PARANORMAL IS ABNORMAL ACTION OF MIND ON MATTER.

ONE NEEDS FIRST A THEORY OF NORMAL ACTION OF MIND ON MATTER.

CLASSICAL THEORY INADEQUATE: NO 'MIND' IN THE DYNAMICS.

QUANTUM THEORY IS FORMULATED AS A THEORY OF MIND-MATTER INTERPLAY!

SIMPLER THAN CLASSICAL PHYSICS!

I SHALL:

1. SHOW HOW QUANTUM THEORY OF MIND-MATTER IS CONSTRUCTED.

2. DO TWO IMPORTANT MIND-MATTER CALCULATIONS.

3. LOOK AT RAMIFICATIONS FOR PARANORMAL.

IN QUANTUM THEORY NUMBERS GET REPLACED BY MATRICES (OPERATORS).

1. AB CAN DIFFER FROM AB

2. Tr A = 'A NUMBER'.

I SHALL DO THE CALCULATIONS WITHOUT USING ANYTHING ABOUT MATRICES BEYOND WHAT I HAVE JUST TOLD YOU.

VON NEUMANN-WIGNER QUANTUM THEORY.

THE EVOLVING STATE OF THE UNIVERSE IS REPRESENTED BY A "MATRIX" S(t).

EACH POSSIBLE EXPERIENCE IS REPRESENTED IN THE THEORY BY A MATRIX P THAT SATISFIES PP=P.

EACH ACTUAL EXPERIENCE IS REPRESENTED BY A "REDUCTION"

S(t+) = PS(t-)P

THIS REDUCTION:
1. "SAVES" A HIGH-LEVEL NEURAL ACTIVITY
2. "ELIMINATES" COMPETING ACTIVITIES.

THE "SAVED" PATTERN INITIATES A BRAIN ACTION THAT CORRESPONDS TO THE EXPERIENCE:
THE SAVED PATTERN TENDS TO CAUSE SUBSEQUENT EXPERIENCES TO CONFORM TO THE EXPECTATIONS AND INTENTIONS EMBEDDED IN THE EXPERIENCE

THE THEORY IS FORMULATED AS A DYNAMICAL INTERPLAY BETWEEN “PARTICIPANTS” AND “NATURE”

THE TRIPARTITE DYNAMICS:

I. A PARTICIPANT ASKS A YES-NO QUESTION.

II. NATURE RETURNS AN ANSWER, ‘YES’ OR ‘NO’.

III. BETWEEN THESE INTERVENTIONS THE STATE EVOLVES DETERMINISTICALLY.

TYPICAL QUESTIONS:

**** AM I “SEEING THE POINTER MOVE TO THE RIGHT”?**

**** AM I “FEELING MY ARM RISE”?**

**** AM I “INTENDING TO RAISE MY ARM”?**

DETAILS:

I. EACH YES-NO QUESTION IS REPRESENTED BY A MATRIX P SATISFYING PP=P.
"ASKING" IS REPRESENTED BY THE "VON NEUMANN PROCESS I":
$$S(t) = PS(t-)P + (1-P)S(t-)(1-P)$$

II. NATURE ANSWERS:

'YES' MEANS $S(t+) = PS(t) = PS(t-)P$.
THE PROBABILITY OF 'YES' IS
$[P] = \mathrm{Tr}\, PS(t)/\mathrm{Tr}S(t)$.

'NO' MEANS $S(t+) = (1-P)S(t)$
$= (1-P)S(t-)(1-P)$.
THE PROBABILITY OF 'NO' IS
$[1-P] = \mathrm{Tr}\, (1-P)S(t)/\mathrm{Tr}S(t)$

III. BETWEEN JUMPS
$$S(t') = \exp(-iH(t'-t))\, S(t)\, \exp(-iH(t-t'))$$

FOR "SMALL" $(t'-t)$,
$$S(t') = (1-iH(t'-t))\, S(t)\, (1-iH(t-t'))$$

DERIVATION OF A LOCALITY RESULT.

LET QUESTIONS P AND Q BE ASKED AT THE SAME TIME IN DIFFERENT REGIONS.

PQ=QP

A KEY LOCALITY RESULT:
[Q] IS NOT AFFECTED BY 'ASKING P'.
PROOF:
[Q]=Tr Q(PSP + (1-P)S(1-P))/DENOM
= Tr Q[P S + (1-P)S]/Tr[PS+(1-P)S]/DENOM
= Tr Q S/Tr S.

[USE Tr AB = Tr BA, PQ = QP, and PP=P.]

THE TOP LINE IS [Q] IF QUESTION P IS ASKED AND THE ANSWER IS NOT KNOWN.

THE BOTTOM LINE IS [Q] IF QUESTION P IS NEVER ASKED.

CONCLUSION: ASKING "THERE" DOES NOT AFFECT THE PROBABILITY OF EXPERIENCE Q OCCURRING "HERE".

THE SECOND KEY RESULT.

THE QUANTUM ZENO EFFECT.

**CAUSED BY RAPID REPETITION
OF THE SAME QUESTION P.**

$$\begin{aligned}
&S(t') = P\ (1-iH(t'-t)) \\
&(PS(t)P + (1-P)S(t)(1-P)) \\
&(1-iH(t-t'))\ P \\
&+ (1-P)\ (1-iH(t'-t)) \\
&(PS(t)P + (1-P)S(t)(1-P)) \\
&(1-iH(t-t'))\ (1-P)
\end{aligned}$$

**H ENTERS IN FOUR WAYS:
PHP, (1-P)H(1-P), PH(1-P), (1-P)HP.**

LOOK AT PH(1-P) CONTRIBUTION.
$P(1-iH(t'-t))(1-P) = -iPH(1-P)\ (t'-t)$
IT APPEARS WITH THE FACTOR
$(1-P)(1-iH(t-t'))P = -i(1-P)HP\ (t-t')$

**EACH PH(1-P) AND EACH (1-P)HP APPEARS
WITH AT LEAST TWO POWERS OF (t'-t).**

LET INTERVAL T BE DIVIDED BY 'ASKINGS' INTO n INTERVALS T/n.

LINEAR TERMS IN T/n GIVE n T/n: ZEROTH ORDER IN n.

n CONTRIBUTIONS SECOND ORDER IN T/n : n/nn GOES TO ZERO.

PH(1-P) AND (1-P)HP DROP OUT:

H REPLACED BY PHP + (1-P)H(1-P).

NO P — (1-P) transitions.

S GETS TRAPPED IN PSP, OR IN (1-P)S(1-P)

THIS IS THE QUANTUM ZENO EFFECT.

SIGNIFICANCE OF QZE

IT GIVES AN IMPORTANT QUANTUM EFFECT OF MIND ON MATTER.

The environmental decoherence reduces the state S(t) to effectively a statistical mixture of almost-classical states. This mixture, if it evolved according to the rules of classical mechanics, would evolve (at least to first order) according to

S(t') = exp -iH(t'-t) S(t) exp -iH(t-t')

BUT THEN THERE IS NO SUPPRESSION of the PH(1-P) and (1-P)HP contributions to the evolution of this mixture. There is no confinement: no focussing of attention. For there are no quantum jumps in the classical mechanics case, and it was these jumps, which are a quantum effect, that PRODUCED THE DEVIATION from the classical spreading.

MAXIMALLY PREDICTIVE FORM OF THEORY.
MINIMIZE INPUT FROM PARTICIPANT.

LET $\{P\}(t)$ BE SET OF P's THAT
THE PARTICIPANT CAN ASK AT TIME t.

[THESE P's ACT ON THE DEGREES OF
FREEDOM OF PARTICIPANT.]

DEFINE:
$P(t)=$ THE P IN $\{P\}(t)$
THAT MAXIMIZES Tr P S(t).

ASSERT THAT PARTICIPANT CAN ONLY
CONSENT OR VETO P(t).

SUPPOSE (BY VIRTUE OF ITS SURVIVAL
VALUE) THAT EACH P TENDS TO CREATE
CONDITIONS FOR SELF REPLICATION.

AND SUPPOSE 'RAPIDITY OF ASKING'
IS CONTROLLED BY MENTAL EFFORT.

THEN MENTAL EFFORT WILL, VIA QZE,
TEND TO KEEP ATTENTION FOCUSSED.

TIE-IN TO PSYCHOLOGY.

Wm. James. in "Psychology: The Briefer Course"

Ch. Attention: Sect. Attention and Free Will.

"I have spoken as if our attention were wholly determined by neural conditions. I believe that the array of *things* we can attend to is so determined. No object can *catch* our attention except by the neural machinery. But the *amount* of the attention which an object receives after it has caught our attention is another question. It often takes effort to keep mind upon it. We feel that we can make more or less of the effort as we choose. If this feeling be not deceptive, if our effort be a spiritual force, and an indeterminant one, then of course it contributes coequally with the cerebral conditions to the result. Though it introduce no new idea, it will deepen and prolong the stay in consciousness of innumerable ideas which else would fade more quickly away. The delay thus gained might not be more than a second in duration— but that second may be critical; for in the rising and falling considerations in the mind, where two associated systems of them are nearly in equilibrium it is often a matter of but a second more or less of attention at the outset, whether one system shall gain force to occupy the field and develop itself and exclude the other, or be excluded itself by the other. When developed it may make us act, and that act may seal our doom. When we come to the chapter on the Will we shall see that the whole drama of the voluntary life hinges on

the attention, slightly more or slightly less, which rival motor ideas may receive. ..."

Posing a question is the act of attending. In the chapter on Will, in the section entitled "Volitional effort is effort of attention" James writes:

"Thus we find that *we reach the heart of our inquiry into volition when we ask by what process is it that the thought of any given action comes to prevail stably in the mind.*"

and later

"*The essential achievement of the will, in short, when it is most 'voluntary,' is to attend to a difficult object and hold it fast before the mind. ... Effort of attention is thus the essential phenomenon of will."*

Still later, James says:

"Consent to the idea's undivided presence, this is effort's sole achievement." ..."Everywhere, then, the function of effort is the same: to keep affirming and adopting the thought which, if left to itself, would slip away."

The vN/W theory, with the Quantum Zeno Effect incorporated, explains the mind-brain features that are the basis of James's conception of the action of human volition on brain process.

EXAMPLE: How does your mental action raise your arm?

The set or sequence of P(t)'s is being offered to the mental aspect of the participant-observer by his body-brain. If raising the arm might be appropriate in the current circumstance then the question "Am I experiencing an intention to raise my arm?" is likely to be put forth by the brain. If consented to, not vetoed, this question will be asked. If effort is applied, the same question will be asked in rapid succession. Attention will become focussed on the idea of raising the arm. According to James's ideo-motor theory, the action of raising the arm will be initiated (in the brain) by this dwelling of attention on the idea.

The answer given by nature might be No! Then there will be some more searching. But if raising the arm is by far the most appropriate action under the circumstance, then the probability for a Yes answer— with this probability ground out by the mechanical (survival-honed) evolution —should be high.

If the initial answer is No, and all other alternatives are "bad", on the basis of the mechanically conditioned criteria, then the question should get posed again soon. Maybe this time it will get caught by QZE.

CONCLUSION:

von Neumann-Wigner quantum theory provides the rudiments of a neat and simple framework for studying mind-brain interaction. It has significant explanatory pow-

er: it explains immediately the essential features of volition described by Wm. James.

WHAT ABOUT PARANORMAL?

CONCLUSION I. (LOCALITY)

NORMAL THEORY ENTAILS THAT PROBABILITIES FOR FARAWAY EXPERIENCES ARE NOT INFLUENCED BY MENTAL EFFORT HERE.

[I am assuming here, on the basis of the claimed evidence for NO FALL-OFF AT ALL with either distance or time displacement, that NO DIRECT PHYSICAL CONNECTION is responsible for the purported effects.]

CONCLUSION II:

Distant effects can be obtained by modifying the theory slightly:

Mental Effort:

$$S \rightarrow [(1+s)PSP + (1-P)S(1-P)] \text{ , small s}$$

This violates normal quantum theory.

It would permit SIGNALS to be sent faster-than-light, in violation of ideas from the theory of relativity.

But if experiments really do conflict with this conclusion, then the modification proposed above is one conceivable way out.

It would mean that mental process can influence not only which questions are asked, and when they are asked—which appears to be all that is needed to explain the NORMAL effects of mind on matter—but also can BIAS THE PROBABILITIES away from what quantum theory specifies. That would be a direct violation of present-day quantum theory, but would at least be a well defined and calculable small violation of the normal rules.

CONCLUSION III.

A more plausible possibility would be to suppose that the measuring devices are extentions of the human participant, as more or less suggested by the Copenhagen approach. This would allow, in principle, the P to act not only upon certain high-level degrees of freedom of the brain, but also on some degrees of freedom of the device. This would perhaps allow paranormal effects to come in without actually directly violating the basic quantum rules. One would be exploiting, instead, the looseness of quantum theory pertaining to the choice of P in the vN process $S \rightarrow PSP + (1-P)S(1-P)$.

Since the choice of question P is already a mental operation, it would more naturally be open to mental influence.