THE ORIGIN AND CONCEPTION OF VALUE

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Abstract

The goal of this project is to attempt a logical unfolding of one basic idea -that value emerges out of the chaos of energy through natural selection.

The goal of the first chapter is to attempt to determine the origin of value. The goal of the second chapter is to attempt to determine the origin of the conception of value.

As a first approximation, it can be said that the first chapter seeks for an objective and the second for a subjective account of the origin of value. There is a paradox in this description, however. The objective gives rise to the subjective, but the subjective then constructs the objective. Objects give rise to subjects, but subjects then construct their objects, and different subjects may construct the world into different objects.

This thesis shall attempt to resolve this paradox by describing the course of the emergence of value from the objective into the subjective and then back into the objective, without falling into the vicious circle that results from seeing the world as a juxtaposition of the objective and the subjective.

As I hope to show, in the course of the first two chapters, and the ones to follow, the objective and the subjective are idealizations. They are two asymptotes which knowledge approaches but cannot touch. Knowledge ranges between objectivity and subjectivity, without attaining either. Knowledge is knowledge of something and is to that extent objective. Knowledge is knowledge by someone and is to that extent subjective. Because knowledge has an element of subjectivity,

it cannot be purely objective. And because knowledge has an element of objectivity, it cannot be purely subjective.

The resolution of the juxtaposition between the objective and the subjective, will allow us to describe the emergence of value out of the objective into the subjective and back in terms that do not presuppose either. Subjects arise out of reality that is undivided, and only then divide it into objects in accordance with their constitution, provided to them by undivided reality.

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INTRODUCTION

Value permeates existence. Not only ethics or art, but science, economics, religion, nature and practically everything else in life is subject to valuation. Value judgement is indispensable to the judgement of existence. Anything in existence can be described in any way possible, but unless it is valued, it is of no value. Subtract "good" and every other value judgement from a good deed, a good work of art, a good scientific study, a good economic transaction or a good anything else, and there is no way left to judge it. Truth itself is a value, as will be discussed later, and every claim of fact is valued to the extent of its truth.

All things are valued as good, bad or neutral. The good tends to be pursued, the bad avoided and the neutral ignored as being of no value. Despite this, most thinkers today strive to characterize their theories as value-neutral or free from value judgement. (Cf: Margenau and Oscanyan, 1970, p.15) They do this not because they want to be ignored, but because they view value-neutral as good. How did this view arise?

The primary cause is probably the reasoning that knowledge must be objective, that value judgements are subjective, and that therefore, value judgements cannot be knowledge. If value judgements cannot be knowledge, then value judgements cannot be true. Therefore, to achieve knowledge, a theory must be purged of value judgements. However, truth itself is a value, and therefore, to judge a theory true is to pass a value judgement upon it. Knowledge cannot be purged of value judgement, because knowledge itself is based on the value judgement of truth. A theory is judged good to the extent it is

judged true. If knowledge cannot be purged of value judgement, and value judgement is subjective, then knowledge itself must be subjective. Even leaving the value judgement of truth aside, the knowledge of something must be knowledge by someone; the knowledge of an object, must be knowledge by a subject. All knowledge, therefore, however certain and invariable it appears, must be subject-dependent. It will accordingly be one of the aims of this work to demonstrate the subjectivity of knowledge.

The secondary cause of this reluctance to acknowledge the presence of value judgement in thought is the argument that to derive value judgement from facts is a naturalistic fallacy, which has no basis in reason (Moore, 1903, *Principia Ethica*). This argument has a good deal of logical force, and has effectively stymied much of the research into the origin of value over the past century. However, the argument is belied by the existence of value itself. If values cannot be derived from facts, where do they come from? Value is a fundamental fact of existence. Values permeate existence. Surely there must be a way to reconcile the logic of the naturalistic fallacy argument with the fact of the existence of value! This project will accordingly attempt to trace the evolution of value from the origins of existence to the complexities of modern moral systems while avoiding the naturalistic fallacy.

My aim is to overturn the charges which have led to the banishment of value from theory, and to restore it to its rightful place as the fundamental basis of judgement - a place which it has never abandoned in practice.

In order to do so, it necessary to establish a basis for the assessment of value judgements, themselves, - in other words, a criterion for determining which value

judgements are right or wrong.

The search for the fundamental basis of valuation has not so far met with success. The reason for this lack of success, in my opinion, has been that the previous attempts have sought to establish the criterion of value assessment in the end-products of valuation, without taking sufficient account of the mechanism of value formation. Looked at by themselves, the end-products of valuation of different subjects are often unaccountably different from each other, and cannot be explained by the same principles of valuation. Why is it for instance that certain societies prohibit birth-control, while others encourage it? Looked at, in terms of their origins, however, different results of valuation may be produced by the same mechanism of valuation, just as different species may be produced by the same mechanism of natural selection. Thus, for instance, a prohibition against birth-control in an underpopulated society may give way to moral encouragement of birth-control in an over-populated society. The contrary end-products of these two situations may be governed by the same mechanism of value formation, which may be described as a self-regulatory mechanism of social well-being.

My goal, therefore, shall be to seek for the criterion of value judgement in the mechanism of value-formation, rather than in the end-products of valuation. (Cf: Alexander, *The Biology of Moral Systems*, 1987, p.9) My hope shall be that, just as the emergence of different species can be explained by the same mechanism of natural selection, the emergence of different values can be explained by the same mechanism of value formation. My search shall accordingly be for a dynamic theory of value, in which the unifying principle of value shall be sought for in the mechanism of value formation,

rather than in the admittedly different end-products of valuation. Just as in matters of acceleration, the constant is not the speed, but the change in speed, in matters of value, the constant may not be found in the values produced but in their mechanism of formation and change. Because the end-products of value tend to remain static for long periods of time, previous theories of value have tended to search for a unifying principle of value that is itself static, and have been accordingly foiled by the endless variety of the end-products of value, which seem incapable of a unifying definition. However, just as in the matter of the origin of species, the search for the unifying principle of species-formation was also foiled by the endless variety of species, until the far more static appearance of species was recognized to be dynamic in nature, it may well be that the search for the unifying principle of valuation shall not be successful until the dynamic nature of value is recognized, and the mechanism of value formation is identified.

Once the mechanism is identified, the criterion of value judgement could then be based on it. Interactions which tend towards the production of value in accordance with this mechanism, shall be judged to be of positive value, while interactions which tend away from production of value in accordance with this mechanism, shall be judged to be of negative value. Thus, interactions which produce different results in different circumstances could be judged by the same criterion of value.

In order to determine the mechanism of value formation, I shall attempt to trace the origins of value from its rudimentary beginnings in a state without structure, known as chaos, to the complexities of modern systems of morality. I shall attempt to determine what unifying principle, if any, is responsible for the formation of value in its multitude of

forms.

There have of course been a number of previous attempts to determine the unifying principle of value formation. These attempts can be classified into two categories: those that attempt and those that reject the attempt to derive value from the other facts of existence. The first approach can be described as a naturalistic and the second as a non-naturalistic approach to the study of value formation.

The non-naturalistic approach is best exemplified by G.E Moore (1903) who has argued that the principles of value formation cannot be derived from any other facts of existence. There is, however, a distinction, which was better recognized by G.E. Moore than by some of his followers, between the conceptual and causal derivation of value from other facts of existence. For although the facts of value may not be conceptually deriveable from the facts of non-value, the appearance of value as a fact of existence may well be causally deriveable from the facts of non-value, as shall be discussed further below.

The non-naturalistic approach to value study stops with the analysis of the basic facts of value. This type of effort is best exemplified by Kant (1959), G.E. Moore (1903), Rawls (1971), and most other analytic philosophers of value, who analyze the nature and the relations between our most basic conceptions of value, while refusing to speculate on the causal origins of these conceptions. They start with the meanings of "good", "evil" and other moral concepts, as they understand them, without going further to inquire what caused them to develop these meanings in their minds. Their job, as they see it, is to determine the nature and the structure of ethics, without attempting to determine the

causal origins of ethical concepts.

If we are to seek the causal origins of the meanings of these basic concepts of value, we must go beyond the non-naturalistic approach and into the naturalistic approach to value study. We must not stop at the meanings of value concepts, and must attempt to determine what caused their conception.

Two theories of the natural origins of value have been the most significant, to my mind, at least until the Twentieth Century. These are the theories of value as happiness, and value as power. The first theory has attempted to reduce the concepts of good and evil to functions of pleasure and pain; the second to gain and loss in power. Aristotle (1941), Locke (1997), Hume (1978), Bentham (1823) and Mill (1910) have been the most prominent proponents of the first theory, while Thrasymachos (1956), Han Fe Tzu (1960), Machiavelli (1980), Hobbes (1996) and Nietzche (1996) can be taken to be the most prominent advocates of the second. Neither approach has been fully successful, as much criticism indicates. Essentially, although both happiness and power are adequate measures of well-being in many cases, they do fail in some cases.

Pleasure is not identical to good and pain is not identical to evil, as Moore has so successfully argued (1903). Pleasure is not always a good, as the well-known example of the pleasure derived from malice confirms. (Broad, 1956) Neither is pleasure the only good. Knowledge which brings no pleasure may nevertheless be of value, as Mill has conceded despite his defence of pleasure as the basis of value. "It is .... better to be Socrates dissatisfied than a fool satisfied", as Mill said. (1910; (Cf: Moore, 1903, p.p. 78-79; Ross, 1930)

With the advent of Darwin's theory of natural selection (1994), it has become possible to explain pleasure and pain not as fundamental values, but as empiric measures of adaptation that have developed in certain organisms through the process of natural selection. In such organisms, pleasure has developed as a measure of constructive, and pain as a measure of destructive interactions for the organism. Such an organism's well-being depends on the extent to which what is pleasing to it, corresponds to what is constructive to it, and what is painful to it, corresponds to what is destructive to it. Organisms pleased by what is destructive tend to be destroyed, just as organisms pained by what is constructive tend to be destroyed. Therefore, a correspondence between pleasure and constructiveness, as well as a correspondence between pain and destructiveness tends towards the natural selection of the organism. Consequently, by reason of natural selection, pleasant interactions tend to be constructive; while painful interactions tend to be destructive overall (Cf: Alexander, 1987, p.110).

However, that is not always the case. An organism is not always perfectly adapted to its environment. An organism may well be pleased by something that is harmful to it, such as excessive consumption of sugar; or pained by something that is beneficial to it, such as a later visit to the dentist. (Cf: Ruse, 1986)

The theory of natural selection shows that the values of pleasure and pain are not fundamental values, but are measures that tend to be indicative of the more fundamental value of the organism's well-being. The better adapted the organism is to its environment, the more accurately do the measures of pleasure and pain indicate its well-being.

The theory of natural selection, therefore enables us to explain the origins of the

values of pleasure and pain in terms of their relation to the organism's well-being. While enabling us to explain the origins of these particular values, the theory of natural selection is unable however to explain the origin of value in general, because it presupposes value in its mechanism of natural selection. The mechanism that was proposed by Darwin is of course "the survival of the fittest" (1994, p.63), and the "term 'fittest' clearly had the form of value significance." (Pepper, 1970, p. 107) Stated more openly, the basic principle of natural selection is that: "In every generation, better-adapted individuals will be more likely to survive" (Bell, 1997, p.60) "Better" is a measurement of value. Therefore, the mechanism of natural selection presupposes the value of adaptation for survival. It is impossible to describe the mechanism of natural selection without reference to value. "No selectionally based system works value-free." (Edelman, 1992, p.163)

It is true that the effects of natural selection can be expressed in the value-free terms of differential survival. (Bethell, 1976) However, the causes of natural selection cannot be so expressed. Presumably differential survival is not always merely the effect of chance. Consequently, factors other than chance must be accounted for. Thus, apart from chance, there should be a reason why certain organisms tend to survive more than others in certain environments. The reason offered by the theory of natural selection is that these organisms tend to be better adapted to those environments than the others. This does not mean that every feature of these organisms is a result of adaptation. (Cf: Lewontin, 1978; Kauffman, 1993) It simply means that the organisms whose features on the whole are better adapted to their environment than others shall tend more towards natural selection than the others.

This principle of natural selection is not a tautology. (Pepper, 1970, p.107; Sober, 1993, p.71; Mills and Beatty, 1979; Gould, 1976; Lewontin, 1978) Differential adaptation tends to differential survival, but it cannot be reduced to it. By studying the organisms that survive in greater numbers in certain environments, we may determine what qualities give them an advantage in those environments. These qualities are the adaptations to those environments, such as a warm coat in a cold climate, speed in the presence of predators or immunity to certain disease. An adaptation, however, is not the same thing as survival, since an individual organism with a particular adaptation can fail to survive, while another one without the adaptation can happen to survive. (Mills and Beatty, 1979) An adaptation is simply a quality which on the whole tends towards greater survival, without necessarily doing so in every case. As Stephen Jay Gould states: "...certain morphological, physiological and behavioural traits should be superior a priori as designs for living in new environments. These traits confer fitness by an engineer's criterion of good design, not by the empirical fact of their survival and spread. " (1976; Cf: Lewontin, 1978)

Thus, although the effects of natural selection can be expressed in value-free terms, the causes cannot. It would be a contradiction to state that natural selection acts on organisms regardless of how well-adapted they are. Therefore, the mechanism of natural selection presupposes value, and consequently, cannot explain the origin of value in itself.

To explain the origin of value in itself, we need to turn to the other great naturalistic theory of value - value as power. Traditionally, the theory of value as power has had few supporters. It would nevertheless crop up occasionally over the millenia as a piece of

provocation to the more established and well-meaning theories of value. The reason for this is that power, as traditionally conceived could not possibly be equated with good, and more often than not was equated with evil. Although power has generally been considered to be of value to its possessor and has always been a rather universal object of individual striving, it has not generally been considered to be of value to those that it was exercised against. In short, power has generally been good to have in your hands and bad to leave in the hands of others.

Power has traditionally been conceived however in a limited sense as some form of force, influence or coersion exercised by some against others. In this limited sense, the concept of power could not be used to explain the origin of value. Power in this limited sense simply could not be made equivalent to value, or to be more precise, value could not be described as a function of power in this limited sense.

However, the concept of power has been significantly extended by Einstein's discovery of the equivalence of mass and energy (Einstein, 1952, p.p.67-71). Power in physics is a function of energy over time. Using this function, Einstein's discovery can be described as the equivalence of mass and power. Since $P = E/t$, $E = Pt$, therefore, $E = mc^2$ becomes $Pt = mc^2$. Human beings are objects of mass. Since mass can be considered power in this manner, by reference to power we can describe not only certain interactions between human beings, but the human beings themselves.

Einstein has essentially made power the fundamental concept of existence. As will be discussed in further detail below, all of existence can be described in terms of power, or more specifically, in terms of energy-forms and their interactions. If all of existence can

be so described, then surely the emergence of value can be so described. It shall therefore be the object of this work to describe the origin and the development of value as an energy phenomenon.

In short, we may be able to use energy to explain the origin of value in general. We may then be able to use natural selection to explain the origin of particular values, such as pleasure and pain. By understanding the origins of our values, we may be in a better position to understand the origins of our conceptions of values. And through a better understanding of our conception of values, we may be in a better position to determine the nature and the structure of ethics.

In other words, by applying the mass-energy equivalence from the theory of relativity to the theory of value as power, we may be able to determine the origin of value in general. Then, by applying the mechanism of natural selection from theory of evolution to the theory of value as happiness, we may be able to determine the origins of particular values, thereby completing the case for the naturalistic theory of value formation. Then, by applying the findings of the naturalistic theory of value to the discussions of the non-naturalistic theory of value, we may be able to integrate the two approaches into a complete theory of the origins and structure of value.

This inquiry shall be successful in so far as it is able to describe the proposed process of value formation in a manner that is internally consistent and is consistent with the facts. Because the integration of the above-noted theories shall be required for the success of the inquiry, the theories shall have to be reformulated into terms that are equally applicable to them all. For example, the integration of the theory of relativity and

natural selection shall require that organisms be referred to as energy-forms, and that the mechanism of natural selection be reformulated in terms of energy-forms, in order to apply the principle of equivalence of mass and energy to biological organisms. I trust that if the reformulation is equivalent to the original formulation, this shall not present any problems. In short, as long as the description is accurate and internally consistent, the inquiry shall be judged a success.

This is a work of philosophy. However, whenever factual evidence is needed to support its conclusions, scientific evidence is relied on. The reason for this is clear upon reflection. There are no facts in philosophy - only opinions. The most that can be said is that there are negative facts - facts that certain opinions have been proven inadequate. Our main source of positive facts now is science. Therefore, scientific evidence is needed to establish positive facts in philosophy. In my view, there is no need for a separation between philosophy and science. As Willard Quine writes, "I see philosophy not as an *a priori* propaedeutic or groundwork for science, but as continuous with science. (Quine, 1969, p.126; Cf: Hawking, 1998, p.209; Buskes, 1998, p.ix) Philosophy is an art of asking the big questions: what is existence?, what is space?, what is time?, what is life?, what is thought?, what is value?. Science is a testable method of answering questions. There is no a priori separation between the questions of philosophy and the questions of science. Science has simply limited itself to questions whose proposed answers can be tested by experiment and observation. By limiting itself to questions that can be so tested, science has made progress in providing answers that pass the test. These answers then serve as the basis of asking further questions, whose answers can in turn be tested, thereby

extending the domain of questions testable by science. Through this method, science has approached the questions of philosophy. At this time, physical science has almost entirely co-opted the questions of existence, space and time, while biological science - the question of life. To a lesser extent, cognitive science has began answering the question of thought. The question that remains least explored by science is the question of value. It is to this question that this inquiry shall be directed.

It should be noted that the big questions of philosophy tend to have a holographic nature, so that each question becomes a window on all the others. Therefore, whether we look first into existence, space, time, life, thought or value, we will likely end up confronting the other questions as well. This is what has happened in the course of this inquiry. Therefore, in order to confront the question of value, the questions of existence, space, time, life and thought have been confronted as well.

The search for the origin of value takes us across many fields. It is not possible to do justice to each field in depth. However, there are insights to be gained in breadth that are not available in depth. Breadth is not simply insufficient depth. It is a different way of looking at things, which allows different insights to be gained. It is only by raising his eyes from the earth to the sky that Newton was able to formulate the laws of physics applicable to both. Likewise, it is only by looking at life as a whole, rather than one or another species of it, that Darwin was able to formulate the principles of the origin of species. Value permeates existence. It is not localized to one field of knowledge. Our job, therefore, shall be to trace the path of value through the many fields it traverses. Our hope shall be that by looking at the course of value as a whole, like a river seen from a

mountain-top, we shall see things that cannot be seen from the bottom - and that by sacrificing the detailed knowledge of depth, we shall gain the all-encompassing knowledge of breadth.

The inquiry shall be divided into seven chapters, which shall attempt to trace the emergence of value out of chaos by answering the following questions:

1. What is the origin of value?
2. What is the origin of the conception of value?
3. What is the origin of the knowledge of value?
4. What is the origin of valuation?
5. What is the origin of group value?
6. What is the origin of morality? and
7. What are the structures of morality?

The inquiry shall conclude with a summary of the investigations tracing the emergence of value out of chaos, and an attempt to answer one final question: Does existence as a whole have value?

In short, the purpose of this work is to attempt a logical unfolding of one basic idea - that value emerges out of the chaos of energy through natural selection.

CHAPTER I: ORIGIN OF VALUE

Tao gave birth to One.

One gave birth to Two.

Two gave birth to Three.

Three gave birth

To all the myriad things.

Lao Tzu, 1989, p.42

I. THE QUESTION

What is the origin of value? How did value first arise in the universe, and how did it reach its modern complexity of structure? Modern systems of value are complex structures of interlocking rights and obligations, that vary from place to place and evolve over time. The subtle complexities of the evaluation of correct behaviour in morals, economics, or even sports, for that matter, grow, rather than decrease upon examination.

There are two possible alternatives to explaining this complexity. The first is that it is a product of some greater complexity that created it. The second is that it is a product of some lesser complexity from which it emerged. In this context, the first explanation may be termed religious, the second - evolutionary.

The religious explanation, although capable of explaining particular complexities by

recourse to a greater complexity which created them, cannot explain complexity in itself, because it requires the postulation of complexity as one of its premises. Complexity may be defined as a state with structure, to be contrasted with simplicity, which is a state without structure. A state with structure consists of parts, which in turn, may or may not have structure. By a process of recursion, the parts with structure are ultimately reducible to parts without structure. Therefore, a complex state is ultimately reducible to a structure of simple states. (Cf: Leibniz, *The Monadology*, 1974, p.455)

The religious explanation requires the existence of one or more Beings, which have intelligence and power enough to design, create and maintain the universe. Although power may be a simple, elemental force, intelligence is a highly complex phenomenon, involving structures of concept-formation, concept-manipulation and judgement. Consequently, the religious explanation presupposes complexity, and cannot explain it.

The evolutionary explanation allows for emergence of complexity out of a state with lesser complexity, and that, in turn, out of a state of lesser complexity yet, until it arrives at a state in which complexity initially emerges out of a state of no complexity. The evolutionary explanation is therefore able to explain the emergence of complexity in itself. Consequently, if we are to trace the origins of the complexity of value to a state at which the complexity initially arose out of a state of no complexity, we must rely on the evolutionary mode of explanation.

II. CHAOS

A state without complexity is a state without structure. A state without structure is a simple state. A simple state has no internal order. Therefore, a state without structure is a state without internal order. Such a state may still have external order, which would constitute the external boundaries of the state. A state without internal order is a state of maximum internal disorder. A state of maximum internal disorder is a state of maximum internal entropy. "Indeed, as Boltzmann stated for the first time, the increase of entropy expresses the increase of probability, of disorder." (Prigogine and Stengers, *Order out of Chaos*, 1984, p.297) A state of maximum internal entropy is a state of maximum internal "chaos", taken in its traditional sense as a state without order or structure, rather than in its more specialized, mathematical meaning as "stochastic behaviour occurring in a deterministic system" (Stewart, 1997, p.12). Chaos is the simplest state of being, since it is a state without any internal structure. Therefore, if we are to account for the emergence of the complexity of value from a state at which the complexity initially arose out of a state with no complexity, we must account for the emergence of value out of chaos.

The fundamental problem with the evolutionary explanation is: can a state with structure emerge out of a state with no structure? If a state with structure cannot emerge out of a state with no structure, then structure must have always existed, and existence must not have had a beginning. However, it is now accepted as the standard model of

cosmology that the existence of the universe did have a beginning in an energy explosion. (Gamow, 1954; Silk, 1989; Hawking, 1998) It is furthermore accepted that the structure of the universe is a product of this energy explosion. (Silk, 1989, p.123) Therefore, provided this theory is correct, then the answer to this question must be yes - a state with structure can emerge out of a state with no structure. How does this occur?

III. ENERGY

Let us assume that the standard model of cosmology is correct, and that the universe did originate with an energy explosion. If that is so, then everything in the universe is a product of this energy explosion. Massless energy-forms that exist are a product of the energy produced in that explosion. Massive energy-forms that exist are a condensed product of the energy produced in that explosion (Einstein, 1952, p.p. 67-81). Space is a relation among these massive and massless energy forms. "On the basis of the general theory of relativity, ... space, as opposed to what "fills space", which is dependent on the co-ordinates, has no separate existence." (Einstein, 1961, p.176). Time is interconvertible with space, and as such, is also a relation among energy forms. "...Under these conditions, the natural laws satisfying the demands of the (special) theory of relativity assume mathematical forms, in which the time co-ordinate plays exactly the same role as the three space co-ordinates." (Einstein 1961, p.63) Life is an energy process. Living things are objects of mass, which is bound energy, motored by free

energy. "A flux of energy was the impetus behind the initiation and maintenance of the dynamic state of matter that we recognize as living." (Fox, *Energy and the Evolution of Life*, 1988, p.74) (Cf: Laszlo, 1996, p.83) Human thought is an energy-form effect. Thought is produced by the brain. The brain is an object of mass, and mass is an energy-form. The mind itself is the brain in action. "The main evidence that mind is a process carried out by brains is that there are clear links between particular physical regions of the brain and particular aspects and functions of the mind." (Cohen and Stewart, 1995, p. 170; Cf: Edelman, 1992, p.239) Products of thought, such as concepts, categories or propositions, are energy-form effects, being products of the brain. Systems of thought, such as logic, mathematics, science, philosophy, religion, or ethics are energy-form effects, being products of the brain, as well. Actions and creations of objects of mass are products of energy-forms. Artists, for example, are energy-forms, and their creations are, therefore, energy-form effects. To reiterate, if the universe is a product of an energy explosion, then all of existence is reducible to energy, and consists of energy-forms and their interactions in space and time. Even if the current standard model of cosmology proves not to be correct and it is shown that the universe did not have a beginning, then provided that the theory of relativity remains intact, then it, itself, would nevertheless reduce all aspects of existence to energy-forms, and their interactions.

In light of these implications of modern science, it is interesting to note that the connection between existence and energy was first made by Aristotle, who equated energy with "actuality". (Aristotle, 1941; Edwards, 1967, V.2, p.511)

Energy-form interactions can be categorized as ranging from constructive to destructive, in relation to each energy-form involved in the interaction. An interaction is constructive to an energy-form to the extent it increases the energy of the energy-form. For the purposes of convenience, let us also include interactions with zero energy gain under the category of constructive interactions. An interaction is destructive to an energy-form to the extent it decreases the energy of the energy-form. The total energy of an energy-form interaction remains constant, in accordance with the law of conservation of energy (Clausius, 1865). Therefore, to the extent that some energy-forms increase in energy in an energy-form interaction, some other energy-forms tend to diminish in the interaction.

This categorization is not common in physics or other sciences. However, since all energy-form interactions involve either a gain or loss of energy, with zero-gain being included in the gain category, the categorization is complete. Furthermore, as shall soon be seen, it is key to understanding the metaphysics of value.

If at least two energy-forms are involved in an interaction, the interaction may be:

a. Constructive to both energy-forms involved, at the expense of other energy-forms;

b. Destructive to both energy-forms involved, to the benefit of other energy-forms; or

c. Constructive to one energy-form and destructive to the other.

IV. ORIGIN OF COMPLEXITY

As one variant of constructive interaction, energy-forms can interact constructively by combining into more complex energy-forms. The origin of the complexity of the universe may be found in such constructive energy-form interactions. Without constructive interactions, mutually destructive interactions would maintain the symmetry of chaos as a field of uniform energy activity without structure. (Prigogine and Stengers, 1984, p.124) Constructive interactions break the symmetry of chaos, and from the broken symmetry of chaos arises the complexity of the universe. (Cf: Stewart and Golubitsky, *Fearful Symmetry*, 1993; Waldrop, *Complexity*, 1993; Fox, 1988; Frautschi, 1982; Alvarez de Lorenzana and Ward, 1987) Systems theorist Ervin Laszlo describes essentially the same process in terms of convergence, writing that:

> "The empirical evidence for this process is indisputable. Diverse atomic elements converge in molecular aggregates; specific molecules converge in crystals and organic macromolecules; the latter converge in cells and the subcellular building blocks of life; single-celled organisms converge in multi-cellular species; and species of the widest variety converge in ecologies." (Laszlo, 1996, p.54)

The specific mechanism for the origin of complexity is not certain. At the moment of origin, the universe was either at a state of equilibrium or not.

If at equilibrium, then it was at a state of perfect symmetry of chaos as a field of uniform energy activity without structure. At this state, energy-forms interacted without yet

forming structures. Interaction without structure is interaction without order. Therefore, energy-forms in this state interacted without order. They were at a state of "disorder and maximum symmetry". (Prigogine and Stengers, 1984, p.124) Interaction without order is random interaction. Therefore, energy-forms at the state of the perfect symmetry of chaos interacted randomly. Most such random interactions would have likely produced unstable results, without any resulting combination of energy-forms. However, as a chance result of random interactions in chaos, some interactions may have produced stable structures of combined energy-forms. These would be the first complex energy-forms. Since the complex forms would differ from the simple forms surrounding them, the symmetry of chaos would be broken by this first emergence of complexity. Through further interactions, the complex forms may have by chance combined into yet more complex and stable structures with other forms, thereby further increasing the complexity of the universe.

The alternative is that the universe originated in a state of non-equilibrium. In this case, structure emerged discretely from nothing at the moment of creation. Non-equilibrium is itself a state of structure, since it consists of different parts having different qualities. In this alternative, the seed of structure was present at the origin of the universe and grew from there through the same processes as in the first alternative.

In either alternative, the emergence of structure is an improbable process. The only question is where the greater improbability lies.

In the first alternative, the greater improbability lies in structure emerging out of

equilibrium. Equilbrium is a state of "maximum probability" (Boltzmann, 1872; Prigogine and Stengers, 1984, p.124). Therefore, movement away from equilibrium is a movement away from maximum probability. However, since equilibrium is a state of probability, not of necessity, movement away from equilibrium is a matter not of impossibility but of improbability. It can occur, although the chances of occurrence are presumably lower than for a state that is already at non-equilibrium. Nonequilibrium itself is "a source of order", as Prigogine and Stengers say. (1984, p.180)

In the second alternative, the greater improbability lies in structure emerging out of nothing. Although the movement from non-equilibrium farther away from equilibrium is more likely, the possibility of a universe that already began at a state away from equilibrium is less likely. After all, non-equilibrium is structure. Structure is complexity. The more complex a state, the less likely is it to arise spontaneously out of nothing. An electron is more likely to arise spontaneously as a quantum fluctuation than a building. Likewise, a simple universe is more likely to arise spontaneously out of nothing than a complex universe.

Thus, in either alternative, the origin of structure is a result of an improbability - either of structure arising out of equilibrium, or of structure arising out of nothing.

The solution that has been proposed by the standard inflationary model of cosmology is a compromise. The universe began in a state of equilibrium, but not perfect equilibrium. Perfect equilibrium is not possible, because of quantum fluctuations.

"If the universe became too homogenous, the galaxies could never form. The

rapid-expansion phase boosts the ever present quantum fluctuations up to macroscopic scales. Quantum fluctuations are inevitable, for the simple reason that a particular quantum of energy can never be precisely localized: given the probability of locating something at some time, this inevitable uncertainty translates into energy fluctuations on the microscopic scale of the quantum itself. From these fluctuations, when inflation is over, emerge density fluctuations on the scale of galaxies. We shall see that from these occasional deviations from uniformity, at a level of only about one part in ten thousand, galaxies - indeed all large-scale structure in the universe today - originated." (Silk, 1989, p.123)

Since perfect equilibrium is not possible, perfect symmetry is not possible in the fabric of the universe. It is from this broken symmetry that structure emerges.

"Once, seconds after the singularity, the universe was highly symmetric. It is very important that the universe was not completely symmetric, however - our existence depends on it! Yet the lesson we learn from particle physics is that the universe began in a symmetric state. Elementary particles come into existence when the symmetry is broken, as the universe cools down." (Silk, 1989, p.139)

The emergence of structure however is not sufficient in itself to ensure its survival. Constructive interactions go on alongside of destructive interactions. Complexity is created and destroyed. Therefore, for complexity to have been maintained, it must have reached a sufficiently positive balance between constructive and destructive interactions, to maintain the stability of at least some complex energy-forms, and allow for further

development of complexity by further constructive interactions of energy-forms. States close to equilibrium generally tend towards the equilibrium, with destructive interactions outweighing the constructive ones. At this level, "perturbations or fluctuations have no effect because they are followed by a return to equilibrium." (Prigogine, 1997, p.63) States far enough away from equilibrium may actually tend further away from equilibrium, with constructive interactions outweighing the destructive ones, and structure growing, rather than decreasing. "We know that far from equilibrium, new types of structures may originate spontaneously. In far-from-equilibrium conditions we may have transformations from disorder, from thermal chaos, into order." (Prigogine and Stengers, 1984, p.12) Therefore, the presence of complexity in the universe means that constructive interactions must have sufficiently outweighed the destructive interactions to reach a level far enough away from equilibrium to preserve and extend the growth of complexity.

There is a paradox in this description. The second law of thermodynamics states that the entropy of the universe increases. (Clausius, 1865) Entropy is considered to be a movement towards disorder. Symmetry, however, is order. (Cf: Stewart and Golubitsky, 1993, p.5) Therefore, if the universe originated at or near a state of perfect symmetry, it originated in a state at or near perfect order, and degenerated from there, in accordance with the second law of thermodynamics. Consequently, the appearance of structure in the universe is the appearance of disorder, which broke its perfect or near perfect symmetry. Therefore, what we have previously described as the perfect symmetry of chaos is also to be considered the perfect symmetry of order.

How are we to reconcile the structureless or the near-structureless nature of the early universe with the idea that this lack of structure was in fact presence of order?

Furthermore, how are we to reconcile the appearance of structure in the universe with the idea that the origin of structure was the origin of disorder?

Lastly, how are we even to make sense of the second law of thermodynamics which suggests that the universe began at or near the state of perfect order, that this order was broken by the appearance of structure, but that this structure shall again be dissipated through the workings of entropy until we again reach a state of equilibrium without structure, which shall again be a state at or near perfect order?

This appears to be the operation of the second law of thermodynamics whether the universe is open or closed. The second law of thermodynamics suggests that the universe began in a compressed, high temperature equilibrium without much structure, then broke into structures, which broke the symmetry and equilibrium, but which shall ultimately be reduced to another state of equilibrium without much structure. (Silk, 1989, p.176)

If the universe is open, then its final state shall be a diffuse, low temperature equilibrium without much structure. As Joseph Silk puts it:

> "...in an open universe, galaxies are destined to run down, and stars are destined to burn out, never to be reborn. ...Space will become blacker and blacker. ...Eventually, all matter will become utterly cold, attaining a temperature of of absolute zero. All forces will fade and disappear, until a state is reached where

nothing will ever change again." (1989, p.p.388-389)

If the universe is closed, then its final state shall be a compressed, high temperature equilibrium, again without much structure.

"After attaining a finite size, the universe will eventually begin to recollapse. ... As the collapse unremittingly continues, in what has been aptly labelled the big squeeze, all structure will be destroyed. The universe will collapse into a dense, hot soup of compressed matter." (Silk, 1989, p.p.389-390)

In either event, the second law of thermodynamics suggests that the universe began in a high state of order without much structure, has dissipated towards disorder through the formation of structures, but shall ultimately end up in a state of order without much structure. In other words, entropy broke the simplicity of the universe into structures, but shall continue braking the structures, until the universe returns to a state of simplicity. Therefore, it seems that the law of entropy is a movement from simplicity to complexity to another state of simplicity. Complexity, therefore, seems to be an intermediate step in the movement from simplicity to another state of simplicity. If simplicity is a perfect form of order, then the second law of thermodynamics cannot be said to be a movement merely from order to disorder, but a movement from order to disorder back to order.

How then are we to consider a state of perfect chaos, without structure, as a state of perfect order, without structure? It is here that the distinction between internal and external order comes in. A state of chaos has no internal order or structure. It is perfectly

simple. It has only external order, which constitutes its external boundaries. If, in the beginning, the universe was at or near a perfect state of chaos, then it was at or near a perfect state of symmetry and simplicity. It had no internal order. It had only external order which differentiated it from nothingness that surrounded it. Therefore, if the second law is to be interpreted as movement from order to disorder, at least until the final stages of the universe, then a state of external order only must be interpreted as a state of greater order than a state of internal order. Since order can only be external or internal, a state of pure external order is the greatest state of order. A state of pure external order is a state of perfect inner symmetry, which is a state of perfect inner unity. It is a state without any inner structure or order, and therefore, a state of perfect inner chaos. Therefore, a state of perfect inner chaos is a state of perfect external order.

Internal order breaks the inner symmetry of chaos. The internal unity is broken into parts. Therefore, a state of internal order is a state of broken inner unity and symmetry. It is consequently less ordered than a state of pure external order. A state of internal order can still have the unity of interconnectedness of its component parts. But that is a fractured unity, which lacks the perfect symmetry of simplicity found in a state of pure external order.

Paradoxically, therefore, if the the second law of thermodynamics is to be accepted, order decreases with the appearance of structure. Therefore, the level of maximum disorder is the level of maximum structure, which is the level of maximum complexity. This may be described as the level of turbulence. Turbulence is our most

common picture of chaos. However, turbulence is in fact a highly complex state of structure.

> "For a long time turbulence was identified with disorder or noise. Today we know this is not the case. Indeed, while turbulent motion appears as irregular or chaotic on the macroscopic scale, it is, on the contrary, highly organized on the microscopic scale. The multiple space and times scales involved in turbulence correspond to the coherent behaviour of millions and millions of molecules. Viewed in this way, the transition from laminar flow to turbulence is a process of self-organization."
>
> (Prigogine and Stengers, 1984, p.p.141-142)

Turbulence is a state of non-equilibrium, with different parts having different qualities. It is therefore actually less chaotic than a state of equilibrium, where all structure is dissipated. Thus, maximum disorder is actually reached at the level of maximum complexity of structure, which then destroys itself in a return to maximum simplicity, without structure. Paradoxically, therefore, the state of maximum internal chaos is the state of maximum external order. The state of maximum internal chaos is also the state of maximum internal symmetry. "...symmetry and chaos - pattern and disorder - can co-exist naturally within the same simple mathematical framework." (Stewart and Golubitsky, *Fearful Symmetry*, 1993, p.240) The appearance of structure is the appearance of internal order in the universe, which actually reduces its external level of order, by breaking the symmetry, the unity and the simplicity of the universe, thus reducing its

overall level of order. The dissipation of structure is therefore a return of the universe to a state of maximum external order, which is the greatest state of order.

Given that both simplicity and complexity can be forms of order, we should separate order into the order of simplicity and the order of complexity. The distinguishing feature of the two types of order is that there is no structure within the order of simplicity, while there is structure within the order of complexity. The order of simplicity is present only on the level of the whole. The order of complexity is present also on the level of its parts. If an object is simple, there is no structure within it. Therefore, there is no order within it. The object on the whole can be said to be in order, but nothing inside the object is in any kind of order. Absence of order is chaos. Therefore, a simple object is essentially a boundary drawn around chaos. A complex object is ultimately a structure of simple objects, which in turn are boundaries drawn around chaos. Therefore, the law of entropy describes how the undifferentiated totality of chaos is broken into boundaries of chaos, and how these boundaries are ultimately broken in a return to chaos. Thus, complexity arises from broken simplicity, and simplicity arises again from broken complexity.

The paradoxical relation between simplicity and chaos may also be described in terms of algorithmic complexity. An algorithmic sequence, such as 101100101, is maximally simple when it is maximally compressed, with no redundant instructions left for executing its function. As Stuart Kauffman notes: "If we could detect and remove all the redundancies, the result would be a minimal program that is maximally compressed. It would be patternless - no more redundancies could be sqeezed out of it. It follows that

any such minimal program cannot be distinguished from a random sequence of 1 and 0 symbols!" (1995, p.p.153-154) Thus, a maximally simple algorithm becomes indistinguishable from a random, chaotic sequence. In this way, a maximally simple algorithm can too be considered to be a boundary drawn around chaos.

V. ORIGIN OF VALUE

The energy-forms which interact in space and time, undergo an increase or decrease in energy consumption at each other's expense. From subatomic particles to living things, all energy-forms interact and either gain or lose energy in those interactions. An electron that gains energy in consuming a photon and a predator that gains energy in consuming its prey are both examples of the same general process of energy consumption. The only exception is an interaction in which no energy is transferred, but, as previously postulated, this shall be classed with the interactions in which energy is gained - the gain in such a case being zero.

The energy forms that increase in energy consumption in an interaction, experience an increase in their existence, while those that decrease, undergo a decrease in existence, with the possibility of eventual extinction. The extent of energy of an energy-form may be categorized as its power. Since the extent of energy of an energy-form is the extent of energy over time, power is the extent of energy over time, as it is defined in physics. Since the extent of energy of an energy-form is its power, a tendency towards

power of some energy forms is a tendency towards success and greater continued existence, while a tendency away from power is a tendency towards failure and possible extinction.

The power of an energy form is the extent of its energy. Energy forms existence. Therefore, the power of an energy-form is the extent of its existence.

Over the course of existence, more and more of those forms of energy which tended towards a diminution in power became extinct, while those which tended towards an increase in power, came to occupy a greater and greater share of the sum total energy of existence. This process may be described as a process of natural selection, in which a tendency towards power is a tendency towards survival and success in existence, while a tendency against it is a tendency towards failure and extinction.

The concept of natural selection as used here is to be distinguished from its related concepts of reproduction and evolution. As shall be discussed further below, evolution is the effect of natural selection on reproduction. However, natural selection can occur without reproduction, in which case evolution does not occur. It is just that without reproduction, the effects of natural selection are limited to the individual energy-form selected, and are not passed on to subsequent forms. Thus, an animal that kills its competitor for food is naturally selected over the competitor, but unless the animal reproduces, it can play no role in the evolution of its species. As Stuart Kauffman says in *The Origins of Order*, "...cell division is not essential to Darwin's argument about selection leading to the overgrowth of one form compared with another. Continued evolution,

however, does require heritable variation." (1993, p.389)

From the struggle for power arise the effects of good and evil - good to those who succeed and evil to those who fail. In relation to each energy-form, "good" may be categorized as success and "evil" as failure in the struggle for power. Although these definitions do not appear to accord with many of the modern usages of "good and evil", it is my intention to show in the course of this work how the complexities of modern usage of these and other terms of value are reducible to these fundamental categorizations of energy-consumption.

It should be pointed out that value is to be distinguished from the ability to value. Value is what is good. Negative value is what is not good. The ability to value is the ability to distinguish between what is good and what is not good. Value can exist without the ability to value. A being can be exposed to something of value, without being able to value it. Non-living energy-forms have no ability to value, while living energy-forms do. Thus, for instance, while an absorbed photon is of value to the preservation of an electron, the electron obviously has no ability to value the photon. Conversely, consuming prey is of value to the predator and the predator is able to value the prey. In fact, as shall be further discussed below, the ability to value is a primary empirical distinction between the living and the non-living.

The effects of an energy-form interaction can be categorized as ranging from positive, to negative in relation to each form involved in the interaction.

a. The effect is positive to the extent it tends towards the well-being of the

energy form.

b. The effect is negative to the extent it tends against the well-being of the energy-form.

c. The effect is neutral otherwise.

The well-being of an energy-form can be defined as the preservation or extension of the boundaries of its existence, which are the boundaries of its energy.

a. To the extent that an energy-form interaction increases the energy of an energy-form, the effect is positive to that form.

b. To the extent that an energy-form interaction decreases the energy of an energy-form, the effect is negative to that form.

c. The effect is neutral otherwise.

If in an interaction, an energy-form gains energy from one source, but loses energy from another source, then the value of the interaction to the energy form is determined by whether an interaction results in an overall gain or loss of energy to the energy-form. The overall gain is measured by quantity over time. The longer an energy form gains a quantity of energy, the greater its overall gain.

Since, an interaction is constructive to an energy-form to the extent it increases the energy of the energy-form, and since to the extent that an energy-form interaction increases the energy of an energy-form, the effect is positive to that form, then to the extent an interaction is constructive to an energy form, the effect of the interaction is of positive value to the energy form.

The well-being of an energy form is the extent to which it constructively interacts with other energy forms. The well-being of an energy-form is the preservation and extension of its boundaries of existence. An energy forms constructively interacts with other forms to the extent it preserves or extends its boundaries of existence in those interactions. Therefore, the well-being of an energy form is the extent to which it constructively interacts with other energy forms.

The extent of power of an energy form is the extent of its well-being. The power of an energy form is the extent to which it constructively interacts with other energy forms. The extent to which an energy-form constructively interacts with other energy forms is the extent of its well-being. Therefore, the extent of power of an energy form is the extent of its well-being.

The freedom of an energy-form forms the boundaries of its power. Therefore, the freedom of an energy form is the extent of its well-being. Freedom is the other side of power. Power is the internal ability and freedom the external lack of constraint to express it. The two are interconvertible as mass and energy. The greater the power of an energy-form, the less constraints can inhibit it, so the greater its freedom. The greater the constraints, the lesser is freedom and power. Internal power depends on the external environment. Superman was just a man on Krypton. The greater the external power, the more it compresses the boundaries of freedom. Power is the source of freedom. The more power an energy-form has, the more it is free to do. Striving for freedom is a struggle of the internal power against the external. To counteract external pressure,

internal pressure is needed. Freedom is the domain an energy-form wrests from the external world.

Power, freedom and energy are interconvertible categories in the categoric attribution scheme proposed here. Each can be expressed in terms of each other. However, the terms are used in different contexts in ordinary speech, and I shall attempt to respect that usage throughout this work.

An individual object is a sum of the constructive and destructive interactions of its component energy-forms. As will be discussed further below, an object is here postulated to be anything that exists and that is attributed unity by a subject.

An interaction, which is initially constructive to an object, may be destructive overall, if the end-result of the interaction is a net loss of energy to the object. An individual object is a locus of energy interaction, sufficiently stable and important to a subject to be attributed the unity of an object, as shall be further discussed below. The attribution of unity to a previously undivided manifestation of reality does not affect the flow of energy through the manifestation. An energy interaction may temporarily increase the energy of a particular energy form, as the energy flows into the form, but in the end decrease it, as the energy flows out of the form, as a consequence of the initial interaction. A stroke of lightning, for example, increases the energy of a man before destroying him. Likewise, a high glucose diet may temporarily increase the energy of a man, but in the end weaken his health, reduce his strength and therefore, his energy level. An interaction may also cause both positive and negative short-term effects before

resolving into an either a positive or a negative result overall. Exercise, for instance, first raises the one's energy level through stimulation, then decreases it through fatigue, but in the long run ends up maintaining or increasing one's overall level of power and energy.

The well-being of an object is determined by the extent to which its component interactions produce a positive balance of energy, in interactions with each other and with the rest of reality. A large conglomerate of energy forms may have a lower positive balance of energy than a smaller conglomerate, if its componenent energy forms interact more destructively with each other or with the rest of reality. Therefore, a larger conglomerate of energy-forms may have a lower balance of power, and therefore a lower degree of freedom and well-being than a smaller, but a more powerful energy-form. Thus, an overweight man may be weaker than a fit man, although consisting of a larger conglomerate of energy forms. A larger manifestation of reality, attributed unity by a subject, may have a lower positive balance of energy, and therefore, of existence, power and freedom, than a lesser manifestation. What determines the well-being of an object is not so much its quantity of energy-forms, but how they interact.

VI. NATURAL SELECTION

Natural selection is a process in which some individual energy-forms preserve or extend the bounds of their existence at the expense of other energy-forms. As previously stated, the concept applies both to forms that do and that do not reproduce. As such, it

applies to both biological and non-biological forms. The difference between the two in this respect is that the advantage gained by biological forms through natural selection may be passed on to their progeny, while the advantage gained by non-biological forms cannot be transmitted through reproduction.

Natural selection of an energy-form occurs to the extent the energy-form constructively interacts with other forms. To the extent an energy-form preserves or extends the bounds of its existence at the expense of other forms, it constructively interacts with the other forms. On the other hand, an energy-form is displaced in an interaction with other energy-forms to the extent the interaction is destructive to the energy-form.

Natural selection of an energy form occurs to the extent it achieves well-being at the expense of other energy forms. Natural selection is a process in which some energy forms preserve or extend the bounds of their existence at the expense of other energy forms. The well-being of an energy-form is the preservation and extension of its boundaries of existence. Therefore, natural selection is a process by which some energy forms achieve well-being at the expense of other energy forms.

Energy forms displace other energy forms either directly or indirectly. Energy forms displace other energy forms directly through destructive interaction with those forms. An energy form destructively interacts with another form to the extent it destroys or consumes it. Energy forms displace other energy forms indirectly through destructive interaction with the energy sources of those forms.

Energy sources are energy forms also, and natural selection acts upon energy sources through the same principles that it acts upon the energy forms that consume them. I.e., energy forms preserve and extend the bounds of their existence by destructively interacting with other energy forms, or with the energy sources of those forms.

Natural selection is a process by which energy-forms with a greater power to consume energy tend to displace energy-forms with a lesser power to do so.

Natural selection occurs to the extent that energy-forms depend on the same limited energy sources for well-being. If the total amount of energy for a set of energy-forms is limited, then to the extent the well-being of one energy-form increases, the well-being of some other decreases. In fact, an increase in the well-being of one energy may result in complete displacement and extinction of another form. The extinction of one form may be the result of the extension of existence of another form. Every day new species are extinguished in the Amazon rainforest, so that MacDonald's can make more burgers for us.

Natural selection has generally been described in terms of the survival of the fittest (Darwin, 1994, p.63; Dawkins, 1991). Survival, however is a function of well-being. The greater the well-being of an energy-form, the greater its survival, and the lower the survival of the competing forms. Survival and well-being are therefore interconvertible in this manner.

Natural selection is in effect between: (Darwin, 1994, p.p.48-105, ch. *Struggle for*

Existence and *Natural Selection*; Dawkins, 1991, p.p. 169-195, ch. *Constructive Evolution*)

a. Energy forms that compete for the consumption of other energy forms, to the extent that one form has a greater power to consume energy than another form;

b. Energy forms that consume or destroy other energy forms, to the extent that some forms directly render other forms extinct; and

c. Energy forms that are consumed by other energy forms, to the extent that one form has a greater power to resist or avoid consumption than another form.

Natural selection occurs to the extent that:

a. One energy-form has a greater power to consume energy than another form, (Cf: Darwin, 1994, p.50; Dawkins, 1991, p. 134)

    i. Avoidance or resistance to consumption by some forms, adds to the power to consume other forms. (Cf: Dawkins, 1991, p.179)

b. Some energy-form are more numerous than others and consume more energy than others by the force of numbers, (Cf: Dawkins, 1976, p.179) or

c. Some energy-forms constructively interact to combine into more complex energy-forms with greater power to consume energy than other forms. (Cf: Alexander, 1986, p.66)

The development of complexity in energy-forms is a result of natural selection.

Natural selection is a result of energy-form interactions in chaos. Most interactions produce unstable results. But the ones that succeed, produce stable energy-forms. "Darwin's 'survival of the fittest' is really a special case of a more general law of *survival of the stable*. ... The earliest form of natural selection was simply a selection of stable forms and a rejection of unstable ones." (Dawkins, 1976, p.p.13,14) These stable energy-forms that arise through random interaction but persist due to the stability of their structure may be equivalent to what Stuart Kauffman refers to in *The Origins of Order* as the spontaneously ordered forms. (1993) In Kauffman's view, these forms are the starting points of natural selection - stable, ordered forms arise spontaneously and only then become subject to the pressure of selection. As he says: "Much of the order we see in organisms may be the direct result not of natural selection but of the natural order selection was privileged to act upon." (1993, p.173) However, in the more general sense used here, selection begins earlier, when stable forms are naturally selected over the unstable ones. In this more general sense, the origin of order is itself part of the process of natural selection. It is the selection of stable over the unstable energy forms. These energy-forms compete with other forms for energy consumption. Most forms become extinct. But those that succeed, fill the niches of energy consumption. As the more simple niches are filled, other simple energy forms that are produced, tend to fail, while some of the more complex energy forms, that are produced, tend to fill the more complex niches of energy consumption. "That the history of life shows a supposed rise in complexity in some forms is no more than a contingent consequence of the fact that the world filled up,

and so new options required new adaptations." (Ruse, 1986b, p.20; Cf: Prigogine and Stengers, 1984, p.194)

It should be noted, however, that complexity can decrease as well as increase as a result of natural selection. It depends on whether the greater complexity or the greater simplicity of the competing energy-forms tends more towards constructive interaction in the circumstances. Organs and other adaptations can atrophy as well as develop. The eyes of the mole, the legs of the snake and the tail of the human are examples of adaptations that have partially or completely atrophied. "Organisms may readily be selected to become smaller, simpler, or less aesthetically appealing; internal parasites, for example, are often considered to be degenerate relative to their freeliving counterparts or ancestors..." (Bell, 1997, p.144-145) Therefore, although the development of complexity in energy-forms is a result of natural selection, it is not the only result that can occur as a result of natural selection. Complexity tends to increase as a result of natural selection only to the extent that an increase in complexity of energy-forms tends towards greater constructive interaction of the forms. It tends to decrease in the reverse proportion.

VII. REPRODUCTION

Reproduction of energy-forms is a means of preserving their complexity. (Cf: Dawkins, 1991, p.56; Cohen and Stewart, 1995, p.243) An energy-form reproduces itself through interactions with other energy-forms to the extent it creates another energy-form

of similar structure to itself. Reproduction of a stable energy form is an accident of chaos, a stable resolution of a variety of possible outcomes. Energy forms that are randomly produced out of chaos vary in their ability to reproduce. The forms most able to reproduce are the forms that reproduce the most. The products of the reproduction vary in their degree of similarity to the forms that created them. Of these products, the forms most able to reproduce are again the forms that reproduce the most. Therefore, by a process of natural selection, energy-forms are selected for their ability to reproduce, thereby increasing that ability. "Information cannot be transmitted without loss; therefore, no message can be copied perfectly with certainty. ... variation is a property of self-replicating systems that does not in itself require any special explanation. ... Anything that replicates will do so imprecisely; some of the variants that appear will have altered rates of replication; those that with higher rates of replication will be selected. ... The direct response to selection is therefore always an increase in the rate of replication in given circumstances." (Bell, 1997, p.p.6,20,9)

Through the process of reproduction, the complexity of an energy-form is maintained through production of other energy-forms of a similar level of complexity. Further interactions of the more complex energy-forms with other forms, may lead to random creations of yet more complex, stable energy forms. If those more complex, stable energy-forms are able to reproduce, then a greater level of complexity is preserved through reproduction, which can then serve as a base for random creation and preservation of further complexity of energy forms through constructive interaction.

Reproduction, therefore, is both a development and a base for further development of complexity of energy-forms.

Once again, it should be noted, however, that reproduction is a base for further development of complexity of energy-forms only to the extent that such development tends towards greater constructive interaction of the energy-forms. Reproduction "is always to some degree imprecise" (Bell, 1997, p.6), and the products of reproduction may vary in their complexity to some extent. The products of reproduction are therefore subject to the same processes of natural selection discussed above. These processes may lead to natural selection of either greater or lesser complexity in the products of reproduction, depending on whether more or less complex energy forms tend towards greater constructive interaction in the circumstances.

VIII. EVOLUTION

Evolution is the effect of natural selection on reproduction. As Graham Bell says in "*The Basics of Selection*": "Heritable variation in the rate of replication causes evolution through selection" (1997, p.24). As previously discussed, an energy-form reproduces itself through interactions with other energy-forms to the extent it creates another energy-form of similar structure to itself. Natural selection is a process by which some energy forms preserve or extend the bounds of their existence at the expense of other energy forms. As energy forms reproduce, some products of their reproduction, tend to preserve

or extend the bounds of their existence at the expense of other products. The process is recursive, and with each generation, some energy forms produced tend to extend the bounds of their existence at the expense of other energy forms, while maintaining the sum total of energy, in accordance with the principle of conservation of energy. This is the process of evolution.

IX. GROWTH OF VALUES

The fundamental value of an energy form is well-being. The well-being of an energy-form, as previously described, is the preservation or extension of its boundaries of existence, which are the boundaries of its energy, power and freedom.

The well-being of an energy form is preserved or extended by constructive interaction. An interaction is constructive to an energy-form to the extent it increases the energy of the energy-form. An energy form which is losing energy requires constructive interaction to preserve it. To the extent an interaction increases the energy of the energy form, it increases the boundaries of its energy, power and freedom, which are the boundaries of its existence. Therefore, To the extent an interaction increases the boundaries of the existence of an energy form, the effect of the interaction is positive to the well-being of the energy form.

The well-being of an energy form is a result of the broken symmetry of chaos. The well-being of an energy form is a result of constructive interactions in relation to the form,

and as has previously been discussed, constructive interactions break the symmetry of chaos.

The complexity of the universe increases through constructive energy-form interactions by the process of recursion. Through constructive interactions, energy forms tend to combine into more complex energy forms. The process tends to repeats itself, thereby increasing the complexity of the universe.

As energy forms combine into more complex energy forms, they become further and further split off from the uniform symmetry of chaos, by becoming more and more different from other energy forms. The landscape of reality becomes more and more varied, and less uniformly symmetrical.

As energy forms become more complex, interactions that are constructive to these forms also tend to become more complex. As energy forms become more different from each other, interactions that are constructive to these forms also tend to become more different from each other.

An interaction that is constructive to an energy form is an interaction that is of positive value to the form. As energy forms become more different from each other, the interactions that are of positive value to these energy forms also tend to become more different from each other. An interaction that may be of positive value to one form, may be of negative value to another form.

The fundamental value remains well-being, which is of positive value to all energy-forms. However, as the energy-forms become more complex and specialized, the

interactions of value to them tend to become more complex and specialized. The more complex the interaction, the more particular tends to be its application of value. (Cf: Kauffman, 1993, p.334) On the other hand, the more fundamental the interaction, the more general tends to be its application of value. Interactions of value, therefore, tend to range from the most fundamental and general to the most complex and particular. The more complex the interaction, the more its value tends to vary from energy-form to energy-form. The more fundamental the interaction, the more its value tends to remain constant from form to form. Thus, for instance, cellular respiration is of positive value to all cellular life-forms, while consumption of particular food-stuffs may be beneficial to some life-forms while poisonous to others.

The values fundamental to certain types of energy-forms are the effects of interactions that are constructive to the structure of those energy-forms. To the extent that different energy-forms have certain structures in common, interactions constructive to those structures will tend to be of positive value to those forms. Interactions constructive to certain energy-forms are catalysts that lock into the structure of the form and produce results of positive value to the form, like enzymes catalizing the processes of cellular respiration.

Since complex energy forms are composed of simpler energy forms, an interaction that may be of positive value to one component form, may be of negative value to another component form. Therefore, in situations where two component forms combine, an interaction may be of mixed, positive and negative value to the complex energy-form.

As the complexity of the universe grows, the variety of interactions of positive value grows also. Therefore, as the uniform symmetry of chaos continues to be further broken into the growing variety of complex energy-forms, the variety of interactions that are of positive value to these energy-forms grows as well.

X. CONCLUSION

Value emerges out of chaos through constructive energy-form interactions. Constructive interactions break the symmetry of chaos, and from the broken symmetry of chaos arises the complexity of the universe. The well-being of an energy-form is the preservation or extension of the boundaries of its existence, which are the boundaries of its energy. The complexity of the universe grows through constructive interaction by the recursive mechanisms of natural selection and reproduction. As energy forms become more complex through constructive interaction, interactions that are constructive to these forms also tend to become more complex. As energy forms become more different from each other, the interactions that are of positive value to these energy forms also tend to become more different from each other. Thus, value emerges and grows into a multitude of forms.

CHAPTER II: THE ORIGIN OF THE CONCEPTION OF VALUE

The way that can be spoken of

Is not the constant way.

The name that can be named

Is not the constant name.

The nameless was the beginning

Of Heaven and Earth.

The named was the mother

Of the myriad creatures.

Lao Tzu, 1963, p.1

I. THE QUESTION

What is the origin of the conception of value? Having asked how value first arises in the universe, we now need to ask how the universe begins to conceive of its own value? We shall accordingly discuss the origin of beings capable of conception, the general features of their conceptual apparatus, and its relation to the value of their existence.

The ultimate question that needs to be answered is: what is the origin of the knowledge of value? However, the knowledge of value is notoriously subjective. The

same object often has a different value to different subjects. Therefore, an investigation into the origins of value-knowledge requires an analysis of the relation between subjects and objects, and in particular, an assessment of how subjects conceive of objects.

The knowledge of value is knowledge of what is good. "Good", as will be discussed in the following chapter, is a simple, natural category in most human categoric attribution schemes. To lay the groundwork for that discussion, we shall ask here what categories are simple and natural?

In short, this chapter shall inquire into the qualities of the subjective and the objective, as well as the simple and the natural, in preparation for the discussion of the origin of the knowledge of value to be taken up in the following chapter.

II. EMERGENCE OF SUBJECTS

Energy forms that are randomly produced out of chaos vary in their ability to distinguish between interactions that are constructive and destructive to them. (Mather, 1970; Laverack, 1981; Ayala, 1987) The greater the ability to distinguish between constructive and destructive interactions, the greater is the tendency to seek the former and avoid the latter. Therefore, the greater the ability of an energy-form to distinguish between constructive and destructive interactions, the greater its tendency towards natural selection. (Cf: Gregory, 1981; Brown, 1981; Lorenz, 1975; Riedl, 1984)

Constructive interactions tend towards and destructive tend against the well-being

of the energy-form. Therefore, natural selection tends towards the development of energy-forms that are able to distinguish between what is good and bad for them.

Energy-forms with an ability to distinguish between different interactions may be considered subjects. Therefore, natural selection tends towards the development of subjects.

The greater the ability of a subject to distinguish constructive interactions from destructive interactions, the greater its tendency towards natural selection.

The ability to distinguish between different interactions may be considered cognition. Subjects may therefore be considered beings with cognition. "Cognition is a biological feature that has been moulded by natural selection." (Dukas, *Cognitive Ecology*, 1998, p.1) Cognition varies in complexity from the most elementary to the most complex forms. "The brain evolved gradually from simpler structures that processed information." (Dukas, 1998, p.5)

By definition, as will be discussed later, a subject conceives by concepts. Without concepts, nothing is conceivable to it. Natural selection, therefore, tends towards the development of concepts to the extent that these enable subjects to distinguish constructive from destructive interactions.

As will be discussed further, concepts are objects of meaning. Meaning, therefore, tends to be a product of natural selection.

The ability to distinguish constructive from destructive interactions can be considered to be knowledge of the difference between the two. Knowledge is here

postulated to mean the operational ability to distinguish between different states, rather than the intellectual ability to 'understand' the difference. The greater the subject's knowledge of the difference between constructive and destructive interactions, the greater its tendency towards natural selection. Natural selection, therefore, tends towards the development of knowledge, to the extent that it enables subjects to distinguish constructive from destructive interactions. (Cf: Cosmides, Tooby and Barkow: *The Adapted Mind*, 1992, p.7; Edelman, 1992, p.p. 122, 135, 161; Byrne, 1995) As Karl Popper says in his essay on *Evolutionary Epistemology*: "The specifically human ability to know, and also the ability to produce scientific knowledge, are the results of natural selection." (1984)

It should be pointed out that this discussion is in terms of tendencies which have been realized in certain cases, but which did not have to be realized. This applies in general to all discussions of tendencies. A tendency is a basin of attraction, which, once entered, inclines towards a particular destination. The basin, however, need not have been entered. The number of possible attractors is presumably infinite, while the number of attractors actually entered is presumably finite.

III. CONCEPTS

As previously stated, a subject conceives by concepts. Concepts are objects of meaning which, alone or in combination, form the subjectively attributed categories of

reality and non-existence, the instruments for the operation on such categories, and other entities.

Concepts are the original carriers of meaning. Without concepts, there is no meaning. All other meaning is constructed from concepts.

By definition, without concepts, nothing is conceivable to a subject. The only parts of reality that are conceivable to a subject are those which fall within the concepts possesed by it. Thus, if a subject has no concept of gravity, gravity is inconceivable to it.

About reality, in itself, nothing can be said. Every statement about reality is an application of concepts to it. We can only speak of reality conceptualized. This does not mean that reality in itself does not exist, simply that, by definition, it cannot be conceived without the use of concepts. Neither does this mean that reality in itself does not have structure, simply that, this structure, again by definition, cannot be conceived without the use of concepts (Cf: Lorenz,1975; Campbell, 1988; Buskes, 1998; Allan Goldman, 1988, p.214).

The idea of reality in itself being inconceivable goes back at least to Kant (1958) and has been endorsed by a number of writers since, including Carnap (1967), Kuhn, (1962), Swoyer, (1982), Goodman, (1978) Feyerabend, (1962) and Korner (1984), as has been reviewed by Steven Edwards (1990).

Edwards (1990, p.p.99, 102), and Davidson (1984) have argued that since unconceived reality cannot be experienced, it cannot be held to exist. However, the reason that unconceived reality cannot be experienced is because reality that is

experienced by a subject is automatically conceived, i.e., processed through the subject's conceptual apparatus. "Objects of experience may not be separable from the conceptualization of them." (Edwards, 1990, p.91; Goodman, 1978) The difference between conceived and unconceived reality is not physical but logical. By being processed through a subject's conceptual apparatus, unconceived reality becomes conceived. There are not two separate realities: the conceived and the unconceived. There is one reality, which in relation to a subject is conceived, and in no relation to the subject is unconceived.

The reason we need the idea of unconceived reality is to avoid falling into Berkeley's paradox that reality can only exist if conceived. (Berkeley, 1965) For all we know, beings capable of conception need not have developed in the universe. Presumably they were not there in the beginning. That did not prevent the universe from originating, although it did at the time prevent it from being conceived by anyone.

Likewise, the reason we need the idea that unconceived reality may still have structure, albeit unconceived, is to avoid falling into the paradox that reality is given structure through conception. We give structure to our conception of reality, not to reality itself. A mountain has structure, whether it is conceived or not, and would continue to have structure on a desolate planet. Likewise, a planet has structure, whether it is conceived or not, and so does the universe. The structure would simply not be conceived, if there was no one to conceive it. As Konrad Lorenz has put it: "Any person not 'sicklied o'er with the pale cast' of philosophical thought will regard it as utterly perverse to believe

that the everyday objects around us only become real through our experience of them. Any normal man believes that the furniture in his bedroom is still there after he has left the room. The scientist who knows about evolution is firmly convinced of the reality of the external world; the sun shone for ages before there were eyes to see it. Whatever lies behind our ideational forms of space and the empirical principles of causality may have existed from the befinning of time." (1977, p.15)

As will be discussed further below, conception is a physical process, adapted through natural selection to its environment, in the same manner as locomotion. Conception does not create the environment any more than locomotion does. It adapts to the environment that exists already. Although then, of course, by becoming a part of the environment, it adds to the environment. As Konrad Lorenz notes with respect to the philosophers who have fallen victim to the paradox that conception actually creates the structure of reality: "To everyone it is self-evident that water possesses its properties independently of whether the fins of the fish are biologically adapted to these properties or not. Quite evidently some properties of the thing-in-itself which is at the bottom of the phenomenon "water" have led to the specific form of adaptation of the fins which have been evolved independently of one another by fishes, reptiles, birds, mammals, cephalopods, snails, crayfish, arrow worms, etc. It is obviously the properties of water that have prescribed to these different organisms the corresponding form and function of their organ of locomotion. But when reckoning in regard to structure and mode of function of his own brain the transcendental philosopher assumes something fundamentally

different... " (*Kant's Doctrine of the A Priori in the Light of Contemporary Biology,* 1975, p.p.187-188)

There is no contradiction in stating that reality has structure, whether it is conceived or not, but that the structure can only be conceived through concepts, just as there is no contradiction in stating that reality exists, whether it is conceived or not, but that it can only be conceived through concepts. This statement places a logical limit on the conception of reality, not on reality itself. The logical consistency of this view is clear in the following restatement of this position by Donald Campbell: "While to Lorenz, more than Kant the *Ding an sich* is knowable, it is certainly only known in the knower's categories, not those of the *Ding an sich* itself." (*Evolutionary Epistemology*, 1988, p.428)

Nicholas Rescher (1980) along with Rorty (1972), Goodman (1978) and Davidson (1984) have argued that "No intelligible content can be given to this idea [of] ... thought-independent reality". (Rescher, 1980, p.p.336-337) In doing so, they have confounded the concept with reality. Unconceived reality in itself cannot of course be conceived, and therefore made intelligible. However, the concept of "unconceived reality" is perfectly intelligible. It simply means "reality that is not conceived" and it is very useful specifically for the purpose of avoiding Berkeley's paradox. It is similar to other conceptual tools, such as the concepts of "unintelligible", "incoherent" or "self-contradictory", which also serve to deliniate what can from what cannot be conceived.

Concepts combine to produce various concept-sets which may further combine to

produce new ones. The combinations of concept-sets of interest to us take the form of categories, category-sets, propositions and proposition-sets. Questions, commands and exclamations are some of the other structures of concept combination.

In relation to categories, concepts can be separated into dependent and independent types. A concept is dependent if it can only form categories in combination with independent concepts. Dependent concepts operate on categories in the creation of new categories. The dependent concepts can be logical or non-logical. The most important dependant logical concepts used for the construction of categories are the concepts of conjunction, disjunction and negation. Non-logical dependent concepts appear as prepositions, such as "in", "on" and "very", and in a variety of other forms. Although not prominent in philosophy, the non-logical dependent concepts play a major role in ordinary communication, greatly enhancing the subtlety and complexity of categoric construction. Although dependent concepts are not categories themselves, categories of them can still be formed. Categories of non-categories are possible. For instance, the concepts of "and" as well as "but" fall within the category of conjunction. A number of concepts might also fall within the categories of negation and disjunction.

A concept is independent only if it can form a category in isolation from other concepts. Concepts such as "animal", "living", and "human" are of this nature. Such concepts form our natural categories, and will be discussed further in the section dealing with such categories.

A concept-set consists of one or more concepts. Concept-sets interact during

combination like light-rays in an interference pattern. Areas of meaning which cohere remain light, while those in conflict darken each other out. When more than one coherent pattern of meaning is created by the combination of concepts, ambiguity results. Thus, in a clear concept-set, all meaning is narrowed to a single pattern of coherence. In such a set, the area of a constituent concept-set which is a disjunction of alternative meanings is narrowed by the meanings of the other concepts into a single coherent area of meaning.

The concepts in a set create the context which narrows their own areas of meaning. The context is the semantic interference pattern of a concept-set, delimiting the area of each concept in the set to the portion which can cohere together with the rest.

IV. CATEGORIES

A category is a bounded area of meaning. Thus, two categories with the same boundaries are identical, while all others are different. As a rule, such boundaries can be said to form double rather than single lines around the category. The double lines enclose the area of irregular meaning of a category which shifts into vagueness as it reaches the outer boundaries. "Most, if not all, categories do not have clear-cut boundaries." (Rosch, 1978, *Principles of Categorization*, p.35; Cf: Wittgenstein, 1958, p.36)

"Categories" are here used in the inclusive sense as *any* bounded areas of meaning, rather than in the exclusive sense used by Aristotle and Kant, as a set of certain fundamental bounded areas of meaning.

An object-set is a category only if it has a finite area of meaning under which some things can fall and others can't. A concept such as "everything" excludes nothing, whereas a concept such as "nothing" excludes everything. Thus, neither is a category. Similarly, a disjunction of a category and its negation is a totality, while its conjunction a void. A concept which means everything is too indeterminate to be a category; whereas, one that means nothing lacks sufficient meaning to be one.

For a subject to have a category of an object-set is to be able to distinguish it from other objects. A category of an object-set possessed by a subject is complete to the extent that the subject is able to distinguish the object-set from all other objects. The better a subject distinguishes an object-set from others, the less is the area of vagueness and irregularity in the category of the object-set, and the closer do the two boundaries of the category come to being one.

In the mechanical sense postulated here, categories can be possessed by intelligent and non-intelligent subjects. For instance, amoeba possess categories of food and non-food, the edible and the non-edible.

> "A most rudimentary ability to gather and process information about the environment can be detected in certain single-celled organisms. A paramecium follows a sinuous path as it swims, ingesting the bacteria that it encounters. Whenever it meets unfavourable conditions, such as unsuitable acidity or salinity in the water, the paramecium checks its advance, turns and starts in a new direction. This reaction is purely negative: the paramecium does not seek its food

or a favourable environment but simply avoids unsuitable conditions. A greater ability to process information about the environment occurs in the single-celled alga Euglena, which has a sensitive spot by means of which it can orient itself towards the direction of light. Euglena's motions are directional; it not only avoids unsuitable environments, but it actively seeks suitable ones. An amoeba represents further development in the same direction; it reacts to light by moving away from it and also actively pursues food particles." (Ayala, 1987; Cf: Buskes, 1998, p.34)

As a rule, intelligent subjects aren't distinguished from the non-intelligent by the possession of categories, but rather by the complexity of their categoric frameworks, in conjunction with other properties.

Some of the other requirements of intelligence are the abilities to:

a. Form propositions;

b. Solve problems;

c. Understand;

d. Question; and

e. Judge.

The purpose of the mechanical definition of categories is not to humanize the non-intelligent, but to dehumanize the intelligent, to bridge the gap between the two forms of reality. Both the intelligent and the non-intelligent are constructed from many of the same or similar building blocks of nature. The intelligent has developed from the

non-intelligent by an increase in complexity. The two are not fundamentally and mysteriously different.

Categories form three general relations among them:

a. Analyticity,

b. Consistency, and

c. Incompatibility.

One category is an analytic property of another if and only if the outer boundaries of the latter fall within the former. The outer boundaries of a category are equivalent to a cross-section of all its analytic properties. For instance, if the category "man" had only three analytic properties, namely "human", "not woman", and "not child", then the outer boundaries of "man" would be perfectly defined by the cross-section of "human", "not woman", and "not child". Technically speaking, this is true even when other analytic properties do not fully define the boundaries of a category, since each category falls within itself and is its own analytic property.

Synonymy is a sub-class of analyticity. Two or more categories are perfectly synonymous if each is an analytic property of the others. For instance, if "human" and "homo sapiens" were perfectly synonymous, then each would entail the other.

As mentioned, another name for the analytic relation is entailment. Each category entails its analytic property, as "corpse", for instance, entails its analytic property, "death".

A category can be an analytic property of a non-categoric concept. For instance, the category of conjunction is an analytic property of the dependent concept "and". But

only categories and objects at least partly constructed from categories, such as propositions, can be analytic properties. No other objects have the area of meaning within which objects of meaning can fall.

Two categories are consistent only if their outer boundaries intersect, thus forming a common area of meaning. "Alive" and "human" are two such categories, while "dead" and "alive" are not.

A subclass of consistent categories form associative relationships. One category is an associative property of another only if the inner boundaries of the latter fall within the former, while the outer ones still intersect. In fact, the inner boundaries of a category are a cross-section of all its associative properties. Another name for the associative relation is implication. For instance, ugliness is an associative property of leprosy and is implied by it, but is not entailed by it, since an attractive leper is still analytically possible.

Two categories are incompatible only if their boundaries do not intersect, and they, as a result, have no common area of meaning. Combinations of "tall" and "short", "smart" and "stupid", "dead" and "alive" etc. are of this type, if applied to the same object at the same time.

A category can even be internally inconsistent if it is a conjunction of incompatible categories, whether directly or by entailment.

The idea of analytic relation goes back at least to Kant (1958), and has since been endorsed by a number of writers, including Carnap (1967), Grice and Strawson (1956), and Mannheim (1936).

Willard Quine, in the *Two Dogmas of Empiricism* (1961, p.20), has denied the validity of analytic relation. He argues that it cannot always be determined whether a relation between categories is analytic. For instance, he says, "I do not know whether the statement 'Everything green is extended' is analytic." (p.32) Thus, he proposes that the concept of analytic relation should be abandoned. He argues that "Any statement can be held true come what may, if we make drastic enough adjustments, elsewhere in the system." (p.43) However, the relations between categories, in his view, are established on the basis of pragmatic utility, on the basis of choosing the more "convenient conceptual scheme". (p.45) "Conservatism figures in such choices, and so does the quest for simplicity." (p.46)

There are two difficulties with this proposal. Firstly, simply because it is not clear whether some relations are analytic, does not mean that all relations are therefore not analytic. As Grice and Strawson write, "the existence, if they do exist, of statements about which it is pointless to press the question whether they are analytic or synthetic, does not entail the nonexistence of statements which are clearly classifiable in one or other of these ways" (1956, p.158) It is not clear whether "Everything green is extended" because it is not clear whether "extension" is an analytic property of "color". It probably is upon reflection, since all colored things should be extended (in order to have the room for the paint), but it may only be an associative property, in which case, "extension" is not entailed by "color", but is simply implied by it. In this case, only the inner boundaries of "color" fall within "extension", while the outer ones still intersect. "As is frequent enough in

such cases, the hesitation arises from the fact that the boundaries of application of words are not determined by usage in all possible directions." (Grice and Strawson, 1956, p.153) The analytic relation is much clearer in cases such as "all men are human", or "all humans are animals". To deny analytic relation in these cases would be to contradict oneself, or to change the meaning of words, i.e., to assign different categories to the symbols used to represent them.

Secondly, to abandon the concept of analytic relation would be to abandon a useful way of describing certain relations among categories. How would we be able to distinguish between "man is an animal" and "man is an Irishman" if the distinction between analytic and associative relationships was wiped out? (Cf: Grice and Strawson, 1956, p.146) Why would we choose to make our conceptual scheme less convenient? As Quine says, "Conservatism figures in such choices", and why would a conservative want to change his world-view for no good reason?

Categories range from the general to the particular. If a general category is an analytic property of the particular categories, then all the particulars are conjunctively the general. Thus, blue, green and grey are all colors. The general category may be alternately realized as one or another set of the particular categories. Thus, a color is usually one of blue or green or grey or so on in any particular case.

A category of an object is one under or within which the object falls. Thus, green is a category of grass, and color is a category of green. If something is an object's category,

then let it be postulated that the object may fall under or within it, if it is a concept-set, such as the concept of color for instance; and that otherwise, it can only fall under the category.

V. NATURAL CATEGORIES

As previously discussed, independent concepts are those which can form categories in isolation from other concepts. These are by far the majority. Concepts of objects, ranging from the atom to those of the universe and of most things in between, are of this type.

Since all meaning comes from concepts, and the meaning of categories can't be created from the dependent concepts alone, the independent concepts are required for the existence of categories.

The independent concepts are the original categories. A subject possessing no such concepts does not know the meaning of any categories. All other categories are constructed by the combination of the independent concepts, with or without the use of the dependent ones.

The independent concepts are the natural categories. They are objects, and thus possess a sense of unity attributed to them by subjects, as will be discussed further below. The categories constructed from independent concepts can themselves become natural from frequency of use and whatever other reasons that categories become

natural. Until then, the categories constructed from independent concepts are only collections of objects.

Despite a good deal of research that was initiated by the publication of *Natural Categories* by Eleanor Rosch in 1973, it is not yet clear how natural categories are produced. Consequently, it is difficult to determine which can and which can't be so produced. Because of our ignorance we can't discount the possibility that all could be so produced.

Once produced, however, natural categories of objects tend to be extended to incorporate similar objects. The extended categories may be extended yet again by objects similar to the newly incorporated objects. However, because the objects of the first extension may be similar to the original objects of the category in one way, and similar to the objects of the second extension in another way, the objects of the second extension may have nothing in common with the original objects of the category. That is why natural categories often do not have one common meaning that can be set out in one definition, but rather layers of different meanings that have accumulated over time by the process of analogy. These layers of meaning produce what Wittgenstein called "family resemblances" for different objects that fall within the same natural category. (1958, p.32)

For instance, the natural category of the word "plant", according to the *Barnhart Dictionary of Etymology*, may have been intially derived from the the Latin "planta", which means "the sole of the foot". From this, it acquired the meaning of "plantare", which

means "to drive into the ground with the feet". Later, it acquired the meaning of "what comes out of the ground". The meaning was then expanded to "any living thing that is not an animal". From the general sense of something planted or fixed developed the meaning of "an indistrial plant". And later from the same general sense, developed the meaning of a "spy" that is planted in the midst of the enemy. (Barnhart, 1988, p.802)

Similarly, the natural category of word "spirit" may have been initially derived from the Latin "spirare", which means "to breathe". From this, it acquired the meaning of "the breath of life" which animates all living things. Later, it shed some of its connection with living things by becoming a "supernatural, incorporeal being" that exists in life and in the afterlife. And later from the same general sense, it became the "animating spirit" of a whole manner of enterprises, such as "the spirit of the revolution". (Barnhart, 1988, p.1047)

Lastly, the natural category of the word "web" may have been initially derived from the Old English "webb", which means a "woven fabric". From this, it acquired the meaning of "a web woven by a spider". Later, it also became applied to the rather delicate "material connecting the toes of certain acquatic birds as well as some other animals". Later on became used to mean "a snare or entanglement". And later yet, developed a meaning of "anything flimsy or insubstantial" (Barnhart, 1988, p.1225)

In all these examples, we can see how the meaning of a natural category goes through repeated extensions by analogy to one or another of its features until the objects of the last extension may have no features directly in common with the original objects of

the category. That is how the "sole of the foot" and a "spy", "to breathe" and the "spirit of revolution", or the "woven fabric" and "the feet of a bird" ended up falling under the same natural categories.

For the purposes of construction, the natural categories are put in place by a subject like a framework of two-dimensional geometric figures which are transparent except for the boundaries, and are suspended at different levels above the world. Together, they cover the whole world, overlapping in many places. Light shines through them from above producing a variety of different patterns on the surface of the world. These patterns separate the world into a variety of different figures, which are the categories of the world available to the subject.

A form of this idea also goes back to Kant (1958) and has since been endorsed in one form or another by Quine (1969), Korner (1984), Carnap (1967), Kuhn (1962), Strawson (1959), Mannheim (1936), Swoyer (1982), Goodman (1978), Feyerabend (1962), Wittgenstein (1958), Rescher (1980) and Kraut (1986) as also reviewed by Steven Edwards (1990).

Combinations of different natural categories can replicate the ones already existing. From the bottom, the combination may appear equivalent to the natural category. But from a side, it can be seen that the natural category exists on one plane, while the combination - on a number of different levels. The natural categories on these levels happen to narrow or widen into the figure, which from the bottom appears identical

to the single natural category. This combination is the definition of that natural category.

To the extent that the natural categories used by a subject are different, his categoric framework is different. However, as Stephan Korner has pointed out, all categoric frameworks must have a common core, in order to be considered categoric frameworks. This common core should include, in Korner's view, the principle of non-contradiction, differentiation into particulars and organization into kinds. (1984, p.76, p.89)

Steven Edwards has argued that because all categoric frameworks must have something in common, there can only be one categoric framework. In his view, what are ordinarily considered different categorical frameworks are simply parts of this single general categoric framework, operating by the same core principles. (Edwards, 1990, p.84) However, that is like saying that because all the languages have something in common, such as words and grammar, there is only one language; or that because all animal species have something in common, such as DNA and metabolism, there is only one animal species. Having something in common does not create an identity. Edwards has conflated the point that all categoric schemes must have some categorization principles in common, with a view that they have all the categorization principles in common. It is true that different categoric frameworks have something in common, but that does not turn them into one framework.

Edwards' argument is derived in part from Davidson, who denies "the very idea of a conceptual scheme". (Davidson, 1984, p.183) The argument of Davidson is as follows. "Speakers of different languages may share a conceptual scheme provided there is a

way of translating one language into the other." (Davidson, 1984, p.184) "The failure of intertranslatability is a necessary condition for difference of conceptual schemes." (Davidson, 1984, p.190) But if a foreign language cannot be translated into our language, then there is no evidence to consider the foreign language as a language at all. "a form of activity that cannot be interpreted as language in our language is not speech behavior." (Davidson, 1984, p.186) As Rescher summarizes this argument, "Intertranslatability establishes sameness of conceptual schemes; translatability into *our* lingo is the test criterion for something's being a language, ergo there are no other, genuinely alternative conceptual schemes. The position is that the very idea of "*alternative* conceptual schemes" involves *a contradiction in terms* - to establish that a conceptual scheme is present we must translate into our language, to establish alternativeness the translation must break down." (Rescher, 1980, p.325-326; Cf: Edwards, 1990, p.93)

There are two difficulties with Davidson's proposal. Firstly, schemes that are intertranslatable are not therefore identical. Continuing with our geometrical model of meaning, the world could be divided into a scheme of triangular categories or a scheme of rectangular categories. The fact that triangles could be combined into rectangles, and therefore, the first scheme translated into the second, does not mean that the first scheme is the same as the second, since the two divide the world up differently.

Secondly, translation is not the sole mode of identification of a different language or conceptual scheme. As Rescher points out, "What counts for 'their having a language' is not (necessarily) that we can literally *translate* what they say into our language but that

we be able to *interprete* their sayings" (1980, p.326). Davidson's difficulty arises from the fact that he equates translation with interpretation. To interprete a system as a language or a conceptual scheme does not require that it be translated into our scheme, as long as it can be recognized as a language or conceptual scheme by other means. As Rescher notes, "We knew well from the factual context that cuneiform inscriptions represented writing well before we had decoded them. As any cryptoanalyst knows, we can tell *that* a language is being used, and even a good deal about *how* it is being used, short of any ability to translate." (Resher, 1980, p.327)

VI. SIMPLICITY AND COMPLEXITY

A category is simple only if it is natural, but not equivalent to any positive combination of other natural categories. It is complex otherwise. Thus, a category is simple only if it can't be defined without the use of negation. The nature of positivity and negativity shall be discussed in the following section.

All non-natural categories are complex. All the meaning available to a subject consists of the dependent and independent concepts in his framework. Only categories found among these concepts can be simple. All other categories must be constructed from them. Since the non-natural categories are not concepts, they can't be simple, and can only be used by the subject if constructed from his concepts.

Simple categories can be combinations, so long as no positive combinations of

natural categories are equivalent to them. For instance, the category "green", which is simple in our framework, is a conjunction of "simple and category" as well as a disjunction of "light or dark". Green falls within the narrowed area of the conjunction and the widened area of the disjunction. So it is both of them. However, neither one is necessarily green, since their areas of meaning extend beyond that category. Nor can any positive combination of other available natural categories be constructed which would necessarily be green and vice versa, i.e. - equivalent to green.

Although simple as a rule, natural categories may be complex. It is possible for several natural categories to form a combination equivalent to another natural category. For example, "human" is a natural category which is equivalent to the disjunction of "man, woman or child", all of whose components are also natural.

A category is not simple absolutely, but only within the framework of natural concepts used by a subject. The apparent absoluteness of simplicity stems from the mistaken belief in the soleness of positive definition.

A definition of an object is a description which uniquely refers to that object. Definitions can be positive, negative or correlative. (Cf: Moore, 1903, p.8)

A positive definition of an object is a statement of all that the object is in ontologically positive terms.

A negative definition is a statement of all that an object is not, in ontologically negative terms. Simple and complex categories may be defined by combinations of purely negative categories, whether by conjunction, disjunction, non-logical combinations,

or mixtures thereof. Just as a conjunction of positive categories, a conjunction of negative ones can create a common area of meaning whose boundaries are equivalent to those of the term defined. For instance, the category of good, which is probably simple, can still be defined as something which is neither evil nor neutral. Various combinations of negations might form categories whose disjunction precisely fills out the boundaries of the definiendum from within.

If the number of natural categories is sufficient to create all the possible categories by various combinations, then all the natural categories can be negatively defined by this brute method. By this method, all the possible categories incompatible with the one to be defined are negated, thus defining from the outside the boundaries of that category; while, the categories which are compatible are not negated but simply restricted in their areas of meaning to those parts which fall within the definiendum.

A postulation of the brute method is that all the possible incompatibles of a category hermetically enclose its boundaries of meaning. I.e., All possible meaning produces a field without gaps. Any meaningful space around a category can be filled by other incompatible categories. The field of meaning is like the world, and the incompatibles are like its geographic areas. Any space between two areas automatically becomes a third. Thus all space is necessarily filled by incompatible areas.

A correlative definition is a statement of something, though not everything, that an object uniquely is or isn't, in ontologically negative or positive terms.

Such a definition can be:

a. Purely positive, stating something that the object uniquely is;

b. Purely negative, stating something that the object uniquely is not;

c. Or a mixture, describing a unique combination of things that an object is and isn't.

The mixed correlative definition is the most easily applied of all the types of definition. Such a definition generally places the category to be defined within its analytic property and then negates all the other disjuncts which share that property. For instance, a man might be defined as a human who is neither a woman nor child.

A definition including intermediately negative categories is of the mixed correlative type, since any intermediately negative category has ontologically positive and negative components.

When the number of natural categories is limited, not all of them can be positively defined, although many of those can still be defined correlatively or negatively.

Since after a certain point all the possible categories can be negatively defined, then if all the possible categories were naturally produced, they could also be positively defined. If all the possible categories existed naturally, there would be more than enough to define each negatively simply by negating all the categories falling completely outside the definiendum. Moreover, each negation of a natural category would itself be natural. Consequently, negation would no longer be required to define a natural category. What previously had to be defined by a combination of negations could now be defined by a combination of natural categories. Since all the categories would be natural, and all could

now be positively defined by other natural categories, all categories could now be positively defined.

If all the possible categories were positively definable, then none would be simple, since each category would be equivalent to a positive combination of other natural categories. Even such apparently simple concepts as those of colors are in our framework might possess complexity in another. For instance, if light and dark red were naturally produced, and had their own separate names, such as led and ded, then the concept of red would no longer be viewed as simple, but would instead become regarded as a disjunction of led or ded, which in turn would become the simple categories.

If all the possible categories were natural, simplicity could only be attributed arbitrarily, for the purpose of consistency in definition. I.e., some categories would be postulated indefinable for the purpose of defining others. In reality however, naturalization of all possible categories would destroy their simplicity.

This implies that the discussion of complexity in the first chapter was not in absolute terms, but in terms of the categoric framework used. Complexity was defined as a state with structure, to be contrasted with simplicity, which is a state without structure. As discussed, a state with structure consists of parts, which in turn, may or may not have structure. Within a categoric framework, a state has parts, if the category of the state can be divided into component categories. If the category of the state cannot be divided within a categoric framework, then the state is simple within that framework. Thus, if a state of a homogenous substance is at non-equilibrium, then different parts of the state can be

described by different categories. For instance, a part of the state is at "20 degrees" and another part is at "10 degrees". The category of that state is thus divisible into two component categories of "20 degrees" and "10 degrees", and the state is therefore complex. Conversely, if the state is at equilibrium, then different parts of the state cannot be described by different categories, and the state is simple. However, if a different categoric framework had ways to separate a homogenous state at equilibrium into parts, that state would not be simple in that framework, as will be discussed further below.

VII. POSITIVITY AND NEGATIVITY

Categories can be positive or negative.

A category is negative to a subject to the extent that:

a. It is a category of negation; or

b. Its meaning is understood by the subject to be a negation of a natural category or of a positive combination of natural categories.

A category is positive in the reverse proportion. The meaning of a purely positive category is derived without negation of any other categories. A positive combination of categories is one made without the use of negation. If a category is understood to be entirely of what is or does, in the ontologic rather than the linguistic sense of these terms, then this category is purely positive. Most natural categories are of this type. Thus, "a human" is considered to be purely a category of something that is, "drinking" - purely of

something that does.

Despite their tendency towards the positive, natural categories can still range towards the intermediate, and all the way towards the purely negative.

Intermediately negative categories are understood as negations of positive categories but whose boundaries are restricted from pure negativity by positive analytic properties. An example of an intermediate would be the concept of silence. Although natural, this category is still regarded as something negative, not as something that is but largely as something that isn't. Silence is understood as a negation of speech, which is delimited by the positive analytic property of the capacity for speech.

The negation of an intermediately negative category is intermediately positive. Such negation is not negative to the same extent as the negation of a purely positive category. Thus, "not silent" is not as negative as "not speaking", "not weak" is not as negative as "not strong".

Purely negative categories can be either categories of negation or negations of categories. Categories of negation may be catalogues of the dependent concepts of negation, including the concepts such as "not" and "nothing", as well as the categories of "nothingness" and "non-existence". Even if such categories were naturally created independently of positive categories, they would still be considered purely negative by the subject.

All the negations of purely positive natural categories, such as "life" or "human" and of their positive combinations, such as "human life", which themselves constitute

categories, but don't correspond to any natural categories, nor to any positive combinations of natural categories, are purely negative. For example, the negations of purely positive categories, such as "not life", or "not human" or "not human life" are all purely negative. Since correspondence between such negations and other natural categories is extremely rare, practically all negations of purely positive categories and their positive combinations are purely negative. The closest correspondence that I have found between the negation of a natural category and another natural category is the correspondence between "silence" and the "negation of speech". However, as previously indicated, even this correspondence is only partial, delimited as it is by the fact that silence is a negation of speech only in those capable of speech.

The distinctions between the natural categories and their negations are relative to a conceptual framework. The meaning-producing relation between a category and its negation may be reversed. (Cf: Frege, *Negation*, 1977; Ayer, *Negation*, 1959) The negation, itself, could be naturally created, and the category's meaning could be understood derivatively, by negation. The great scope of meaning covered by most negations doesn't destroy the capability of their creation as natural categories. After all, we do have natural categories, such as reality, the universe and existence, which are nearly all-encompassing.

It is possible for both a category and its negation to have their meanings naturally created. Furthermore, the meanings of both a category and its negation may be naturally created independently of each other, rather than derived one from the other. For instance,

it is conceivable that a subject could learn the meanings of the categories "To be" and "Not to be" separately, rather than learning one naturally, and then learning the other as a negation of the first one. Ever more capable subjects may have ever more natural categories in their conceptual frameworks. Perhaps in the framework of an infinitely capable subject, all the possible categories could be naturally produced, as will be further discussed below.

The proportion of positive to negative categories is relative to a conceptual framework.

A framework consisting only of purely negative categories could exist. A framework in which all the categories are purely negative could only consist of the categories of negation.

Purely negative categories can be either categories of negation or negations of purely positive categories. A negation of a purely positive category, derives its meaning by its relation to the purely positive category. Thus, without the purely positive category, its negation has no meaning. Since an object must have meaning to be a category, negations of categories couldn't exist as categories without the purely positive categories. Conversely, categories of negation are not dependent on positive categories and could be naturally created without them. In other words, frameworks of purely negative categories, including categories such as "not good" or "not alive", could not exist without the corresponding positive categories of "good" and "alive". However, frameworks of categories that are merely catalogues of the concepts of negation, such as "not" or

"nothing" could logically exist by themselves, although, of course, they would be of no value without other concepts to be applied to.

A framework consisting only of purely positive categories could exist. Only such categories would exist in a conceptual framework containing no dependent concepts of negation, since it is by these that the negative categories are formed. The more natural categories there are in a framework, the more positive categories tend to be there, since natural categories tend to be positive.

Perhaps in the mind of an infinitely capable subject, a conceptual framework could exist in which all the possible categories are naturally created. In such a framework, the categories purely negative in human frameworks would attain all the gradations of positivity possessed by our natural categories. In fact, in such a framework, all but the categories of negation could be purely positive. Categories whose meaning is derived without negation of any other categories are purely positive. If all the natural categories were understood by the infinitely capable subject irrespective of each other's negations, then, with the exception of the categories of negation, all the possible categories would be purely positive to it.

VII. OBJECTS

An object is anything that exists and is attributed unity by a subject. A specific entity, a group of entities, a process, an event, a relation, a concept, a subject, a property,

a fact, a fictional character existing solely in the imagination, or anything else which exists in some way, can be an object to a subject, if attributed unity by the subject.

An object-set consists of one or more objects.

This definition of object is postulated in order to create a term of very wide reference. It is not intended to capture the full common meaning of the concept of object.

The unity required for an object is acquired either by the attribution of simplicity to an existent, or by the attribution of interconnectedness to its component parts.

An object is necessarily an object of some category. Without concepts, objects couldn't exist to a subject. Without concepts, a subject can't conceive of anything. Thus, if an existent doesn't fall into any concept-set of a subject, the subject can't conceive of it. If he can't conceive of it, he can't be aware of its existence. So, he can't attribute any properties to it. Thus, he can't attribute unity to it. Therefore, without concepts, an object can't exist to a subject. By definition, an object can only fall into a concept-set that forms a category. Thus, without a category, an object couldn't exist. Concepts themselves are objects falling into the category of concepts.

Thus, an existent must fall into some category in order to be an object. If an existent doesn't fall into any category of objects that a subject possesses, that existent isn't an object to the subject. All of reality that is conceivable to a subject is separated into his objects according to his categoric attribution scheme. Considered apart from the subject's categories in which the object falls, the object would fall outside the subject's categorical framework and would return to being an unattributed part of an undivided

reality.

An object only exists in relation to a subject, since an object only exists if attributed unity by the subject. An object to one may not be so to another, if not attributed unity by the other. Objects in themselves don't exist. "...the things which we intuit are not in themselves what we intuit them as being, nor their relations so constituted in themselves as they appear to us, and that if the subject, or even only the subjective constitution of the senses in general, be removed, the whole constitution and all the relations of objects in space and time, nay space and time themselves, would vanish." (Kant, 1958, p.82).

This does not contradict the previous assertion that unconceived reality exists and has structure. It simply means that objects are already a form of conceived reality, and do not exist without conception. They are a product of the interaction between unconceived reality and the subject's conceptual apparatus, as will be further discussed below.

An object may be partially indefinite. We may know of an object, but not of some of its parts. By attributing unity to an object, a subject divides it off from the rest of undivided reality. By attributing unity to an object's part, a subject divides the part off from the rest of reality. Therefore, by attributing unity to an object's part, a subject defines a previously indefinite manifestation of reality.

"Chaos" itself is an object in our categoric attribution scheme, whose internal manifestations are indeterminate. Chaos as a whole is a stable manifestation of reality, and has been attributed the category of an object in our categoric attribution scheme.

"Undivided reality" is also an object in our categoric attribution scheme. It is most like the reality in the mind of a newborn child, which is "global and non-differentiated." (Subbotsky, *Foundations of the Mind*, 1992, p.1; Cf: Piaget, *Construction of Reality in the Child*, 1954; p.xii) It is in fact identical to the concept of reality as chaos. It is the most general category that we can use, but by being a category rather than a totality, it is limited. A truly undivided reality without any category imposed on it by a subject cannot be referred to by a subject. As Edwards writes, (1990, p.88) "it may still be allowed that this alleged reality exists. It may be said that it exists independently of any possible conception of it. In saying that, however, there is conception of it in some degree." Like Lao Tzu, who said that "The way that can be spoken of is not the constant way" and then went on to write a book about it, we have to cheat a little here.

A subject is a part of reality, and its attributions of observation are causal links between itself and reality. "all human knowledge derives from a process of interaction between man as a physical entity, an active, perceiving subject, and the realities of an equally physical external world, the object of man's perception." (Lorenz, 1977, p.1; Cf: Lorenz, 1975; Grice, *The Causal Theory of Perception*, 1961; Alvin Goldman, *The Causal Theory of Knowledge,* 1967; Allan Goldman, 1988, p.88; Buskes, 1998) Various forms of perception are physical processes placing the subject within the web of existence. Objects cause attributions of observation in the subjects. A correct attribution of observation occurs when the object attributed causes the attribution. A perception of a tiger is correct only if the tiger is the cause of the perception. The correctness of an

attribution has nothing to do with the true nature of an object, independent of attribution. Perception is not a veil placed over its object, and the object is not a mysterious something behind the veil. Perception is a natural process like any other. What we see is a natural phenomenon dependent on our constitution, the constitution of the object of observation, and the circumstances of observation. An animal with different senses would have a different constitution and would observe differently. Neither of us is closer or farther from the truth in our observation of an object, when the object causes the observation. A flower might look grey to a cow, which has monochromatic vision, and yellow to a human, but neither is closer to the truth of the true appearance of the flower. Appearance is a function of observation, and observation is a function of the subject observing. Thus, appearance is always dependent on the subject to which it appears. There is no true appearance independent of a subject. We are simply subjects of different natural processes, of which perception is the effect. It is as pointless to wonder whether we see the "truth", as it is to wonder whether a pressure guage indicates what "pressure" is in itself. The indications of the guage are the causal effects of pressure, just as our perceptions are the causal effects of various phenomena. Both are only true to the extent that they are causally connected to their objects. Neither presents the objects in themselves, but only the perceptual effects of the objects.

> "What objects may be in themselves, and apart from all this receptivity of our sensibility, remains completely unknown to us. We know nothing but our mode of perceiving them - a mode which is peculiar to us, and not necessarily shared in by

every being, though certainly, by every human being."

(Kant, 1958, p.82).

The properties of observation are caused by the object and the subject. They are a function of both, and don't exist if either is absent. As Karl Popper writes, "The thing-in-itself is unknowable: we can only know its appearances, which are to be understood (as pointed out by Kant) as resulting from the thing-in-itself and from our own perceiving apparatus. Thus appearances result from a kind of interaction between the things-in-themselves and ourselves." (1962)

A group of subjects may share the same categoric scheme to some extent. Communication would probably be impossible between subjects whose schemes had nothing in common. They would be in different worlds, even if one was inside the other, like a virus inside a whale.

Attribution of properties is impossible without subjects. Properties are functions of categories, and categories are attributed by subjects only.

Differences in categorization schemes of objects can exist between different subject-sets, such as species, nations and individual subjects, or the same sets of subjects at different times, since the attribution schemes of subjects may evolve over time. "Objects in the world are *not* labelled with dimensions or codes, and the way they are partitioned differs from person to person and from time to time." (Edelman, 1992, p.237)

Subject-species with different senses from those of humans might divide reality into completely different kinds of objects. Their separation of figure from background might attribute to figure things that we attribute to background, for instance.

> "...in reality, the world, with its "objects", is an unlabeled place; the number of ways in which macroscopic boundaries in an animal's environment can be partitioned by that animal into objects is very large, if not infinite. Any assignment of boundaries made by an animal is relative, not absolute, and depends on its adaptive or intended needs." (Edelman, 1992, p.28; Cf: Laverack and Cosens, 1981, p.vii; Laverack, 1981, p.15; James, 1907, p.171; Lewis, 1929, p.271-72)

Categorization of reality in different languages by different nations of subjects at different times may be radically different. "Each language performs this artificial chopping up of the continuous spread and flow of existence in a different way." (Whorf, *Language, Mind and Reality*, 1956, p.253) "Psychology, anthropology, and comparative linguistics bear witness to the variety of ways in which different persons and groups of persons differentiate the world of experience into objects." (Korner, *Categorial Frameworks*, 1970, p.2; Cf: Hollis and Lukes, 1982, p.7; Levi-Strauss, 1966)

Each original thinker divides reality differently. Consider the world-views of Aristotle, Newton and Einstein. On many questions, these views conflict, so that at most one is right. However, on other questions, all three schemes present different but compatible categorizations of reality, all of which may correspond to reality equally well. (Cf: Kuhn *The Structure of Scientific Revolutions*, 1969)

This last example, however, is a reminder that not all categoric schemes are equally valid. As Chris Buskes notes, "It is true in a trivial sense that we cut up the world when we employ a certain scheme of description. The point is that we may do so wrongly:" (1998, p.67)

IX. FAMILIARITY

Conception originates with familiarity. Familiarity creates a form from a previously haphazard cluster of elements. Conception of an object originates from familiarity with the object, because familiarity creates the object by attributing unity to a manifestation of undivided reality.

Familiarity with an object is recognition of the object. Successively deeper levels of familiarity are created by recognition of the object's parts, the parts of its parts, and their interrelations, ad infinitum. The study of an object creates deeper levels of recognition and, therefore, familiarity with the object, its parts and their interrelations. The greater the familiarity with the object, the greater the comprehension of the object. Through deeper levels of recognition of an object's parts, a subject determines previously indeterminate parts of an object. "Indeed, ... neurobiology is a science of recognition." (Edelman, 1992, p.79)

X. ORDER

Patterns of order are established by familiarity. A pattern of order is a manifestation of undivided reality attributed unity by a subject, thereby turning it into an object in the subject's categoric attribution scheme. A pattern of order recognized by a subject is a manifestation of reality, which is stable in its interaction with the subject.

Order is not order in itself, but order in relation to a subject. The order of an object is both object and subject-dependent. Manifestations that a subject interacts with, are not stable in themselves, but stable in the interaction with the subject. Manifestations that are stable in interactions with one subject, may be unstable in interactions with another subject. What is a pattern of order to one subject may be pure chaos to another.

Familiarity is an attribution of order. Conception is chaos reduced to order. Order is a familiar form of chaos. Manifestations of reality that are unfamiliar are undetermined. The undetermined is unpredictable. The unpredictable is random. The random is chaotic. Therefore, the manifestations of reality that are unfamiliar are chaotic. However, as the manifestations become more familiar, they tend to become more predictable. As they become more predictable, they become less random. As they become less random, they become less chaotic. As they become less chaotic, they become more ordered. Therefore, familiarity tends to reduce chaos to order. Since conception originates with familiarity, conception tends to originate when a subject reduces chaos to order. The extent to which existence is not reduced from chaos to order is the extent to which it tends to remain unconceived. As G.G. Simpson writes, "The whole aim of theoretical

science is to carry to the highest possible and conscious degree the perceptual reduction of chaos that began in so lowly and (in all probability) unconscious a way with the origin of life." (Simpson, 1961, p.5)

The categories of indeterminacy, unfamiliarity, unpredictability, randomness, chaos and order are subject-dependent. What is chaos to one may be order to another. It all depends on the nature of the subject's constitution and the state of the subject's knowledge.

As discussed previously, the greater the ability of a subject to distinguish constructive interactions from destructive interactions, the greater its tendency towards natural selection. Through the process of natural selection, subjects tend to develop with those categories of objects that are of value to them, whether positive or negative. Through this process, subjects with categories of varying value may randomly develop out of chaos, but shall tend towards natural selection to the extent that the categories are of value to them. This means that the categories that are randomly created out of chaos vary in value, but tend towards natural selection to the extent of their value. As the neurobiologist Gerald Edelman proposes in his theory of neuronal group selection, "categorization always occurs in reference to internal criteria of value, and ... this reference defines its appropriateness. Such value criteria do not determine specific categorizations but they constrain the domains in which they occur. According to the theory, the bases for value systems in the animals of a given species are already set by

evolutionary selection. ... Categorization manifests itself in behaviour that appropriately fulfills the evolutionarily selected requirements fo such life-supporting physiological systems." (1992, p.p.90-91; Cf: p.208) Likewise, Konrad Lorenz writes that: "we have developed 'organs' only for those aspects of reality of which, in the interest of survival, it was imperative for our species to take account, so that selection pressure produced this particular cognitive apparatus. ... The categories and modes of perception of man's cognitive apparatus are the natural products of phylogeny and thus adapted to the parameters of external reality in the same way, and for the same reasons, as the horse's hooves are adapted to the prairie, or the fish's fins to the water." (1977, p.p.7,37) Perhaps Miguel de Unamuna has expressed it best, when he said that: "Beings which appear to be endowed with perception, perceive in order to be able to live, and only perceive in so far as they require to do so in order to live." (1954, p.22)

The selection of categories with reference to their value tends to continue during the cultural development of subjects. Again, the categories that are randomly created out of chaos vary in value, but tend towards natural selection to the extent of their value to the subjects. Categories of value to some subjects may then be communicated to other subjects, and become a part of their categoric attribution scheme, to the extent that these are of value to the other subjects. As William James suggests: "(Common sense) categories may after all be only a collection of extraordinarily successful hypotheses (historically discovered or invented by single men, but gradually communicated, and used by everybody) by which our forefathers have from time immemorial unified and

straightened the discontinuity of their immediate experiences... (As such) all our theories are *instrumental*, are mental modes of *adaptation* to reality". (1907, p.p.193-194)

In the case of cultural development, the natural selection does not necessarily operate on the subjects with the categories of value, but may operate on the categories themselves. In such a case, the natural selection of the subject is useful, but may not be necessary for the natural selection of the subject's categories of value. As suggested by Richard Dawkins (1976), the categories of value may perpetuate themselves through the culture of subjects through a process similar to but distinct from the biological process of natural selection. Such categories may spread from subject to subject through communication, rather than through hereditary transmission. That is how, for instance, Newton's categories of absolute space and time reproduced themselves through humanity, while Newton did not.

Categories that lose their value over time tend to pass out of usage. Thus, for instance, there are far fewer categories in use today that relate to animal transport than there were during the days of the horse and buggy.

Manifestations of absolutely neutral value are unlikely to be picked out and categorized as objects by subjects. (Cf: Putnam, 1981, p.201) It is said that an Eskimo has 38 words for snow, an Egyptian perhaps one, a Pigmy perhaps none. (Cf: Hollis and Lukes, 1982, p.11; Cf: Weissman, 1993, p.72; Whorf, 1956, p.216)

The value of each particular category at a particular time may not be directly useful, as noted by Levi-Strauss. (1966, p.8) Levi-Strauss proposes two related accounts

for the value of categories that do not have direct practical use.

The first is knowledge. Humans have learned to value knowledge in itself, whether or not it leads to results of direct practical value. Therefore, a category of existence may be of value simply because it increases our stock of knowledge. (Levi-Strauss, 1966, p.9)

However, not all knowledge is of equal value. Presumably, the greater the actual, or at least, the potential contribution of the knowledge to the subject's well-being, the greater the value of the knowledge. Therefore, categories without direct practical value may be valued as sources of information of potential value. As William James notes, "since almost any object may some day become temporarily important, the advantage of having a general stock of *extra* truths, of ideas that shall be true of merely possible situations, is obvious." (1907, p.204)

The second account proposed by Levi-Strauss for the value of categories that do not have direct practical use is classification. "Classifying, as opposed to not classifying, has a value of its own... Any classification is superior to chaos" (1966, p.p.9,15) Thus, on a fundamental level, the formation of categories in itself is of value to a subject, because the reduction of chaos to order is of value to the subject. Chaos is undifferentiated. Order is differentiated. By reducing chaos to order, a subject is able to differentiate its interactions with reality. By doing so, the subject is able to distinguish between interactions that are constructive and destructive to it. And, as discussed above, the greater the ability of a subject to distinguish constructive interactions from destructive interactions, the greater its tendency towards natural selection.

However, not every categorization of reality is of equal value to a subject. A categoric attribution scheme that has no category for 'snow' is of less value to an Eskimo than an Pygmy. A scheme that differentiates more in auditory than visual forms is of less value to an eagle than a bat. Therefore, not only is categorization of value to a subject, but the form of the categorization is also of value to the subject. Some categoric frameworks are better than others to a subject. Since categoric frameworks differ to the extent that they consist of different categories, the use of some categories may be of greater value to a subject than the use of others. As Putnam writes, "any choice of a conceptual scheme presupposes values". (1981, p.215)

Time and space are subject's categories, and temporal and spatial stability are subject-dependent attributions. (Cf: Kant, 1958; Stapp, 1972; James, 1907, p.178) As the linguist Benjamin Whorf found "the Hopi language is seen to contain no words, grammatical forms, constructions or expressions that refer directly to what we call 'time'". From this he concluded that "Just as it is possible to have any number of geometries other than the Euclidian which give an equally perfect account of space configurations, so it is possible to have descriptions of the universe, all equally valid, that do not contain our familiar contrasts of time and space. The relativity viewpoint of modern physics is one such view, conceived in mathematical terms and the Hopi Weltanschauung is another and quite different one, nonmathematical and linguistic." (*An American Indian Model of the Universe*, 1956, p.p.57-58)

Stable manifestations of reality are outnumbered by unstable ones, but outlast them. That is how they bring themselves to the attention of subjects. Manifestations of chaos that are too fleeting for a subject to perceive would not have time to register as objects in the subject's categoric attribution scheme.

Patterns of order are stable manifestations of reality that arise purely by chance and persist due to the accidental stability of their structure. Order is an accident of chaos - a stable resolution of a variety of possible outcomes.

Order is a result of decoherence. Decoherence is a resolution of a few stable states from a variety of unstable states. (Omnes, 1994, p.p. 108, 270, 272, 303, 485; Gell-Mann and Hartle, 1990, p.p. 425-458) The unstable states interact destructively and dissolve into chaos, leaving a few stable states to interact constructively with the subject. The superposition of all possible states of reality decoheres into a few patterns of order.

Manifestations of reality that are unstable in interactions with a subject are indefinite in relation to the subject. A subject can be considered to be a measuring apparatus. "Perception is a special case of a measurement. ".(Omnes, 1994, p. 509, Cf: Stapp, 1972) A subject is any existent capable of attributing properties to manifestations of reality by distinguishing them from other manifestations. Any existent capable of attributing properties is a measuring apparatus. A measuring apparatus is an object capable of decohering into stable states in interactions with manifestations of reality.

Thus, a subject is capable of attributing properties to the extent it is capable of decohering into stable states in interactions with manifestations of reality. A subject is only capable of attributing properties to those manifestations of reality, which decohere into stable states in interactions with the subject. If a manifestation of reality does not decohere into a stable state in interaction with the subject, the subject has no way to assign a definite property to the manifestation. Thus, the physical and the cognitive meet at the level of subject-object interaction.

> "An eye therefore possesses the main characters of a quantum detector, namely an elementary reaction at the atomic level, an amplification process leading to a macroscopic phenomenon and, finally, a record in the brain." (Omnes, 1994, p.63)

The famous Schrodinger's cat, for instance, is a subject that decoheres into a stable state of being either dead or alive, upon the release or non-release of the poison gas by a quantum measuring apparatus that interacts with a partially indefinite manifestation of reality - an electron - by attributing a property of either the "up" or the "down" spin to it, thereby giving either thumbs up, or thumbs down on the life of the cat. (Omnes, 1994, p.109, 303, 305, 309) Thus, the fate of the cat is ascertained by the cat, as a subject of this particular interaction. The cat does not need to wait for a human subject to determine its fate. (Gell-Mann and Hartle, 1990, p.453)

A manifestation of reality is stable in interaction with a subject, to the extent the interaction is constructive to the manifestation, whether or not it is constructive to the subject. If the interaction is instantly destructive to the manifestation, the manifestation is

not stable in interaction with the subject. An energy form is stable to the extent it is resistant to annihilation in interactions with other energy forms. An energy form is resistant to annihilation in interactions with other energy forms, to the extent such interactions are constructive in relation to the form in question. I.e., to the extent an energy form preserves or gains energy overall in interactions with other forms, it is stable. Through the process of natural selection, subjects tend to develop sensors that constructively interact with manifestations of reality that are destructive to the subjects as a whole. These sensors are called nociceptors, which are "sensors adapted to the reception of noxious stimuli". (Laverack, 1981, p.12) Such sensors are stable in interactions with the destructive manifestations, and are therefore able to detect them.

The principle of Entropy is subject-dependent. The principle is that entropy of any closed system tends to increase. (Cohen and Stewart, 1994, p.251; Clausius, 1865) Entropy is a movement from order to disorder. Order is subject-dependent. What is considered order by one subject, may be pure chaos to another. Different subjects may have a different number of categories of order. If all possible categories of order are outnumbered by all possible manifestations of disorder, in a subject's categoric attribution scheme, then states of order are more likely to dissolve into states of disorder, then the reverse, thereby increasing the entropy of the system. This is the situation in the human categoric attribution scheme. However, if all possible categories of order outnumber all possible manifestations of disorder, in a subject's categoric attribution scheme, then

states of disorder are more likely to dissolve into states of order, then the reverse, thereby decreasing the entropy of the system. Furthermore, if all possible variations of reality were categories of order in a subject's categoric attribution scheme, there would be no movement from order to disorder within the subject's scheme, and the entropy within such a scheme would neither increase nor decrease, but would, in fact, be a concept without any application. That is how things would look from the point of view of God, to whom every manifestation of reality would be recognizeable as a form of order. "Indeed, it is mathematically correct that the entropy of a system described in perfect detail would not increase; it would remain constant." (Gell-Mann, 1994, p.226) God, as Einstein said, does not play dice, but we do. (Stewart, 1997, p.p.xi-xii) Therefore, whether or not entropy of the universe increases depends on whether or not, all possible categories of disorder outnumber all possible categories of order in the subject's categoric attribution scheme. For example, 50 yellow peas in the corner of a box of 1000 green peas, tend to scatter into disorder, if the box is shaken, because to a human subject, there are only a few possible outcomes that would be recognized as orderly. If, however, to another subject, 51% of possible outcomes would form patterns of order recognized by the subject, the entropy of the system would not tend to increase in this other subject's categoric attribution scheme.

Stable manifestations of reality are both subject- and object-dependent. Subjects themselves are manifestations of reality, and their attributions are generally not arbitrary,

but are a causal result of their interaction with the rest of reality. "The natural world (partly) determines and constrains our use of language, concepts, and categories". (Buskes, 1998, p.67) Therefore, an attribution of order by a subject to a manifestation of reality is generally not arbitrary, but is a causal effect of the subject's interaction with the rest of reality. However, the attribution of order may not result from a different subject's interaction with the rest of reality, to whom the manifestation may appear as pure chaos. Existence that goes out of one subject's field of vision does not necessarily disappear, but may come into focus in another subject's field of vision. It is conceivable that certain manifestations of reality would remain stable in interactions with all possible subjects, but only if all possible subjects are able to interact with them. Attributions of properties to even the most invariable manifestations of reality are still subject-dependent.

We make the world, but first, the world makes us. We categorize the world, but the world makes us, and therefore, our ability to categorize the world. Our categoric attribution schemes of the world tend to depend on our values, but our values are generally not arbitrary, and are given to us by the world. Therefore, when Hilary Putnam, for instance, writes that "what counts as the real world depends upon our values" (1981, p.137), he must keep in mind that our values are themselves a product of the real world. (Cf: Weissmann, 1993) The proper chain of causation, therefore, is not that we create the world based on our values, but that the world creates us and our values, and we create an image of the world which depends on our values. Thus, our image of the world is not arbitrary, but is a product of our values, which are a product of our development in the

world.

XI. CONCLUSION

In summary, it can be concluded that reality perceived by a subject is subject-dependent, in so far as the form attributed to reality by the subject is determined by the subject's interactions with undivided reality. The argument upon which this conclusion is based can be summarized as follows: Existence is energy. Subjects are energy forms capable of attributing properties to other energy forms in interactions. Energy forms that interact with subjects range from stability to instability in those interactions. Energy forms that are unstable in interactions with a subject, remain indeterminate in those interactions. Energy forms that are stable in interactions with a subject, tend to be recognized by the subject to the extent they are of value to the subject. Energy forms that are recognized by the subject become familiar to the subject. Through familiarity with an energy form, a subject tends to attribute a form of order to it. A form of order is a form of unity. Therefore, through familiarity, a subject attributes unity to certain energy forms, thereby distinguishing them from undivided reality and turning them into objects in the subject's categoric attribution scheme. Hence, conception emerges out of stable interactions of subjects with reality, to the extent that these interactions tend to be of value to the subjects.

Postscript

The foregoing discussion of the objective and subjective aspects of the origin of value, will now set the stage for an attempt to unify the two as the two asymptotes of the knowledge of value, to be taken up in the following chapter. This will then lead us into a discussion of the origin of value judgement, in the chapter that follows. In the remaining chapters, we shall then discuss the origins of group value, the origin of morality and the structure of ethics, as stages in the emergence of value out of chaos through natural selection.

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