant that the other was NOT simultaneously determinable by any method at all!

Now, physically, this is quite a reasonable point to make. It effectively says that in this realm, the very act of attempting to measure changes to some extent the situation you are intervening in. It is, in fact, not just true of this particular realm, but indeed of all Science, and because of it Mankind (with his dearly held belief in **Plurality** – the separability of all component Parts – had always had to “nail down” many of the contributing factors as possible in any studied situation, in order to clearly reveal and make extractable ANY glimpsed relation in Reality.

Science was constructed, therefore, entirely out of multiple, contrived and maintained Domains as the only way to extract “pure and unaffected” component relations. Heisenberg’s Uncertainty Principle was a particular of a much more general case, caused by pluralistic assumptions imposed upon an actually holistic World.

In other words, the problem of all interference was solved by making the Observer God-like!

He nailed to the floor as many affecting and confusing factors as possible, and eliminated most minor, contending factors via averaging over several separate runs, until a very well ordered and treatable Domain was produced, and a processable data set was delivered.

So, all extracted relations were from a thoroughly “farmed” Reality, and as long as the following user was a disciplined horticulturalist, and kept his Domains corrected and rigorously maintained, he could use his extracted laws with accuracy and confidence.

Clearly, to really solve these problems at the Sub Atomic Level, the scientist had to abandon a strictly pluralist standpoint and methodology, and embrace a fully holistic stance.

And, of course, all the usual methods would not suffice there as we (and all our equipment) would be elephants in the room, or like a dog running through the beautiful patterns on the surface of a puddle. And our usual analogues would also be inadequate to the task. Our whole methodology would have to be transformed to have more to do with holistic conceptions and models, and abandoning analytic plurality, with its Principles of Simplicity, Beauty and Symmetry for what they were - wholly idealist conceptions.

Clearly, there is much to do. We have to immerse ourselves and **swim**, rather than erecting solid bridges to “everywhere”!

So we, along with Steven Weinberg (the Nobel Laureate) might well be moved to ask, *“How can a particle know when it is being watched, and why should observation change its actual behaviour?”*

But, really it is the wrong question.

If Reality really does involve such a particle within an Empty Photon paving, with the former acting like a particle, but the latter like an influencing wave, then our observations could indeed, very easily, disturb the latter, which in consequence of their mutual interactions would certainly change things for the particle.

Remember, these are not ocean liners ploughing through a quiescent sea: they are more like corks influenced by patterns in a lake, where an energetic puppy, chasing the cork, can totally change the patterns on that surface and hence redirect the cork, or, even more likely, with the total break up of the patterns, produce a mix where contending contributions largely cancel out and our cork proceeds, wobbled, but not significantly deviated by what determined its prior trajectory, or for it instead to be determined by the gentle breeze, maybe?

The trouble is that our technologist/scientists are so securely wedded to their ability to predict, that they raise their laws to pre-eminence: they become eternal, and hence empower their users, both practically and “theoretically”.

The scenario outlined here makes these things *consequent* and NOT **formative** and it is, therefore, generally considered unacceptable.

Philip Pearle, in 1989, proposed a Universe filling entity, but his ideas were rejected because the equations-producing theorists could only deliver unacceptable anomalies in their formulae based upon his ideas.

And anything, which couldn't be encapsulated into a formula, wasn't considered to be “cracked”! It was, and nowadays usually is, a case of the tail wagging the dog.

Formulae are never, the essential bases for all phenomena, but the other way round: they can be sometimes, and usually with extensive constraints, be extracted from phenomena, and used, as long as the Domain that was erected for extraction is again set up and maintained.

Nimmrichter in Vienna attempts to help by considering interference of waves (functions and not physical phenomena) and the effects on these ideas.

Now, it is interesting how pre-determined are all these musings by the absolute necessity to end up with formulae.

Notice that Pearle's all pervading paving of entities and Nimmrichter's interference crops up in my alternative, though these are indeed physical and accompanying of the particles involved. [And Bohm, all those years ago, also spoke of Pilot waves accompanying the passage of particles]. Yet these modern day theorists (actually mathematicians with idealist conceptions) insist that the waves are not physical(?), but **probability waves** associated with the particles, themselves, *intrinsically*.

An Afterthought: Though, some of these researchers talk about observation affecting their kind of particles, and “collapsing” their probability waves, what is actually needed is some sort of explanation as to how such interventions destroy the disturbances set up in the Empty Photon paving, and hence, indirectly, their effect on the particle being studied.

An Interesting Aside: Many years ago, some colleagues of mine in Glasgow were researching chemical reaction fronts in liquids. To do this they not only rejected the, “Stir well and wait for equilibrium!”, imperative, but, on the contrary, even “suspended breathing” while they initiated their oscillating reactions. Finally, after many failures, they managed (using reactions with differently coloured resources/products) to get the actual reaction fronts clearly visible for close study.

They turned out to be **Toroidal Scrolls!**

For centuries these patterns had never been observed, despite hundreds of thousands of experiments, and the moral must surely be that many important things are very easily disturbed and totally hidden by the smallest of external influences.

Clearly, in our “collapsing” of the wave function examples, real waves in the paving of Empty Photons are also very easily dissociated, leaving NO coherent and single outcome effect, but instead a normally cancelling random set of fluctuations.

(1.944 words)