INTELLIGENCE AND ABSTRACTION

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How we define a term will determine how we can use it.

Intelligence has many definitions; some are:

1.) Information communicated
2.) Ability to learn
3.) An act of understanding
4.) Ability to deal with new situations
5.) Ability to deal effectively with tasks involving abstractions
6.) The capacity to apprehend facts and propositions and their relations and to reason about them.

Ref: A Comprehensive Dictionary of Psychological and Psychoanalytical Terms by H. B. English and A. C. English - Pub. by Longmans, Green & Co., N. Y. 1958

Basically all of the above definitions have in common the concept of how information or matter is ordered, organized, and responded to.

If one accepts the generalization that intelligence is the capacity to order, organize and respond to information and or matter then one can classify and categorize intelligence in a number of ways.

With such a broad definition some types of non-living matter show intelligence. With such a broad definition of intelligence one is then aware that intelligence exists over a wide spectrum. At its most simple level intelligence could be the ability of some simple molecules to arrange their own structure in conjunction with other similar molecules to form simple crystals. At the other end of the spectrum of intelligence would be the highly abstract thought of the atomic scientist.

Man has long sought after truth. At times he has found it. More often he thinks he has found it. Even when he has not found truth his theories, hypotheses, and beliefs have given him a starting point that helps him order, organize, and bring meaning into his worl

Metaphysics is a branch of philosophy that is concerned with the contemplation of truth. (Ref: The Philosophy of Being, by Henri Renard S. J., The Bruce Pub. Co., Milwaukee 1943)

Metaphysics derives its name from Aristotle's attempts at classification of science. Aristotle classified science into "practical" and "speculative". He stated that practical science gives us useful knowledge. Speculative science (philosophy) seeks only to discove and understand the order in the universe and the order of nature independent of how it affects us. Some speculative philosophies have evolved into sciences by testing these speculations in objective ways that could be repeated.

Aristotle divided "Speculative Science" into three classes: physics, mathematics, and theology (later called metaphysics). He made these divisions on the basis of different degrees of abstractions implied in the division.

Aristotle's three degrees of abstraction are:

1.) Physics: These abstractions are based on such physical properties as color, weight sound, temperature, taste, and smell, etc. From these physical propertie one can evolve abstractions based primarily on the physical basis of the information that is present. These physical properties cause human sensory receptors to respond with basic information about the physical world.

This information from sensory receptors can be elaborated into more abstract information.

2.) Mathematics: Here Aristotle placed information of a higher order than the information that caused only changes in the physical senses. Here he placed the elements of quantity (numbers) and form (number and geometric shape), and the classification and elaboration of these concepts.

3.) Theology: (Metaphysics) Here Aristotle placed concepts and ideas at a level of abstraction where realities can exist in immaterial objects (thoughts, intellect, will) and also in material objects. Andionicus of Rhodes (70 B.C.) placed Aristotle's writings on theology under the heading of Metaphysics (meta = after) because they appeared after physics in his writings.

Aristotle taught that humans could only attain intelligence by a process of abstraction. He also taught that abstraction and thought exist in varying degrees; and that the degree of abstract thought attained depends upon the depth the mind penetrates the data.

Metaphysics, Aristotle's third and most abstract class of speculative science is defined as the study of "being", e.g. the study of things that are or can be. Thus metaphysics claims the whole field of reality (and fantasy) for study. The realities of metaphysics may be possible or actual; abstract or concrete; finite or indefinite; and material or immaterial. Thus in the seeking of truth one can contemplate such real or unreal objects as spirits, the soul, sin, devils, gods, heaven, hell, and all other phenomena.

With the progressive development of the natural sciences, which largely evolved from metaphysics and/or philosophy, fewer and fewer objects and situations were left for being known only by the "contemplation of truth." Special systems of analysis and testing were developed that went beyond the "contemplation of truth". These special systems of testing and analysis; and the objects of their scrutiny became the natural sciences of today.

Intelligence and Chemical Systems

If one accepts intelligence as the capacity to order, organize, and respond to information and/or matter then one can say that a simple type of intelligence exists in matter at a simple molecular level. A slightly higher order of intelligence can be observed in some DNA molecules that have the capacity to duplicate themselves in optimal environmental conditions. This capacity is seen in chromosomes and also viruses. Single celled organisms show an even higher level of intelligence as in them the DNA directs the production of messenger RNA, adapter RNA, and Ribosomal RNA that direct the protein and enzyme synthesis and also the metabolic functioning of the cell.

A still higher order of intelligence would be when cells join together for their mutual benefit. Other types of biological intelligence are seen in asexual reproduction, budding, sexual reproduction, and spore formation.

As intelligence progresses from lower order to higher order many of the systems of intelligence that have been developed in the lower forms are retained or modified in higher forms of intelligence. The lower forms form a foundation on which higher forms are built.

The intelligence of many biological systems is built in, is automatic, and is unthinking. This intelligence is inherited via the DNA code. As more complex forms of life have evolved one can observe the development of types of intelligence that allow for a more flexible adaptation to the environment. The highest form of this type of intelligence is seen in man with his capacity for abstract thinking. Intermediate types of intelli-

gence can be observed in various forms of animal life that show the capacity for varied levels of intelligence. A good reference source for such intermediate types of animal intelligence is Heinz Werner's " Comparative Psychology of Mental Development."