SCIENCE AND MYSTERY

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"*The advances of biology have revolutionized the view we have of ourselves and our significance in the world. Many myths have had to be abandoned. But mystery remains, more profound and more beautiful than ever before, a reality almost inaccessible to our feeble human means.*" *(Christian de Duve, 2000,p 13).*

"*The most beautiful and deepest experience a man can have is the sense of the mysterious. It is the underlying principle of religion as well as of all serious endeavour in art and in science ... He who never had this experience seems to me, if not dead, then at least blind. The sense that behind anything that can be experienced there is a something that our mind cannot grasp and whose beauty and sublimity reaches us only indirectly and as feeble reflection, this is religiousness. In this sense I am religious. To me it suffices to wonder at these secrets and to attempt humbly to grasp with my mind a mere image of the lofty structure of all that there is*" *(Albert Einstein, 1932).*

"*How sad it would be, I thought, if we humans ultimately were to lose all sense of mystery, all sense of awe, if our left brains were utterly to dominate the right so that logic and reason triumphed over intuition and alienated us absolutely from our innermost being, from our hearts, from our souls*" *(Jane Goodall, 2000, p. 177).*

"*[Therefore] let us regard this universe, all of life and its evolution, and the evolution of human culture and the human mind with awe and wonder*" *(Stuart Kauffman, 2008, p. 232).*

Note: all of the above quotes are by scientists.

To most scientists mystery seems to be the unknown. On this view, as our knowledge increases, mystery recedes or will be eliminated: the mystery will be taken out of things. However, at least some scientists realise that science has inherent limits. Mystery, as understood in this article, is beyond these limits, which means that it is beyond the reach of science. Science can only provide maps of the territory of reality, not a complete understanding of reality itself. Therefore, reality remains mysterious. Nonetheless, as maps point to the territory, science can be a pointer to the mystery of reality. If according to radical empiricism science also includes subjective inner experience, it may even provide a path toward mystery and enlightenment, which, however, cannot be completely conveyed through language. On the other hand, mystery may be a source for science. Mystery matters also because it is important for our health and sanity and a positive attitude towards our environment. Mystery generates or implies wonder, awe, and reverence including the sacred. The recognition and experience of mystery needs to be part of education from kindergarten to university and adulthood.

Limitations of Science

Scientists often talk about taking the mystery out of something. In this article I do not refer to this shallow mystery that can be taken out, that can be solved, that sooner or later can be rationally understood and thus will cease to be a mystery. The mystery (or the mysterious) I refer to in this article cannot be solved because it is beyond the scope of science. It is not the mystery of the unknown but the mystery of the unknowable *(Sattler, 2015a).*

I see at least the following two reasons why science cannot reach the mystery as I understand it as that which is unknowable:

1. Science uses language and mathematics, a form of language, and language cannot completely reach reality. As Korzybski has shown so convincingly through his Structural Differential, language abstracts (selects) from reality; it cannot describe reality as it is. Therefore, "whatever you say a thing is, it is not" *(Korzybski, 2010,VIII).* Reality remains beyond

the grasp of language, including mathematics. It remains mysterious.

2. As Ken Wilber *(2001)* and others have pointed out, science as it is usually practiced, restricts itself to objective experience. Subjective experience is usually excluded from the domain of science. As a consequence, our inner experience of the mysterious is also excluded. However, contrary to mainstream science, according to radical empiricism, inner experience can also provide data for scientific investigation. But as this investigation uses language, we lose again the mystery of reality.

I find it noteworthy that science itself has found its limitations. Because of these limitations it cannot reach mystery. However, it can be a pointer to mystery and may be even a path toward mystery and enlightenment.

Science as a pointer to mystery

Science depends on language and logic. If only the common Aristotelian either/or logic is used, the door to mystery seems closed. But if broader, more inclusive kinds of logic are used, the door to mystery may open. Buddhist logic, as explicated by Nagarjuna, has four values: either, or, both/and, neither/nor *(Sattler, 2010)*. Thus it includes the Aristotelian either/or, but transcends it though the inclusion of both/and and neither/nor. Both/and recognizes the principle of complementarity that has been well established in modern physics *(Plotnitsky, 2012)* and has been extended to practically all other domains *(Korzybski, 1958; Sattler, 2008, Chapter 6)*. Neither/nor points beyond logic and language. When we say that something is neither true, nor false, neither good, nor bad, neither desirable, nor undesirable, we transcend logic and language and in that sense we point to the indescribable, the mysterious.

Jain logic has seven values, which allows us to recognize seven perspectives of every situation. For example, with regard to the nature of an electron, this could mean: 1. In some ways (that is, from one perspective) it is a particle; 2. In some ways it is not a particle; 3. In some ways it is a particle and it is not; 4. In some ways it is a particle and it is indescribable; 5. In some ways it is not a particle and it is indescribable; 6. In some ways it is a particle, it is not a particle, and it is indescribable; 7. In some ways it is indescribable. The recognition that in some ways it is indescribable opens the door to mystery. Many examples could be given that illustrate the importance of Jain logic that emphasises the many-sidedness of everything and that has far-reaching consequences for science, politics, and the human condition *(Rankin, 2010).*

Although the wisdom of many-sidedness that includes the indescribable, the mysterious, has been forgotten or ignored to a great extent, more recent explorations in science and logic have reconfirmed it and put it on a more scientific basis. Thus, Korzybski's Structural Differential shows clearly that reality cannot be fully represented through language and logic and therefore remains unspeakable, unnameable, mysterious *(Korzybski, 1958, 2010)*. Why is this so? Our sensory experience or perception, description, and inferences represent different levels of abstraction. Abstraction means selection. Thus, due to the limitations of our sensory apparatus and our nervous system, our sensory experience or perception of an object represents only a selection of all the features of that object. For example, we do not perceive ultraviolet patterns in flowers, nor do we hear ultrasound. When we describe the object, we abstract further. For example, when we describe a flower, we select certain features from the welter of our experience. And when we draw inferences, we abstract even more. Therefore, from the real object through perception, description, and inferences, more and more information is lost due to the process of abstraction that selects only some features. Korzybski's Structural Differential illustrates that process as explained in the legend of Figure 1.

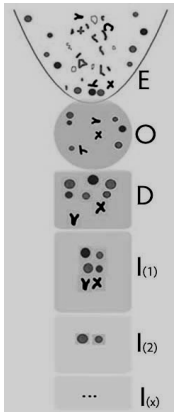

Fig.1 Korzybski's Structural Differential as presented by Steve Stockdale. The parabola on top represents an object or an event (E) that happens in reality. Each dot, figure, or line stands for an aspect or feature of that event. The circle below (O) represents our sensation or perception of that event. Note that our sensation or perception does not include all the features of the real event. The box below the circle represents our description (D) of our sensation or perception, which is abstracted from the latter and therefore does not include our complete sensation or perception. Usually it includes even fewer features than indicated in the box D. Finally, the boxes below the description box represent inferences (I) that are even more abstract than the description.
Steve Stockdale's presentation (originally in colour)is reproduced with his permission from http://www.thisisnotthat.com/structural-differential/

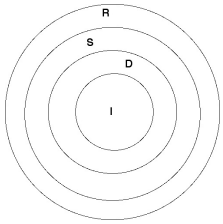

Fig.2 The outermost circle contains all of reality (R). The circle inside the outermost comprises our sensory experience (S) or perception of reality. Inside the circle of sensory experience is the circle that contains our linguistic description of sensory experience (D), and in the centre are inferences (I) that are even more abstract than linguistic description and sensory experience. This figure is reproduced from Sattler (2015c).

In Figure 2, I pictured the increasing abstraction from reality (R) to sensing or perceiving (S) to description (D) and finally to inferences through increasingly smaller circles: our sensory experience or perception is more limited than reality itself, our description of our sensory experience or perception is more limited than the latter, and finally inferences are more limited than our description. The advantage of representing the Structural Differential as in Fig. 2 is that it does not require breaking down reality into discrete features that are represented by dots, figures, or lines. The advantage of Korzybski's and Stockdale's presentations is that they illustrate well the process of abstraction. The different presentations complement each other.
Since science involves perception, description, and inferences, it is more limited than reality. Although science can come closer and closer to an understanding of reality, due to its use of language and mathematics, it cannot reach reality and therefore reality remains mysterious. Through this recognition of the mystery beyond science, science can be a pointer to the beyond, the mystery.
There is a saying: Don't confuse the finger (that points to the moon) with the moon. Thus, don't confuse science with the mystery of reality. Science provides maps of the territory of reality, but, as Korzybski emphasised, "a map is not the territory it represents, but, if correct, it has a similar structure to the territory, which accounts for its usefulness (*Korzybski, 1958, p. 58*). As a map points to the territory it represents, science can be a pointer to the mysterious territory of reality, if one is aware of the process of abstraction that is so often ignored or forgotten and then leads to various forms of scientism that confuse science with the mystery of reality.

Science as a path toward mystery and enlightenment

Besides pointing to the mystery, we also want to become the mystery. Some scientists and laypersons appear to be able to partake of the mystery. They feel a sense of awe and wonder, and "their experience of wonder does not vanish when the questions have been answered. To the real scientist, a question that has been answered becomes not less wonderful, but more so. Increased understanding increases scientific awe" *(Midgeley 2000, pp. 186-187).* For example, Carl

Sagan, the astrophysicist, wrote: "The size and age of the cosmos are beyond ordinary human understanding, lost somewhere between immensity and eternity," and he added: "Our contemplations of the cosmos stir us. There's a tingling in the spine, a catch in the voice…We know we are approaching the grandest of mysteries" *(Sagan, quoted by Wolfe, 2015, p. 16)*. Such an experience may happen spontaneously but usually it does not last. It may last only for an enlightened person who lives out of the mysterious source of existence so that mystery remains an undercurrent of everyday life. Can science help us in any way to move toward a life that remains suffused by mystery and enlightenment?

To function as a path toward mystery and enlightenment science has to be understood more holistically as Broad Science *(Wilber 2001)*. Contrary to mainstream science that recognises only external objective experience, broad science includes also inner subjective experience. It is based on what has been referred to as radical empiricism *(Sattler 2015a)*.

According to Wilber *(2001, pp. 73-76)* both broad and narrow mainstream science, proceed in three steps:

1. An injunction that says that if you want to know something, then you must do something: make an observation, perform an experiment, etc. For example, if you want to know whether a plant is composed of cells, you must look through a microscope. And if you want to know the effects of meditation, you must practice meditation. Only talking about it is not enough.

2. Experience that is brought forth as a result of the injunction. It may include physical, mental or spiritual experiences. Thus, practicing meditation may bring forth the experience of mystery.

3. Communal checking can confirm or discount our conclusions.

In his recordings "The Science of Enlightenment," Shinzen Young *(1997, Session 9)* proposed a scientific model or theory that explicates the mindfulness path to enlightenment: infusing our experience with mindfulness and equanimity will catalyse insight and purification, which eventually may lead to enlightenment. Like many other scientific theories, this is a probabilistic theory that makes only probabilistic predictions. Mystery may be experienced on this path. Eventually, the dualism of the experiencer and the experienced may be transcended. Thus, the experiencer may not just experience mystery but may become it.

Science may be able to speed up spiritual development through the investigation of correlations between inner experience and external objective data such as, for example, correlations between meditative experiences and neurological events such as brain waves. As this research advances, we may be able to develop technologies that influence our inner experiences in ways that bring us closer to the mysterious and enlightenment *(Shinzen Young, 1997, Sessions 23/24)*.

For the less technologically minded, there are, of course, other ways toward the mysterious. One important way is through great art such as music and visual arts. Even poetry that uses language can lead us toward mystery because "the poet is using words to evoke feelings that cannot be expressed in words" *(Wolfe, 2015, p. 21)*. Furthermore, mystery can be experienced in nature, through beauty, love, paradox, and in various other circumstances *(eg, Wolfe, 2015)*. However, since science has become increasingly dominant in our society and since so many scientists talk in a shallow way about taking the mystery out of things, I consider it important to realise that the profound mystery I refer to in this article cannot be taken out; it remains. We just have to be open and receptive to experience it and to be it.

Mystery as a source for science

So far I have tried to explain how science can point to and lead toward mystery. I should not neglect to emphasise that it works also in the opposite direction: the experience of mystery can be helpful for science; through intuition it can be a source for scientific inspiration and discovery. As is well known, in addition to logical reasoning and empirical testing,

intuition plays an important role in the scientific process, especially with regard to fundamental innovations that challenge habitual thinking and require major shifts in outlook. The experience of mystery can open up our mind in such a way that novel intuitions emerge that then form the basis for rigorous empirical testing. Many examples could be given *(eg, Wolfe, 2015, pp. 50-52).* I think that the experience of mystery may have led at least some scientists to develop a "science of oneness" *(Hollick, 2006)*. Others may have found interconnections through more direct empirical observation and experiment. Albert Einstein thought that the experience of the mysterious "is the source of all true art and science" *(Einstein, quoted by Ravindra, 1991, p. 322)*.

Why mystery matters

Mystery, as it transcends words and language, can be experienced in sound or music and in silence. Thus the contradiction, antagonism, conflict, and war that may arise through the use of language, especially if it is not recognized as a map, can be overcome. In sound or music and in silence we are united, we can be in peace. Thus, the experience of mystery can beneficially transform our individual lives and society. It can lead to better health and more sanity *(Sattler, 2015b)*.

The recognition and experience of mystery can generate or imply wonder, awe and reverence, including the sacred. "The word sacred is, for many, tied inextricably with the concept of the divine, but in many instances it is used to express an immense respect or reverence"*(Kauffman, 2008, p. 286).*Such reverence can prevent ruthless exploitation of the environment and other people. Wonder can lead to openness and creativity. Awe can transcend egocentricity.

Mystery may also be related to spirituality depending on how the latter is defined and understood. Wilber distinguished the following four phases of spiritual unfolding: belief, faith, direct experience, and adaptation *(Wilber 1999, p. 312)*. Belief involves language because a belief is normally expressed through words, and for this reason belief cannot fully embrace mystery. Faith may come closer to mystery, but to the extent that it is articulated linguistically it also might miss mystery. However, direct experience may open the door to mystery. And adaptation, which implies the unity of the experiencer and the experienced beyond words, means being mystery.

Why mystery is important in education

When a child or a student is told, "This is a rose," the child or student may conclude that he or she now knows what this thing is. The mystery is taken out of it. In other cases where we do not yet know what something is, the child or student is often told that at present we do not yet know what it is, but future research will reveal its nature so that again the mystery will be taken out of it. The result is a deprivation of the mysterious with all the negative consequences I mentioned in the preceding section. This deprivation appears to be based on a profound misunderstanding of the nature of language, which leads to an unrealistic orientation in the world and an insanity with potentially devastating consequences some of which I mentioned above *(see also Sattler 2015b).* The remedy to this situation appears rather simple. Instead of telling a child or student again and again, "This is a rose," "This is a bad person," "This is an evil nation," etc., we tell them "We call this a rose." What it is, we don't know because it remains mysterious. Nature remains mysterious. And we say: "This person did something that I consider bad," but who and what this person is, remains mysterious. And we say: "This nation engaged in an action I consider evil," but what this nation is remains mysterious as it remains mysterious what my nation is, and thus these two nations are embraced by the mysterious. What a difference this realization could make for cooperation between nations and world peace! But most education from kindergarten to university works against this recognition and therefore works against more realistic understanding, cooperation, and peace.

Nonetheless, where mystery has been obscured it can be rediscovered.

I dedicate this article to Gerald Walton Paul with whom I have had many wonder-ful conversations about the importance of mystery.

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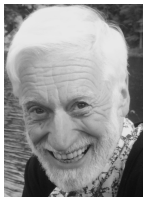

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