

## **Rebuilding the Bridge Between Science and Mysticism**

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### **Abstract**

Prior to 1600 or so, science and mysticism were mutually supportive, complementary approaches to advancing human evolution. However, most of the recent scientific work on consciousness and neuroscience has weakened the level of connection, and even led to harmful stereotypes about what mysticism actually is. This paper reviews that background, and provides a brief introduction to new developments in mathematical neural network theory, including a model of intelligence and mind which is fully compatible with mysticism (at least of the Pythagorean or Stoic schools). It is hoped that this new bridge between fields will help raise the appreciation of mysticism, and assist in its long-term mission of fostering the fullest flowering of human potential, including mind, body and soul.

## **Reconstruire le pont entre la science et le mysticism**

Paul J. Werbos, Ph.D.

### **Résumé**

Avant les années 1600 environ, la science et le mysticisme étaient perçus comme des approches en interaction et complémentaires à l'évolution de l'homme. Toutefois, la plupart des travaux scientifiques récents sur la conscience et la neuroscience ont affaibli cette interconnexion, créant ainsi des stéréotypes dommageables liés à la véritable nature du mysticisme. Cet article aborde cette question en plus de présenter une brève introduction des nouvelles avancées liées à la théorie mathématique des réseaux de neurones, y compris un modèle de l'intelligence et du cerveau entièrement compatible avec le mysticisme, à tout le moins avec les écoles de pensée de Pythagore et du stoïcisme. Espérons que ce nouveau pont entre ces deux domaines permettra une meilleure appréciation du mysticisme et contribuera à la poursuite de son objectif à long terme visant l'épanouissement du plein potentiel humain, notamment celui de l'esprit, du corps et de l'âme.

## **Reconstruyendo el Puente entre la Ciencia y el Misticismo**

Paul J. Werbos, Ph.D.

### **Resumen**

Hasta antes de alrededor del año 1600, la ciencia y el misticismo se apoyaban mutuamente, siendo enfoques complementarios para el avance de la evolución humana. Sin embargo, recientes investigaciones científicas sobre consciencia y neurociencia debilitan el nivel de conexión y hasta llevan a estereotipos dañinos sobre lo que realmente es el misticismo. Este artículo analiza los antecedentes y proporciona una breve introducción a los nuevos desarrollos de la teoría de redes neuronales matemáticas, incluyendo un modelo de inteligencia y mente, el cual es completamente compatible con el misticismo, al menos con las escuelas Pitagóricas y Estoicas.

Esperamos que este nuevo puente entre campos ayude a elevar el aprecio del misticismo y ayudar en su misión de largo alcance de fomentar el florecimiento del completo potencial humano, incluyendo mente, cuerpo y alma.

### **Reconstruindo a Ligação entre Ciência e Misticismo**

Paul J. Werbos, Ph.D.

#### **Resumo**

Antes de mais ou menos 1600, a ciência e o misticismo se apoiavam mutuamente, com abordagens complementares sobre os avanços da evolução humana. Contudo, a maioria dos trabalhos científicos recentes sobre consciência e neurociência enfraqueceram esse nível de conexão, e até levaram a estereótipos prejudiciais sobre o que é realmente o misticismo. Este estudo revisa este contexto histórico e fornece uma breve introdução sobre os novos desenvolvimentos da teoria de rede neurais matemáticas, incluindo um modelo de inteligência e mente que é totalmente compatível com o misticismo (pelo menos nas escolas pitagoreanas ou estoicas). Espera-se que esta nova ponte entre estes campos ajude a aumentar a valorização do misticismo, e ajudar na sua missão a longo prazo de promover o pleno florescimento do potencial humano, incluindo a mente, o corpo e a alma.

### **Die Brücke zwischen Wissenschaft und Mystizismus wiederaufbauen**

Paul J. Werbos, Ph.D.

#### **Zusammenfassung**

Vor dem Jahre 1600 haben sich Wissenschaft und Forschung gegenseitig unterstützt und waren einander ergänzende Ansätze bei der schreitend menschlichen Entwicklung. Jedoch hat die meiste gegenwärtige wissenschaftliche Forschung über das Bewusstsein und die Neurowissenschaft den Grad dieser Verbindung geschwächt und sogar zu schädlichen Stereotypen darüber, was Mystizismus eigentlich ist, geführt. Dieses Forschungspapier sieht sich diesen Hintergrund an und liefert eine kurze Einführung in die neuen Entwicklungen in der mathematischen Nerven-Netzwerktheorie, einschließlich eines Modells der Intelligenz und des Geistes, das vollständig vereinbar ist mit dem Mystizismus (wenigstens der pythagoräischen oder der stoischen Schulen). Wir hoffen, dass diese neue Brücke zwischen den wissenschaftlichen Bereichen die Wertschätzung des Mystizismus erhöht und ihn in seinem langfristigen Auftrag der Förderung einer vollkommenen Entfaltung des menschlichen Potentials, einschließlich Geist, Körper und Seele, behilflich ist.

#### **The Big Picture**

For centuries and centuries, mystery schools such as the Rosicrucian Order and its Asian cousins have provided exercises and disciplines aimed at enabling people to develop the full natural capabilities of the body, mind and soul, with a strong special emphasis upon the soul. But in recent decades, many scientists have found it ever more difficult to reconcile what they learn from science with the very idea of soul. There have been many efforts to build a kind of weak or fuzzy treaty between the world of mysticism and the world of science. There have been a few promising images of how they might fit together in a more useful and substantive way, such as

the Gaia hypothesis and the work of Teilhard de Chardin, but the hard-core study of mathematics and the brain has been ever more difficult to reconcile with the pursuit of mysticism. Until now.

The goals of this paper are: (1) to review a new understanding of the mathematics of intelligence in the brain which has emerged from research in neural networks,<sup>1,2</sup> and (2) to suggest a simple augmentation or extension of that understanding, which is not only consistent with mysticism, but provides a new basis for appreciating it, strengthening it and increasing its ability to achieve its fundamental goals.

Of course, there are many varieties of science and of mysticism which are not compatible with each other. The very words “science” and “mysticism” mean very different things to different people. The twentieth century Anglo-American school of philosophy rightly stressed how often people can become lost in totally meaningless arguments when they assume different or fuzzy definitions of the words they use, and are not really careful about definitions and common sense. The next section will describe what I mean by “science” and by “mysticism” – or, in other words, what kinds of neuroscience and mysticism are ready for a new partnership.

This paper will make little or no effort to try to persuade people who have made fundamental personal commitments to varieties of mysticism, science, religion or ideology which rule out this kind of partnership, or people whose experience is not yet rich enough for them to see the need for it (as I once was myself). This is necessary here for two reasons: (1) there is a huge number of such varieties on earth, well beyond what a single journal paper can discuss in detail; (2) there are fundamental limits to the power of words alone in liberating people from prisons which they construct for themselves at the nonverbal level of their mind.<sup>2</sup> Nevertheless, I do remember quite clearly the time when I did not have enough experience to justify believing in the soul, and I remember how strong and valid the arguments were against the soul, *before* my own personal experience compelled me to become open-minded and then to grapple with a much larger base of experience. After that experience, to deny the soul would be a gross exercise in denying reality, as crazy as denying or opposing the existence of grass or trees or the feelings I share with my wife. Most people take different paths to becoming open-minded, but I will make a few comments about my own path, for the benefit of those readers who may be groping with similar issues.

The first person approach in this paper would be unfamiliar both in traditional forms of mysticism (where removal of “I” and of “the little self” is an important exercise) or in non-normative objective science.<sup>3</sup> But in the new synthesis,<sup>2</sup> we vigilantly respect the distinction between what we can learn, scientifically, from the database of shared experience which all humans can agree to, versus what we can learn from the larger database of experience in “first person experience.” Both are an important part of human culture. There is an analogy here to the relation between non-normative social science, and modern rational policy research, which can benefit each other but are quite distinct and legitimate social intellectual activities.

Science is simply not ready yet to affirm the existence of the soul based on evidence which all humans can agree to. Thus the relevant data and tentative conclusions do need to be qualified by the word “I,” or even by specific names, in order to avoid the pretense that these are matters

which we could all agree to even if we had a perfect ability to infer the implications of our limited experience.

Many scientists and people striving for human progress would also object strongly to the hierarchical forms of organization which have been inherited from the past in all ancient schools of mysticism and religion. Of course, similar concerns apply to the issues of modernizing universities and corporations.<sup>4</sup> The Rosicrucian Order has often discussed the need for 108-year cycles of decay and rebirth, in order to avoid the kind of entropy which has been seen in many large historic organizations. Lewis<sup>5</sup> played a major role in consolidating and enhancing the heritage of Rosicrucians and other schools of mysticism, in a way which served as a kind of tool or augmentation for the rest of society, including the highly decentralized and democratic structures of Quaker meetings. The development of new forms of organization and corporate culture is an important area for research and for policy, but it is well beyond the scope of this paper. This paper will mainly focus on science and mysticism as systems of ideas.

This paper is mainly written for those readers who are open-minded and free enough that they can seriously entertain the possibility of a new integration of science and mysticism. It will begin by portraying a picture of what science and mysticism are really about, as systems of ideas, in the modern world. Though I am not currently a member of the Rosicrucian Order or of any other school of mysticism East or West, I feel great gratitude for what these schools have provided to me and to others in the past, and a need to highlight the unique importance of the heritage which they offer to us all. I also feel great gratitude for what I have learned from the Rosicrucian writings and actions of Raymond Bernard and Christian Bernard (filtered of course through my own consciousness), but those subjects are also beyond the scope of this paper, which is aimed at a level of experience which, while not universal, is more consciously familiar to a larger audience.

## **Science, Mysticism, and the Rosicrucian Order: A View of the General Background**

### *Science and Mysticism in General*

Years ago, a great controversy erupted when Webster's dictionary included a "definition" of "Jew" as an avaricious and evil sort of person. Similar definitions of words like "mysticism" and "sustainability" have become very common, and are often defended as axioms by people committed to attacking those concepts. However, mystics – like Jews and people committed to sustainability – have some right to their own concepts and traditions, and to the use of the word which refers to these core concepts. Here, when I refer to "mysticism," I will basically be referring back to the very first sentence of this paper. Here, "mysticism" refers to systems of disciplines and exercises which attempt to enhance the first person experience of life, in order to advance the full natural flowering of the body, mind, and soul, with a special emphasis upon attaining the full maximum potential of the soul. It is about direct experience, first and foremost, and not about words. The rose symbolizes that flowering.

Mystery schools have existed and have learned from each other for untold centuries, all over the world. It is hard for me to refrain from saying more about that incredible history here. Nevertheless, the modern form of mysticism as reflected in the Rosicrucian Order was strongly

reshaped by the major change of culture in the West from about 1300 to 1600, which will be my starting point here.

Circa 1300, intellectual debates in the West all ultimately raised the question: “How is it that we can know anything at all? What is the foundation of knowledge, the ultimate rock we can depend on?” Some said The Book, and developed elaborate hermeneutic reasoning attached to The Book. Some said “Authority – ultimately, the living embodiment of Christ, the Pope.” Some said Pure Reason, which generally ended up being some interpretation of Aristotle. Hermeneutics, Aristotle, and the Pope all contributed to the Great Inquisition, and to the enforcement of rigid doctrines such as the doctrine that the earth is the center of the universe. Dangerous aberrations of politics like that continue to this day, in the West and elsewhere.

But in those days, new thinkers like William of Ockham pioneered a new approach, which took direct experience as its foundation. We each as individuals ultimately have two foundations we can build upon – the history or time-series of everything we have seen or sensed directly, and the full use of our intelligence (which includes both deductive reasoning and inductive learning, verbal and nonverbal, mathematical and nonmathematical). Our ability to learn from experience depends on certain basic principles such as Ockham’s Razor which science is now beginning to understand far more precisely.<sup>1,6</sup> In natural life we rely heavily on using that natural learning ability long before we understand it more objectively; with full self-awareness, we express that natural ability to its fullest, and our scientific understanding of it supports its operation.<sup>2</sup>

This new emphasis on the empirical approach led to two strong new currents of culture, both of which initially flowed together. There was the “scientific method” as promulgated by Francis Bacon, which grew into the great scientific revolution, later analyzed by historians such as Kuhn<sup>3</sup>. Kuhn defines “science” as the exercise of two or three basic disciplines – the full use of intelligence to learn what we can from experience, *and* a focus on what we can learn from shared, replicable experience such as laboratory experiments. There was also the reinvigorated Rosicrucian Order, also supported by Bacon at the same time, with auxiliary organizations such as Scottish Rite Freemasonry strengthening the effort to take a more modern and liberated approach to life in general, not just to science. Visiting the dining hall and chapel of Trinity College of Cambridge University, one can easily enhance one’s feeling for the truly powerful rivers of thought which flowed from there (and still flow in various ways). In the world of religion, the Society of Friends (Quakers) worked to create a similar revolution, and there were important connections at times between all of these traditions. H. Spencer Lewis,<sup>5</sup> for example, worked intensely through at least three of these channels, in his efforts to advance human evolution.

A certain degree of secrecy was necessary at times, unfortunately, because of powerful groups committed to murdering people who think for themselves. Historians have noted that Leibniz resigned loudly as a secretary of a Rosicrucian body, in protest against that policy, and he is well-known to have been in conflict with Newton. But for purposes of this paper, the ideas are what matter, not the historical personalities.

All these traditions ultimately rely on the full use of intelligence and learning from experience to enhance our understanding, as a foundation for our spiritual development and as a channel for its

expression. The main difference is that science, as a special niche in our society, focuses on *shared* and “*replicable*” experience, while mysticism consciously tries to address the full range of first-person experience. In a sense, science is like poetry – a very specialized discipline, defined by the constraints it imposes in order to achieve a certain kind of power or effect. Mysticism is like prose, which is more inclusive. The two will never be the same, since different databases of experience lead to different inferences, but they can learn from each other and share concepts. Mysticism in this sense includes science as *one part* of its database.

### *Preliminary Journey from Science to the Soul*

But now I must move on, and make a sharper distinction.

Science actually has some ability to reach beyond the laboratory, and correlate neural network mathematics with those types of first-person experience which anyone can see fairly easily. Science can make sense of Freud’s concept of “sanity” and of Confucius’s concept of “integrity” as interpreted by those Confucian scholars who do not believe in the soul at all.<sup>2</sup>

At a time when I did not believe in the soul at all myself, I could easily see the logic of trying to achieve that kind of sanity or integrity. I tried to understand intelligence in the brain, in part because I knew that greater integrity would allow me to be far more effective in using my mind, but also because I felt that a better understanding of this mathematics would help us get rid of wrong ideas about the soul which cripple people and cause wars and other problems on a large scale. Like most of the other founders of the neural network field, I was deeply excited by one of the two books which launched the neural network revolution, by D.O. Hebb.<sup>7</sup>

Hebb argued that the probability of soul or of paranormal abilities is very low, despite laboratory evidence which would be convincing for any other theory about the mind, because of the strong prior probability against the idea. Sagan has popularized this line of thinking by saying “extraordinary claims require extraordinary justification.” Hebb argued for a low prior probability, based on the apparent physical impossibility of those kinds of connections between human minds and the larger universe. All of this rested heavily on his understanding of the laws of physics.

Ironically, the effort to achieve greater integrity and to understand the brain was one of the main causes of life experience which forced me to change my position. (Other causes may include some kind of genetic predisposition, and concern for the fate of humanity as a whole.) That was not the intention, but the effect was evident. In truth, it happened in stages, as one thing happened after another. But one very unmistakable experience of quoting a speech before it was given<sup>8</sup> made me resolve in 1967 that I would henceforth be open-minded. I did not immediately accept the existence of paranormal effects or of the soul, but in Hebb’s language – I adjusted my likelihood function enough that I resolved to be truly open-minded, and to assume a kind of 50-50 attitude towards the possibility of soul and paranormal phenomena. I also resolved to not let this get in the way of my clarity of thought or effectiveness, and to work hard to understand just what was really going on here.

Of course, many people have not yet reached that point. That is why mysticism is not for everyone. The pursuit of sanity or integrity really should be for everyone, and is legitimately something to pursue through the shared channels of science and general culture.<sup>2</sup> It is also very important as a preparation for more serious mysticism, because lapses in sanity which may be harmless in everyday life can become far more serious when amplified by the power of the soul. But in essence, mysticism is there to provide a path for those who are ready to move beyond what is shared by everyone. It takes the discipline of sanity, and extends it to a larger domain of experience.

Back when I was open-minded and groping for deeper understanding, in 1973 or 1974, I obtained a copy of the simple booklet from AMORC, *Mastery of Life*. Many of my schoolmates at Harvard would have been very turned off by that book. For example, I knew proud intellectuals whose pride would lead them instead to things like the Order of the Golden Dawn or Gurdjieff, which use big words and provide great play for hermeneutics. The simple common words in *Mastery of Life* were in many ways the direct opposite. Yet because of my training in pure mathematics, I understood the importance and power of concise statements put in the simplest possible terms. Also, I had had lots of experience with people saying they didn't understand my equations (including PhDs on the Harvard faculty!), urging me to find ways to say complex and tricky things in words that people could understand. Reading that little book, carefully, and trying to read between the lines as deeply as I could, in a quiet meditative environment (as the book itself called for), was very encouraging to me, and I decided to go further, in order to learn more. Even though I could not fully trust other people's accounts of *their* first-person experience, I felt I should do what I could to learn as much as possible from the experience of other people, from all times and cultures.

To be honest, I should note that *Mastery of Life* was certainly not the only thing I read or learned from in those times of groping. For example, I probed into other schools, and I also probed into parapsychology.<sup>9,10,11</sup> Years later, I was intrigued to see how certain types of mental discipline<sup>11</sup> were also crucial in the most successful efforts along those lines in the West; however, because those efforts addressed the cognitive aspect of integrity, but not the emotional or affective part, and were not as well-grounded in understanding the phenomenon, they were limited in many ways in what they accomplished.

Before going on, I should mention another aspect which raised my interest in the Rosicrucian Order. In trying to understand what could possibly explain my personal experience, and how to rebuild my understanding of reality, I immediately realized that my experience to date was still far too limited to answer most of my questions. I knew I could find lots and lots of theories about the soul, from dozens of sources which I could not fully trust (in part because of how much they contradicted each other, and in part because of obvious political and historical biases). Also, I already began to feel that our inner nature calls for us not only to understand the soul, in intellectual terms, but to strengthen it and express it in life. This is quite different, of course, from believing in the soul or invoking it as an excuse for things we want to do for mundane reasons. I certainly did not want to turn into a "spiritual couch potato," the kind of person who is furiously loyal to some theories, like a football fan who is furiously loyal to one team, and claims to worship physical activity, even as he spends his life on the couch swilling beer, watching other

people exercise on television, as his own body, mind and soul all slowly deteriorate away to nothing.

But how could I expand the database of experience, and get more reliable hints from the more direct experience of others? In late 1972, when I was regularly visiting the library of the Harvard Medical School to read books about the brain, I also read through all the back issues of the *Journal of the American Parapsychology Association* – which were interesting, but only got me so far. At one time, my housemate (a Harvard anthropologist) showed me a simple book, entitled something like “How to Help Yourself with ESP,” which I might have rejected with contempt just a year or two before. But then I was intrigued by the fact that it contained a number of very straightforward exercises or experiments, which I could try for myself, drawing my own conclusions. I had no interest in whether the book was ultimately true or false, and I did not approach this with any kind of slavish devotion to the book; I was determined to try to see as much as I could for myself, using the book as a kind of hint about where I might get more access to these phenomena. Two of the exercises did work out for me, with some adjustment, and helped me begin to appreciate the need for a wider perspective. I then began to realize how much I needed to work with others, drawing on the best that had emerged from centuries and centuries of exercises and experiments.

The beginning monographs of AMORC stressed the need to build two foundations first, before going too far into the most serious exercises or experiments. They stressed the need to try to develop *understanding*, first, as a basis for action, and the need to develop a kind of deeper ethical balance (which basically corresponds to integrity). This happens through at least two spirals. The key position of this paper is that to progress still further, we need to spiral around these foundations one more time, and deepen the understanding and the ethical foundations still further. The next section describes the basics of how new science can contribute to this.

### **Neural networks, the Brain, and the Soul**

Science, mysticism, and Quakers are all “big tents.” They all understand that progress requires respect for a diversity of views. The unification proposed here is not such a big tent; it draws on particular strands of mysticism and of science. On the mystical side, it draws on the Pythagorean and Stoic viewpoints, which are among the strands which continue to exist within the Rosicrucian Order.<sup>5</sup> Of course, the mathematics available to the Pythagorean view has advanced quite a bit over the past two thousand years.

In the Pythagorean view, mysticism and the soul have nothing to do with the supernatural or with “miracles” which violate the laws of nature. They are governed by the laws of nature, just like the mundane side of life. “As below, so above” (or vice-versa). The laws of nature can be understood in mathematics, in principle, even though we still do not know them completely yet, after thousands of years of serious progress which has yet to reach fulfillment.

In this view, mysticism is not about escaping reality or escaping from the complexities of life. It is the exact opposite. It is about strengthening one’s sense of reality, and one’s demand for realism. It is about opening up to a much larger reality, embracing all of what we see every day with our mundane eyes but also embracing more, and doing our best to create a harmonious



balance – such as the “alchemical marriage” – between the elements of that large and complex reality. The sheer complexities of real life can be very overwhelming at times, and even frightening (especially if one sees some of the dark thoughts which exist in our world); however, for the true mystic, it feels safer to be in the light than to be in the darkness, even if what one sees poses difficult challenges, and even if one cannot cope with everything at once. Mysticism is about strengthening soul, mind and body, so as to better rise to these challenges.

The best survey data now available<sup>12</sup> suggests that a majority of productive PhDs have had the kind of personal experience which leads them to go beyond the simple mundane view of life which I believed in as a teenager. Most often, they are frightened by that experience, and revert to formal religion as a way to acknowledge but also to avoid that experience. The true mystic – like Heisenberg, Schrödinger and DeBroglie – faces up to the situation, and acts on the fact that they would feel more secure in the light than in the darkness.

Even though I criticized some of the wrong uses of Aristotle, the Stoic tradition and modern science both have a great debt to some of his better ideas. Aristotle proposed that humans are born with some inner sense of “telos,” some sort of inborn purpose, which we see simply as following nature in the pursuit of “happiness,” which is basically how we sense “telos.” These ideas stimulated the philosophy of utilitarianism, by philosophers like John Stuart Mill and Jeremy Bentham, which tried to express Aristotle’s basic ideas in a more mathematical and consistent way. Finally, the great mathematician John Von Neumann developed a concept of “cardinal utility function,” U, which led to the new formulation which I have pioneered.<sup>1,2</sup>

The new mathematical understanding of mind is still a big tent, in a way. It certainly does not require belief in soul or in mysticism. But it also makes full room for it, and provides a vehicle for the fuller expression of mysticism.

For those who prefer pictures or equations over words, I will first copy over the two most important figures in my recent reviews,<sup>1,2</sup> and then explain only a few of the most basic aspects of what they mean.

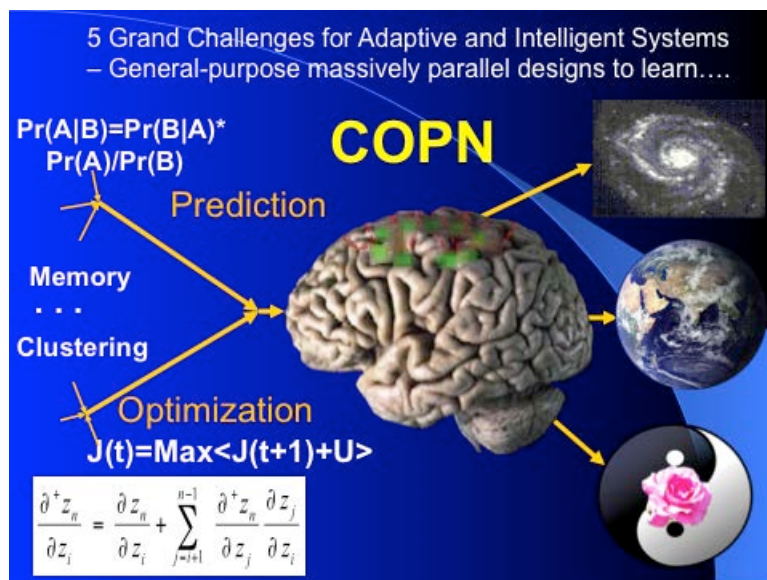


Figure 1. How we actually reverse-engineer the brain with mathematical neural networks and make use of what we learn.

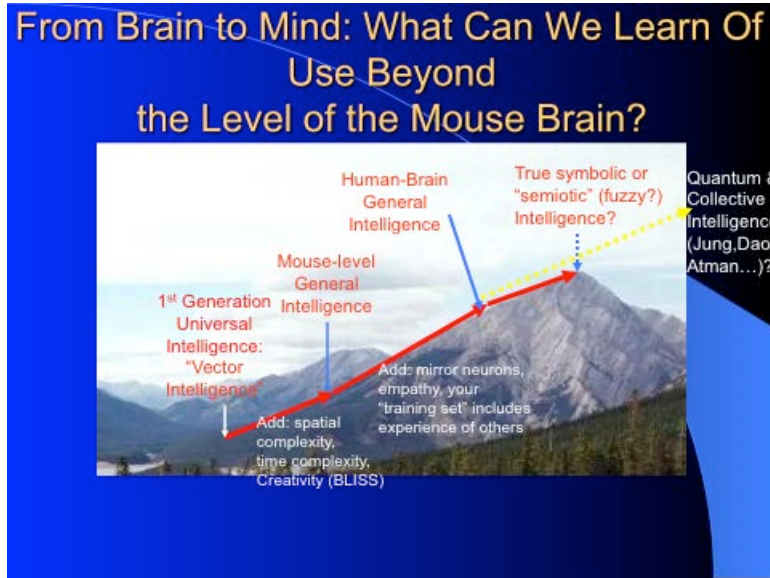


Figure 2. Mathematics reveals levels and levels of consciousness<sup>13</sup> or intelligence, based on ever more universal underlying principles.

For hard-core mathematical science in this century, the number one challenge is to “reverse engineer” the higher-order learning abilities of the smallest mammal brain, the mouse, as illustrated in Figure 1. We now know the principles which make this possible, but the work needed in education, follow-through, implementation and application is very great.<sup>1,6</sup> From building on what we know from the mouse, science also has a foundation for better understanding the human mind and human potential, in a more qualitative way.<sup>2</sup> That second stage takes us to the top of the mountain in Figure 2. The new mathematics makes perfect sense for those who would be happy to stop at the top of the mountain. However, there are certain limitations apparent even in the most refined and cultivated human brain which learns to emulate the top of the mountain. In my view, first-person experience and mathematics both tell us that there is still another level of mind, beyond what we can actually see in the mundane individual brain. At the present time, first-person experience and the strengthening of the soul and the brain are the main vehicles we have to better understand that next level – though we also have work to do in improving our knowledge of the underlying laws of physics.<sup>14,15</sup> But even so, all levels of intelligence or mind have important things in common.

Aristotle described mind as an aspect of the “form” or organization of the cosmos, not as a kind of substance. All mind must have a foundation in some kind of substance. When we look at our world with mundane eyes only, the only minds we see are embedded in physical brains and organisms. In the augmented view, we simply conclude that the relevant substance is not just a matter of neutrons, electrons, and light governed by classical physics; rather, there is more substance and life that we do not see, and also a few relatively small but significant changes in

how the physics works. When we look out at the world through our eyes – the “I” who is looking out is not just the consciousness embedded in our brain, and not just the esoteric consciousness embedded in that other substance, but a hybrid of the two. We are a symbiotic life form, a symbiosis of “body” and “soul.” In order to extend the mundane concept of sanity or integrity<sup>2</sup> to the entire self, it is necessary that we achieve what Rosicrucians call “the alchemical marriage” – a kind of harmonious mutual support of both parts of the self, consistent with the modern concept of “Pareto optimality.” The details of that process are very important, but beyond the scope of this paper.

In this view, all “mind” may be viewed as systems which process information. The brains we see with our mundane eyes basically have three parts: (1) the intelligence or consciousness, which learns over time how to be ever more effective in understanding its environment and in maximizing its utility function  $U$  (i.e. happiness or telos); (2) the primary emotional system which actually provides us with this sense of  $U$ , and also gives us some indications of what specifically makes us happy; (3) other, older things, like sensory input, muscle output, and hard-coded blind reflexes. In other words, mind as we know it simply cannot be divorced from purpose and happiness. Where there is no sense of purpose, no emotion and no sense of value, there is essentially no mind and no consciousness. The primary emotional system speaks to us in feelings and in images, not in words or mathematics, but we can use words or mathematics to try to understand it better and see it more clearly, just as we use words and mathematics to try to understand what we see through our eyes.

Could it be that the universe itself is some other kind of mind, a mind which does not have any kind of purpose and is not engaged in learning? If so, it is not “mind” as we see it and understand it. Such another concept of mind is essentially meaningless, until one somehow specifies the idea more than I have ever seen anywhere. Trying to develop such a concept is a valid intellectual challenge,<sup>14</sup> but for now I do not yet see the real need for it, in explaining experience. The concepts of symbiosis, life, and purpose seem powerful enough to explain everything I have encountered at any level of life.

As life becomes ever more complicated, all of us naturally wonder what we can really count on, what is most important to us, and where our commitment should be unmistakable. The frustrations and difficulties of life often tempt us to a variety of reactive and truly irrational behaviors. In my view, “sanity” or “integrity” means always remembering our basic innate sense  $U$  of what we really like and what we really do not like, for its own sake. Thus in my own life, at times of challenge, I often find myself affirming the old Rosicrucian phrase “life, light, and love.” (And sometimes I remember that old woman in the musical *Cats*, who sang about “remembering what happiness is.” It is said that that musical was inspired by ideas from Gurdjieff on how to become an Immortal, which were clearly inspired by ancient Taoism, probably by way of Sichuan province and the old Silk Road. But other followers of Gurdjieff have told me: “Hey, he is just telling you to store your most important data on the hard disk, instead of RAM, so that you won’t lose it when you shut off for the night.”)

Light, life, and love – what could I add after that? We never outgrow that foundation. But in actuality, the full pursuit and service to light, life and love is a never-ending challenge, demanding intelligence, flexibility and all the abilities of our minds and souls. The very

existence of the human species is at risk over the next few millennia, and it will depend very heavily on that small number of people who are most completely conscious and competent and willing to work hard and creatively on behalf of life, light, and love. Figure 1 moves out from the brain, to ask: What can we do to preserve and strengthen life and sustainably on the planet earth, and also to extend it beyond the planet earth to outer space, and also to strengthen our common growth in inner space, where we are all connected together and depend upon each other? The rose on the yin-yang symbolizes the latter.

The cultivation of integrity at a mundane level<sup>2</sup> is really not so different from cultivation of integrity at a higher level. If you read that more mundane guide to human potential carefully, you can see how “as above, so below” applies at many levels. When I spoke on this new synthesis at the main Confucius Institute in China in 2011, we were in agreement – but the Chinese informed me that the very word “integrity” is expressed in Chinese as “zheng qi,” as correct or balanced “qi.” A member of the Confucius family showed me his old eagle statue, which he used to symbolize the higher esoteric side of his life, which rises above the old astral dragons and etheric tigers which are more familiar in the common life of China. Perhaps if more of us learn how to really emulate this eagle, we might be able to fly to a place of real survival.

## Summary and Conclusions

This paper defines a new synthesis, to make a stronger connection between hard-core mathematical science and hard-core experience-based mysticism. The neural network field does not propose to redesign the human brain or the human mind, but it does offer a higher level of understanding and self-awareness than is possible without making full use either of science or of mathematical thinking.

The principles described in this paper are relatively simple, and more like a set of axioms than a body of theorems and knowledge about life. Life is more complex; the more detailed papers cited here are windows into some of that complexity. Even so, axioms are important. The effort to always remember the basic axioms and build upon a solid foundation is especially important when life becomes more complex and there are no easy answers other than continuing the effort to keep learning and growing and surviving and appreciating what we are building upon.

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