

A Method to Measure Consciousness, and Demonstrations of Worldly Multiplicity¹

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Abstract: *The role consciousness plays in the classic Young's Double-Slit Experiment (YDS) is represented Symbolically by Boolean Logic, and the resulting equations manipulated in order to interpret the results and clarify the role of the mind in this demonstration of particle duality. Results are also used to prove that the Universe is both and neither Digital nor Analogue at the same time. Lastly, an experiment is proposed wherein the presence or absence of 'consciousness'--in the sense of YDS—can be measured in seemingly unconscious individuals e.g. coma victims, certain envenomations, sleeping Toms, etc...*

Part I: Consciousness' Role in Young's Double-Slit Experiment (YDS)

The following basic symbology was jotted down and stored a couple cycles ago, for no real reason except perhaps a passion for the Ideas and to give it a try. Now it has found it's **purpose** in the future (and this present—or the one before 'this' was typed—or, to the way left of *this* word). Oh, you know what I mean.... Where it was waiting in a timeless Meta-E8 exceptional Lie Group subset where **motivations** reside, along with most else. And everything else is in there too, if you'd like to include The seven Categories of Thought![1], waiting to be contained in the particular Universe of this Essay...

Assumption: The Symbols of Boolean Logic are commutative (Order is unimportant: $abc=cba=bca$)

Commutative in the same sense of the word as in the Mathematical Definition. This is not rigorously justified; only assumed to simplify the demonstration. Thus these results then do not necessarily hold in a quantum mechanical framework—they may only hold in the classical framework.

I have since discovered through research [4],[6] and these various essays [7] and communications, that the above assumption probably does not hold. And manipulating symbols using a timeless action metric, or quantum conditions rule to control the commutativity properties, would likely result in more accurate and interesting predictions for experimental test, in addition to theoretical analysis, that would also hold in the Standard Model...

¹ Entry for Essay Contest (fqxi.org): Is the Universe Digital or Analogue? 2011

Part ii: YDS represented by the Symbology of Thought

Universal Law of Duality: this is also called the law of Thought.

$$P^2=P$$

or

$$P(1-P)=0$$

It means that something can not be and not be, at the same time (thank you, brilliant Shakespeare, for reading your Ancient Philosophy!) . A thing can't have a property and not have it simultaneously.

Obviously, this purely red dot • is not also purely black for this time you are in the act of looking (measuring).

This Law of Duality eventually (apx. 50-75) years later to the invention of computers² ...

Let

S=The Soul

H=Human

P=Pattern, can be either an interference pattern (concentric dark/light circles) or a random distribution of points, a.k.a. Wave or Particle, respectively.

D=Particle Detector

O=Observation by a HS (sees³ detection of particle in a certain slit)

Then

$$P=\text{particle pattern}=\text{DHSO} \quad \{1\}$$

Boolean Interpretation of this Symbological Equation: *The particle pattern results when a detection is observed by a human soul.*

$$1-P=\text{wave pattern}=\text{HSO}(1-D)$$

Interpretation: *The wave pattern results (or a non-particular pattern) when a human soul makes an*

² As a quick explanation: the only numbers that satisfy $P^2=P$ are 0 and 1. So to represent the process of thought as we know it by using the mathematical tool of numbers, only 0 and 1 are correlated with the Law. Hence a digital computer can 'think' much faster than a human by using the same symbolism we are using here, but with the restriction that only two Symbols are used in all above equations.

³ Of course, by term 'sees' used above, the usage is meant as the particle detector reading a particle, not the classic sense of 'see', where a photon must strike the eye...

observation and there is no detection of the particle.

Interestingly, experiment has shown that even when there is no particle detector connected to the slits, a wave pattern also occurs.

So, also $1-P=wave=HSO$

thus

$$1-P=wave=HSO=HSO(1-D) \quad \{2\}$$

adding equations {1} and {2}

$$1=particle \text{ and } wave=DHSO+HSO(1-D)=HSO(D+1-D)=HSO$$

Interpretation: *all particle and wave patterns are a result of a human soul observing the pattern*

Before continuing, let us simplify things a bit by letting $HS=C$, where C is consciousness (whatever that means in an experimentally testable sense). So this equation then means: **the human soul is consciousness.** Well maybe or maybe not. We will save that Theory until experiment can decide the validity or no... Maybe the soul is much *more* than consciousness. But surely a part of the soul is consciousness? Even if not, for the sake of brevity, let us assume that all human souls have consciousness. Then

Developing equation 1: $P=particle=DHSO=DCO$

$$P=P(0,0,0)(1-D)(1-C)(1-O)+P(1,0,0)D(1-C)(1-O)+P(1,1,0)DC(1-O)+P(0,1,0)(1-D)C(1-O)+P(0,1,1)(1-D)CO+P(1,1,1)DCO+P(1,0,1)DO(1-C)+P(0,0,1)(1-D)(1-C)O$$

$$\text{trivial: } P=DCO$$

$$C=P/DO=0/0 (1-P)(1-D)(1-O)+1/0 P(1-D)(1-O)+1/0 PD(1-O)+0/0 (1-P)D(1-O)+PDO+1/0 PD(1-O)$$

$$C=a(1-P)(1-D)(1-O)+b(1-P)D(1-O)+PDO \quad \{1\}$$

and

$$0=P(1-D)(1-O) \quad \{2\}$$

and

$$0=PD(1-O) \quad \{3\}$$

Interpretations:

{1} *consciousness is sometimes a wave that is not observed whether detected or not, and is always the result of an observation of a detection of a particle.*

{2} and {3} *If a particle is not observed, whether detected or not as a particle, it does not exist. It is a*

non-real, virtual, wave until it becomes actual.

After the universal, invisible non-real wave is detected by a consciousness it changes into a particle.

If the wave is detected only by a sensor that detects particles, the wave remains non-existent until the moment a consciousness or Human Soul looks at the detector. AT that moment (or within a stocky instant or several), the pattern on the screen changes to a point-distribution which particles normally make. The non-real universal wave , becomes real and actual, due to a soul gaining knowledge of it's action, and changes into a particle in reality.

And back into non-existence the moment the detector is turned off...but importantly, the universal wavefunction has “collapsed” and subsequent measure s of the wave will result in predictable results.

Part iii: This Symbology Reveals Multiplicitous Universal Activity

This experiment is a measurement of a process of action: this action takes place in the realm of the Universe of all Mathematics, where all of the Universe of Reality is contained as a part of this greater Universe. Not so incidentally, so is the Universe of the Mind contained in that greater mathematical realm of possibility. And the digital finally becomes one, and therefore analogue.

The Analogue World is what it is until it's observed by a consciousness. Then The World becomes digital through the filtre of human sensory perception.

The Digital World remains what is it until measured by a consciousness. Thereupon that World becomes Analogue after the measure, in the sense that yet another measurement will result in an observable that is completely random in the range of eigenvalues.

The World is Digital *and* Analogue. It is also at the same time (and with the same total action) Digital *or* Analogue. And at different times (precisely like the matrix), the World is Digital. And at other different times altogether, Analogue only.

So the conclusion gathered here is that the answer to the Problem of: Is the Universe (World) Analogue or Digital (does $W=A$ or $W=D$)? Is that the **World is Analogue, Digital, Both and Neither**. Let these bold-faced words be represented by the Symbol T.

In the timeless World of Math, the above result is possible. While in our own world of Mind, the above is impossible according to 'Both and neither can happen together as properties only when at different times. Something can't be both 'here' and 'not' at the same time. It only makes sense when the operative phrase becomes, “where did I put that”? In other words, at different times something can actually be both here and not here....

In a nutshell, what the above result actually is demanding is that reality must be timeless. OR the converse: in a timeless universe, the world is all things and nothing in it's *succession* and for it's

duration. It is highly indicated that these two properties and the proposition above are all that is required (along with existing work that has come to this physicist's grokking) to generate a T.O.E.⁴

In an infinite-dimensional Hilbert Space:

$$T=W=AD$$

$$T=W=DA$$

$$T=W=A$$

$$T=D$$

or

$$T=ADDAAD$$

which all become in the subset (Finite-dimensional) of this space, in time:

$$T_1=W_1=AD$$

$$T=W=DA$$

$$T=W=A$$

$$T=D$$

where, now we have time introduced, which brings in order and duration properties. And the World Symbols get specific and distinct now as shown...

Finally, in this our own specific subset where reality resides in time and with the quantum measurement problem of scale introduced, poof

T transforms into a very specific W.

This world. This entire universe which was once one, and therefore digital. This world that then incorporated order and succession, bringing on the beautiful continuous infinitude of the Analogue we live in now. This, that that will again be (and already is and was in the IDHS), will be a digital universe.

If I may be permitted to extend this metaphor a little too far perhaps?

It's the Cycle that never repeats. It is a Koan. It is a massless particle. It is an individual human life whose wavefunction representation is a wave packet. With a wavelength hopefully wide, spreading through time as live get s lived, thought are thought.

And happiness is asymptotically approached to every eventual avail!

Part iv: Experiments to determine the type (and/or presence) of

⁴ See Final Footnote at the end to *see* that this is probably not the case...

Consciousness in other Animals

Perform the YDS experiment (with various permutations to isolate variables) with a 'banana' treat reward for repeatability. If the animal can consistently determine whether the pattern is an interference or point distribution, she gets a tasty treat for being so scientifically methodical.

Results will determine 1) whether other animals than man are conscious in the same way or not, and 2) if not how different? More conscious than us, less? What are the gradations from a flatworm to an orangutang? Surely the orangutang is 'more conscious' than a worm? Or not? Variations on the principles of this experiment will answer all of these questions...

Part v: A method to diagnose consciousness in coma victims

Finally, we get to the best part...

teaching coma patients: SciAm reference [2].

Recently researchers have discovered that comatose persons can learn to anticipate a small puff of air to the eye, causing them to wink milliseconds early in anticipation of the puff. This was previously unsuspected, that coma victims are capable of learning... Apologies, I cannot specifically locate reference [2]. It was in the magazine Scientific American, relatively recently (within 6M) and the name of the article was Learning in Comatose Patients. If the reader cannot locate this article please disregard the remainder of this chapter, as reference [3] below is an even newer development in experimental brain-imaging and pretty much moots the speculation below by demonstrating the hypothesized consciousness-probe. What a happy and funny (or is it?) coincidence...

Correlate the small puff of air to the observation of the pattern in YDS. Results will indicate whether an unconscious coma patient can change the interference pattern of the particles by observation. If so, then the unconscious individual is in actuality conscious in the same sense as an observer is. Therefore, if the diagnostic criteria for determining medical vegetative states had diagnosed a coma (unconscious/unresponsive states),

the criteria could be refined and become more objective to guide Heroic Measure ethical decisions and ensure the victims wishes are adhered to until the last. And most importantly of all, many lives could be restored that would otherwise have been squandered in hope only. Also perhaps lives that are ended prematurely due to human error will be minimized even further. Good stuff

In closing, I would like to go very far out on a predictive limb and state the following: In principal this experiment could be made portable. Imagine the consciousness wand of the near-future; the c-wand, if you will. With fine (person) and coarse (groups) settings to detect measuring minds. We will part here with a couple quick likely applications of the c-wand: EMS prioritizing; monitoring anesthetic efficacy real-time; determining time-of-death; figuring out if your cat is really sleeping...

Ok,I threw that last one in for my own reasons. And whether my feline is messing with me is neither here nor there. But it brings up an interesting point nonetheless. To Whit, what if sleeping, under drugs, in a coma, dead, hypnogogic states, etc. are all different Species of Unconsciousness? Fascinating either way and illuminating in only one of those ways mayhap? Farewell, you analogue-to-digital converter, you.

Update: It seems that this essay can literally and figuratively never be absolutely current. So here is new information as of 18Feb2010 to this investigator [3]. So we are will on our way to the consciousness-wand so to speak, with imaging technology currently serving as the info-gathering agent. Again, Tie the YDS experimental setup to the MRI with enough cpu power and a probe of some sort would act as the consciousness detector!

Part vi: A Book or Three, mayhap, Plus a Quantitative Method to Control Hardware and Software Using Asimov's Three Laws

According to Wikipedia [5], **The Three Laws of Robotics**, often shortened to **The Three Laws** or **Three Laws**, are a set of three rules written by [science fiction](#) author [Isaac Asimov](#) and later expanded upon. The rules are introduced in his 1942 short story *Runaround* although they were foreshadowed in a few earlier stories. The Laws are:

1. A robot may not injure a human being or, through inaction, allow a human being to come to harm.
2. A robot must obey any orders given to it by human beings, except where such orders would conflict with the First Law.
3. A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

The following is just a representation in symbols of asimov's three laws of robotics. The author does not claim that this is original work. Only that to his knowledge, it is original to him. If it does turn out to be original that is excellent, but also can be informative if compared with similar work if not.

This symbology can be used as a guide to physically wire a robot to obey the three laws, and also as a guide to the principles of writing software with the laws in mind. There is a lot of possibility here, but not a lot of space. This subject is to be revisited in another work...

<Update 15FEB2011> When this was written it was mostly theoretical as far as configuring hardware or software in accord with the three laws. However, due to personal experimentation and training, it is now quite possible to demonstrate at least the practicability of using the symbolic three laws as a principle of design for hardware. This could be done using a microcontroller to set potentials and instructions to the various hardware components, using the three laws as a guiding principle.

While this may not be original work, it is to my knowledge. And if this has been reproduced elsewhere, then that is excellent. For then we can compare and contrast the different approaches to robot design.

Symbology Followeth:

1. A robot may not injure a human being or, through inaction, allow a human being to come to harm.
2. A robot must obey any orders given to it by human beings, except where such orders would conflict with the First Law.
3. A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

Let R=robot (that exists with the three laws governing it's actions)

I=injure

H=Human

J=Inaction

O=obey

C=Orders

F=First Law

S=Second Law

T=Third Law

P=protect

The three laws are True for our robot: $F=S=T=1$

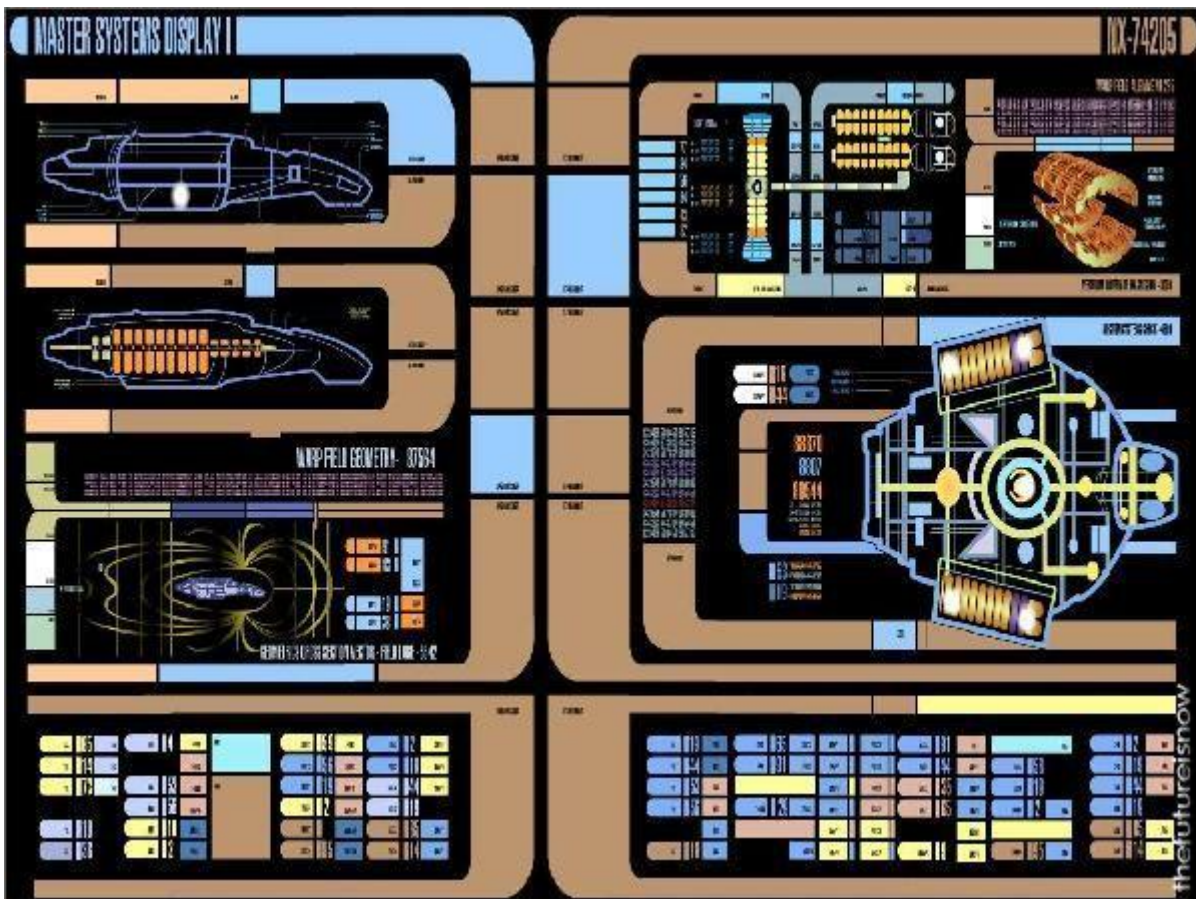
Law 1: $F=1=R(1-1)H+JHI$

Law 2: $S=1=ROCH+vC(1-F)$

Law 3: $T=1=RP+v([1-F]+[1-S])P$

If it seems worthwhile, these three laws can be combined into one Law which includes the other two. Then the Equations can be manipulated to eliminate, say, the human variable (H), and then express the three laws independent of the Human component. This would possible illuminate shortcuts in programming and assist in building future computer models and simulations...

This result is not purported to be original work, only that to this investigator's knowledge that that is the case. If these laws have been represented by others in another way, comparing and contrasting the approaches should prove illuminating...



It is an honour to be considered among this ensemble of estimable and excellent essayists...

Tommy Gilbertson

Epilogue: As this Essay is submitted, Wisconsin, USA is in a political turmoil. As Richard C. Hoagland (former NASA advisor to W. Krock) said just tonight (18FEB2011—1490 Hz Amplitude Modulated) on the Radio Show Coast to Coast with George Noory, that the turmoil in WI is exactly the same phenomenon that has just happened in Egypt and recently around the globe: an emergent property of mass-consciousness. It feels almost either ironic or mandatory, or even somewhere twixt the two, that this essay has that subject that it has brushed upon from such an apparently different direction.

References

[1] An Investigation of the Laws of Thought, G. Boole 1854

[2] **Many** apologies to the author(s) of “Learning in Comatose Patients” in the Jul-Nov2010 Scientific American Magazine, for I have since lost the exact sources. Nevertheless, as explained on page -6- new recent information [3] only affirms the proof of principle of quantitative as well as qualitative Measures of consciousness (through corrolation of YDS observations) described, albeit with more sophisticated tools. And the deadline for this contest is now.

[3] Nature Online Article: Mind and Brain, 3Feb2010, Brain scan allows unconscious patient to communicate by Heidi Ledford

[4] Principia, I. Newton 1687

[5] http://en.wikipedia.org/wiki/Three_Laws_of_Robotics
15Feb2011

[6] The Principles of Quantum Mechanics, P. Dirac 1930

[7] FQXI.org--two previous essay contests and entries...
<http://fqxi.org/community/essay/winners/2008.1> (Subject: The Nature of Time), and
<http://fqxi.org/community/essay/winners/2009.1> (Subject: What’s Ultimately Possible in Physics)—last visits: 15 Feb2011

[8] <http://lhc.web.cern.ch/lhc/> (Large Hadron Collider Website): 15Feb2011

