

**SYMBOLISM AND THE STRUCTURE OF CONSCIOUSNESS**

by

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## I. INTRODUCTION

Is there pure objective reality? Or, is everything that is actually an abstraction of a given reality? This is a question that has been speculated and postulated on by humanity for thousands of years. Ancient peoples described their observations of phenomena in myths and symbolism. Today, we gain skills and knowledge about various phenomena through word symbols, mathematical symbols, design symbols, etc., which enable us to communicate and probe toward further understanding and mastery. To an enquiring mind it is apparent that these symbols are not the reality, but an abstract representation of "intangible" principles.

In my attempt to understand the meaning of existence, reality, meaning and truth (what is the meaning of meaning?), a number of years ago I turned to my Webster's Dictionary and read therein: 1) Existence: state of being, life duration, having reality; 2) Reality: fact actually; 3) Fact: true, reality, really true; 4) True: in accord with fact, reality, actual existence; 5) Actual: existing in reality, real; 6) Real: existing or in fact, actual, true.

This traveling in circular thought patterns led me to believe that Webster did not understand reality either! It appears that reality is not a matter of static definition, but, rather, a living philosophy or "approach to life". Science represents one such approach. Further, it is apparent that our knowledge gained through a particular philosophical system may not be absolute, e.g. because we cannot know both the velocity and position of a particle does not mean that intuition or meditation is going to reveal it. And, on the other hand, the stringent rules of empirical verification alone are not necessarily accurate nor adequate when considering phenomena such as intuition and "miracles".

Symbolic representation is at the center of any human endeavor and represents in a fundamental sense the manner in which the brain operates. Symbolism is used to represent information and "concretize" thought. In the western European culture we are more used to the methodology of scientific thought so that in this paper I will use examples from the scientific method to demonstrate how basic symbology is to human thought.

Consider a simple, universal word such as water, which is a symbolic representation of the "universal solvent". The word in English, French, Spanish, German, and Japanese represents symbology for the same substance as water, l'eau, de agua, das wasser, and yō ni, <sup>水</sup> <sub>51<</sub> 二 .  
(See Figure 1)  
The image of a noun concept in the mind, such as water or chair, was well described by Socrates words. This model which hypothesizes a "world of perfect images" as a way to describe the concept that innate object grouping and categorization as in Immanuel Kant's hypothesis.  
(Figures 2 and 3 and Table I.)

## II. SYMBOLIC REPRESENTATION AS SCIENTIFIC LAW

Let us examine how the scientific method operates. Science is a philosophical system that can be applied to phenomena which are in some sense reproducible. The purpose of "doing" science is to discover the laws or structure of Nature through the process of external validation. The motivation for conducting scientific investigation is to satisfy our natural, innate curiosity about the way Nature works — our drive to ken the Cosmos. The scientific method addresses itself to formulate objective answers in a very precise and specific way about the structure and content of reality.

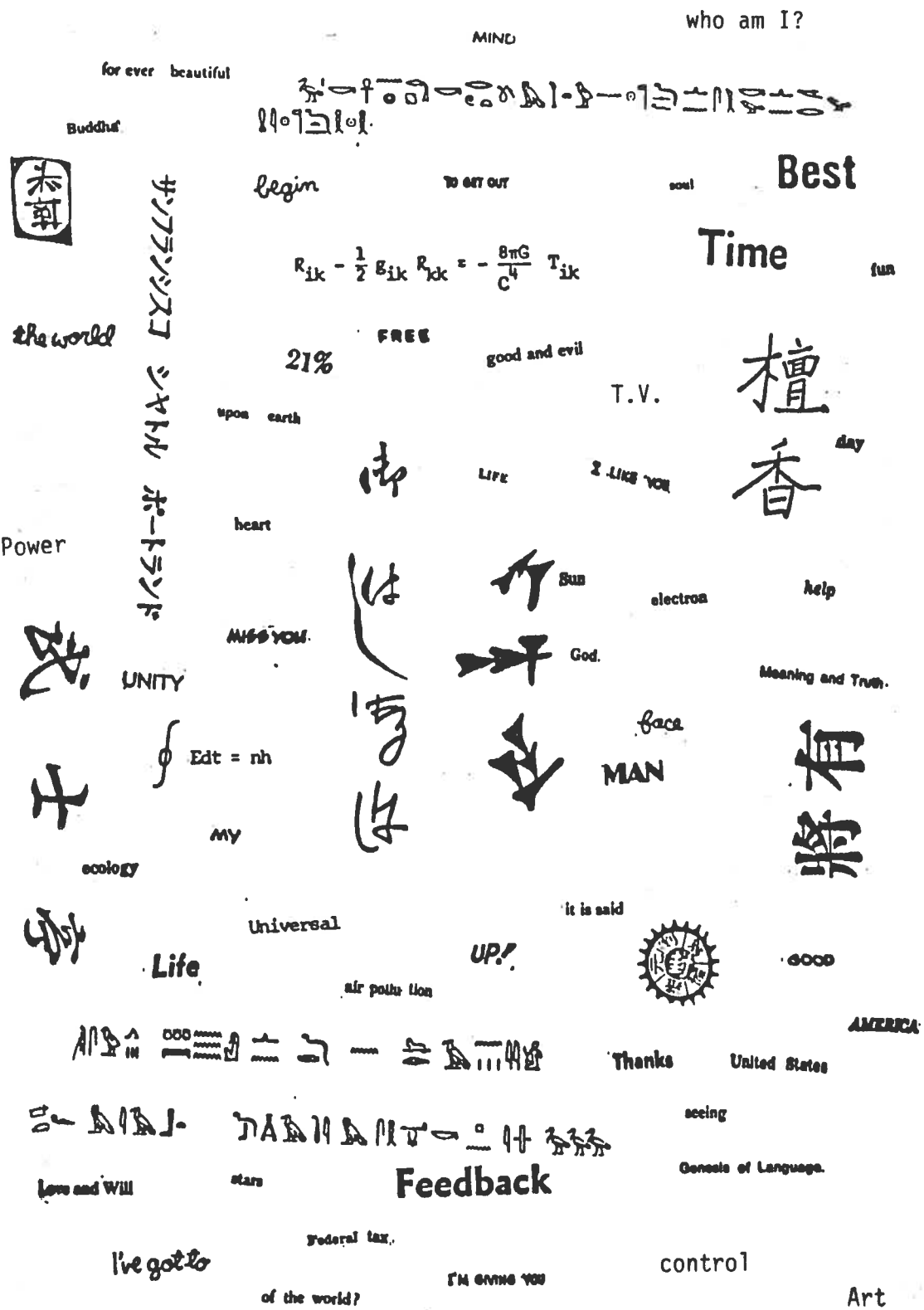


Figure 1, Symbolic representations of concepts in different languages such as English, Egyptian, Japanese, Cuneiform and physics!

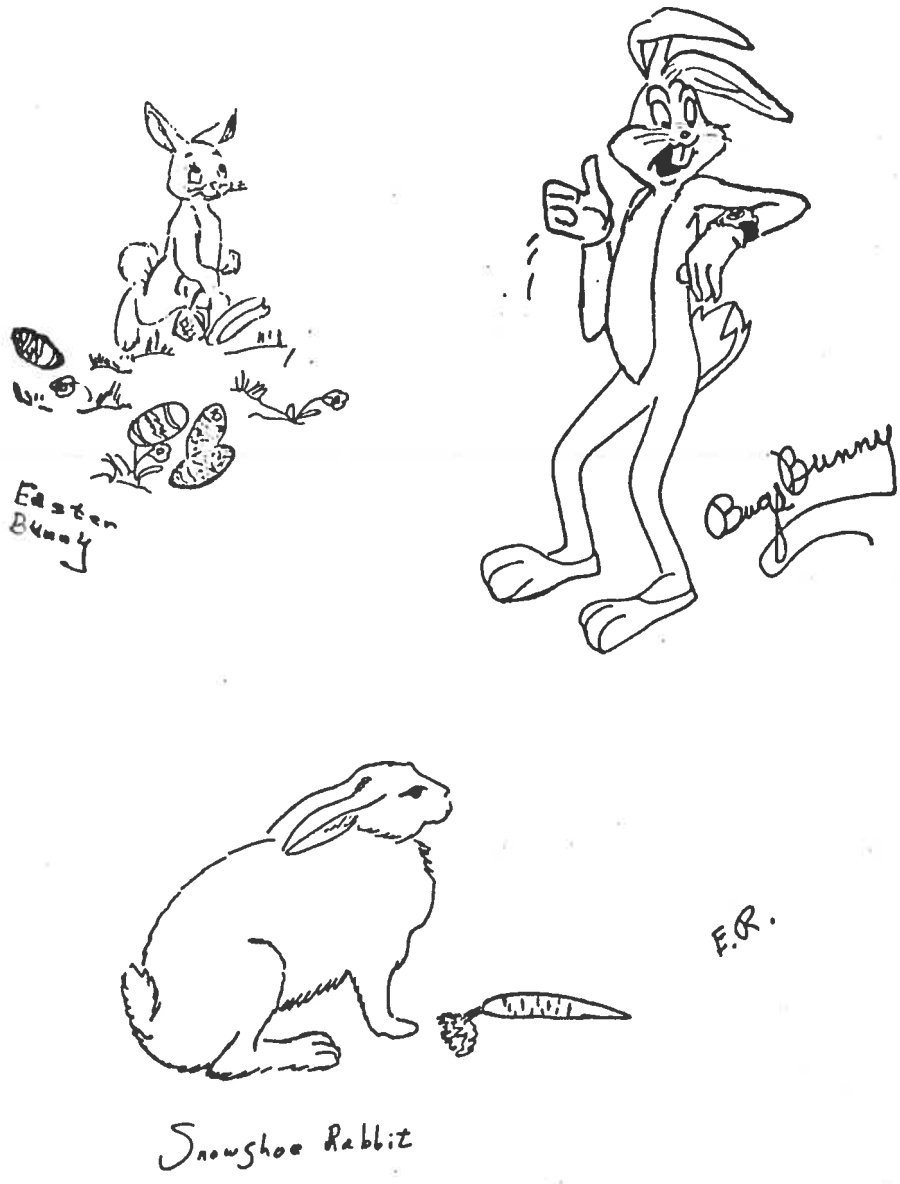


Figure 2 Categorization and object grouping.

Mössbauer Effect  
 Properties  
 Metabolism  
 Electronic Properties  
 Biology  
 Chemistry  
 Dynamics  
 Data  
 Medicine  
 Polypeptides  
 Control  
 Matter  
 Solid State  
 Hormonal  
 Research  
 Fundamental  
 Experimental  
 Materials  
 Physics  
 kinetics  
 Elements  
 Mechanisms  
 Oxide  
 Brain  
 Development  
 proteins  
 JOURNAL

Figure 3 Noun labels, concepts and symbols in English

TABLE. 1 Some western philosophers and their concepts. (It is difficult to summarize anyone's philosophical framework in a few words. In fact, one's philosophical concepts change over time and may explore different points of view, comparing and contrasting them to others' philosophies.)

Philosopher	Born/Died	Some of his major concepts
Descartes, Rene'	(1569-1650)	<ol style="list-style-type: none"> <li>1. Mechanistic view</li> <li>2. Mind/body duality</li> <li>3. Importance of pineal gland</li> <li>4. Acausal</li> <li>5. Space-time independence</li> <li>6. "What you see is what there is"</li> </ol>
Leibnitz, Wilhelm von Gottfried	(1646-1695)	<ol style="list-style-type: none"> <li>1. The monad as a fundamental metaphysical unity</li> <li>2. Synchronistic link of mind/body division</li> <li>3. Space-time independence</li> <li>4. Acausal</li> </ol>
Kant, Immanuel	(1724-1804)	<ol style="list-style-type: none"> <li>1. Innate Categorization</li> <li>2. Causality (cause-effect relationship)</li> </ol>
Spinoza, Benedict	(1632-1697)	<ol style="list-style-type: none"> <li>1. Contingency (like monad)</li> <li>2. Causality</li> <li>3. One-world unity</li> <li>4. Process as primary</li> </ol>
Hegel, Georg	(1770-1831)	<ol style="list-style-type: none"> <li>1. Thesis, antithesis and synthesis: analogy to Yin - Yang Concepts</li> </ol>
Jung, Carl	(1875-1961)	<ol style="list-style-type: none"> <li>1. Archetype (as in Socrates "world of images")</li> <li>2. Synchronistic view (analogous to 6th century B.C. view of Lao Tze)</li> </ol>

The basis for the scientific method is the interplay of observation, experimentation and hypothesis. One develops a concept or idea about the way in which Nature works and then formulates this idea into a testable hypothesis. He or she then goes into the laboratory and experimentally tests the hypothesis. It is usually found that the hypothesis is incomplete or inadequate. Then a modification is made and more laboratory experiments are conducted. This experimental-theoretical interchange proceeds as we refine our idea about the way Nature works.

Our ideas can be expressed and communicated in the form of language and language equations. These are symbols to facilitate our thinking process, to enable ourselves to organize thoughts in our head, and to communicate our concepts. (Figure 4)

Also, our theories themselves, operating as concepts about the "way Nature works" are symbolic descriptions we use to create predictions and organize observations. The systems of prediction (i.e. statement of the most likely outcome of future events, as in quantum physics, or for past events, as in archaeology, astronomy) are formulated into hypotheses, theories, laws, and principles. The more experimentally verified a theory can be determines whether it is labeled a speculation, hypothesis, or a law or principle, the latter two which are considered to be more universal and fundamental. Scientific laws represent relationships between constancy and change. A scientific law is a constant relationship between variables and constants in which the constant relation is represented by an equals sign. The symbols representing change depend on the passage of time and constant quantities are perceived and formulated as not changing in our perceivable reality of our perception of time.



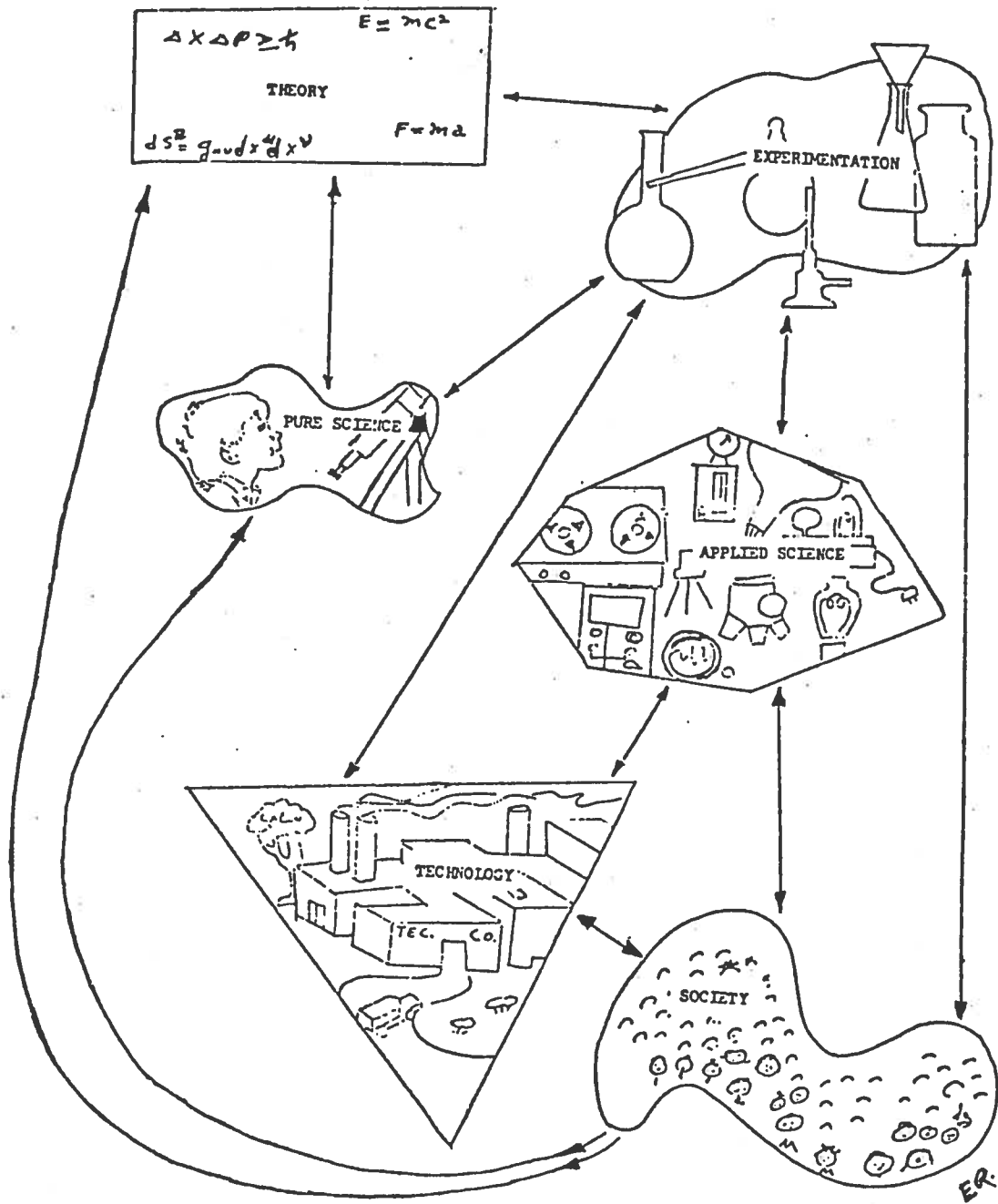


Figure 4 Schematic of the relationship of pure and applied; theoretical and experimental; and technology and society.

The concept of time itself derives from our sense of repeatability and harmony and our apparent unidirectional path from birth, growth and death.

In the Vedic literature of India, there are three Gunas of growth (Sattva) and decay (Thomas)(change), and maintaining (rajas)(constancy). This law, whether seen as scientific or Vedic, is an expression of the relationship between constants and variables. In mathematics this relationship can be seen where an equal sign is present. Probably one of the best known examples is the Einsteinian relation,  $E = mc^2$ , which symbolizes that energy equals mass and  $c^2$  (which is the constant velocity of light squared) – one of the universal constants of Nature. We believe that our watch measures time, when time actually is a measure of the change in matter and energy. Returning to a high school reunion after 20 years and change in matter and energy is most evident.

Change is quite evident, but what can we find that is constant? Not much! An aspect of constancy may be expressed as a constant such as pi (= 3.1416). This number pi, or  $\pi$ , is the same for all circles. In the 1930's, the Indiana legislature passed a law to let pi be 3.0000! But the number pi is not a random number, but a symbolic number, representative of the geometrical structure of Nature. The power of symbology becomes misused when the symbol is interpreted as being the thing it represents!

There are some unusual constants such as the velocity of light,  $c$ , the gravitational constant which comes into Newton's universal law of gravitation, and the electric charge on an electron which appears to be constant. Einstein demonstrated that geometrical structure geometry can accurately symbolize the universal gravitational constant, and this concept is being extended to represent other forces in Nature. For example,

in geometric language "gravity" can represent the "law" that controls the movements of the heavenly bodies, that directs the orbit in each sphere in exact accordance with the weight of its mass, and in such a manner that the earth unfailingly circles the sun, and the moon circles the earth. In Chinese philosophy the formula of Wu Wei represents this principle: All stars have to circle around the Pole Star because it remains still. All vassals and creatures in their respective circles move spontaneously in submission to the emperor, because he understands how to make his heart empty and motionless while sitting in perfect self-collection on his throne. His serene countenance is directed southward and he radiates to mankind and the whole world of nature the virtue of his own harmonization with the law of the circling play of heaven and earth.

In any philosophical system, communication of information is significant. For this we use language which is a symbolic representation of ideas and principles — mathematics is the language of physics. (see Figure 1) While the numerous fields of science are united by a similar creed of methodology, there are different symbols and languages used which can result in communication difficulties. That terminology and language can be an obstacle when trying to communicate complex ideas or principles to someone is even more apparent when attempting to do so with someone who sees the world through a different philosophical system.

In many instances philosophers of previous civilizations and decades have expressed ideas and observations that science expresses in a different language. Immanuel Kant introduced the concept that we are born with certain inherent processes of mind. In science we call these innate cognitive constructs objective grouping and causal sequencing. e.g.,

how is it that children can recognize a Bugs Bunny cartoon character as being the same object as the Easter Bunny (object grouping). Socrates would perhaps have said that this is possible because there exists an ideal image of "bunniness" somewhere. Observation and experimentation has brought us another view than "bunniness". (See Figure 2.)

The causality principle is the relationship between the cause-and-effect sequence, where cause (a thrown rock) creates an effect (broken glass). (See Figure 5.)

Conservation of energy and other physical variables, and symmetry relationships are most important to the structure of science. Reproduction and symmetry in Nature are basic to the development of the ideas of scientific law. We expect that the earth will continue to rotate on its axis and that the sun will appear in the eastern sky. This expectation is the basis for setting our alarm clock that get us to work (unless we use our biological biorhythm clocks).

Symbolic representation occurs in all aspects of human endeavors. It is certainly exemplified in the scientific approach to gaining knowledge but it is also central to religious and/or mystical approaches. In past years comets were considered to be symbolic of the Hand of God. Scientists later identified them as a ball of rock with ionizable gas around them which created a comet tail when the solar wind interacted with the gases. This later concept does not necessarily preclude the former religious concept!

Science is the accumulated, systematized knowledge ascertained by observation and experiment, which is brought under general rules or laws. Mysticism, on the other hand, relates to obtaining information by direct experience. Mysticism is the belief that the most reliable source of

# DUALITIES

## TWO-BODY FORCE

$$F = \frac{G m_1 m_2}{r^2}$$



PAIR

## WORDS

Right - Wrong  
 Love - Hate  
 Good - Bad  
 Up - Down  
 Young - Old  
 True - False

## BRAIN HEMISPHERES



Left - Right

*unity* → *whole, holistic*



YIN - YANG

(one)

Female - Male

## CAUSALITY



CAUSE

EFFECT

## SCIENCE - RELIGION

Reason - Emotion  
 Objective - Subjective  
 Deduction - Induction



## SPACE - TIME

(x, t) & (p, E)

Spatial - Temporal

## CANONICALLY CONJUGATE VARIABLES

(x, p) > ħ

Canon = Law  
 Conjugate = Next to, Union

## EQUALS

A = B

Figure 5 gives example symbolic representations of duality and causality. Causality demands the existence of the dual pair of cause and effect.

knowledge or truth is intuition rather than reason, or the scientific method. The mystical experience is interpreted as one that cannot be communicated to another but is a personal reality. One can discuss the Path (Buddha) but not explain the experience.

Although the definitions and practice of science and mysticism appear to indicate that these two methods are at odds with each other, they in fact have many common assumptions. In fact, I believe they are very complementary in the search for truth, as we can see by the similarity in their representations in symbolic forms

The root form of the basis for symbology in science and mysticism have fundamentally similar structures. The methodology and practice of science and mystical practice have unique similarities, particularly in their use of symbolic forms but are also quite different.

Although the usual actual experience of science (as theory and experiment in a laboratory – with dials, chemicals, etc.) and mysticism (direct inspired experience, say in meditation), there are many common concepts to both of them. Some of these are

- (1) duality, or a paired concept (in mysticism, yin-yang) or (in science, canonically conjugate variables).
- (2) experience – sense detection, perception
- (3) intuition – direct knowing
- (4) constancy and change, 3 Gunas (mysticism) and scientific law
- (5) causality, the cause and effect relationship (in mysticism: the Law of Karma, and in science: the scientific law of causality)
- (6) Law or rule relationship
- (7) pattern, repeatability, and harmony
- (8) categorization or object grouping (although mysticism does

discuss categories of existence this method is much more the preoccupation of the scientific method (Darwin's classification of species, etc.)

- (9) Symbolic representation, symbolism and language (written in symbols or spoken) is fundamental to the communication of information (science), or is a trigger to experience (mandala).

What are some of the differences between the scientific and mystical methodology? Upon observation of these methods in action in the search for truth, we "picture" the scientist in the laboratory: equations on the board, flasks with boiling liquids over bunsen burners, racks of electronics, etc. We "picture" the mystic in quiet contemplation or meditation. The scientific method involves the interaction of experimentation and hypothesis (theory). From the results of an experiment one develops a hypothesis of what occurred and what will occur in the future under the same or similar conditions. Then an experiment is designed and conducted to test the hypothesis. It is either verified or not. If not, the hypothesis is modified to describe the experimental results. If the results of the experiment deviate too much from the prediction, then a new hypothesis is developed and tested, and so on, in the never-ending search for knowledge.

Mysticism, on the other hand, involves what is usually defined as a subjective set of experiences occurring in an individual's mind. In science, reproducibility is a key factor, so that many individuals should be able to perform the same experiment and still obtain results which are agreed upon as being the same (similar). This is termed objectivity. Taking certain areas of observed phenomena out of the mystical/unknowable

and into an understandable realm is indeed what science is all about. However, the mystical aspects are never completely removed and science finds itself firmly rooted in mysticism after all. Science, like mysticism, represents phenomena of the universe in symbols; language which describes the observable phenomena, which, of course, are themselves not the phenomena. The procedure of science involves the substitution of mystical symbols for scientific symbols. It is felt by the practitioners of science that this method produces more reliable and repeatable results.

But then the whole scientific process is involved in mystery (or intuition): even when a discovery is made it usually leads the way to new mysteries previously unseen. A good scientist, in any field, must necessarily be involved in the unknown as well as the known — to be pushed from behind by the known and pulled onward by the unknown.

In mystical systems emphasis is placed upon "intuition" as the most reliable source of knowledge or Truth, rather than reason or scientific method. This "intuition" occurs when immediate and true knowledge is attained through a direct experience that does not depend upon systematic mental activity or sense impressions. However, it seems clear that there are certain ingredients necessary to experience or achieve this "intuitive flow or insight". The origin of science is a creative process and may in some sense be "mystical" in origin: analytical reasoning proceeds from the general (general laws or principles) to the specific (or a particular case). A general law is applied to a specific case; synthetic reasoning proceeds from many specific examples to a creation or development of a general rule or law. Ideally the process of science should utilize both general and specific information or principles, analyzing, synthesizing all known information, assimilating while simultaneously



"letting go" — not allowing the part to obscure the whole. It is said that Sir Isaac Newton watched apples fall from a tree and from this sprang his development of the law of universal gravitation. How does the initial idea or concept come? Albert Einstein reported that his "experience" of the theory of relativity came in a flash, but it took him months to put it into concrete symbols/language. Kerkule', an organic chemist, was said to have dreamed of six snakes in a ring, each biting the tail of the next one. He awoke with the theory of the ring structure of benzene ( $C_6H_6$ )! Where does inspiration occur? Where does creative synthetic thought find its origin?

Here is an example of where Kerkule moved from one level of symbolic abstraction into a more concrete form of symbolic representation. Interestingly enough, Einstein recognized the root of creative endeavor from his own experience as being intuitive. In his own words, he said, "the most beautiful and most profound emotion we can experience is the sensation of the mystical. It is the sower of all true science. He to whom this emotion is a stranger, who can no longer stand rapt in awe, is as good as dead!"

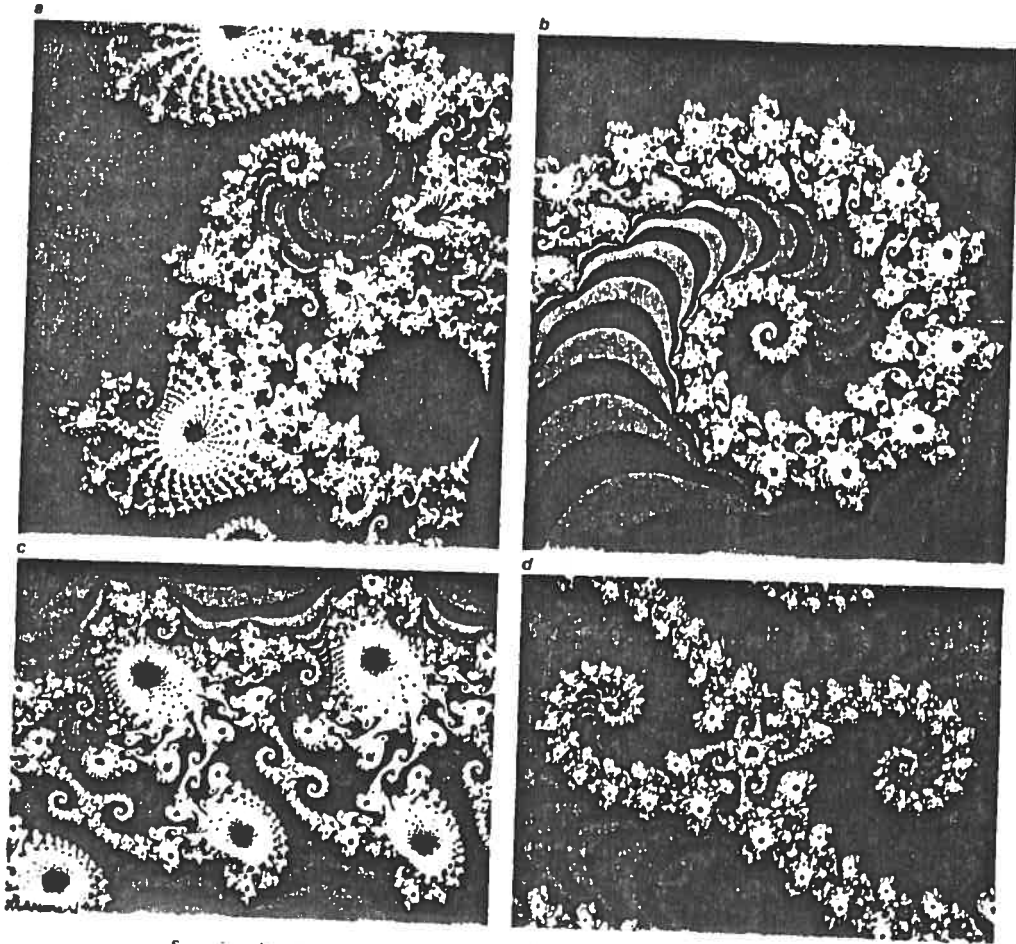
H.Skolimowski, in his paper, "Structure, Symbol and The Theatre of the Mind," places the use of the scientific method in its proper context. The use of the scientific method, after all, is aimed at self-knowledge and self-improvement. R.Ravindra ("what is science than that art mindful of her?") eloquently expresses what I feel — that in general scientists have lost their vision for the search for truth. In fact, I feel some of the issues that Ravindra brought up presented some of the motives scientists have for pursuing scientific knowledge which relate to dominance of Nature and gaining personal influence. He contrasts this with

motives such as that of Einstein's, in which the scientific endeavor represents part of his spiritual path. This is like a yogi and I believe that any endeavor conducted so as to enhance oneself and all of mankind is part of a real spiritual path and hence has value. In this manner the scientific endeavors are part of an evolutionary path as Skolimowski puts it.

If we distinguish the modes of science as pure and applied science, theoretical or experimental, and applied technology, we see more clearly the role for which we utilize the scientific process. Nikola Tesla expressed his motive for developing the a.c. power grid for the world: to free man from the drudgery so that he may reason and improve the quality of life. Each aspect of the use of science is represented by a set of concepts and symbols. These symbols represent how we conceive a plan to create and utilize science and other human knowledge.

### III. SYMBOLOGY AND THE MIND/BRAIN

The root of thought and concepts arise out of the structure of consciousness in the mind. Certainly what we know becomes the content of our consciousness. Is our consciousness constructed so as to be compatible with understanding this universe? Surely we could not have survived on this planet without at least some parallel between our mental process and the function of the world. It does seem, however, that if we rely solely on what we do know, the content of our consciousness can get in the way of our experiencing fully, or, we might not see the forest for the trees. These issues relate to the connection of symbolic representation of natural form. (See Figure 6.)



*Successive enlargements of the "shepherd's crook" in region a of the image on the preceding page*

Figure 6 These forms are generated by complex numbers termed fractals. These forms, created from mathematical symbology, may represent self organizing and chaotic behavior in Nature.

As J. E. Charon so clearly points out in his paper, "The Roots of Behavior in Contemporary Physics," symbols occur in the mind and forms occur in nature. F. Bonardel in "Symbolization and Transformation" extends some of these ideas further to express the power of symbols as used to conceptualize and how they can be used to represent and lead us conceptually to a "dark" or "light" age, to a death, revolution, and rebirth concept.

Dennis Stillings, director of the Archaeus Project (Minneapolis, MN, "Meditations on the Imagery of Nuclear War and Nuclear Peace," 1985) discusses the power of symbols and images in creating the concept of a peace (quiet) as nothingness or annihilation, i.e. actually creating destruction or creating a lively peace in a future in which man does not annihilate himself. Throughout history it has been well recognized the power of symbology from ancient China, ancient Egypt, and the science of Hitler's Germany. These symbols can be in the form of visual, auditory, and sometimes tactile, as in the case of ceremonial dance.

Let us pursue the issue of the origin of symbology in some more detail. The structure of the perceived modes of the brain are so constructed as to operate as a pattern recognition system. The operation of memory utilizes pattern recognition in a mode which operates like a hologram. For example, a small part of an object is perceived and the whole object (or a symbolic representation of it) is constructed in one's mind so that one is able to recognize the object. One can recognize a book or chair from seeing a small part of that object when the rest is obscured or hidden, as an object or in a representation of the object, such as a photograph. The object image is also created from a symbolic representation, such as a word, chair.

The symbolic modes of an object must be identified, learned and remembered, i.e. one must learn to read, etc. Also, one must learn to perceive the content or meaning attached to symbols (such as geometric forms, algebraic equations, etc.) and photographs, mirror images of self, etc. Polaroid photographs have been made of people who have not been exposed to photography and it takes some instruction and encouragement when they see their reflection for them to recognize the photographic symbol as images of themselves. Often exclamations of delight accompany such recognition.

Symbolic representation in terms of category specification is exemplified by the following example. A chimpanzee was raised from infancy by a human couple. The chimp was taught to separate a pile of randomly mixed 8x10 glossy color photographs of chimps and portraits of people into separate piles: one chimps and one humans. The chimp did this task infallibly. He had not seen a live chimpanzee in his own experience. One day, one of the people in the laboratory studying chimp behavior, photographed the chimp and made another 8x10 glossy color photo and mixed this photo in with the pile, to see which pile the chimp would place this photograph when he sorted the pictures. Invariably, after many such runs, the chimp always put the symbolic representation of his own photograph in the human pile.

There is strong evidence to suggest that pattern recognition and symbolic recognition is innate and not a completely learned task. Utilizing and amplifying on symbolic images is a learned task.

About 12 years ago, a series of experiments were conducted with four six-month-old babies. The targets for the babies to observe were simple geometric patterns such as circles, squares and triangles. These

were pictured on 11x17 cards. Since the babies were pre-verbal, response to yes was head turned to the right and no meant turn the head left, to signify yes and no in response to recognizing figures as the same and different. Feedback for a correct response was given by a woman who would jump up behind the crib and say peek-a-boo (as food withholding was inappropriate). Not only were the babies very accurate in their response but they could recognize the vertices of targets without the legs as triangles, i.e. they could reconstruct in their mind missing pieces of the figures. It appears that primitive figure symbol recognition is innate.

Let us now return to our examination of the relationship of form and symbol in the context of innate and learned human capacities. Symbols represent the concretization of thought. In fact, thoughts are molded in symbols. These thoughts can be stimulated by external form or can be created without novel external physical form stimuli. In fact, internal, (what we term "psychological", or philosophical, religious or scientific) conceptual forms also generate what we create or perceive as symbols. I believe that this internally generated "form" is what M.Maffesoli refers to as formism in his paper, "Formism: tradition and modernity." Formism stabilizes individuals and societies and creates order but it also limits. Creativity and new views of reality allow us to generate new possibilities.

The operation of symbolic representation of thoughts, either generated internally or externally from forms (usually as a combination), is fundamental to how we know this world. Thought as its generated symbols create great power, as H.Skolimowski and others have pointed out. It is the human mind which is the ultimately powerful instrument of all human endeavor.

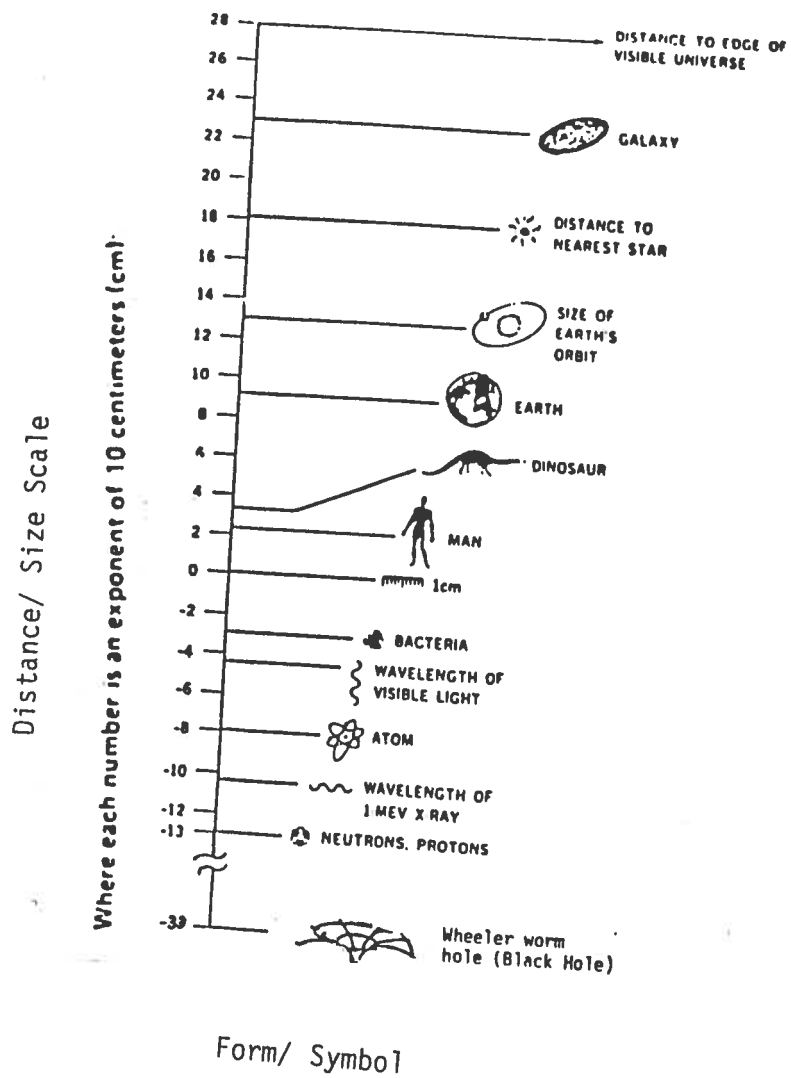


Figure 7 We represent object size and scale in the Universe. The size scale of a form determines what symbology we give it to create a thought content, relative to our size.

# Summary of Multiplicities at $E_{cm} = 10 - 40 \text{ GeV}$

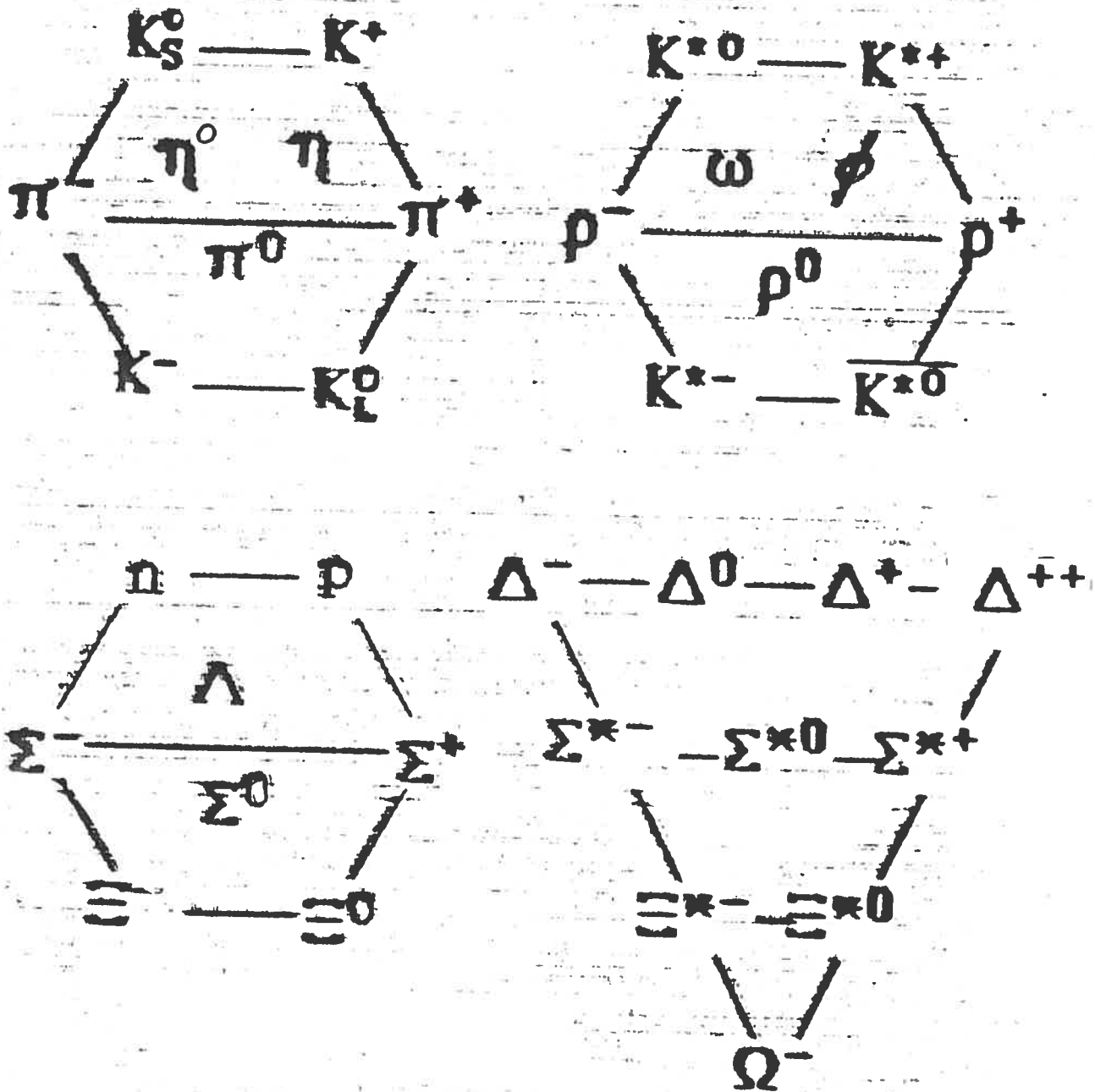


Figure 8 Symbolic representation of particle mass splitting of octets and deceptets in the  $SU_3$  group theory of "elementary particles".



## MIND / BODY / SPIRIT

FUNDAMENTAL ASSUMPTIONS ABOUT THE NATURE OF REALITY  
DETERMINE WHAT WE PERCEIVE THE  
NATURE OF REALITY TO BE.

SOME ISSUES TO CONSIDER:

1. THREE VIEWS:
  - A) MECHANISTIC
  - B) MIND/BODY DUALITY
  - C) SPIRITUALISTIC
  
2. CONSTRAINTS OF PHYSICS AND THE STRUCTURE OF THE MIND.
  
3. WHAT PSYCHIC PHENOMENA CAN TELL US ABOUT THE MIND/BODY INTERFACE.
  
4. HOLISM: JOINING OF THE THREE ASPECTS OF REALITY, MIND/BODY, AND SPIRIT IN THE VEDIC AND OTHER TRADITIONS.

Figure 9 Presented is some issues concerning the relationship of mind, body and spirit and some of the possible implications of these relationships.

#### IV. CONCLUSION

Specifically symbolic recognition is a major clue as to the functioning of mind, that is, how information is encoded, remembered, used and communicated. The relationship between learning and innate mental constructs relates to symbol recognition and later interpretation, symbol "object grouping", and causal-temporal associations, giving us a major clue as to how the human and animal mind function. There are many reasons to study the brain and mind of man. I will list some of what I perceive to be key issues here: Enhanced learning, mental health, understanding of emotions such as in the MacLean triune brain model to work for peace and happiness rather than violence and war.

Our human potential is a vast and largely untapped reservoir which can be utilized to bring about vast positive changes in global values to enhance the quality of life on earth.

References papers in this paper refer to other papers presented in Committee III and E.A.Rauscher's Philosophy of Science, published through the University of California, Berkeley (preprint 1971), and D.Shilling's paper, "Psychological perspectives," (preprint, fall 1985).