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To Whom It May Concern:

I am writing this note in behalf of Eddie Oshins. <Eddie@QuantumPsychology.com>

This note is a capsule description of his work and its significance for mathematics, physics and psychology,

Oshins has been a pioneer in the interpretation of quantum theory and quantum logic both for physics and for psychology. He has, in the course of his career, clarified the wave logic of Yuri Orlov, made very creative suggestions about the possibility that the human brain processes superpositions in a way that is mathematically analogous to the evolution of a state in quantum mechanics, and made very remarkable connections among standard logic, the logic of distinctions of G. Spencer-Brown and the insights and techniques of quantum logic. These topics are highly significant and I will elaborate on them.

Oshins has suggested that superposition and spinor properties of brain action may be observable through the use of SQUIDS, CAT scans and magnetic resonance devices. These experiments should be performed. He has also deeply investigated relationships among quaternions, spinors, body movement and movements in Chinese martial arts. It was through this connection that he and I found a very beautiful representation of the quaternions that is performed by hand and arm movements.

He has subsequently gone very deeply into this investigation. In the early 1990s, Oshins proposed a classical (not yet quantum) test that would indicate a need for a spinor modification to Georgopoulos' "population vector" interpretation of motor cortex data from monkeys conditioned to perform "mental rotation" tasks. He has also suggested that a modification of work by von Bekesey might enable addressing a chiral superposition of handedness as a test for a "quantum superposition." These ideas are refreshing and open a window to new ways of asking such questions, irrespective of these outcomes. I am sure that such proposals will relate to the previous suggestions about spinors, superposition and brain action in many fruitful ways.

On the side of logic and the logic of distinctions, Oshins brings an entire dimension that is ignored by orthodox logicians and mathematicians. Both Oshins and I have independently explored the phenomena of self-reference as conceived of by G. Spencer-Brown. My own approach, along with Francisco Varela, was directed toward investigating a new logical symbol representing self-recursiveness, and lead to the "extended calculus of indications." Oshins later showed that this realizes a distributive and noncomplemented lattice as a 3-chain characteristic function. I also investigated other ways to reconstruct the complex

numbers in analogy to imaginary values in multiple valued logics and analogies with discretized classical wave-forms.

In contrast, Oshins began with Spencer-Brown's analogy to "this statement is false" by the arithmetic equation  $x = -1/x$ . He extended this into a matrix eigenvalue equation using noncommuting quaternions and spinors for an abstract quantum distinction that he calls a "bit of ambiguity". He recognized that the simplicity of a distinction has the full subtlety of an observable in quantum mechanics. The formalism of quantum mechanics makes explicit the role a distinction plays in bringing forth particular observations in the physical world. It was Oshins who first laid-bare the lattice theoretic similarities and differences between these approaches. Intriguingly, Oshins' line of attack leads to a nondistributive and complemented lattice — precisely the opposite result to our extension of the same original work of Spencer-Brown!

In his context, the distinction takes the role of the experimental arrangement, described in classical language and allowing certain kinds of observation while (via complementarity) excluding others. Oshins has been persistent and insistent on the relevance of the quantum logical point of view in studying matters of form and distinction. He has shown that the logically correct formulation of the "formula of second-order change" ("not a but also not not-a ") as presented in MRI brief therapy is as a violation of the distributive law. Formally, von Neumann has shown by his quantum logic that this violation embodies the lack of commutivity for physical observables that was proposed by Heisenberg as the basis for quantum mechanics. Oshins is attempting a similar scientific formulation for language and logic with his quantum psychology.

Oshins has proposed an ingenious interpretation of this violation in terms of an explicit Principle of Metalogical Ambiguity for competing, complementary contexts. He has used this approach to formally harmonize what was previously considered irreconcilable points of view regarding schizophrenia as a logical phenomenon. The expansions of contexts advanced by Oshins enriches the various discussions and often points out the weakness and poverty of classical or Boolean points of view. In this time of development of quantum computing, Oshins' insights are needed and appreciated.

To return to the first point, Oshins was one of the few people who stood up for Orlov's work when Orlov was in prison in the former Soviet Union, and Oshins was instrumental in helping Orlov gain his freedom.

In summary, Eddie Oshins is a highly creative and courageous researcher, one of the most honest scientists I know. I recommend him to you with all my heart.

Yours truly,



Louis H. Kauffman  
Professor of Mathematics