

Lancaster HEP Seminar

9th February 1990



*The question is; what does
superman experience, being a
perfect observer, and what
does he think, having
the highest level of
unity consciousness?*

UNITY CONSCIOUSNESS AND THE PERFECT OBSERVER

— A TRANSCENDENTAL ARGUMENT BASED
ON QUANTUM PHILOSOPHY.

1. THERE IS A PROBLEM

Who is a perfect observer?
What is unity consciousness?

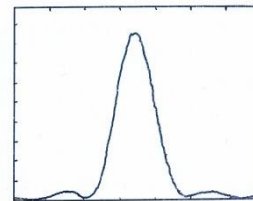


Nobody knows what Quantum Philosophy means!

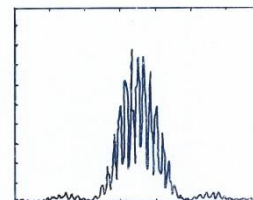
Wave-Particle Duality

- To avoid an ultraviolet catastrophe, Planck postulated that light of frequency ν comes in quanta of energy $h\nu$.
- Einstein predicted the photoelectric effect which showed that light has particle-like properties.
- De Broglie suggested the converse, that electrons should display wave properties.

Single slit diffraction pattern
(composed of dots)



Double slit interference pattern
(composed of dots)



• No monistic ontology is forthcoming.

Schrödinger's Cat Paradox

- Wave mechanics incorporates the superposition principle.
- A photon directed towards a semi-silvered mirror will be described by a superposition of transmitted and reflected parts.
- According to Born, the amplitude of the wave gives a measure of the probability of finding the photon to be transmitted or reflected.
- According to von Neumann, the theory applies to macroscopic as well as microscopic objects



• Ignorance is theoretical, in conflict with classical epistemology.

The EPR Paradox

- According to Heisenberg's matrix mechanics, if two observables are represented by matrices which do not commute then their exact simultaneous values cannot be ascertained. Quantitatively:
$$\Delta a \Delta b \geq \frac{1}{2} |\langle [A, B] \rangle|$$
- EPR define an observable to be an element of reality if it can be predicted with certainty without being disturbed.



• Conclude: Quantum mechanics is incomplete

OR

• Pass on at a distance

2. THERE IS A SOLUTION

a perfect answer is!



The scientist has faith that sensible questions have answers.

Is this a sensible question?

Einstein's Interpretation

- Einstein will not let go of locality or determinism.
- He believed $\frac{h\nu}{\phi T} = \frac{CM}{CSM}$.
- Bell considered a spin EPR arrangement with two possible orientations a & a' of spin meter A and b & b' of spin meter B.
- Consider $Y_n = a_n b_n + a_n b'_n + a'_n b_n - a'_n b'_n$ for the n^{th} pair of particles.
Notice $a_n b_n \cdot a_n b'_n \cdot a'_n b_n = a'_n b'_n \therefore |Y_n| = 2$
- Define correlation coefficients from a large number of measurements
$$c(a, b) = \lim_{N \rightarrow \infty} \frac{1}{N} \sum_{n=1}^N a_n b_n$$
- Then
$$|c(a, b) + c(a, b') + c(a', b) - c(a', b')| \leq 2$$
- Quantum mechanics violates this inequality. ($c(a, b) = -\cos \theta_{ab}$)
- Experiment confirms the quantum mechanical prediction.
- The classical world picture is irretrievable.

Bohr's Interpretation (Orthodoxy)

- Every quantum phenomenon has a feature of wholeness which cannot be subdivided.
- A phenomenon is destroyed by surveillance of the interaction between object and measuring apparatus.
- Complementary phenomena require essentially different experimental arrangements.
- Experimental arrangements define which classical concepts can be meaningfully applied to the object.
- \therefore there are limits on the simultaneous use of classical concepts.
- However, an account of all the evidence, including an account of the experimental arrangement, must be given in the ordinary classical language of everyday life.
- This introduces an unnatural arbitrary cut between quantum description of objects and classical description of measuring instruments.

Other Interpretations

- Heisenberg particle diagram
- Superposition becomes a sum over histories.
- Everett, Wheeler and Graham ascribe reality to every wave component.
- Collapse of wave packet corresponds to location of 'this' consciousness. [There is no information in memory except that relating to 'this' world. EWB]
- de Broglie, Rimini and Weber propose random spontaneous jumps, the probability of a jump increasing with the complexity of the quantum system.
- Quantum mechanics is made rational by introducing the impossible in lots of little (random) bits!
- Wigner asks his friend to check the cat
$$\psi_{\text{see cat awake}}^{\text{friend}} + \psi_{\text{see cat asleep}}^{\text{friend}}$$
- He asks his friend what that state is like.
- He concludes that the superstate collapses to an eigenstate at the moment of consciousness.

3. THIS IS IT

Unity in yin-yang duality.



This (theory-laden world), whatever it is, is the source of the problem and the source of the solution.

Problem + Solution = Proposition

Complete Sense

- ▲ Rather than blind evolution, consider that each step in evolution of life was made consciously and then programmed into automatic response layer by layer.
- LIFE WAS DESIGNED.
- ▲ AI models the programming, not the intelligence.
- ▲ As life extended its senses it flexed its forms of perception and categories of understanding.
- ▲ Hypothesis: Life forms above balanced senses

$$\Delta a \sim \Delta a^\dagger$$
- ▲ Classical (ordinary everyday) language reflects this balance.
- ▲ Further extension of senses (by measuring instruments) can cause imbalance and reveal quantum language.
- ▲ Hypothesis: Coincided as a set of measuring devices, life forms maximise certainty (minimise uncertainty)

$$\Delta a \Delta a^\dagger \sim \Delta b \Delta b^\dagger \sim \dots \sim \hbar$$
- ▲ One is complete sense, both in terms of the 5 senses making a complete set for the normal experience and in terms of giving complete meaning.

The Non-Super-Self

- ▲ The here and now experience of the subject-object whole is definite, is not a superstate.
- ▲ According to Einstein, Tolman and Podolsky our description of the future and the past is a superstate.
- ▲ Collapse of the wave function is understood as an epistemic-cum-ontic realisation, or $t=0$ boundary condition.
- ▲ The superposition principle reflects the ONTOLOGICAL RELATIVITY.[†]
- ▲ Only quantum language is necessary because describing the afferent and experimental results classically just means observe 'this' to be in 'that' definite state.
- ▲ Microscopic objects, macroscopic objects and friends are all superstates until realised by the self.

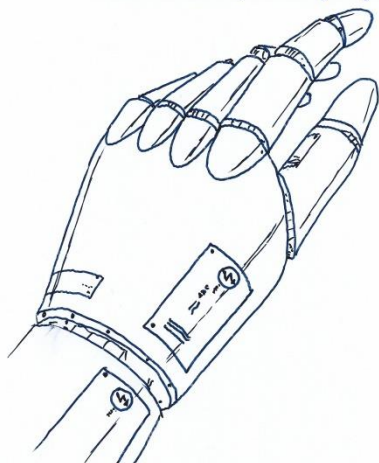
[†] NB. Particle physics is introducing a new type of ontological determinism - not determining what an object will do but determining what objects can exist in the first place.

The Perfect Observer

- ▲ Omniscience can mean nothing other than knowledge of the pure state.
 - ▲ Omnipresence can mean nothing other than being of the pure state.
 - ▲ Feynman and Wheeler argue that by the CPT theorem there may be only one of each type of particle in the universe.
 - ▲ There only is one life in a TOE.[†]
 - ▲ Therefore, there is only one source of consciousness.
 - ▲ There only is one observer.
 - ▲ One is the perfect observer.
 - ▲ One is the subject-object whole.
 - ▲ One is the common, the original particle.
 - ▲ There is a timeless description of the common.
- [†] NB. The unique 'big TOE' does not necessarily reflect QUT fundamentalism but could still reflect bootstrap non-reductionism.

4. THAT IS THAT

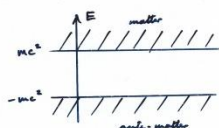
Whatever that is, it is definitely itself.



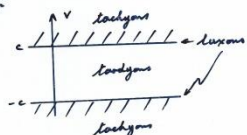
That (theory-laden world) transcends problems and solutions.

Quantum Mimicology

- + Antimatter makes negative numbers whole: (one electron) plus (minus one electron = one positron) = zero electron.



- + Tachyons have imaginary properties and are theoretically allowed.
 $m = m_0 / \sqrt{1 - v^2/c^2}$



- + Minkowski argued that Pythagoras' theorem could be extended to 4 dimension if the 4th dimension was considered to consist of imaginary numbers.

- + Then the only time that is real is $t=0$ i.e. NOW.

Quantum Logic

- + What counts as an explanation relies on familiarity with the paradigm.
- + "The answer to the EPR paradox is found to lie in the logical relation existing between the data shown off by a macroscopic measuring apparatus and the proposition expressing the result of the experiment as the value of a microscopic observable." R. Omnès, *Phys Lett A* 138 (1989) 157

$$+ \text{Schematically: } \frac{\text{geometry}}{\&R} = \frac{\text{logic}}{\&M}$$

- + Replace boolean lattice of classical phase space by projection lattice of Hilbert space.

Classical	Quantum
\vee or	\oplus linear span
\wedge and	\cap self-orthogonal intersection
\sim not	\perp orthogonal
$<$ less than	\subset contained in

- + Propositions are of the form: the state vector lies in space U .
De Morgan holds: $U \cap V = (U^\perp \oplus V^\perp)^\perp$ etc..
Distributivity fails: $U \cap (V \oplus W) \neq (U \cap V) \oplus (U \cap W)$
- + Kochen & Specker showed $CL \not\hookrightarrow QL$; $QL \not\hookrightarrow CL$.
- + This completes the overthrow of classical metaphysics.
- + $\Delta(\text{space-time}) \cdot \Delta(\text{energy-momentum}) \geq \hbar$
 $\Delta(\text{continuity}) \cdot \Delta(\text{causality}) \geq I$
 $\Delta(\text{geometry}) \cdot \Delta(\text{logic}) \geq \text{unity}$

Sophons for Psyche

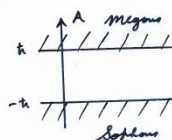
- + Consider that the properties of material objects are associated with real numbers (Latin) while properties of thoughts are associated with imaginary numbers (Gaelic).

$$+ \mathcal{T} = it, \quad \mathcal{U} = iE$$

$$\Delta \mathcal{T} \Delta E \geq \hbar$$

$$\therefore \Delta \mathcal{T} \Delta \mathcal{U} \leq -\hbar$$

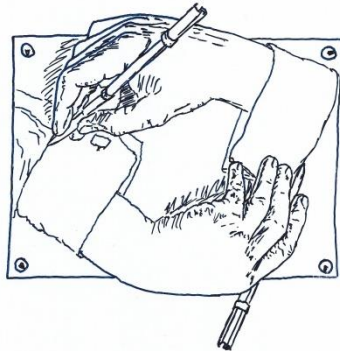
- + Regard the time-energy uncertainty relation as a certainty principle following from a principle of greatest action.
- + Call thought substance (prototypical ideas) SOPHONS and material substance MEGONS.



- + Descartes, the founder of modern philosophy, when viewing a table considers there to be one material table and another table in the mind, contingently identical.
- + Sophons and Megons herald a Cartesian monism.

5. 0

⊕ 'PROBLEM / "→ 1"



The way to understanding, wisdom and
awe.

Unity Consciousness

1. Unity consciousness is the state of mind of a perfect observer.
2. Extending the sense, given a TOE, confirm the unity.
3. ATHAN IS BRAHMAN
4. 7 levels of consciousness:
1. Dreaming sleep
 2. Waking sleep
 3. Waking consciousness
 4. Transcendental consciousness
 5. Cosmic consciousness
 6. God consciousness
 7. Unity consciousness
- } ? ← need absolute/relative freedom! ?
5. 8 steps of yoga (from yoga = union)
1. yama - restraints
 2. niyama - observance
 3. asana - posture
 4. pranayama - breath control
 5. pratyahara - sense withdrawal
 6. dharana - concentration
 7. dhyana - meditation
 8. samadhi - unity consciousness
- ($\ddot{\text{Sri}} = \text{AUM}$)

✶ The 5 propositions.

Psychological Consequences

- Mind over body is undoubtable in hand control.
- Theory of conscious evolution suggests mind over body can extend to heartbeat, digestion, gestures ...
- If freewill is not illusory, as it would have to be in strict classical determinism, then it amounts to control of the superstate.
- Omnipotence is the mind over (interacted) matter.
- The concepts of purpose, responsibility and justice can become meaningful.
- Even ESP is conceivable.

~ Helpfully in the case of Commander Aylmerburg:

"The winter, when 13 years of age, was assigned in a boat when landing on the island of Bally, east of Gough, and was nearly drowned. On being to the surface, after being repeatedly submerged, the boy called his mother. This caused the boat's crew, who spoke of it afterwards, and general him a good deal about it. Months after, on arrival in England, the boy went to his home, and while telling his mother of his narrow escape, he said, "Little I was under water, I saw you all sitting in that room; you were making something worse. I saw you all - mother, Emily, Eliza and Ellen." His mother at once said, "Bless you, and I bless and you say for me, and I sent Emily to look out of the window, for I suspected that something had happened to that poor boy." The time, owing to the difference of boat lengths, coincided with the time when the voice was heard."

- ~ Persecution of a woman in a semi-shut-off cage by 2 anonymous scientists.
- ~ Psychokinesis by "Schmidt's cat" in a randomly heated garden shed.

There is a Problem

There is a Solution

This is It

That is That

