A New Way of Thinking

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A set is a collection of well defined and distinct objects. Such a definition includes two assumptions: a) That objects can be **well defined** and b) That objects are **independent** from each other. Both of these assumptions are no more supported by Quantum Mechanics. Experiments have shown that any "object" is both a particle and a wave. This means that any object is both localized in space-time and also not localized in space-time. If this claim is true we are facing a paradox. How can an object be both localized and spread? This situation requires that we either give up our definition of an object, or we give up our bivalent logic.

The Aristotelian bivalent logic says that A can only be equal to A. Thus A becomes an independent closed system that has well defined boundaries. The bivalent logic splits the world into two categories; every entity is either A or NOT-A. There is no other alternative. Such a way of thinking led to the mathematical concept of a set and to the Naïve Set Theory.

According to the naïve set theory any object belongs either inside or outside a given set. Sets can be a conglomeration of sets; that is any object within a set can be a set in its own right. For example, the Standard Model of Particle Physics says that particles split into two sets: the force carriers and the matter particles. Matter particles also form two sets: the Quarks and the Leptons. Force carriers are presently known as the photon, the gluon, the heavy bosons and the Higgs that is still being searched at CERN. It seems that this hierarchy of sets will never end. The reason is that; we are used to **define** a particle as an independent object, which exists within certain well defined boundaries.

The new developments in science tell us that we need to change such a definition and the only way to do it is to change our way of thinking, or more precisely: our logic. Aristoteles (384-322 BC) invented a logic that applies only to closed systems. The famous syllogism is the following: "**All men are mortal. Socrates is a man. Therefore Socrates is mortal**". In this way of reasoning the word "all" defines a closed set, the set of men. As soon as we accept the concept of "all" we are creating a boundary and limiting our reasoning capacity.

In mathematics a closed set is defined as an interval whose end points are included. For example [0,1] means that the numbers between zero and one included form a closed set. The probability of any set of events is also confined

between zero and one. The probability theory rests on the premise that all possible outcomes are already known beforehand. Even the probabilistic approach of Quantum Mechanics is based on the assumption that all possible quantum states are known.

Such an ad hoc acceptance leads to a closed set defined as $\Sigma_n \ P_n = 1$, meaning that the sum of all probabilities **must** add up to one. In the bivalent logic this fact is defined as: NOT-A = 1 – A, or equivalently A + NOT-A = 1, meaning that there is an inside and an outside of any object. These two regions are distinct and separate. But the present model of the universe claims that the universe has neither an inside nor an outside (see article **3-A Different Universe**). Therefore the present model needs a different logical system.

Let us call this new way of thinking the "**And-And Logic**". According to this logic any physical "object" or "entity" can be defined as being both A and also NOT-A, but A and NOT-A do not add up to 1. They add up to B, which can be expressed as **A**U**NOT-A = B**, where the U stands for "union". This sort of union is neither the union of two different sets nor does the U replace the plus sign, but can be considered as the AND operator. It rather means that the inside and the outside are interconnected and form a space that is neither the inside nor the outside. Thus, B is both A **and also** is not A.

For simplicity and clarity let us use **AND** instead of U. B**AND**NOT-B **=** (A**AND**NOT-A)**AND**[NOT-(A**AND**NOT-A)]**=** C. So every new object or concept is related recursively to an undefined number of objects or concepts. The sum of all these objects or concepts do not add up to one, but becomes fuzzy and uncertain as the iteration is repeated.

Let us consider some examples where this **And-And Logic** applies:
"The world is both objective **AND** not objective (is subjective)",
"Interactions are both local **AND** non-local",
"Measuring a phenomenon is both possible **AND** impossible",
"Light is both a wave **AND** a particle",
"Evolution of species is a valid fact **AND** is not a valid fact",
"The universe and the human brain are separate **AND** are not separate"…

This kind of logic does not lead to clear-cut definitions and closed sets. It is rather confusing for most of us who are used to think in an **EITHER-OR** manner. But the present deterministic world view has hit a wall. It can neither pass through nor jump over it. The only way to continue advancing is by destroying the wall, and refusing to build a new one. Such an approach to reality requires a new world view, a new paradigm. In this new way of thinking there are no ALL's, no MUST's, no OR's and no clear-cut boundaries. The entities of the world, including the universe as a whole, are neither 'well defined' nor independent from each other.

Such a way of thinking has been applied by Eastern Mystics and Gnostics for many thousands of years. It is only recently that Western scientific thinking is slowly starting to accept the holistic structure of 'what is' out there. As mentioned before, all entities -be it living or non-living- are **open structures** interacting with their surrounding.