Science and the Human Mind

by

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Many, many years ago, when a scientist wanted to measure the average velocity of a particle, he had to be concerned with choosing a time interval. After calculus came in and the instantaneous velocity was obtained from a mechanical model, the experimenter was pushed out of the experiment. Such is the case with Newtonian mechanics.

When quantum mechanics was developed along with the uncertainty principal, a scientist who wanted to measure the momentum of a particle with some precision (which is principally it's velocity), does so at the expense of having little idea of where the particle will be located. Furthermore, we find that quantum mechanics is only concerned with the calculations of observable quantities. Detailed mechanical models are considered misleading and unnecessary.

In other words, the very things that pushed the experimenter out of the experiment, are insufficient in quantum mechanics and the human mind is now an essential feature in every experiment.

There is a story about Moss Hart and Kitty Carlisle. Moss Hart was a playwright and his wife Kitty Carlyle, a movie actress. They were very wealthy and had a beautiful estate. Their grounds were marvelous to behold. Moss Hart wrote a play with another playwright, George S. Kaufman, a spoof about Hollywood when talkies first appeared. Kaufman was invited to their estate and when he saw their beautiful grounds, he proclaimed,"It just goes to show you what god could have done if he had money." That nasty, jealous crack should have been, if truth be told," It just goes to show you what god might have done if he only had a human mind." But god or nature does not have a human mind. In order to make any plot of land livable for a human being, most of everything that exists there must be cleared away, which is what the scientist calls noise, and the small amount that remains as well as the additional things we plant to please us, we call reality.

As I say in my book, "The Mathematics of Change. The Life cycle of Everything",one wonders if, in spite of all the experiments we are performing, our interpretation of them falls back to how the human mind is able to process information, rather than discovering an external reality of our natural world independent of our mind. It never ceases to amazes us the close connection between science and mathematics. But mathematics comes solely from the mind. It is remarkable only if we think they are separate."

Schrodinger's famous cat experiment was designed to show that the Copenhagen group's interpretation of quantum mechanics leads to absurdities.The interpretation of the group was that all possibilities that an object can be in, exist simultaneously until an observation is made.Then it collapses to one of it's states and proceeds from there.

Since in the experiment, there is a probability that a poison may be released that will kill the cat, we have a situation where the cat is both dead and alive according to the Copenhagen group, which is absurd for a thinking creature. The trouble with this thought experiment, is that there is no human mind in the box with the cat before it is opened. To obtain this, we offer the following: Schrodinger announces the experiment to the world. There is a large group of people who believe the cat will come out dead, and they have strong arguments to back them up. There is another large group of people who believe the cat will come out alive, and they too have strong arguments in their favor. Then there is an overwhelming amount of people from all over the world who do not give a damn whether the cat comes out dead or alive. They have other things to think about. They are the noise, which when removed, will leave the dead cat people and the alive cat people as the reality of the situation. The two groups will argue with one another; call each other names. Much like the republicans and the democrats. Finally the box will be opened. If the cat comes out alive, the dead cat people will claim that it was sheer luck. Their arguments are as strong as ever. The alive cat people will be celebrating, slapping each other on the back, telling each other how wise they are. This is all that will have been learned from Schrodinger's cat experiment.

In todays world, with the James Webb telescope operating a million miles from earth, we have scientists asking the question,.

"What happens far out in space without a human measuring it?"

Asking what happens without a human mind, in any proposed experiment, is no longer a sensible question!

There are other limitations of the human mind that narrow our view of reality even more.We are aware that objects, including ourselves, are changing continuously, but we are not wired to experience that change. To us, we see the same things tomorrow that we saw today. A creature who was aware of change would find us very primitive. Even our mathematics would be different if we had this awareness. We are very comfortable in saying that 1+1=2. But, after the first 1, what does the second 1 refer to? It either refers to the same unchanged object that no longer exists, or it refers to being in the same category that the first 1 is in, that has not yet changed. Such categories would be extremely primitive to these creatures.

Not only are we comfortable with unchanged objects, but ever since the ancient Greeks among others claimed that nothing exists but atoms and space, the atom became an unchanged object and to this day all of our elementary particles are unchanged. If we want to go beyond the unchangeability of atoms and accept that everything is continuously changing, then we need to know where it is going, and what goal, if any, it is attempting to reach.

Since humans are changing objects that we know the most about, we shall start there. We go through a life cycle from birth to death. In a simplistic world, where there are no obstacles(which never happens), we move toward our ideal way of life, living our dream, so to speak. How long it takes to approach this goal is called our pace.Does this pace remain with us through life or does it change? For some of us the change of pace may be very slow. For others, it may be almost continuous

What things can happen which changes our pace? One thing is trauma. If we stretch a spring it's pace is changed. When we stop, it snaps back to it's previous pace, unless we have exceeded it's elastic limit. Then the change of pace is permanent. Aging is a permanent change pace. As we age, our pace changes from a child who can only dream of living his ideal life, to where, as he gets older, he gets closer to that dream becoming reality, to where, at his peak, he is living his dream. As he ages more, he begins to slip. He no longer can perform as he did in the past. His ideal slips away from him until he eventually dies.

All forms of living creatures go through a life cycle. Whether there is an ideal way of living for them, we may never know, but never the less, we see a pattern with living things. Is it true for nonliving things as well? The answer is yes.

Consider the car. You use it for many years but eventually it stops working and is sent to the junk heap.But that does not mean the the car is gone. Newer, modern versions of the car, due to the advancement of human technology, now floods the highways.The pattern is the same and so now it is time to take another look at particle physics. We quote from [9], p.28 "One of the most important symmetries arise from the indistinguishability of particles of a given kind. For example, all electrons are identical in their properties and behavior. The dynamics of any system must be invariant under the interchange of one particle by another of the same kind, Quantum mechanics offers two possible realizations of this invariance. Since two successive interchanges of the same pair reestablish the original state, the only change in the state vector that one interchange can cause is multiplication by +1 or -1. Consequently the state of N identical (or indistinguishable) particles is either symmetric or antisymmetric under the interchange of any pair. Particles described by symmetric states are called bosons, those described by antisymmetric states fermions."

With particles having life cycles, not only is it impossible for them to be unchanged, but it is also impossible for them to be indistinguishable.However, something in their life cycle must distinguish whether they are bosons or fermions.Going back to human beings, at some age in their life, each one is in a state where we can compare each defining trait in that state with the corresponding trait of the person's ideal state. If the trait is less than the ideal; we say it is down. If above the ideal, then up. If we move to a little older age and find the same pattern, we say the state is a boson. If we move to an age a little older and the pattern reverses, where down becomes up and vise versa, so that a second age increase is necessary to get back to the original pattern, it is called a fermion. It turns out for a human being that we are born as bosons and only after we have gotten much, much older do we become fermions. where we stay that way until we die. We thus attribute this property to all particles.

Imagine a photon getting old. It can't quite continue moving at the speed of light like it did in the past and slows down a little.By doing so it, acquires a bit of mass to compensate. Also, by this time it has become a fermion. What we now have is a neutrino. Meanwhile, as the electron ages, It becomes fat and ugly, a muon.

These particles came about because it was thought at the time that the nucleus composed of protons and neutrons were the fundamental particles of the universe, and when it was discovered that the proton and neutron were just two different states of the same particle, negotiated by an electron and a photon, it was thought that here is the fundamental particle. But when the nucleus was bombarded by several hundred million electron volts, that trauma forced a change of pace for a split second to witness and old electron photon couple before springing back to it's original electron photon pair. Of course, since particles don't age, it was assumed that new particles came into existence, with new names.

If we continue along with a life cycle, then the young electrons as well as the protons come out as bosons before they acquire any electrical properties. Without these properties, it may be impossible to establish their existence and perhaps may account for much of the dark matter that we know exists but cannot seem to find.

Whenever a mathematical model is used for a real situation, a narrow concept of reality is used. However, the stunning successes of science still hold. Putting humans on the moon, controlling nuclear energy, the incredible accuracy of the standard model, the tremendous breakthroughs in medicine, life saving drugs that enhance our physical and mental health, etc, all testify, that even with a narrow view of reality, we can still get so many things accomplished. At the same time, however, the human ego is ever present in the human mind, always ready to overstate it's abilities. If we succeed in connecting gravity with the other three forces in the standard model, we will have achieved, according to the scientists, "the theory of everything". Really!, with our limited view of reality? I don't think so.

In my book, I have developed a mathematics of changing objects and a mathematical model for the human being, leading to unusual and surprising results; results that mimic black holes and symmetry breaking as well as afterlife and judgement day. We are not near the end of our journey understanding reality, but rather, traveling along a road with no end. in sight.

References

Book

The mathematics of Change. The Life Cycle of Everything

Articles

1. The Mathematics of Continuously Changing Objects
2.A Matrix Method for Decision Making and Forecasting
3. The Best Matrix
4. A Mathematical Journey Through Alcoholics Anonymous
5. Mathematical Justifications for Common Observations In AA
6. Bill Wilson's Life in Recovery
7. Partial Order, Simple Order, and Natural Progression

The book and these articles which provide the proofs of the results stated in the book, can all be found on my website:

marvinbarsky.weebly.com

[8] Byron, Fuller, (1970), Mathematics of Classical and Quantum Physics, Addison, Wesley Publishing Company
[9] Gottfried, Weisskopf (1986), Concepts of Particle Physics, Volume 1 Oxford University Press
[10] Lively, (1966), Atomic and Nuclear Physics, Blaisdell Publishing Company
[11] Bergmann, (1948), Introduction to the Theory of Relativity, Prentice Hall, Inc