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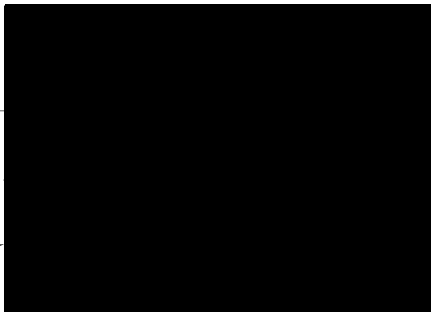
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ORGANIC STATES OF BEING AS CURRICULAR GOALS

by

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A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF SCIENCE (EDUCATION)

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of

Education

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ABSTRACT

The premise of this thesis is that organic states of being can and have been used as goals in educational programs and curricula and that the logical base for the design and implementation of such curricula is and must be the functioning of human consciousness itself.

Chapter I of the thesis examines the major lines of epistemological thought which have been brought to bear on the study of human consciousness and concludes that, at this time, a systems approach appears to be the most promising. Chapter II examines the current research and thinking in the areas of evolutionary development and neurophysiology of human consciousness concluding that an understanding of man's biological continuity and evolutionary history is of importance for the study of consciousness. Chapter III examines current research and thinking in the area of cultural and psychological aspects of human consciousness and concludes that the cultural/psychological context of an individual is of critical importance in the direction and maintenance of the individual's state of being. Chapter IV presents a simple working model of the functioning of human consciousness consistent with the materials discussed in the previous chapters. Chapter V examines, in the light of the model, the processes involved in Zen Buddhist meditation on the koan as an example of an educational curriculum designed to achieve a particular state of being which uses as its operational base the functioning of human consciousness. Chapter VI summarizes the conclusions of the thesis.

The study draws a number of conclusions. First, an individual's discrete state of being or state of consciousness results from an interaction of the person's biological and cultural contexts. These contexts limit, constrain, and give direction to the individual's development at any point in time. The nexus point in the interaction between these contexts is the attention/awareness function. Curricula designed to achieve specific states of being are based

on the manipulation of the individual's attention/awareness function.

The thesis is primarily theoretical in nature. It does not attempt to be directly applicable to the processes involved in the current institutions of mass schooling.

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I.

INTRODUCTION

...perhaps the human race has developed to a point where it is ready for the realization of human consciousness

Philip Lee (1976)

Man has always been a seeker. He has never been content to let be what is and has striven continually to "build a better world." He has worked to change this, to move that, to re-define the parameters of his possibilities and to bring his castles built in air to fruition in the here and now of his material-social world. Whether a man be a builder of bridges or ideas, he has worked with great will to see his constructions come to life under his hands. From the beginnings of human existence men have seen visions and dreamed dreams. They have seemingly never been content to live in the world but have been bent on molding it into conformity with how it might be, how it 'should' be; the proliferation of specific visions, specific dreams, has been manifold. There is an ancient Yiddish tale which states that if you put three Jews together you will get four opinions; seemingly this has always been the case, though it has hardly been limited to the Jewish people.

The major schism has never been over the specific visions, though these have undoubtedly wreaked their own share of

bloodshed and turmoil, but over the basic, underlying methodology which must be employed for attaining those visions. The major schism has been between those who follow the "Way of Doing," and those who follow the "Way of Being." The Way of Doing has been the characteristic mode employed in Western societies, indeed, it has been the major mode in most modern, and organized societies. It is the sire of modern law, technology and science, as well as many of the subjective semi-mystical endeavours of both the East and West.

It is a methodology, a mode of interacting with the world, which involves the molding, changing, and re-shaping of actions, events and things to bring them into conformity with the specific vision of the perpetrator. It is basically a pragmatic, in the short run sense of the term, and violent tradition. Its methodology has always been a technical one; its rationalization is temporal and relative. Its origins are dim. Both Christian and Jewish traditions trace its inception to the first-born generation of man in the legend of Cain and Abel. It is a methodology and a stance which has gained and been able to maintain a considerable credibility in virtually all of the modern world societies and cultures. The basic requisites for operating within this mode are specific knowledge, or information, and power. Knowledge and information are required to achieve efficiency; power is required to implement, manage, direct and control the required changes toward the visionary goal. Participation requires only that one make the Faustian

margin.

The Way of Being represents the second basic mode of approaching the world. Though it has traditionally held more credibility in Oriental cultures it has never managed to claim a very broad base of adherents in either East or West. The Way of Being is a path concerned not with changing, re-shaping, or molding events, actions or things in an attempt to conform them to a pre-ordained, arbitrary and temporal will of an individual or group of individuals; it is a path which seeks to bring into harmony the way an individual "is" with the way the essential nature of the universe "is." It is neither active nor re-active, subjective nor objective. Its concerns are integrative and non-violent. The major requisites of the Way of Being are wisdom, i.e. the recognition of and guidance by a knowledge of the total systemic nature of a phenomenon (Bateson, 1972), and adaptability. Doing is made use of within this mode, to be sure, but that doing is subordinated at all times to being. The Way of Being is a personal rather than a collective endeavour, and its credibility is dependent on those specific individuals who follow this path and are able thereby to validate its importance.

The original conception of Education--the drawing forth from within of inherent wisdom--was concerned with the Way of Being. Those charged with the various tasks of Education were charged with helping individuals to realize and develop their

inherent wisdom. Specific activities and experiences with which students were presented were designed to enable them to attain particular states of Being which facilitated the realization of their inherent wisdom. Now, particularly in modern societies, the aim and focus of Education has been toward the Way of Doing. The step is in many ways an easy one for it is entropic. For an educator to monitor and direct what a student is doing is a fairly casual affair; for him to monitor and direct what that student is "being" requires a great deal more attention, wisdom and perceptiveness. It requires, as well, that the teacher be sufficiently farther along the path of being than any of his students such that he may be able to recognize and relate directly to the state of being in which the student is engaged.

While it is easy to speak about states of being in a general way it is somewhat more difficult to precisely define what is meant. The science of consciousness is still in its infancy and we have a long way yet to go before we grasp even the rudiments. For the purposes of this work Charles Tart's (1976b) description of a discrete state of consciousness will be used to define states of being. Tart wrote:

I shall define a d-SOC (discrete state of consciousness) for a given individual as a unique 'configuration' or 'system' of psychological structures or subsystems. The structures show some variation in the way in which they process information, or cope, or have experiences within one or more varying environments. The structures operative within a d-SOC comprise a 'system' where the parts, the psychological structures, interact with each other and stabilize each other's functioning by

means of feedback control, so that the 'system', the d-SoC, maintains its overall patterning of functioning within a varying environment. That is, the parts of the system that comprise a state of consciousness may change over various ranges individually, but the general configuration, the overall pattern of the system, remains recognizably the same (pp.116-17).

Laslo, Levine and Milsum (1974) further suggest that the state or condition of a system is defined as a function of the quantitative values of a set of independent condition called state variables. These state variables comprise the minimal number necessary to describe the particular condition or state of the system as distinct from all the other possible conditions which could exist. The particular state or condition of the system results in what is termed a 'state vector'. Laslo, Levine and Milsum (1974) state:

The particular collection comprised of the state variables for a system is one natural group, and this is called the systems state vector (p.80).

The greater portion of Education research at the present time is concerned with the specifics of the Way of Doing. In the last 20 to 30 years, educational researchers have managed to pile up an imposing mass of data on various aspects of learning and teaching which have to do with the way of Doing. Research into the specifics of the Way of Being has been limited, and it is only recently that there has been any marked degree of increased interest. Most of the information available in this area has been confined to esoteric and mystical tracts which have not found much credibility within the orthodox confines of academia. In recent years, however, there has been an increased

interest in the area of human consciousness, and developments in new theoretical approaches, specifically systems theory, have enabled a growing number of scholars to approach this area within the constraints and confines of the academic world. Progress has been painfully slow. The weight of inertia, tradition, methods of verification, inquiry techniques and research methodologies have all been directed toward and developed for research into aspects of the Way of Doing, and they have had only limited usefulness in exploring the Way of Being.

It will be the aim of this work to explore, in a very limited fashion, some of the aspects and implications for the field of Education, specifically the area of curriculum design, of the Way of Being. The work will seek to explore the possibility that states of being may and have been used as valid curricular aims and to examine the basic, underlying premises required for a curriculum directed toward achieving a particular state of being. It will be the major premise of this thesis that states of being may be used as valid curricular aims and that the basic logical system involved for the design of curricula for achieving states of being is the functioning of human consciousness itself. The work centers around two major thrusts. First, I will attempt to develop a working model of human consciousness consistent with current thinking and research in the areas of evolutionary development neurophysiological functioning, and the cultural aspects of

human consciousness; and second, I will try to draw conclusions from examination of a particular curriculum designed specifically to achieve a state of being and making use of the functioning of human consciousness as its logical base. There is no serious thought that the conclusions presented in this work will be directly applicable to the current institutions of mass schooling. These institutions serve their own purposes and work within their own systemic constraints. I leave their criticism and praise to those who are knowledgeable about and choose to enter the political arena.

In order to achieve the goals of the work it will be necessary first to briefly examine the major strains of epistemological thought which have been brought to bear on the study of human consciousness; second, to examine the current research and thinking in the area of evolution and neurophysiology of human consciousness; third, to examine current research and thinking about the psychological and cultural aspects of human consciousness; fourth, to present a model of the functioning of human consciousness consistent with the neurophysiological, psychological, and cultural aspects; fifth, in the light of that model, to examine a specific curriculum designed to achieve a particular state of being--in this case the processes involved in Zen Buddhist meditation on the koan; and sixth, to draw what conclusions appear justified from the information and processes examined in the course of this work and describe their implications in terms of the design

of curriculum directed towards achieving specific states of being.

This work is in no way intended to be an exhaustive account of all the information available on human consciousness, nor is it intended that it shall be a final or complete picture of the alternatives available for further investigation. Its aims are much more modest. It is intended to demonstrate that the Way of Being is a viable and tested mode of human experience and can form a basis for the design of valid educational programs and experiences. Additionally, I contend that understanding of the functioning of human consciousness is a critical factor in the design of programs and experiences which are directed toward working with states of being. The ideas presented in this thesis are not new, nor are they ideas which are currently of great concern to the main stream of educational researchers or practitioners. It is my feeling and belief, however, that they should and must not be ignored within the field of education, and that they have a great deal to contribute to a field which is of such critical importance to the lives and development of so many people.

"Something old, something new, something borrowed...." Tradition has it that this is the formula for success in marriage, the melding of disparate personalities, hopes, dreams and potentials. So, too, will it be the formula for this paper which will attempt to meld ideas, practices and research-some

old, some new. Bringing together strains of thought and work from different and very separate areas of human endeavour is always fraught with difficulties. Yet, the effort is often extremely fruitful. It may serve as a key to new dimensions of understanding; occasionally it points a new direction for further investigations. To paraphrase Robert Frost, it is the path less taken which may make all the difference.

As an educator, I am vitally interested in methods and techniques of teaching, or of promoting learning, which are proven to be successful. The science of Education, if we may be allowed to call it that, is very much in its infancy. Empirical research does exist, but for the most part, it is a projection of a conceptual framework rather than a basis for it. Educators are dedicated borrowers. They have taken and attempted to apply to their own particular problems the work of psychologists, philosophers, sociologists, anthropologists, engineers, computer programmers and a host of others from the myriad of discipline areas. The range of success has been somewhat circumscribed, and until recently the reasons for this have not been forthcoming. Under the guise of being 'practical' and 'reasonable', we, as educators, have failed to extend our borrowing behaviors far enough and have limited ourselves to such an extent that we have not taken into account some very useful and perhaps critical avenues of research and experience. I, too, will carry on in the borrowing tradition. I will, however, attempt to borrow from areas little tapped by the

main-stream of educational thought in the hopes of bringing within the scope of our discipline information and experience already within the scope of human knowledge and experience which I believe to be both necessary and critical for any serious discussion of education as a process and as a discipline. Too often in Education we work from the position of necessity: "My god, its nine o'clock, what do I do now...." As Alfred North Whitehead (1959) so distinctly put it, "Necessity is the mother of futile dodges."

Dogen-zengi (in Herrigel, 1960), the noted Zen master said, "Time goes from the present to the past." I shall begin with the new and proceed to the old: a reverse course which, in true Zen style, I trust will lead us toward the future.

II.

ORIENTATION

Mind-Brain-Consciousness: Epistemological Issues

...every man must attempt to justify his own form of madness...

—Norah Lofts (1975)

Introduction

In dealing with the concept of 'mind' we have been plagued with false premises for a long time. It is only, in the West, within the last twenty or thirty years, with the advent of systems theory, that we have been able to get the beginnings of a workable picture about how the 'mind' functions and what 'it' is. We undoubtedly have a great way yet to go, and it may, in fact, be the case that no conceptual scheme, no matter how sophisticated, will be able to model the system of which it is a functioning part. This chapter will attempt to present an overview of the major streams of thought which have been applied to the study of consciousness and discuss their usefulness in terms of that study. As Pearce (1976a, 1976b) points out, the choice of an epistemological system or framework is ultimately an aesthetic one. Each system allows or fosters results and possibilities not available in others. However, as this chapter will attempt to illustrate, the approach now referred to as

'Systems Theory' appears to offer the greatest potential, at this point in time, for the study of consciousness in the frame of reference required by an inquiry of the type of this work.

As Pearce (1976b) has so clearly indicated, "The relation of mind and reality has been but dimly grasped" (p. 188). Thomas Aquinas recognized that, "Whatever is received is received according to the nature of the recipient" (cited in Cohen, 1965, p. 84). The basic problem here, the "Catch-22", if you will, is that our very perception is a function of our conceptual framework. David Bohm (1965), speaking from the vantage point of theoretical physics, wrote, "...the totality of the universe is too much to be grasped definitively in 'any' form of knowledge, not only because it is so vast and immeasurable, but even more because in its many levels, domains, and aspects it contains an inexhaustable variety of structures, which escape any given conceptual "net" that we may use in trying to express their order and pattern" (p.228).

These difficulties in no way, however, excuse us from attempting to make the best possible use of what we do have. We must simply keep in mind that our conceptual framework is in some large sense arbitrary, limited, and that it must reflect, at its very basis, a statement contained within the boundaries of our shared consensus 'about' reality.

There exists a major controversy among those involved with

the study of consciousness. It is concerned with the question of how the functions of brain, mind, and consciousness relate.

Sperry (1964) writes:

[The] Inability to comprehend the essence of mind has been a major obstacle to the progress of philosophy throughout its history. Questions such as those concerning scientific truth, the nature of reality, and the place of man in the cosmos require for their study some knowledge of the constitution, quality, capacities, and limitations of the human mind, through which medium all such problems must be handled. ...In fact, all the ultimate aims and values of mankind could be profoundly affected by a throughgoing rational insight into the mind-body relationship (pp.43-44).

Ornstein (1972) poses the question by asking, "What is the relation between mental processes, e.g., sensations, and the neural processes which occur invariably and simultaneously with them?" (p.57). The answer is not a simple one, and a 'solution' may, in fact, not be forthcoming. As Bohm (1965) points out:

"...mankind has never encountered any 'general' statements that were not approximations, having limited domains and conditions of validity. Moreover, even if there did exist general statements which had not yet been shown to be thus limited in their validity, there would...be no way to be sure that they would continue to be verified, as the domain under consideration is extended indefinitely. Thus, the notion of absolute truth is not based on facts, and can indeed never be proved by any experiments" (p.125-26).

The mind-brain-consciousness problem, or question, is not a new development. Rene Descartes, often referred to as the father of modern philosophy, pondered the question deeply. He conceived the universe as consisting of two, basic, separate, non-related but interacting substances: a thinking substance

and a material substance. "...the whole nature of the mind," wrote Descartes, "consists in thinking, while the whole nature of the body consists in being an extended thing, and...there is nothing at all common to thought and extension" (cited in Ornstein, 1972, p.4). Descartes wrote that man was, in effect, a composite entity consisting of soul, which was incorporeal, and body, which was corporeal. Yet, he saw a necessity for the two substances to interact by some means. He postulated that:

...the part of the body in which the soul exercises its function immediately is in nowise the heart, nor the whole of the brain, but merely the most inward of all its parts, to wit, a certain very small gland which is situated in the middle of its substance and so suspended above the duct whereby the animal spirits in its anterior cavities have communication with those in the posterior, that the slightest movements which take place in it may alter greatly the course of these spirits; and reciprocally that the smallest changes which occur in the course of the spirits may do much to change the movements of this gland. (Descartes, 1967, p.345-46).

Descartes' conceptualization of the phenomena of mind and brain did not put the controversy to rest. As Pierre Gassendi (in Descartes, vol.II, 1967) noted:

...it still remains to be explained, how that union and aparent intermingling...can be found in you if you are incorporeal, unextended and indivisible. For if you are not greater than a point, how can you be united with the entire body which is of such great magnitude? How, at least, can you be united with the brain, or some minute part of it, which...must yet have some magnitude or extensions, however small it be? If you are wholly without parts, how can you mix or appear to mix with its minute subdivisions? For there is no mixture unless each of the things to be mixed has parts that can mix with one another. Further, if you are discrete, how could you be involved with and form one thing along with matter itself? ...what must the union of the corporeal with

the incorporeal be thought to be? ...ought not that union to take place by means of the closest contact? But how...can that take place apart from the body? How will that which is corporeal seize upon that which is incorporeal, so to hold it conjoined with itself, or how will the incorporeal grasp the corporeal, so as reciprocally to keep it bound to itself, if in it, the incorporeal, there is nothing which it can use to grasp the other, or by which it can be grasped? (pp.21-2).

It is a controversy which is still to be settled.

There are at least four major strains, or schools, of thought currently attempting to explicate the mind-brain-consciousness question. These schools are reflected in many different discipline areas. A simple table does not do any of them justice, but, for the sake of comparison, we will accept that limitation. They are:

1. The Dualistic theorists
2. The Materialistic Identity Theorists
3. The Multi-Aspect Theorists
4. The General Systems Theorists

The Dualistic Theory

The Dualistic Theorists are well represented by the writings of Descartes. There are several variations on this theme, but the major thrust is that man is a composite being: he incorporates the two separate elements of body and soul, the corporeal and the incorporeal elements, within his single being. These two elements, which are discrete, interact by some unknown or mysterious means. As discussed above, this viewpoint has very definite limitations and, aside from its historical interest, has little to recommend it as a basis for serious

investigation at this juncture. As Ornstein (1972) writes:

Such a view of the relation between mind and body is today not a "live option". We regard it as more than a mere coincidence or a divinely pre-established harmony that, under normal circumstances, when I receive a serious injury, I feel pain or when I try to refrain from striking someone in anger, I usually succeed. It would seem that there is an undeniable connection of some sort between what are called 'mental' events or processes and what are called 'physical' events or processes. This is true both at the macro-level of behavior (mind and body) and at the micro-level of neurophysiology (mind and brain). (p.9)..

The Materialistic Identity Theory

The Materialistic Identity Theorists claim adherents from a variety of discipline areas from philosophy to neurophysiology. Their basic position is well summed up in the writings of Gilbert Ryle (1962). He states:

...'my mind' ...signifies my ability and proneness to do certain things... (p.168).

...in describing the workings of a person's mind we are not describing a second set of shadowy operations. We are describing certain phases of his one career; namely we are describing the ways in which parts of his conduct are managed (p.5).

To find that most people have minds (though idiots and infants in arms do not) is simply to find that they are able and prone to do certain sorts of things (p.61).

...when we speak of a person's mind, we are not speaking of a second theatre of special-status incidents, but of certain ways in which some of the incidents of his one life are ordered (p.167).

To talk of a person's mind...is to talk of the person's abilities, liabilities and inclinations to do and undergo certain sorts of things and of the doing

and undergoing of these things in the ordinary world
(p.199)

"The Identity Theory is the view that consciousness or sensations are really processes occurring in the brain. They are not composed of "mind-stuff" or of mental or thinking substances as Descartes had maintained but of electro-chemical processes in the brain. Sensations, in this view, are strictly 'identical' with brain processes" (Ornstein, 1972, p.22). Sperry (1964) writes:

...current brain theory encourages us to try to correlate our subjective psychic experience with the activity of relatively homogeneous nerve-cell units conducting essentially homogeneous impulses through roughly homogeneous cerebral tissue. ...The difference between one mental state and another is accordingly believed to depend upon variance in the timing and distribution of nerve excitations...

...The layman naturally assumes the major work of the brain to be the manufacture of ideas, sensations, images, and feelings, the storage of memories, and the like, and often expects the physical correlates of these to be some kind of aural end-product phosphorescing within the cortex or emanating from its convolutions. These subjective phenomena may, however, be regarded as phases of brain function itself, not products of it.

Thus, whether accompanied by consciousness or not, all brain excitation has ultimately but one end, to aid in the regulation of motor coordination...

The evolutionary increase in man's capacity for perception, feeling, ideation, imagination, and the like, may be regarded, not so much as an end in itself, but as something that has enabled us to behave, to act, more wisely and efficiently (p.46-130).

"The Identity Theory postulates an identity between neural and mental processes. This identity is formulated as "mental processes are neural processes" and not as "neural processes are

mental processes". This is because Identity theorists are claiming that mental processes are 'really', or are 'nothing but' neural processes. It is, therefore, a materialistic reductionist theory" (Ornstein, 1972, p.27). Descartes formulated the statement, "I think, therefore I am." Identity theorists could easily formulate the statement, "My C-fibers are firing, therefore I am."

The stream of thought represented in Identity Theory has had a major influence on modern scientific research and philosophy, and has gathered a prodigious number of adherents in a wide variety of fields. It has manifested itself in the field of education most powerfully in the writings of B.F. Skinner and his followers under the label "Behaviorism". Skinner (1971) writes:

In the traditional view, a person is free. He is autonomous in the sense that his behavior is uncaused. He can therefore be held responsible for what he does and justly punished if he offends. That view, together with its associated practices, must be re-examined when a scientific analysis reveals unsuspected controlling relations between behavior and environment (p.17)

He dismisses the concept of mind entirely:

Whatever we do, and hence however we perceive it, the fact remains that it is the environment which acts upon the perceiving person, not the perceiving person who acts upon the environment (p.179).

If our understanding of contingencies of reinforcement is not yet sufficient to explain all kinds of thinking, we must remember that the appeal to mind explains nothing (p.186).

Hidden in the wings within Skinner's approach, as with all identity theorists, is the underlying assumption that there (1) exists an objective reality "out there," and (2) that there is some sort of mechanistic one-to-one correspondance between events in that external, objective reality and responses in the neurophysiological system of the individual organism. Both of these assumptions must be called into question. Jerome Bruner (1966) points out that what is humanly possible is a function both of our actions and our beliefs. He says that we believe ourselves into action and act ourselves into beliefs.

An article appearing in National Geographic Magazine in April, 1966, documents firewalking in Celon. The firewalking ceremonies involve several people who walk, skip and dance for prolonged periods on burning coals at a temperature of 1328 degrees Fahrenheit. Clearly, according to our knowledge of the physical laws of the universe, these individuals should have been burned to death in a matter of moments; yet they not only survive but are able to repeat their firewalking exercises time and again without showing any signs of injury or discomfort. In this example, as in many others, the hard and fast correspondance between "physical reality" and the human system is mediated by 'meaning'. The firewalkers do not 'know' that the fire will burn them and they are not burned. Within their mental system exists the possibility of walking on burning coals, and the existance of that possibility enables them to perform the feat which within the normal Western mental system

is seemingly impossible.

The Identity Theorists' approach lends itself, at first glance, very well to empirical research methods, which may account for a good deal of its popularity. To the critical eye, however, it does contain some very large gaps in its logical framework which, "...[show] where it would lead if we followed it to its logical conclusion, viz., to nothing" (Ornstein, 1972, p.158). Ornstein (1972) writes:

For a statement to have empirical content, it must be testable by observation or experiment. This means that there must be some way of telling whether the state of affairs depicted by the statement either obtains or does not obtain. If there is no way of telling, by observation or experiment, whether the statement is true or false; if, that is, the statement is compatible with any conceivable state of affairs, then it is utterly devoid of empirical content. It cannot tell us anything, it cannot inform us of anything, unless its truth (or falsity) would make some detectable difference between its being true or false (p.29).

Nagel (1964) writes, "...a function of verification is to supply satisfactory evidence for 'eliminating' some or all of the hypotheses we are considering" (p.21). Ornstein (1972) continues:

No Identity theorist has ever outlined, or even suggested observations or experiments whose outcome would eliminate all other prevalent theories but his. Unless such an observation or experiment is proposed, it will not be possible sufficiently to differentiate the Identity Theory from other theories so that it can be independently tested. At the present time, the Identity Theory is not testable, in the sense that counts, and is therefore of no use in furthering scientific research (p.33).

In his article, "The Perception of Pain", Melzack (1966) reported that:

"The psychological evidence strongly supports the view of pain as a perceptual experience whose quality and intensity is influenced by the unique past history of the individual, by the meaning he gives to the pain-producing situation and by his "state of mind" at the moment. ...In this way pain becomes a function of the whole individual, including his present thoughts and fears as well as his hopes for the future" (p.37).

Wilder Penfield (1950) writes:

Let us consider the brain-mind relationship briefly... It is a boundary which, as some philosophers explain it, does not exist at all. But for the neurophysiologist there is a working boundary that does exist. Physiological methods bring him nearer and nearer to it. But he comes to an impasse, and beyond that impasse no present-day method can take him. If he could state that nerve impulses moving in certain patterns are one and the same thing as mind, he accomplishes little for his future work except to deprive himself of a useful working terminology (p.56).

As a theoretical framework, the Identity Theory is seen to be clearly of little use. We are forced, within its confines, to reduce phenomena to the point of the absurd. If the entire spectrum of 'mental' phenomena can be reduced to brain functions, and brain functions can be reduced to electrical impulses, etc., we soon are left with nothing. Clearly there exist neural correlates to mental phenomena (Ornstein, 1972). However, saying that mental phenomena are 'simply' brain functions tells us nothing. If we are willing to accept that a word is "nothing but" the letters written on a page (Ornstein, 1972), we are soon left with Bateson's restaurant dilemma of eating the menu instead of the meal (Bateson, 1972).

The Multi-Aspect Theory

Ornstein (1972) presents in his book, *The Mind and the Brain*, what he terms the "Multi-Aspect Theory of the Mind". It is an attempt to, "...enable(s) us to do justice to the facts about ourselves, something which narrower theories of the mind cannot do" (p.16). He suggests that, using the example of pain, there must exist at least four distinct aspects involved in defining the 'mind'. They are:

1. The experiential aspect: This is the felt quality of the sensation.... It is what one experiences or feels.... This is the feature...which leads us to call pain a 'mental' process. It is because this feeling or sensation could not exist unfelt or unsensed that we call it 'mental'. That is, it [pain] could not be truly said to 'exist' unless it were sensed. "I am in pain but I am not aware of the pain" is self-contradictory. It could not exist unless it existed as an aspect of consciousness.

2. The Neural Aspect: These are the brain processes which we have granted to be invariably correlated and concomitantly variable with specific experiences. As neurophysiologists will readily admit, extremely little is known about how the brain operates. ...The firing of the neurons in question, then, has been conceded to be necessary and sufficient for the occurrence of the experience. If the appropriate neurons are not firing in X's brain, and the rest of his body, then he would not be having this experience.

3. The Behavioral Aspect: This is an aspect of mind. That is, we often do refer primarily to someone's behavior when we speak of his mind, e.g., "He has a good mind". However, ... consciousness is a sufficient condition for the presence of a mind. ...but also behavior. ...there is an intimate relationship between the experience and the behavior.

4. The Verbal Aspect: This is not what X feels, not

what is occurring in his brain, not what happens to him and not what he does--it is what he says. It may be objected that verbal behavior is just a species of behavior, and, therefore, that it should not be classified separately. ...I think, however, that the verbal aspect of pain merits separate classification. It is the one aspect of pain which is uniquely human. ...This aspect, along with the first and second, etc., is part of what it means to have a mind. Humans, unlike the rest of the animals, can "speak their minds". Ability to use language has been at least as important in human evolution as being able to use tools. The development and transmission of culture--a distinctively human product--would have been impossible without language (Ornstein, J., 1972, pp. 122-38).

Ornstein defends his Multi-Aspect theory on the basis that, "There are several aspects of mind and each--or certain combinations of them--may be regarded as a criterion of our ascription of a mind to any entity or being. This enables us to see our way to a solution, or dissolution of the puzzles about the possibility of ascribing a mind to machines, certain of the animals, or perhaps a being from another planet" (Ornstein, 1972, p.16). His position is that former theories, e.g., the Dualistic and the Identity theories, are non-demonstrable scientifically, non-verifiable, and therefore of little use. He states that they are also too confining and limited in their domains of validity to be of much use as a basis for further investigations (Ornstein, 1972).

While Ornstein's analysis and subsequent dismissal of the Dualistic and Identity theories appears quite justified, it seems evident, as well, that the Multi-Aspect Theory simply begs the question. Creating a more complex system to replace a

simpler one which has been found wanting and has failed to deal with the subject area is not necessarily a solution. It may give more scope for investigation and remove some of the limitations inherent in the simpler system, but it can do little more. It may, in fact, simply confuse the issue by suggesting a blurred picture in place of a formerly clear but inaccurate one.

As R.D. Laing (1974) points out in reference to psychiatry:

The most serious objection to the technical vocabulary currently used to describe psychiatric patients is that it consists of words which split man up verbally in a way which is analogous to the existential splits we have to describe here. But we cannot give an adequate account of the existential splits unless we begin from the concept of a unitary whole, and no such concept exists, nor can any such concept be expressed within the current language system of psychiatry or psycho-analysis.

The words of the current technical vocabulary either refer to man in isolation from the other and the world, that is, as an entity not 'essentially' in relation to the other in a world, or they refer to falsely substantialized aspects of this isolated entity. Such words are: mind and body, psyche and soma, psychological and physical, personality, the self, the organism. All these terms are abstract. ...How can we speak in any way adequately of the relationship between me and you in terms of the interaction of one mental apparatus with another? How, even, can one say what it means to hide something from oneself or to deceive oneself in terms of barriers between one part of a mental apparatus and another? ...Unless we begin with the concept of man in relation to other men and from the beginning 'in' a world, and unless we realize that man does not exist without 'his' world nor can his world exist without him, we are condemned to start our study of...people with a verbal and conceptual splitting

The initial way we see a thing determines all our subsequent dealings with it (pp.19-20).

Bateson (1972) sums up the arguments which set the stage for a General System's Theory. He writes:

Many investigators, especially in the behavioral sciences, seem to believe that scientific advance is predominantly inductive and should be inductive. ...they believe that progress is made by study of "raw" data, leading to new heuristic concepts. The heuristic concepts are then to be regarded as "working hypotheses" and tested against more data. Gradually, it is hoped, the heuristic concepts will be corrected and improved until at last they are worthy of a place in the list of fundamentals. About fifty years of work in which thousands of clever men have had their share have, in fact, produced a rich crop of several hundred heuristic concepts, but, alas, scarcely a single principle worthy of a place in the list of fundamentals.

It is all too clear that the vast majority of the concepts of contemporary psychology, psychiatry, anthropology, sociology, and economics are totally detached from the network of scientific fundamentals.

...No man, after all, has ever seen or experienced formless and unsorted matter; just as no man has ever seen or experienced a "random" event. (p. xix-xxv).

As Pearce (1976b) has pointed out, "We impose our categories on what we see in order to see. We see through the prism of our categories. ...The universe, like nature, is a conceptual framework that changes from culture to culture and age to age" (p.34). Any conceptual system which we impose is in large part arbitrary. And, of course, "Epistemological error is often reinforced and therefore self-validating" (Bateson, 1972, p. 48).

The General Systems Theory

The stream of thought leading to a General Systems Theory has developed from discoveries in modern physics, cybernetics,

ecological investigations and a variety of other discipline areas. Einstein spent the last years of his working life attempting to formulate his "universal field theory". He was attempting to derive, or realize, a mathematical statement which would predict the universe as it was at any given moment (Bohm, 1965). He and others were beginning to conceptualize the universe as a closed system. Heisenberg and other physicists at the turn of the century showed that everything in the universe was in vibration--that on both the macro and micro-levels everything was in motion and that the motion of one entity effected the motion of all others. To borrow a phrase from Jung, there appears to exist a "synchronicity" to all phenomenon in the universe. Modern ecological theorists have demonstrated that, "The unit of survival is not the breeding organism, or the family line, or the society," as was thought in Darwin's time, but that, "The unit of survival is a flexible organism-in-its-environment" (Bateson, 1972, p.451).

We are beginning to see, to know, that unless we view phenomena as integral functions within a closed system, no portion of which is unaffected by all other portions, we are limiting ourselves to such a degree that we cut ourselves off from even the hope of developing a consistent picture of what is occurring within any given sub-system in our universe. In relation to the mind-system of human beings Bateson (1972) writes:

Now let us consider for a moment the question of whether a computer thinks. I would state that it does not. What "thinks" and engages in "trial and error" is the man 'plus' the computer 'plus' the environment. And the lines between man, computer, and environment are purely artificial, fictitious lines. They are lines 'across' the pathways along which information or difference is transmitted. They are not boundaries of the thinking system. What thinks is the total system which engages in trial and error, which is man plus environment" (p.483).

This is no mere quantitative step towards considering more parts within a system but a major qualitative difference in understanding. The 'mind', which for so long psychologists and neurophysiologists have equated with the brain, is no longer a localized phenomenon. It is seen as a system, a matrix, of interactions. To understand what the 'mind' is and how it functions, it is necessary to begin to view it in this light.

Ervin Laszlo (1975) writes:

System is one of the most popular terms currently in the scientific vocabulary. It has penetrated the language of everyday life.... It is recognized as a basis not only for empirical sciences, but also, albeit in tacit form, of much of human behavior (p.9).

In the 1920's only Ludwig von Bertalanffy and Paul A. Weiss in biology, and Alfred North Whitehead in philosophy became aware of the potentials of developing a general theory of complex phenomena--a general theory of biological systems, or a general philosophy of organism.

The promise of a general system theory is that it can capitalize on the emergence of parallelisms in different scientific fields and provide the basis for an integrated theory of complex organization per se (p.1).

Scientists have always sought, in Einstein's (1934) words, "the simplest possible system of thought which will bind together the observed facts." From Kepler,

who had hope of understanding the Plan of Creation, to Heisenberg (1952)-- who, despite the complexities of quantum physics, maintained that what the physicist seeks is to penetrate more and more reality as a great interconnected whole--we can perceive a search for theories that respond to the scientist's appreciation of elegance and accuracy combined with integral scope and extensibility to neighboring fields and as yet uninvestigated phenomena (p.11).

The move towards a general systems theory approach is just such an attempt. As I will be making use of a systemic approach in the following chapters I will briefly sketch the basic tenets of a general system theory framework. For a more detailed description of the application of the general system theory to social and biological phenomena the reader is directed to the work of Bateson (1972), Ervin Laszlo (1975), and Laszlo, Levine, and Milsum (1974). Laszlo (Laszlo, Levine, and Milsum, 1974) defines a system as:

...a set of interacting functional relationships between various components which transform a set of inputs into a set of outputs. ...the definition also includes the concept that each system may be considered to be comprised of subsystems...[and] indeed each system in turn is inevitably only a subsystem of some other larger hierarchy of systems... (p.79).

All systems involve a complex of features, dynamic processes and interactions or relationships. The realization that these processes are common to systems has enabled scientists to analyze particular systems with a great deal more facility than was possible before the advent of the general system approach. All systems involve a 'state' or condition which is dynamic and results in a 'state vector'. Laszlo (1974) defines state as:

...the quantitative values of a set of independent conditions, state variables, [which]...comprise(s) the minimal number necessary to describe the particular present condition.

A vector is defined as a collection of elements, or variables, with the number of elements and the ranges of values depending on the characteristics of the system under study. The particular collection comprised of the state variables for a system is one natural group, and this is called the system's state vector (pp.79-8)

A system is also evaluated in terms of its 'input vector', the constellation of matter-energy and information which enters the system, and its 'output vector', the constellation of matter-energy and information which is, "...a direct result of the operation of the system.... Often the output is considered to be that subset of the state vector which can be measured" (Laszlo, Levine, and Milsum, 1974, p.8).

Both input and output vectors are subject to constraints which may result from either the environmental context in which the system operates, or as a result of the structure of the system itself. More often, the output and input vectors are constrained as a function of both the environment and the structure of the system. "The structure of the system is the arrangement of its subsystems and components...." (Miller, 1975, p.35), and it determines, to a large extent, what the system can take in and what it can put out: the structure of the system determines its 'process'. "All change over time of matter-energy or information in a system is 'process'. Process includes the ongoing 'function' of a system...." (Miller, 1975, p.35).

Living systems, which are simply a particular subset of all possible systems (Miller, 1975), have several particular characteristics not common to non-living systems. Of particular importance to this study is the characteristic referred to as homeostasis--the propensity to maintain a "steady state". Bateson (1972) writes:

All biological and evolving systems (i.e. individual organisms, animal and human societies, ecosystems, and the like) consist of complex cybernetic networks, and all such systems share certain formal characteristics. Each system contains subsystems which are potentially regenerative, i.e., which would go into exponential "runaway" if uncorrected. The regenerative potentialities of such subsystems are typically kept in check by various sorts of governing loops to achieve "steady state." Such systems are conservative in the sense that they tend to conserve the truth of propositions about the values of their component variables which otherwise would show exponential change. Such systems are homeostatic i.e., the effects of small changes of input will be negated and the steady state maintained by 'reversible' adjustment (p.441).

Joseph Pearce (1976b) has pointed out:

The difference between Einstein's relative universe and the Dream-Time cosmology of the Australian aborigine is not a matter of truth or falsehood, realism or illusion, progression or regression, intelligence or stupidity, as the naive realists have claimed. It is a matter of esthetic choice. Each system produces results unobtainable in the other; each is closed and exclusive (p.14).

I am sure that within my lifetime--and I intend to have more than a mere peek into the 21st. century--scientific theory will undergo major and dramatic changes just as it has done from its beginnings. While the man standing on top of Mt. Everest

may claim to be nearer the sun than the man at the foot, to extend that claim to say that he has reached the sun is clearly an exaggeration. General system theory does appear at this point in time to hold the greatest promise and provide the best vehicle for understanding the types of questions currently involved in the study of consciousness. Its use appears quite valid. It must not, however, be considered "the" way, for it is, as Pearce points out, ultimately an esthetic choice. Before setting out on the rest of this journey, this exploration into consciousness, I would ask the reader to look to and remember David Bohm's (1965) statement that:

Truth is thus seen to be apprehended in an essentially dynamic way, in the sense that our knowledge of it can undergo fundamentally new developments at any point, developments that contradict the older structure of ideas in unexpected ways and contain unexpected basically new features. ...In this process there is no permanent accumulation of theories, nor is there an approach to any particular form as a convergent limit. What has been achieved at any given stage is, of course, eventually recorded in journals and textbooks, which make it available for technical application, for study, and for further development and criticism by investigators. But it is in the confrontation of new problems to which older theories are always giving rise that scientific truth has its essential life in a kind of "growing region" where man is always meeting what has hitherto been unknown to him (p.13).

Conclusions

Questions concerning the nature and functioning of the phenomenon known as mind have been asked and pondered by man for centuries. It is a critical area of human questioning; the nature of the answers which men have used have had far reaching

implications in virtually all of the various discipline areas. The very nature of truth, understanding and perception of the world are involved. An understanding of the nature and functioning of consciousness would have a profound influence on all human endeavour.

There are four major trains of thought which have been applied to the area of consciousness: the dualistic theory; the materialistic identity theory; the multi-aspect theory; and the general systems theory. The dualistic theory suggests that mind is a discrete phenomenon from physical reality and that by some unknown means the two entities interact. The materialistic identity theory stipulates that the phenomenon of mind is simply the product of the functioning of the neurological system of individual beings. The multi-aspect theory argues that mind is a conjunct of several discrete aspects which taken together constitute mind. The general systems theory, which appears at this time to provide the most satisfactory approach to the questions involved in the study of consciousness, allows the postulation that mind is a phenomenon which arises out of the functioning of the universe. The theory involves a holistic view of phenomenon and suggests that particular phenomenon cannot be separated out from the whole without misunderstanding. The phenomenon of mind is seen as an integral function of the universe system and individual "minds" are seen as sub-systems within that larger context. In fact, the notions of context and entities are seen within the general systems approach to be

misleading. The universe system is both an entity and a context for itself.

The nature of scientific truth is that it is in a constant state of change and development. The specific approach taken at any given point in time is a function of how the natural world is being perceived; and the vantage point of observers has a major influence on what is seen to be the 'facts of the matter'. While the general systems approach appears at this time to be the most satisfactory vantage point for developing an understanding of the processes involved in consciousness, it cannot be considered as the final or ultimate point of departure. There may, in fact, be serious question as to whether the human mind is capable of conceiving a phenomenon of which it is a part.

III.

THE EQUIPMENT

The Neurophysiology of Consciousness

Some may believe that a biology of the mind is impossible, either on theological or on philosophical grounds. I take here a different view, that a biology of the mind is feasible and is one of the great goals of science, possibly the greatest.

Salvador E. Luria (1974)

Introduction

An exploration of human consciousness must, necessarily, include reference to the large and rapidly developing body of information on the evolution of the brain, and the physiology of brain functions. I am not a physiologist, nor do I pretend to be intimately acquainted with all the technical minutiae of that field. However, at this juncture it does appear critical that those attempting to understand the processes involved in education have at least some conceptual understanding of the nature of the physiological system of the brain with which they deal. Physiologists have clearly shown that there exist neurological processes which correlate with mental and psychological states and processes and that there are definite connections between the two (Ornstein, 1972). What the precise

connections and correlations are is still in some doubt, but the importance of the neurophysiological data cannot be denied. Just as a designer of machinery may be a better designer by virtue of an understanding of the basic physical concepts which underly the operation of machinery, so too, a designer of educational programs with at least a minimal understanding of the physiological system with which he deals may make a better educational designer.

Evolutionary trends and development

Alan Bilsborough (1974) writes that, "The expansion of the human brain is one of the most spectacular evolutionary trends shown by any mammalian lineage..." (p.195). Of all the major characteristics used by anthropologists to identify man, to single him out as different from other primate species, aside from the use of language and symbolic systems, the development of his central nervous system (CNS) has been the single, most consistently used characteristic. Martin (1974) points out that the evolutionary factors which favored the emergence of man also favored a rapid development of a highly developed C.N.S. and that this evolutionary process proceeded with a marked degree of consistency in its rate of development from the time of the australopithecine level of human development to the present time. He further suggests that an acknowledgement of the biological continuity of human evolution is a basic requisite for an understanding of man's present condition.

Living organisms have been in the process of evolving on Earth for some four billion years. Precisely how this process originated or has proceeded is not known; and there still exists a significant amount of disagreement within the scientific community concerning many of the specifics (Ferguson, 1973). Researchers have uncovered, however, a great deal of information. The genetic material, DNA, which carries the coded hereditary information for all living organisms is composed of the same four types of protein molecules called nucleotides. This commonality of genetic material for all living taxa on Earth strongly suggests that all organisms on Earth are descended from a single ancestor, a single instance of the origin of life, and have evolved and diverged by similar processes (Sagan, 1977).

Human beings have emerged at the current point from a long period of evolutionary history. Their precise origins are still a matter of some speculation. The first animal which truly appears to have been modern man's ancestor was 'Homo habilis' who inhabited the African savannahs. The earliest specimen of these creatures have been dated to 3.7 million years ago (Sagan, 1977). Homo-sapien, modern man, dates back only some .2 million years. Animals which appear to bear very similar characteristics to humans have existed for some time previous to 'Homo habilis'. It is quite significant that each of the "more highly evolved" members of man's evolutionary history retained

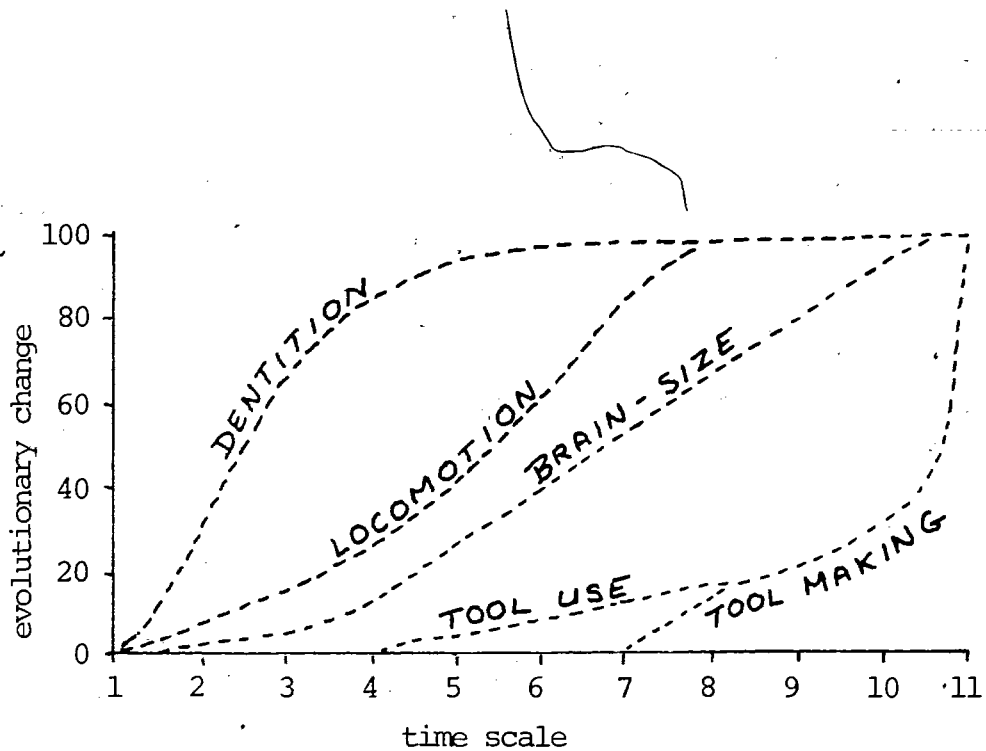


Figure 1

A hypothetical diagram illustrating the concept of "mosaic" evolution in man. The vertical scale indicates 'cumulative' evolutionary change, with the modern human condition taken as 100% change from the ancestral condition in the man-ape stock. The horizontal scale indicates the passage of time, though this cannot be regarded as a linear scale in view of present uncertainty about the fossil record (from R.D. Martin, 1972).

many of the characteristics of his predecessors while adding new potentials, abilities, and structures onto the already extant potentialities, abilities, and structures.

One of the key features of the entire evolutionary process is that organisms and their environments evolve together and form a complex matrix of interactions and mutual influence. Bateson (1972) points out that when discussing evolution formerly we talked in terms of the individual, the breeding organism or the family line or taxon. Ecologists have now recognized that each step of the hierarchy is a 'system' rather than a piece cut off from the whole and viewed against its surrounding milieu. The phenomenon we refer to as 'Mind' is not seen to be localized in the individual organism but in the total structure of the evolutionary process. Johnson (in Ferguson, 1973) suggests that the evolutionary process exhibits a "field of organism" which is subject to the "pull of the future" as well as the "push from the past."

Sagan (1977) states that human intelligence is fundamentally indebted to the millions of years of development and evolutionary history. He suggests that findings from dream research provide some excellent examples of the continuity of the evolutionary process. In a study of dream content of college students the following five types of dreams were statistically most often reported in order: (1) falling; (2) being pursued or attacked; (3) attempting repeatedly and

unsuccessfully to perform a task; (4) various academic learning experiences; (5) diverse sexual experiences. Sagan (1977) concludes somewhat controversially from this and other data that the types of dreams can be closely associated with what we know about human evolution from the small tree-dwelling primate-like creatures to the inhabitant of the savannah grassland environment. It appears that modern man carries within his being both the genetic information resulting from approximately four billion years of evolutionary development and the "ancestral memories" of a species evolution dating back some four to five million years.

The Triune Brain

In its evolutionary development, the human brain has extended along the lines of three basic patterns which may be characterized as the Reptilian, Paleomammalian (old mammal brain), and Neomammalian (new mammal brain). Each of these major subdivisions of the brain possesses its own special and unique type of intelligence, its own sense of time and space, its own subjectivity and objectivity, its own memory system, its own motor control functions and is capable of operating with a marked degree of independence (MacLean, 1969). The amalgamation of these interconnected but functionally independent subdivisions results in a complex and sometimes conflicting situation in terms of the consciousness system of the human

being. In the following section, I will attempt to explore and present some of the important information available about the Triune Brain concept and suggest some of its implications with relation to the total functioning of the human consciousness system.

Luria (1970) provides an excellent overview of the three major sections of the brain in terms of their functional characteristics. He refers to them as "blocks" and states that the first block, the reptilian region, regulates the energy level and tone of the whole neurological system and provides a stable basis for organization of the various processes which occur in all the various centers and regions of the brain system. There is also evidence that it is within this region of the brain that the phenomenon of consciousness arises (Sagan, 1977). The second block, the limbic region, plays a critical role in the analysis, coding and storage of information. This second block is further divided in three subsections each with a particular function. The first subsection, the primary zone, sorts and records sensory information; the second subsection organizes the information further and codes it; and the tertiary zone combines data from the host of incoming pathways and lays the groundwork for the organization of behavior. The third block of the brain, the neomammalian region, comprises the frontal lobes and is involved in the formation of intentions and programs for behavior. This region of the brain serves particularly to regulate the

attention and concentration functions of the organism. Pribram (1971) states that the third block plays a role when active choices have to be made.

The reptilian section of the brain, the oldest section of the brain in evolutionary terms, is associated with "species-specific" behaviors. Its programming appears to be relatively innate and not subject to environmental influences to any significant extent. Its major known functions seem to be associated with body maintenance tasks such as respiration, hormonal secretions, heart beat, etc. It controls the base level activities of the autonomic nervous system and serves to maintain the general tonus of the nervous system (Luria, 1966).

Ethological observations carried out on various primate species indicate that the programmes of the Reptilian section of the brain are concerned with stereotyped patterns of behaviors based on ancestral learning and ancestral memories. This section of the brain is hidebound by precedent, and shows a marked tendency to follow proven methods and patterns according to a rigid schedule. In many ways, the Reptilian brain behaves as though it were neurosis-bound by an ancestral superego; it appears to lack the necessary neural equipment for learning to cope with new or changing situations (MacLean, 1969). MacLean (1975) suggests that lizards and other reptiles provide excellent illustrations of complex prototypical patterns of behavior commonly seen in mammalian species including man.

Species	Earliest Specimen	Endocranial Volume	Height and weight	Ratio, Body to Brain Weight	Comments
Australopithecus robustus (including Paranthropus and Zinjanthropus)	3.5 m.y.	500-550 cc	1.5 m (5') 40-60 kg (85-130 lbs)	90	Powerful masticatory apparatus; sagittal crest; probably rigid vegetarian; imperfectly biped; no forehead. Bush habitat. No associated tools.
Australopithecus africanus (gracile Australopithecine)	6 m.y.	430-600 cc	1-1.25 m (3'-4') 20-30 kg (45-65 lbs)	50	Stronger canines & incisors; prob. omnivores; imperfectly biped; slight forehead. Bush & brush habitat. Stone & bone tools.
Homo habilis	3.7 m.y.	500-800 cc	1.2-1.4 m (4'-4.5') 30-50 kg (65-110 lbs)	60	High forehead. Omnivore. Completely bipedal. Savannah habitat. Stone tools, possible building construction.
Homo erectus (Pithecanthropus)	1.5 m.y.	750-1250 cc	1.4-1.8 m (4.5--6') 40-80 kg (100-180 lbs)	65	High forehead. Omnivore. Completely bipedal. Varied habitat. Varied stone tools. Invention of fire.
Homo sapiens	0.2 m.y.	1100-2200 cc	1.4-2 m (4.5'-6.5') 40-100 kg (100-220 lbs)	45	High forehead. Omnivore. Completely bipedal. Global habitat. Stone, metal, chemical electronic, nuclear tools.

m.y.=million years; cc= cubic centimeters; m=meters; kg=kilograms

Figure 2
Modern man and his ancestors (from Sagan, 1977)

He lists 24 patterns of behavior exhibited by reptilian species which are also common in mammals including man. They are: (1) selection and preparation of homesites; (2) establishment of domain or territory; (3) trail making; (4) "marking" of domain or territory; (5) showing place--preferences; (6) ritualistic display in defense of territory, commonly involving the use of coloration and adornments; (7) formalized intraspecific fighting in defense of territory; (8) triumphal display in successful defense; (9) assumption of distinctive postures and coloration in signaling surrender; (10) routinization of daily activities; (11) foraging; (12) hunting; (13) homing; (14) hoarding; (15) use of defecation posts; (16) formation of social groups; (17) establishment of social hierarchy by ritualistic display and other means; (18) greeting; (19) "grooming;" (20) courtship, with displays using coloration and adornments; (21) mating; (22) breeding and, in isolated instances, attending offspring; (23) frolicking; and (24) migration.

The parallels between these reptilian patterns of behavior and those demonstrated in man are clear. The issue is not that man performs these behaviors "instinctually," or that he is merely a scaleless reptile with the capacity to stand on two legs and speak, but that in the evolutionary process, newer developments have been added on to the already existing structures and patterns rather than replacing them. Successful

patterns of behaviors, relationships and interactions among and between individuals and their world have continued to exist despite the complication of their expression. In effect, nature is extremely conservative and unwilling to discard traits or characteristics which have proven themselves successful. The evolutionary process, rather, emphasizes the development of new structures or traits which are added on to those already extant. John Bolby (1971), in his discussion of the evolutionary succession of behavioral patterns, states:

Evidence available at present suggests strongly that, whilst certain behavioral sequences in some species are organized in fixed chains and other behavioral sequences in other species are organized by means of causal hierarchies or plan hierarchies, a great deal of behavior is organized using a mixture of methods. So far from the methods being mutually incompatible, they are plainly complementary to one another. There is no reason, moreover, why similar behavior, for example nest--building, should not be organized as a chain in one species, as a causal hierarchy in another, and as a plan hierarchy in a third; or why the same behavior should not be organized as a chain or a causal hierarchy in immature members of a species and reorganized in terms of a plan hierarchy in the adult members (p.19).

The second section of the brain, the paleomammalian (old mammal brain), "...appears to represent nature's attempt to provide the reptilian brain with a 'thinking cap' and to emancipate it from the ancestral superego" (MacLean, 1969, p.12). The paleomammalian section of the brain, also called the limbic section, "...is sometimes called the emotional brain, the nose brain, the smell brain, and the rhinencephalon. Early investigators had wrongly assumed that its primary function was to interpret olfactory sensations" (Ferguson, 1973, p.65).

Recent investigations (MacLean, 1969; 1975) have revealed that the limbic subdivision of the human brain plays an important role in elaborating emotional feelings that guide behavior with respect to the two basic life principles of self preservation and preservation of the species. The limbic structures can alter metabolism, oxygen consumption, thirst, and appetite. They can slow or increase the heart rate, increase or lower the blood pressure, alter sex hormone concentration in the blood stream, induce spontaneous ovulation, block ovulation, or produce erection in a male. They have been shown to facilitate healing and increase resistance to disease, facilitate or block learning and memory, trigger or block the fight-flight mechanisms and induce or inhibit sleep (Ferguson, 1973). The limbic region of the human brain provides a critical function of being a liason between the ancient reptilian section of the brain and the modern neomammalian region, the neocortex.

There are three major subdivisions within the limbic region of the human brain. Each subdivision is associated with specific types of functions within the total spectrum of activites dealt with by the limbic region as a whole. "...the lower part of the limbic ring (see Fig. III-4) fed by the amygadala is primarily concerned with emotional feelings and behavior that insures self-preservation. In other words, there is evidence that its circuits are kept busy with the selfish demands of feeding, fighting and self-protection" (MacLean, 1969, p.14).

MacLean (1969) cites the classical studies of Kluver and Bucy (1939) which demonstrated that, "...if this part of the brain was surgically excised in wild monkeys, they (1) lost their sense of fear; (2) became tame; (3) would eat all manner of objects such as nuts, bolts, and faeces; and (4) developed bizarre sexual behavior and other changes that would be prejudicial to their survival in a natural environment" (p.15).

The second subdivision of the limbic brain is, "...involved in expressive and feeling states that are conducive to sociability and other preliminaries to copulation and reproduction" (MacLean, 1969, p.15). Experimental findings (Heath, 1954; MacLean, 1957a, 1957b, 1967b; MacLean and Ploog, 1962, MacLean, Denniston, and Dus, 1963; Olds and Milner, 1954) indicate that this region of the brain is associated with the expression of both facial gestures such as chewing, biting, showing of fangs, and grinding of the teeth, as well as genital responses such as penile erection in the male. "Since fighting is frequently a preliminary to mating as well as feeding, these findings suggest that nature uses the same neural mechanisms for combat in both situations" (MacLean, 1969, p.16). It is useful to remind ourselves here, that in many of the primate species there is a very definite, "...interplay of oral and genital functions, and that this situation presumably evolved because of the primitive use of the snout and olfaction in feeding and mating" (MacLean, 1969, p.44). R.J. Andrew (1964) reported

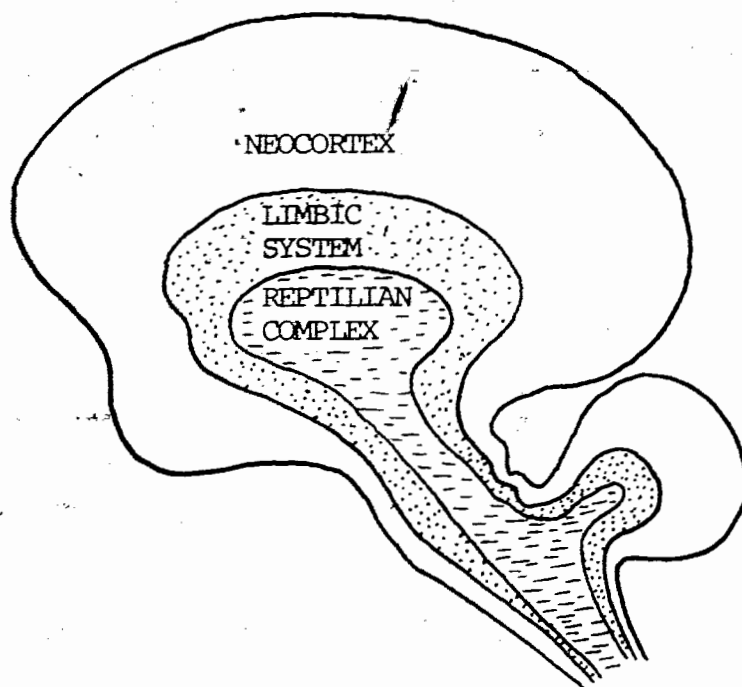


Figure 3

A highly schematic representation of the reptilian complex, limbic system and neocortex in the human brain (from MacLean, 1969).

that in the lemur, a primitive primate which inhabits Madagascar, the males and females engage in greeting behavior which involves the mutual licking of the anogenital areas. MacLean (1969) notes that in several primitive societies in different parts of the world houseguards--stone monuments showing an erect phallus--are used to mark territorial boundaries. It is as though a visual symbol is used as a substitute for the olfactory urinary markings of lower animals.

The third subdivision of the limbic region of the brain, referred to as the limbic cortex, "...provides a functional bridge between the internal and external worlds..." (MacLean, 1969, p.54). Penfield (Penfield and Perot, 1963) report that this section of the limbic region--the limbic cortex--appears to be involved in an important way in dreaming, and that it appears also to have a significant role in memory. This subdivision of the limbic area which has neither direct neural input from the visual apparatus nor from the olfactory mechanisms appears to function as a neural bridge and provides, "...one mechanism by which a union could occur between visual and visceral experience" (MacLean, 1969, p.54). MacLean (1969) suggests that our subjective feelings of individuality are a direct result of our two-fold source of information from the external public world and our own internal private world. He writes that our individuality as well as our personal identification with what happens in the external world depend upon a bonding of the internal and external experiences and sensory inputs. This

bonding occurs within this region of the brain--the limbic cortex. MacLean (1975) suggests that we have, essentially, a neural ladder for ascending from the most primitive sexual feelings to the highest level of altruistic sentiments.

MacLean (1975) reports that when the majority of neural pathways between the reptilian and paleomammalian brains were cut or destroyed in monkeys, after they had been nursed back to health and re-taught to feed themselves and to move about, that the most striking characteristic of the animals is that although they look like monkeys they no longer demonstrate the characteristics which are species-typical. Pribram (1971) reports similar observations with human beings. He states that cutting of the pathways which connect the cortex with the subcortical structures produces severe disturbances in the basic personality structure of the individual. The connections between the reptilian regions of the brain and the limbic regions appear to provide the pathways required for the manifestation of the basic personality structure of the organisms.

The neomammalian (new mammal) section of the triune brain is the last region of the brain to develop in the maturation process of the individual--possibly not reaching its full development until some time in late adolescence--and is most highly developed in man. According to MacLean (1969) it affords:

...a vast neural screen for the portrayal of symbolic language and the associated functions of reading, writing, and arithmetic. Mother of invention, and father of abstract thought, it promotes the preservation and procreation of ideas (p.218).

The neomammalian region of the brain is the seat of the 'conscious' mind in man and serves to interpret, rationalize and conceptualize incoming and outgoing sensory information. Its programming is relatively malleable and subject to change with new environmental conditions and stimuli. The sensory systems located in this region of the brain are primarily those giving information about the external environment, i.e. the visual, auditory, and somatic systems. It seems reasonable, therefore, that this region of the brain would find its major concerns oriented towards the outside world (MacLean, 1975). The rational aspects of thought occur within this section of the brain. Gevarter (1975) summarizes the relationship between the paleomammalian region (limbic system) and the neomammalian regions (cerebral cortex) as follows:

1. The rational portion (conscious cognitive portion) of one's thought occurs primarily in the cerebral cortex (new brain).
2. What one really believes is entered in the old brain. Here is contained the basic value system (rules for survival upon which one acts automatically and which give rise to actions and emotions).
3. The new brain evolves its ideas and value system primarily by the use of consciousness (and intuitive cognitive thought processes).
4. The models of reality centered in the old brain are relatively coarse (undetailed), dealing primarily with how people relate to themselves (in terms of

their self-concepts and expectations), to others, and to the world.

5. The old brain evolves its value system primarily by direct (consciously uninterpreted) experience--that which has emotional impact. This is in contrast to the new brain which evolves its value system through rational interpretation of experience and through cognitive acts.

6. The old brain programming becomes relatively permanent as the individual matures.

7. There is a slow transference of ideas and values accepted by the rational faculty from the new brain to the old brain.

8. The new brain programs can be changed with new perceptions. (pp.80-81).

Although we have looked at the brain in terms of individual regions for purposes of understanding, it is critical to keep in mind that while each of the regions functions with a marked degree of independence it is also very much interconnected to the other regions forming a functional system to which each of the separate regions contributes its unique share. Luria (1966) points out that the significant feature of a functional system is that it is based on a complex dynamic "constellation" of connections which are situated on different levels within the nervous system and that when the organism is involved in the performance of a task the particular structure of the system may change or be modified without the task itself becoming changed. He states that the nervous system of man is organized on a systemic, not a concrete structure.

The fully formed, adult human brain is an extremely complex functional system. As with all complex systems, the whole is

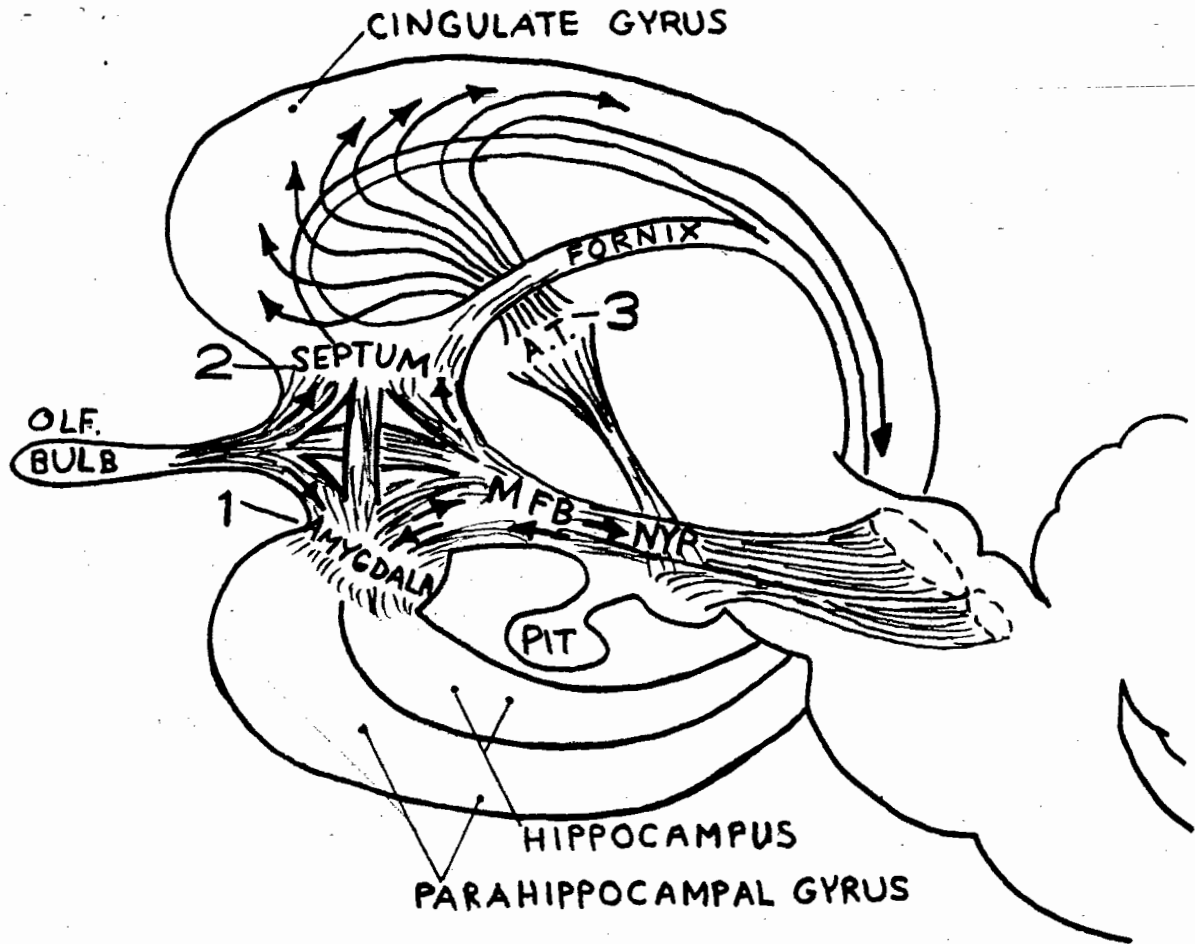


Figure 4

A schematic diagram of the limbic region of the human brain (from MacLean, 1969).

greater than the sum of its parts. For the whole must include not only the parts and their individual functions and processes but the processes and functions involved in the interactions between and among the separate parts. Miller (1975) refers to these as 'emergents'. John Bowlby (1971) states:

...neurophysiologists have been emphasizing on what conservative lines the central nervous system of higher species are built. So far from the neural equipment of earlier design being scrapped, the neural equipment of higher species incorporates within itself all the earlier design features and then adds to it new systems that modify and sometimes override, the activities of the old; in that way more complex and elaborate behavior becomes possible (p.114).

Making the jump from neurophysiological findings to conclusions about behavior patterns has been a major issue for behavioral scientists for some time. Because of its immense ability to adapt to a wide variety of situations, environments and patterns of interaction with the world, the human conscious system has not succumbed to an easy analysis. Building on the triune concept developed by MacLean, William Gevarter (1976) has attempted to diagram some of the apparent interactions involved within the functional system of human consciousness. Based on the eight postulates listed above he concludes:

The old brain is essentially the robot in humans, just as it is in animals. Its programs and responses are a function of experience and input from the new brain. The new brain is our basis for freedom and self-control.

In the early years, the child builds in the old brain a basic value system and a basic way of looking at the world. New brain powers are relatively underdeveloped so that dogma, rules, models, and ideology enter the old brain relatively uncritically. If this

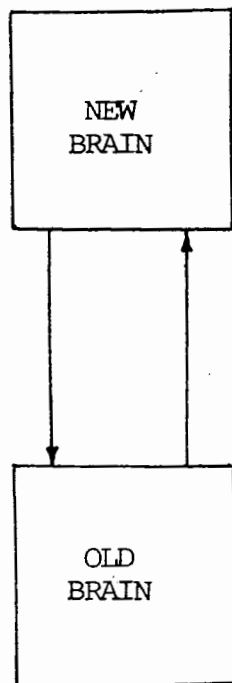
programming has strong emotional content associated with it, then in later years it becomes especially intractable. As the old brain is the ultimate decision maker, this programming is particularly important

The control that one has over oneself is dependent upon self-awareness, intracerebral mechanisms, and environment. Awareness is a new brain function.

...If we understand that the old brain response to stimuli is determined by knowledge of the situation and internal psychological stress, as well as by the old brain value system and programming, then we can utilize the new brain, with its awareness and ability for conscious rational thought and interpretation, to maneuver the situation to elicit a favorable old brain response (p.44).

In this connection, it is important to recall that the neomammalian region of the brain (the new brain) is the seat of ideation, rationalization, and conceptualization, while the paleomammalian (old brain) region--the limbic region--is the seat of responses which are involved in self-preservation and the preservation of the species--sociosexual relationships. In any situation where the individual is under stress, which will be interpreted by the limbic region as a potential threat to survival, it is from the limbic region that the response will originate (Gevarter, 1975, 1976). Gevarter (1976) suggests that the perception of an event or stimuli--the determination of its meaning with regard to the individual--is a product of (1) the external stimulus; (2) old and new brain values, concepts, models and expectations; and (3) the internal state of the organism.

Both the old and new brains perceive events directly



- IDEAS AND VALUES STEM FROM COGNITIVE THOUGHT PROCESSES
- MENTAL MODELS CAN BE VERY DETAILED
- PROGRAMMING SUBJECT TO CHANGE

- BASIC VALUE SYSTEM STEMS FROM EXPERIENCES WITH EMOTIONAL IMPACT
- MENTAL MODELS ARE RELATIVELY CRUDE DEALING PRIMARILY WITH RELATIONAL ASPECTS
- PROGRAMMING RELATIVELY PERMANENT

Figure 5

Old and new brain functions (from Gevarter, 1975).

(MacLean, 1969) and are able, potentially, to respond. However, the old brain, which is concerned with basic survival of the organism, is able to effectively override the potential responses of the new brain in situations involving emotional stress--potential threat to the organism or its relationships with others or the world. "Old brain values and outlooks act like a filter distorting new brain conclusions as a function of emotional content," writes Gevarter (1976), and, "Conditioned response stimuli [old brain values] can bypass new brain analysis" (p.45).

MacLean (1975) describes the characteristic thought patterns of the three major subdivisions of the brain as (1) promentation; (2) emotomentation; and (3) ratiomentation. Promentation applies to the rudimentary, paleopsychic processes of underlying prototypical, species-typical, behaviors or propensions. Emotomentation applies to those cerebral processes underlying what are popularly referred to as "emotions," or prosemanic behaviors. Ratiomentation applies to those higher order processes of the cerebral cortex regions of the human brain which are distinctly ideational and rational. MacLean (1975) writes:

In describing the functions of the triune brain metaphorically, one might imagine that the reptilian brain provides the basic plots and actions; that the limbic brain influences emotionally the developments of the plots; while the neomammalian brain has the capacity to expound the plots and emotions in as many ways as there are authors.

...clinical and experiential findings...indicate that the two older revolutionary formations of the brain are fundamentally involved in the psychogenesis of propense and affective states and that their projecting pathways are essential for prose~~semantic~~ expression of the basic personality.

...there are indications that with the evolution of the forebrain structures underlying the three mentalities in question, no provision was made for intercommunication by the use of words, and this would seem central to many human dilemmas (p.221).

The Split Hemispheres

Researchers have known for a long time that the human brain, like other animal brains, is laterally divided. Hippocrates wrote, "The human brain, as in the case of all other animals, is double" (Chadwick and Mann, 1950, p.183). Until quite recently, however, the real significance of that doubling has not been apparent. As late as 1943 Strong and Elwyn (1943) suggested that the higher cortical functions in man were vested principally in one cerebral hemisphere and that, as a rule, when lesions or damage occurred in the other hemisphere there were no recognizable disturbances. It was not until the early 50's when Sperry and Myers, then working at the University of Chicago, began to study the results of commissurotomy (the cutting of the corpus collosum--the nerve fibers connecting the two cerebral hemispheres) that the roles of the two hemispheres began to emerge. Myers and Sperry found that, "...when this connection between the two halves of the cerebrum was cut, each hemisphere functioned independently as if it were a complete brain"

(Gazzaniga, 1973, p.87).

At approximately age six, when the cerebral regions of the human brain have begun to fully form, the two hemispheres clearly begin to function with a significant degree of independence and in different modes of information processing. David Galin (1976) points out that what most characterizes the hemispheres is not that they are specialized to work with different types of information or material but that they process the same sorts of information by different modes. The left hemisphere, in the normal right-handed individual, processes information in an essentially analytical, sequential and linear manner; the right hemisphere processes information in an essentially wholistic, gestalt mode. As a result of their particular cognitive styles the two hemispheres seem to be suited to dealing with specific sorts of information, situations and problems.

In the normal, adult, right-handed human being, the left hemisphere of the brain functions in a logical, sequential, and analytic mode of information processing. Bakan (1975) capsualizes the mode of the left hemisphere in his statement:

The left hemisphere, usually the "dominant" hemisphere is especially involved with language, logic, propositional thought, and analytic functions. Its mode of functioning has been described as abstract, lineal, rational, focal, conceptual, reality oriented, propositional, and secondary process (Bakan, 1971; Bogen, 1969, Bogen and Gordon, 1971; Nebes, 1974; Sperry, 1968) (p.2).

The mode of information processing characteristic of the left hemisphere is well suited for dealing with the world of objects and things. It separates form from field and allows the individual to deal with separate parts or segments of the object world one at a time (Galín, 1976). It is in this hemisphere that the functions of language-- speech, reading and writing--appear to reside. Krashen (1972) reports that after a child has reached five or more years of age, "...right--hemisphere damage no longer seems to affect speaking, except in a very small percentage of cases that probably represents the incidence of right--brained language in the general population" (Kinsbourne, 1974, p:265). Kinsbourne (1974) reports that left lateralization of language begins well after the origins of language and progresses throughout childhood. There is both a shift towards the left hemisphere and a gradual impairment of the right hemisphere's ability to compensate should damage occur in the left hemisphere. As a result of experimental work with newborn infants Molfese (1972) has concluded that there exists a degree of preprogramming for language in the left hemisphere and for nonverbal sound in the right hemisphere. Kinsbourne and Lynn (1974) reported that the left hemisphere is better at seizing on well-recognized, familiar component features of an object than the right and that it is greatly superior at employing verbal symbols in communicating the nature of the objects seen.

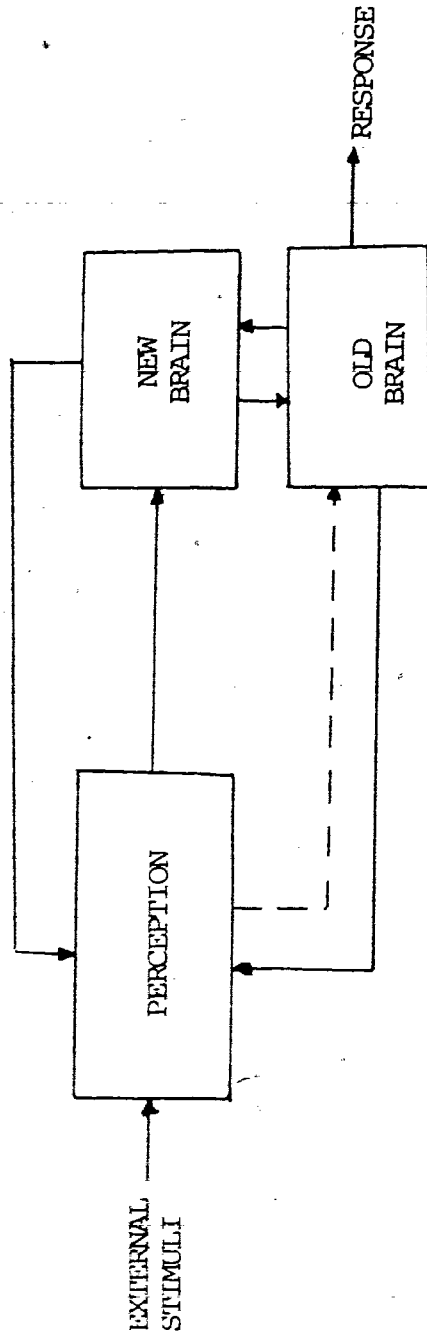


Figure 6

A schematic diagram of old and new brain response patterns (from Gevarter, 1975).

Making use of EEG readings, Ornstein and Galin (1976) demonstrated that subjects involved in tasks such as writing and arithmetic and specifically verbal tasks showed characteristically high alpha readings in their right hemispheres indicating that that area of the brain "idled" while the subject was engaged in left hemisphere activities. With tasks involving spacial orientation such as arranging blocks the reverse condition occurred.

Bakan (1975) summarized the functional mode of the right hemisphere in his statement:

The right or "non--dominant" hemisphere is associated with perceptual--spacial and non--verbal functions, visual and body imagery, music and non--analytic functions. Its mode of functioning may be described as concrete, non-lineal, pictorial, diffuse, metaphoric, affective, archaic, appositional, and primary process (Bakan, 1971; Bogen, 1969; Bogen and Gordon, 1971; Nebes, 1974; Sperry, 1968) (p.2).

Benton (1969) demonstrated that individuals with right hemisphere injuries had difficulties in orienting themselves in physical space and also tended to show difficulties in reproducing drawings, block arrangements, and stick constructions. Ornstein and Galin (1976) have shown that in tasks involving spatial orientation the left hemisphere showed high alpha wave manufacture indicating that it was relatively "at rest" while the right hemisphere attended to the task. In tests involving recognition of objects by tactile sense alone Gazzaniga (1973) reported that the right hemisphere was clearly

superior. As discussed above, the right hemisphere appears to have little or no ability to verbalize.

Bakan (1975) concluded that the right hemisphere's mode of processing mediates more primitive forms of cognition than the left hemisphere. He suggests a correlation between right hemispheric thought and primary process thinking described by Freud. Primary process thinking is characterized by being primitive, magical, archaic, primal, regressive, affective, pictorial, concrete and illogical. Campbell working at Cambridge University suggests from the research findings that the right cerebral hemisphere is particularly well integrated with the limbic regions of the brain while the left hemisphere is much less so (Sagan, 1977). This suggests further that right hemispheric perceptions, perceptions resulting via the right hemispheric mode of information processing, would tend to give the individual a fairly direct link with his evolutionary more primitive mental activities while left hemispheric information processing would be linked more with the individual's cultural or social mental activities which involved language and the symbolic manipulations involved in cultural information exchange.

Some workers in this area have concluded that the human being has, in effect, two separate and distinct "minds" or streams of thought operating simultaneously and independently (see Bogen, 1973). While it appears clear from research data

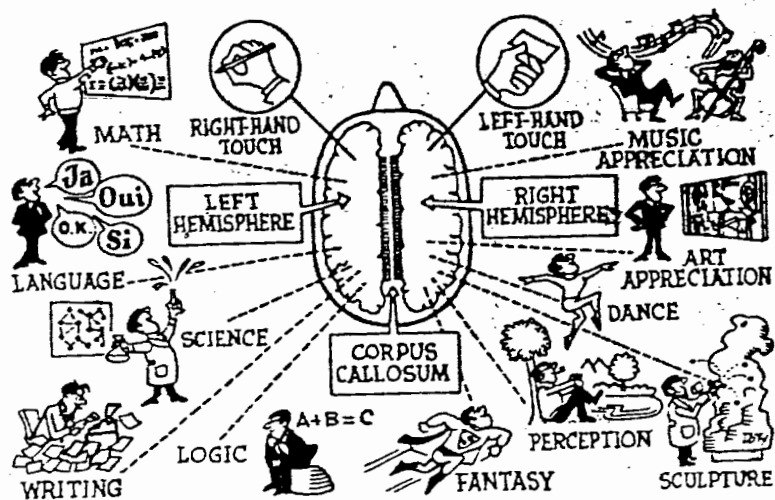


Fig. 7

How the brain divides its work (from Tart, 1976b).

that the two hemispheres of the brain function in different modes or styles of thought, and that the different modes tend to orient each hemisphere towards specific types of functioning, in the normal, non--commissurotized individuals the two hemispheres appear, rather, to function in a reasonably complementary manner. David Galin (1976) states that the wholistic and the analytic modes are complementary, with each providing a dimension which is lacking in the other.

Human beings engage in a wide variety of tasks and activities. Very few of them are clearly differentiated as to specifically verbal or non-verbal, spatial or non-spatial. In fact, an individual is never engaged in only a single task at any given point in time. While a man is engaged in a verbal task, i.e., talking with his friend, he is also simultaneously engaged in standing--keeping himself erect and oriented within his physical environment in relation to his friend--conceiving his train of thought in images and symbols, remembering to pick up the groceries for his wife, day--dreaming about his recent vacation in Greece, making sure that he is in no physical danger, i.e., watching the traffic, etc., and numerous other things as well. Simultaneously, the individual's mind system is engaged in a host of activities which take place unconsciously or "below the limen of feeling" (Langer, 1962).

Susan Langer (1962) concluded that a major portion of human cerebration, the processes involved in human thought, takes

place below the limen of feeling and that many of the mental activities play across the conscious portion although so briefly that they usually go unnoticed. She suggests that there is little use or value in attempting to separate into a special category that portion of thought or cerebration which remains below the limen of feeling and is commonly referred to as the "unconscious system." She suggests, rather, that cerebration is a function of the total nervous system with the highest concentration of activity taking place in the brain and that there is no functional difference between that portion of thought which is above and that portion which is below the limen of feeling.

The question is not so much whether man has, indeed, two minds functioning simultaneously and independently, but to what extent and under what conditions does one or the other of the hemispheric modes dominate. As Bogen (1969) has pointed out, "As soon as we try to distribute, or to localize in any way a particular function, we are soon faced with the heart of the problem--what is a function? ...is love of children a function to be localized in some particular part of the brain...? (pp. 145-46). Robert Nebes (1974) states that competition between the hemispheres for control of the motor output and response hierarchy is normally resolved by the hemisphere which is specialized to deal with the nature of the solution demanded by the particular task taking control of the output systems. He suggests that the resolution might well be a result of balancing

processes taking place at the brainstem level.

Bakan (1975), drawing on research findings from the fields of neuropsychology, psychiatry, and sleep and dream research, suggests that research evidence from a variety of sources converges to support the theory that there is a cyclic ascendance in the functional dominance of the two hemispheres which is manifested by changes at the physiological and psychological levels. Citing Broughton (1974) and Kleitman (1963, 1968) Bakan (1975) suggests that there exists a basic rhythm of the rest--activity cycle (BRAC) which influences the hemispheric functionings during the waking state similar to the sleep-dream cycle which occurs during sleep.

Recent investigations (Etevenon, 1973; Flor-Henry, 1969a, 1969b, 1972; Serafetinides, 1972; Sugeran et al, 1973) have demonstrated that pathology of hemispheric interaction is involved in schizophrenia (Bakan, 1975). Paul Bakan (1976) reports that autopsies performed by researchers at the National Institute of Health which compared the brains of chronic schizophrenics with nonschizophrenics showed that the only distinguishing feature between them was that the corpus collosum, the nerve fibers connecting the two hemispheres, averaged 18 percent thicker in the brains of schizophrenics. Bakan suggests that schizophrenics may have defective barriers separating the two hemispheres as a result of the increased thickness of the colossal tissues which result in their having

difficulties differentiating between modes of thought and problem resolution. Pribram (1971) suggests that the corpus callosum serves to inhibit the transfer of information between the hemispheres as well as to facilitate transfer, and as a result it plays a significant role in terms of hemispheric specificity and dominance. He suggests that by limiting the flow of information between the hemispheres the hemisphere which is more capable and better suited to deal with a particular task is more likely to be able to gain access to output systems.

In task confrontation situations with normal adults Galin (1976) suggests that there are probably two major factors which affect which mode, which hemisphere, will gain control of the output mechanisms. They are (1) resolution by speed; and (2) resolution by motivation. Levy, Trevarthen and Sperry (1972) write that, "...when a hemisphere is intrinsically better equipped to handle some task, it is also easier for that hemisphere to dominate the motor pathways." For example, in cases where a verbal response is required the left hemisphere will gain access to the motor output mechanisms, and in cases where recognition of faces is required the right hemisphere would most easily gain access to motor pathways. Michael Gazzaniga, working with split-brain monkeys, was able to train each hemisphere separately to solve discrimination problems and arrive at divergent solutions. He found that by offering different rewards to the different hemispheres he could predict which hemisphere would dominate the outcome of a particular

task. He concluded that cerebral dominance was quite flexible and that the hemisphere which proved most successful at gaining reinforcement was most likely to gain access to output systems.

Conclusions

Research in the field of the neurophysiology of human consciousness is still in its early stages. Workers in this area have made great progress but information is still conflicting and limited. Some major trends, however, have begun to emerge, and these trends are of importance to the more general study of human consciousness. It has been well established that there are correlations between neurological functions and psychological and mental states. The precise nature of these correlations is as yet not established but we may be reasonably certain, at this point in time, that the functioning of the system is consistent with its structure and that we need not rely on Divine Intervention in order to make sense of thoughts, feelings, and sensations.

We know that in its evolutionary development the human brain has extended along three major lines and that the three major subsections of the brain function each in their own unique manner and contribute their unique flavor to the overall functioning of the system. We know that in the evolution of living systems new structures are added to the old rather than

replacing them and that the neural equipment is organized on a systemic rather than a concrete pattern. This allows at the human level considerable flexibility; it allows the system to adapt and function with a variety of options rather than being limited to a simple one-to-one stimulus-response system characteristic of some of the lower animals. It requires, however, that the new structure carries with it the potentialities and liabilities of its predecessor. The particular subsystem within the consciousness which responds to a particular situation or stimulus is dependent upon (1) the external or internal stimulus itself; (2) old and new brain values, concepts, models and expectations; and (3) the internal state of the organism.

The human brain, like all higher animal brains, is laterally divided. Each of the two hemispheres of the human brain functions with its own particular mode or cognitive style; the integration of these two styles potentially complement one another and together allow the total system a greater degree of flexibility in dealing with the world and in developing optimal problem solutions. The right brain is characterized as being non-sequential, non-linear, and visionary and is linked closely to the limbic and lower regions of the brain. It is associated with what Freud has termed primary process thinking. The left hemisphere is characterized as being linear, logical and personal. It carries the language and symbolic manipulation structures and is associated with the thinking process which

Freud referred to as secondary process thinking.

There is evidence of a rest-activity cycle occurring in the nervous system which favors a cyclic ascendancy between the two hemispheres; in cases of potential conflict between the two modes of information processing represented in the hemispheres the conflict is normally resolved by the hemisphere which is inherently more capable of successfully dealing with the problem or the hemisphere which is able to reach a solution first gaining access to the output systems; there is also evidence that environmental influences and learning may have a definite bearing on which hemisphere gains control of the output systems: the hemisphere which has been consistently rewarded for solving the particular type of problem will tend to gain access to the output systems.

IV.

FUEL AND LUBRICANTS

Culture and Discrete States of Consciousness

The real question is not whether the touch of a woodpecker's beak does in fact cure toothache. It is rather whether there is a point of view from which a woodpecker's beak and a man's tooth can be seen as 'going together'.

Claude Levi-Strauss (1966)

~~Introduction~~

Deikman (1976) writes that man is a creature composed of two elements: the biological and the psychological. Man begins life with both a physically ordered structure and a psychically ordered structure (Rychlak, 1973). While an understanding of the neurophysiological aspects of human consciousness gives us a general framework, a description of the processes of human consciousness, it is necessary as well to examine the cultural milieu in which those processes take place. All human beings are involved in culture; culture forms and determines, to a large extent, the content of human consciousness. The cultural context within which an individual develops and functions constitutes a major aspect in determining how, what, and why he is what he is and does what he does. The fields of culture and personality, psycho-social interaction, personality, and

developmental psychology are immense. It will not be the aim of this chapter to cover the entire range of the pertinent fields but to provide an overview consistent with current thinking in these major fields of the interrelations between the cultural setting and the consciousness systems of individuals and groups.

The Social Agreement

Man, like all the higher primates, is a social being. The human infant is singularly incapable of surviving on his own at birth and requires several years of intense care and nurture before he is able to function even minimally on his own. Even once he has attained a degree of independence and some ability to survive on his own he will typically remain within a social group where he will spend virtually all of his life. In summarizing primate social relations Bolby (1971) says, "With few exceptions, individuals spend the whole of their lives in close proximity to other familiar individuals" (p.89).

Lowrey (1940), Spitz (1945), Bakwin (1949), Gesseld and Amatruda (1954), have all reported from studies on infants raised in impoverished social environments that retardation, infant psychosis, and death may result if infants do not receive the intense and consistent care they require during their early months and years. Bolby (1971) and Pearce (1977) both stress the critical importance of the infant establishing a strong and

lasting bond with his adult caretaker, usually the mother, at a very early age. They both consider, from research evidence, that a child's possibilities of healthy development are greatly limited if this bond is not established.

R.D. Martin (1974) states that variations in the social climate of early learning may greatly effect the development of adult behavior, and that as a result of man's evolutionary history even genetic pre-programming of behavior would have to be adapted to an environment in which culture is as significant as the physical surroundings. Ashley Montague (1974) points out that the environment in which an individual develops is of paramount importance to that development. He suggests that just as an individual acquires the imagery, vocabulary and accent of the speech milieu in which he learns language, so too does he acquire the imagery, vocabulary and accent of intelligence from his developmental milieu.

For the human being, culture--the shared agreement about reality--forms a decisive and critical environmental milieu. Pearce (1976a) writes that the mind finds its definition of itself in confrontation with other minds rather than with 'things'. He states that human beings adjust to the reality of other thinkers not to the reality of the physical world. It is the social milieu which provides "meaning" for acts, thoughts, and objects in an individual's world and which, in fact, largely determines what acts, thoughts, and objects are possible

(Buckley, 1967). David M. Schneider (1976) defines culture as a "system of symbols and meanings." He writes:

...culture constitutes a body of definitions, premises, statements, postulates, presumptions, propositions, and perceptions about the nature of the universe and man's place in it. ...norms tell the actor how to behave in the presence of ghosts, gods, and human beings, culture tells the actors what ghosts, gods, and human beings are and what they are all about (p.203).

The world at large, nature, the facts of life, whatever they may be, are always parts of man's perception of them as that perception is formulated through his culture. The world at large is not, indeed it cannot be, independent of the way in which his culture formulates his vision of what he is seeing. There are only cultural constructions of reality, and these cultural constructions of realities are decisive in what is perceived, what is experienced, what is understood. In this sense, then, 'nature' and the 'facts of life' are always a special case of the cultural definition of things; they have no independent existence apart from how they are defined by the culture (p.204).

Attempting to understand the workings of human consciousness and the acts, thoughts, and perceptions of an individual human being without reference to his culture is very much akin to attempting to understand a fish with no concept of water. Sanity and insanity, right and wrong, proper and improper, possible and impossible are all culturally derived constructions. How the world works, what exists within that world and what the meaning of specific situations, actions, thoughts, and beings are is all culturally determined. It is the process of cultural agreement about reality which largely determines what a human being is, what he does, how he does it and why. Out of the 'total spectrum of human potential' each

culture actively encourages the development of specific types of potential and actively discourages others. Charles Tart (1976b) writes:

A culture can be looked at as the creation of a group of programmers who have (implicitly) agreed that certain human potentialities are beneficial and should be developed, and have set up a society, a system of interlocking relationships, to select these potentialities, to develop them, and to program them, to various degrees (p.106).

The relationship between individual consciousness and culture is not so much a complex relationship as an inseparable one. Like the fish and his water, the man separated from his culture is separated from his milieu of meaning and purpose. The construction which we refer to as individual consciousness is not a natural 'given' but a construction which is a direct function of the individual's continuing and continuous interactions within the milieu of his culture. The individual's normal, waking conscious state is a direct and integral function of the larger cultural consciousness system. Tart (1976b) writes:

Our ordinary consciousness is not at all a natural 'given', but a 'construction', and, in many important ways, a rather arbitrary construct. This is a difficult point to comprehend even on an intellectual level, because, after all, we 'are' our ordinary state of consciousness, and each of our egos tends to implicitly assume that the way 'it' is is the natural, given standard of how an ego, a state of consciousness, 'should' be (p.91-92).

An individual's normal consciousness construction cannot be viewed as a separate, discrete entity. It must be seen, to be understood, as a nexus point within the larger framework of

culture. It is a subsystem within the larger system of consciousness which we call culture. As Gregory Bateson (1972) says, "The individual mind is immanent but not only in the body. It is immanent also in pathways and messages outside the body; and there is a larger Mind of which the individual mind is only a sub-system" (p.461). The particular organization of an individual's consciousness system, his discrete state of consciousness, (d-SoC), (Tart, 1976b), results from the continuous interaction of his various psychological systems and structures with the systems and structures of the larger cultural mind system.

Jung (1960) postulated an "adhesive" model. He stated that all emotional reactions stimulate mental thoughts which form congeries of ideas called "complexes." These complexes serve as sub-structures within the mind through which all subsequent information of experience must be processed. He suggested as well that there exists a "snowball" effect in terms of complex formation--the stronger the complex is, the more it will tend to assimilate other contents of the psyche. Pearce (1977) suggests that the human mind functions not unlike a hologram; it replicates the environment within which it exists but in a creative/symbolic rather than a direct manner.

Miller (1975) stresses that when speaking about systems, in order to avoid confusion, it is necessary to identify the level of reference. For the purposes of this discussion, the

individual human consciousness system has been identified to occupy the 'system' level in the hierarchy. Culture, in this case, becomes identified at the 'suprasystem' level, and the various psychological structures which make up the individual mind become identified at the 'subsystem' level. It is critical to remember, however, that this is simply a point of view, a scale to speak from. Culture itself could just as easily have been identified at the system level. In that case, individual human minds would become subsystems within that larger context.

Pearce (1976b) writes that our experience is our reality. He points out that man is a social creature by nature and that in the process of sharing our experience we have developed a "consensus about reality" which acts as an artificial overlay, "a semantic screen," which blinds us to a process or matrix which is truly cultural. As an individual child grows and develops within his particular cultural milieu, he, normally, over a period of time, internalizes his culture's consensual agreement about the world. Anthropologists refer to this process as "enculturation." It is the process by which an individual assimilates into his own psychological structures the cultural view of reality within which he interacts.

This enculturated view of reality becomes, to a large extent, the reality with which the individual deals. One interacts with, responds to, and perceives through the screen of one's cultural meta-program as naturally and as automatically as

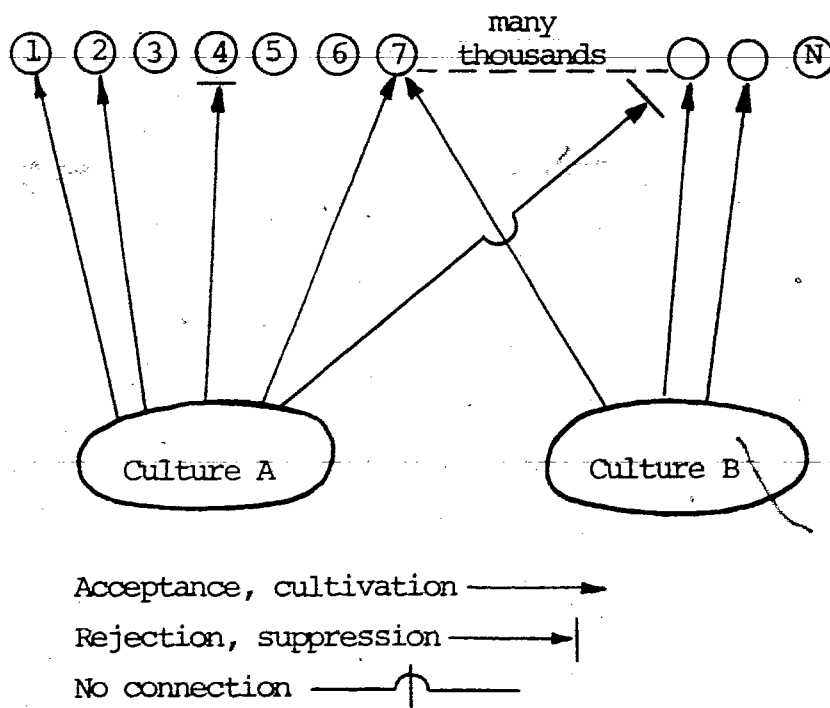


Figure 8

Selection of potentials by a culture
(from Tart, 1976b).

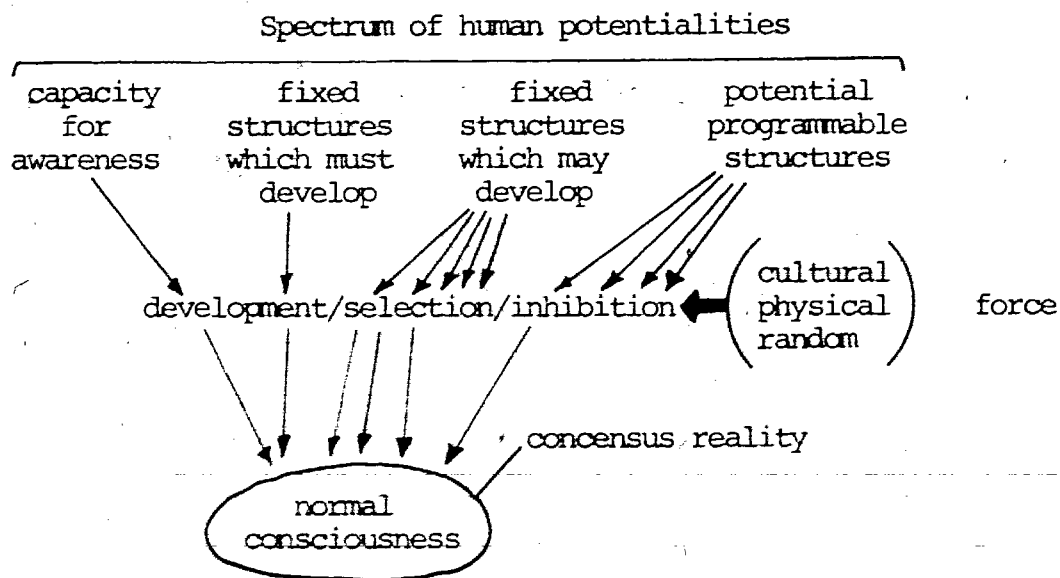


Figure 9

The process of enculturation via development,
selection and inhibition (from Tart, 1976b),

though this arbitrary construction of reality were the only reality which could possibly exist (see Pearce 1976a, 1976b). Pearce (1976b) writes that culture is a "semantic mediant acting as proxy-for-reality interaction." He states that culture shields man from a direct confrontation with a holistic potential, it provides a means for simplifying and ordering the world in which we must interact and function, and that our homeostatic drive orients us towards that "sameness" of the semantic mediant provided by culture.

Internalization of the Social Agreement

All living systems are homeostatic. Through a variety of mechanisms they monitor and regulate their various subsystems in order to maintain a fractional equilibrium both within themselves and between themselves and their environment. Miller (1975) states that each of the numerous variables in a living system exists within a "range of stability." The range of stability is that range within which the rate of correction is minimal and beyond which correction begins. Any input or output which forces a given variable outside of its range of stability constitutes a "stress" and produces "strain" within the system.

Tart (1976b) points out that all living systems contain feedback subsystems which monitor the rate and quality of other subsystems and which trigger corrective responses automatically

whenever the subsystems which they are monitoring move beyond pre-set limits. If the organism is unable to reduce the strains within its system to a tolerable level discomfort, pain and/or death will occur. Pearce (1976b) writes that in the case of human beings the cultural agreement about reality forms a major component of the system's basis for making judgements about the acceptable state of being which the organism is attempting to maintain, and that the human consciousness system orients itself towards maintaining the steady-state balance of familiar patterns originating from within the cultural agreement. He suggests that the interruption of these patterns presents a perceived threat to survival in the same sense that the smell of a fox presents a perceived threat to survival in a rabbit.

The organization and structure of the cultural agreement system forms the environment or matrix of interactions within which individual consciousness develops. Culture, however, is not a fixed or stable construction. It is the resultant vector, the dynamic gestalt, formed by the combined organizations and structural patterns of all the individuals involved in that culture. Each developing individual re-creates culture within himself as he participates and interacts within his cultural environment. As Pearce (1976b) says, "We each, individually, create our own cultural concepts in keeping with our cultural sets in order to survive our culture" (p.28). The major part of this process takes place 'below the limen of feeling', in the unconscious portions of the mind, and becomes, thereby,

extremely difficult to change or modify at will. Pearce (1976b) says that, "To think outside this mode [cultural meta-programming] is equivalent to lifting one's self by one's bootstraps" (p.28).

Hartman (1958) has developed the concept of automatization of behavior. He postulates that the individual organism, in order to make most efficient use of its energy resources, forms patterns of behavior and action which become automatic and thereby require only minimal conscious attention. As patterns of behavior or perception are "learned" they are quickly relegated to an unconscious or automatic level. In his Nobel Prize winning study of stress Hans Selye (1956) demonstrated that all modes of life represent balances between stress and relaxation. Pearce (1977) suggests that the rhythm of learning, or intellectual growth, is a process of movement into the unknown, or stress condition, and assimilation back into the known-predictable, or relaxation condition. The individual assimilates into his known-predictable state new inputs which, once assimilated, form the basis for all further new interactions with and inputs from the environment. Hartman (1958) writes:

In well-established achievements they (motor apparatuses) function automatically: the integration of the somatic systems involved in the action is automatized, and so is the integration of the individual mental acts involved in it. With increasing exercise of the action its intermediate steps disappear from consciousness...not only motor behavior but perception and thinking, too, show

automatization. It is obvious that automatization may have economic advantages, in saving attention cathexis of consciousness in general. ...Here, as in most adaptation processes, we have a purposive provision for the average expectable range of tasks (p.88-89).

Miller (1975) suggests, as well, that the homeostatic adjustments which a living system engages in in order to maintain within acceptable range the various stresses and strains resulting from interaction within the environment tend toward a maximal level of efficiency. A system's level of efficiency is, "...determined as the ratio of the success of its performance to the costs involved" (p.361). He states that the level of efficiency attained by a living system is dependent on the strategies it employs in selecting procedures for reducing strains.

Time and energy are limited resources for any living system. In order to function with some degree of efficiency, a living system must develop strategies for reducing costs and for stabilizing its relationships within its environment. It does this by automatizing its responses to the "normal" range of situations with which it deals on a continuous basis. What the normal range of situations comprise is, to a great extent, determined by the cultural agreement about reality. This frees the system's attention to deal with unusual situations which may arise from time to time. Bateson (1972) suggests that an organism's ability to adapt, to continue to respond in a viable manner to an ever changing universe, is a function of its flexibility. He defines flexibility as "uncommitted

potentiality for change." He states:

Following Ross Ashby, I assume that any biological system...is describable in terms of interlinked variables such that for any given variable there is an upper and a lower threshold of tolerance beyond which discomfort, pathology, and ultimately death must occur. Within these limits, the variable can move (and is moved) in order to achieve 'adaptation'. When, under stress, a variable must take a value close to its upper or lower limit of tolerance, we shall say, borrowing a phrase from the youth culture, that the system is "up tight" in respect to this variable, or lacks "flexibility" in this respect (p.496).

Miller (1975) suggests that the totality of strains within a system resulting from its environmental inputs and its 'template program' [its culturally or biologically determined patterns of behavior--norms] can be termed the system's values. The order or sequence by which the living system responds to various strains in a corrective manner can be referred to as the system's 'hierarchy of values'. Via its interactions within its environment, a living system develops its hierarchy of values which, "...determine its preference for one internal steady state value rather than another. This is its 'purpose'..." (Miller, 1975, p.360). Ashby (1961) points out that only systems which develop and maintain goals or purposes which are continuously viable within a particular environment are able to survive. The danger here, of course, is that a given culture's agreement about reality need not necessarily be viable. There is no guarantee. Just as the living system which we refer to as an individual human being is capable of manifesting pathologies of a psychological nature, i.e., the inability to deal viably with its milieu, so too, the living system which we term culture

is capable of manifesting the same sorts of pathologies.

Bateson (1972) states:

On the one hand, we have the systemic nature of the individual being, the systemic nature of the culture in which he lives, and the systemic nature of the biological, ecological system around him; and on the other hand, the curious twist in the systemic nature of the individual man whereby consciousness is, almost of necessity, blinded to the systemic nature of the man himself. Purposive consciousness pulls out from the total mind, sequences which do not have the loop structure which is characteristic of the whole systemic structure. If you follow the "common-sense" dictates of consciousness you become, effectively, greedy and unwise--again I use "wisdom" as a word for recognition of and guidance by a knowledge of the total systemic creature.

Lack of systemic wisdom is always punished (p.434).

He warns that, "The creature that wins against its environment destroys itself" (p.493).

The Attention/Awareness Function

Since the end of World War II, there has been a great deal of interest in the patterns and processes involved in communication between and among individuals. This area has been approached through a variety of techniques including electronic theory and linguistics. Ethologists have taken a large interest in the various forms of non-verbal communications in animal populations and man. One of the critical factors in all communication networks is that communication is not possible unless there exists a fairly high degree of cohesion or contact

between individuals. Chance (1975) points out that the cohesion within a population is based on an infrastructure of relationships which has a primary function of enabling the individuals to stay together. It is on this basis that the structure of social behavior is built. The particular structural system evolved in any population of individuals is a function of the patterns of attention employed by the members of that population (Chance, 1975).

The patterns of social intercourse--the infrastructure of social communications--which constitute the framework of controls within which communication takes place are posture, gesture, facial expression, and tone of voice (Chance, 1975). These functions (see Chapter Two) emerge from the old mammal regions of the brain and are learned on a primarily unconscious level. Bernstein (1965) suggested that language is subordinated to and used only as an extension of the tacitly accepted framework of communication patterns. Jensen (1968) demonstrated that an individual's capacity to learn is related to his mode of social interaction, his patterns of attention. Tiger and Fox (1971) in their discussion of educational situations state:

The crux of the matter is very simple: dominance and attention are political devices, not instructional ones. Children learn best when their attention is wholly on what they are doing rather than on the teacher. Attention to the teacher and all the neural and emotional processes that this involves may even interfere quite directly with learning (pp.166-7).

At the heart of Tart's (1976) statement on states of consciousness is the observation that there must exist some kind of basic 'awareness', some kind of basic ability to 'know' or 'sense' or 'cognize' or 'recognize' that something is happening (see Tart, 1976, p.92). He refers to this basic process as the attention/awareness function. "Attention/awareness is a term which implies a further basic given that we have some ability to direct this awareness from one thing to another. ...This attention/awareness is something we can experience and conceptualize as distinct from the particular contents of awareness at any time" (Tart, 1976, p. 92). This function is a twofold process: the attention portion of the function enables the individual to direct his consciousness; the awareness portion of the function serves as a rheostatic mechanism controlling the amount of consciousness which is being directed. Tart (1976) writes that attention/awareness constitutes the major phenomenal energy of the consciously experienced mind:

Attention/awareness is, then, an energy in the sense that structures having no effect on consciousness at a given time can be activated if given attention, or structures may draw attention/awareness energy automatically, habitually, as a function of personality structure, thus keeping a kind of low-level, automated attention in them all the time. The selective redistribution of attention/awareness energy for desired ends is the essence of innumerable systems that have been developed to control the mind (p.95).

Conclusions

The developing human mind finds its definition of itself

within a cultural milieu. The 'total spectrum of human potential' is limited a-priori by a culture's collective consensus about reality. This limited version and perception of reality, the cultures's base-line state of consciousness (B-SoC), its normal gestalt vector of agreement, is transmitted to its developing members via their interactions within the cultural milieu by a largely unconscious process. The results of those interactions are incorporated and maintained within the individual's own conscious organization by automatic, internal homeostatic control systems which monitor the individual's consciousness and trigger negative feedback systems when the individual's state of consciousness passes the culturally programmed limits of that particular culture's b-SoC.

The process of enculturation proceeds at a largely unconscious level. The individual interacts with and assimilates into his own conscious organization the concepts of his cultural environment with little or no conscious modification or editorial. As the concepts become established within his own conscious organization they become the basis for further acquisitions and serve to limit and direct all subsequent information flow; they form the "template" programs or filters through which all subsequent perceptions, inputs, outputs and interactions must pass; they form the basis for responses to situations and perceptions with which the individual deals. The mind holographically replicates its environment symbolically and creatively forming subsystems

within itself--complexes--which reflect and mirror the set of system values extant within the larger cultural body. These values define and delimit a particular set of acceptable "states of being" which the culture recognizes. The individual's homeostatic control systems become oriented towards maintaining within acceptable limits the state of being defined from within the cultural agreement.

The attention/awareness function of a consciousness system is the key to the door of consciousness. It activates, directs and maintains the individual's state of consciousness and links him with the larger structures and systems within his environment. An individual's consciousness is a construction, a system of organization of psychological functions. Each culture implicitly selects out of the total spectrum of possibilities specific types of potential which it actively promotes and develops. The individual, via his interaction within his culture, internalizes, by a largely unconscious process, his culture's meta-structure and re-creates culture within his own consciousness. Attention/awareness is the psychological and phenomenal energy which directs, monitors, observes and maintains the individual's state of consciousness. Via the "template" programs it automatically triggers negative feedback mechanisms when the individual's consciousness approaches the limits of his enculturated concepts about reality. It opens, closes and maintains the pathways which propagate the

individual's state of consciousness and link him with the larger systems of organization within his environment.

v.)

SCHEMATICS

A model of Conscious Functioning

The whole point of seeing through something is to see something through it. It is good that the window is transparent, because the street or garden beyond is opaque.

C.S. Lewis (1962)

Introduction

A model is simply a symbolic representation of a perception of reality designed to enable one person to communicate to another his way of conceptualizing the component parts and their interrelationships within a particular system or process. The usefulness of any given model is measured in terms of its ability to communicate the necessary and sufficient information for an individual to grasp the parts and the whole of the system or process which the model is attempting to portray. Our understanding of consciousness, at this point in time, is somewhat limited; Charles Tart (1976b) describes it as being highly fragmented and chaotic. The following model is an attempt to synthesize in a simplified but hopefully workable form some of what we do know about the structure and functions of the consciousness system of human beings.

One of the major failings of our modern, Western science, probably due in large part to our cultural emphasis on the

"major" mode thinking process of logical, sequential, rational thought patterns, has been to think and work in terms of parts and segments instead of wholes and systems. It is becoming ever more apparent that parts can be understood only as a function of the system of which they are a part. Bateson (1972) suggests that unless we are prepared to re-structure the whole of our thinking in this area we may have no more than twenty to thirty years before the logical 'reductio absurdum' of our positions destroys us. We continually strive to separate meaning from context, and we are continually frustrated in our attempts. There is no meaning outside of context. In our search for cause and effect, we have continually overlooked the fact that within a closed system there are no causes separate from the functioning of the system itself. The moment we arbitrarily stop and define a time as point zero, and attempt to isolate cause and effect within the system, we begin our journey down the proverbial garden path. Bateson (1972) states:

...epistemological error is often reinforced and therefore self-validating. You can get along all right in spite of the fact that you entertain at rather deep levels of the mind premises which are simply false. ...up to the point at which you create around yourself a universe that you now try to live in" (p.48-485).

This chapter will attempt to consolidate the information presented in Chapters III and IV within the systemic approach suggested in Chapter II into a useable model which describes the functioning of human consciousness. It will be, of necessity, a simple model; it will not attempt to incorporate all of the

technical details of neurophysiology or of culture/personality studies. It will simply attempt to deal with the gestalt of these fields while being consistent with what is known at this time relating to the field of human consciousness studies. As discussed in Chapter II, man's understanding and conceptualization of phenomena in the natural world undergoes continual change and re-evaluation. The facts of the matter are in a state of constant change and development. The model suggested here should not be considered as a final or completed picture of how the consciousness system of human beings functions. It is simply an attempt to organize into a workable framework what is currently thought to be the case so that we may proceed in the next chapter to examine a curriculum designed to result in a specific discrete state of psychological and biological being. It will be an epistemic model as MacLean (1975) suggests--a model which attempts to understand and portray the consciousness system from the inside out.

Background.

The model of 'mind' which I shall put forward here attempts to take into account that the individual mind is simply a point within the matrix of the larger 'mind' system, the 'field of consciousness' within which it interacts and exists. Pearce (1976a) states:

Aldous Huxley spoke of "mind at large," Jung of a "collective unconscious," James of "other consciousnesses all about us." A model of a vast cosmic "storehouse" of information or data begins to emerge. Our brains are then seen as "valves" filtering from this what we need for survival (p.159).

The individual mind is seen, in this light, as a point within the matrix of consciousness through which information flows, is interpreted, re-directed, and transformed. Bateson (1972) suggests four characteristics which he sees as functionally defining 'mind':

1. The system shall operate with and upon differences.
2. The system shall consist of closed loops or networks of pathways along which differences and transforms of differences shall be transmitted. (What is transmitted on a neuron is not an impulse, it is news of a difference).
3. Many events within the system shall be energised by the respondent part rather than by impact from the triggering part.
4. The system shall show self-correctiveness in the direction of homeostasis and/or in the direction of runaway. Self-correctiveness implies trial and error. (p.482).

As discussed in Chapter II, the phenomenon which we refer to as mind is an extremely difficult one to pinpoint and define. It does not confine itself within the boundaries of an individual being, though the individual being does function as though it were an independent and self-contained mind unit. The phenomenon of mind is rather a product of the systemic structure of the universe itself. The biological system we term as the ecological matrix of the earth exhibits all the characteristics

suggested by Bateson as pertaining to mind. Several researchers have argued that the mind is simply a function of the brain processes of individual beings (see Sagan, 1977). However, as Penfield (1975) suggests, it appears more useful at this time to conclude that mind is a discrete phenomenon which shares the same organizational processes as the brain but is not synonymous with it. The critical factor is that the mind phenomenon does not limit itself to the confines of an individual being. It is a phenomenon which exists within and itself creates to a large extent its own matrix, its own environment. The human 'mind-brain' is a subsystem, a nexus point within a matrix of interactional pathways which ultimately includes the entire universe.

The Components

The human being is a living system composed of components having both psychological and biological dimensions (Deikman, 1976). There exist two major vector flows which the individual both helps create and interacts within. These are (1) the vector flow of evolutionary, genetic, biological development, and (2) the vector flow of cultural evolution and development. The first exists as the field within which the second takes place. The nexus point within this transaction system--biological, genetic evolution vector flow interacting with cultural development vector flow--is the individual's

attention/awareness function which activates and maintains the individual's particular d-SOC which, in turn, determines his mode of perception and information processing, which, in turn determines his behaviors and actions and motivations, which in turn, over time, produces changes in the underlying biological/ecological matrix. As Bateson (1972) points out, environmentally sound somatic changes sustained over time militate strongly towards the development of genetic changes. After Pearce (1977) who borrowed the terms from Freud, I shall refer to these two vector flows as (1) Primary Process; and (2) Secondary Process.

Primary process is linked with the biological, evolutionary, genetic development of the organism, the individual. It is the function by which the individual is linked with his past, current, and potential possibilities and experiences (Pearce, 1977). MacLean (1975) has concluded that the old brain sections of the human brain, the reptilian and the neomammalian sections, hold ancestral memories and patterns of behavior which have evolved along with the species. Jung (1960) emphasized that man's heredity is psychic as well as physical; man's roots, both physical and psychical, lie in the "primordial past." The very structure of the genetic information the individual carries within each of his cells, the shape, size, strength and configuration of the individual's body, his visual acuity and congenital potentials are products of a long evolutionary sequence which provides not only a starting point

for the individual's development but an inertia extending to various degrees in particular directions. Like a passenger stepping down from a moving bus the individual emerges into being out of a biological and a psychical matrix which is dynamic and has vector which it imparts to the individual.

Bruner (1971) makes the observation that a child's 'intent' to do always precedes his ability to do. Furth (1970) suggests as well that the development of intelligence is a result of an internal regulating force that is not solely dependent on the external environment of the individual child. Rychlak (1973) states that the mind is a mechanism which has certain stylized methods of expression built into it "from the inside." Jung (1954) states that the individual inherits a particular disposition to work in a certain way which stylizes his interactions and orients him for the future. He refers to this as the set of "a priori categories of possible functioning."

Primary process appears to be associated with old brain systems and with the right hemisphere modes of perception. The set of concepts or schemas which constitute the individual's primary programming are internal in origin and result from the individual's evolutionary history and experience and his genetic programming; the individual carries within himself the results of some four billion years of evolutionary history and development. Primary programming is developmental in character and to some extent requires triggering from external

environmental sources for its proper development (Pearce, 1977).

Bolby (1971) strongly emphasizes the critical importance of particular environmental triggering processes involving the juvenile and his caretaker--usually the mother--if normal development is to occur. The concepts or schemas involved in primary programming constitute a readiness or an intent on the part of the individual to engage in specific types of interactions with his environment at a particular point in his developmental sequence and are in that sense pre-programmed. This infant's sucking reflex or his propensity to stare at and interact with human-like faces are examples. In relation to primary processing Pearce (1977) writes:

...it is the function through which we are conscious of the earth as a thinking globe, the flow of life, the general field of awareness, and almost surely, even larger ecologies of thought (p.125).

Secondary processing in the individual is associated with the individual's culture's 'intentions' or agreements arising within the minds of the cultural body within which the individual develops. The sets of concepts and patterns of action/perception which the individual acquires during the process of enculturation and which constitute his secondary programming are external in origin. Secondary processing is associated with the left or "major" hemispheric mode; it involves language and the semantic/symbolic structure of the individual's culture's consensus about reality. Information concerning secondary processes is transmitted to and from the

individual via the semantic, symbolic communications structure which the particular culture has evolved. The culture's 'collective unconscious', or agreement, functions in a manner similar to an individual's genetic programming. It forms a 'template' program which forms, directs and orients the individual towards specific types of interactions and modes of being. Secondary processing is particularly stressed in modern, Western societies where the cultural emphasis is outward directed towards manipulation of the environment. Many of the more "primitive" societies tend to emphasize primary processing to a much greater extent (Pearce, 1977).

Just as the functions of the right and left hemispheric modes are not necessarily antagonistic but potentially complementary (Galín, 1976) so too the functionings of the primary and secondary processing modes are not necessarily antagonistic. In the integrated, fully functioning individual primary processing provides the basic intent, the basic orientations and directions while secondary processing provides for the expression of that intent. It is only when the secondary programming which the individual encounters is too greatly divergent from his innate primary programming that difficulties of varying degrees arise. Pearce (1977) suggests that autism in children may be a result of secondary programming which was too divergent from the child's 'intent' for the child to bring the two together into a functional whole. When sufficient stress is put on a living organism that organism

simply shuts down and either physical or psychological pathologies result. Primary perceptions, writes Pearce (1977) are:

...designed to establish links between self and world, and they utilize sound biological procedures in the brain. Primary perceptions furnish a way of drawing on nature's body of knowledge and of being informed by this general field of awareness as needed for well-being (p.137).

A primary perception may take place through, but is not limited to, the five senses. In the early years, primary perceptions are almost surely part of the general cognitive fabric of the child's reality (p.130).

Many of the so-called extra-ordinary mental or psychic phenomenon like ESP, psychokinesis (moving things by thought), psychic healing and other non-ordinary events relate directly to the old brain and the cerebellum section of the brain system (Manning, 1975). These are all primary process functions. Their potential expressions are all secondary processing phenomena. The individual's attention/awareness function provides the nexus point of interaction between the two modes of processing. It provides as well the phenomenal energy which directs and guides the functioning of the entire system which makes up the human mind-brain (Tart, 1976b).

Discrete States of Consciousness

All organisms exist within, at any given point in time, a particular, discrete state of being which is a product of the

functioning and interrelationships among their various subsystems. The consciousness system of human beings, which has its highest concentration in the neurological tissues of the brain, is an extremely complex phenomenon. The human brain is divided into discrete regions both vertically and horizontally, and the various regions while working as a systemic whole function, as well, with a marked degree of independence. (see Chapter III). The vertical divisions of the brain resulting from an evolutionary developmental sequence both tie the individual to his evolutionary history and provide for complex higher cerebral activities characteristic only of man. While individual human beings are capable of complex rational thought processes, lower or evolutionary older sections of the brain are able to override the higher regions of the brain under certain types of circumstances where threats are perceived to the survival of the organism or its relationships to other members of its social grouping.

Tart (1976b) suggests that a minimal set of mental substructures which could serve to delimit a particular state of psychological being, a discrete state of consciousness, are: 1) extroceptors; 2) introceptors; 3) input processing; 4) memory; 5) sense of identity; 6) evaluation and decision making; 7) motor output; 8) subconscious; 9) emotion; and 10) time sense. The structuring of the human consciousness system is organized on systemic rather than concrete lines (Luria, 1966) so that when we speak of substructures or mental functions we are not

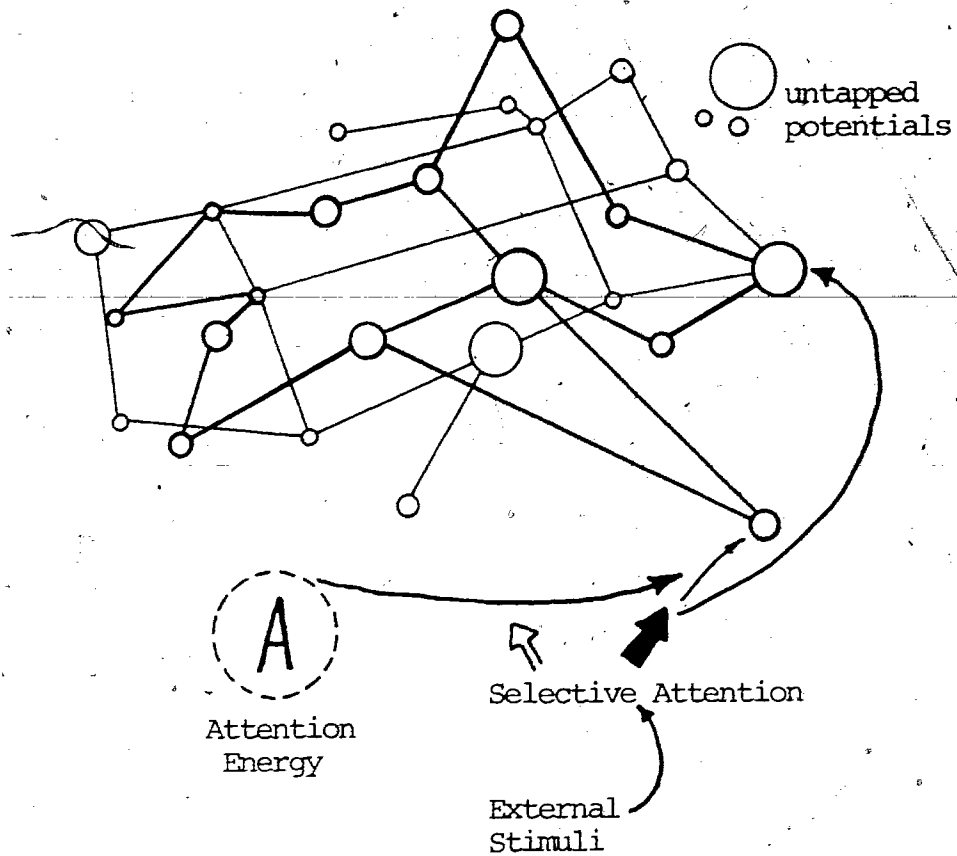


Figure 10

A schematic representation of a discrete state of consciousness (d-SoC) as a configuration of structures and subsystems forming a recognizable pattern. Light lines and circles represent 'potential' interactions and potentialities/structures/subsystems not used in the base-line d-SoC (from Tart, 1976b).

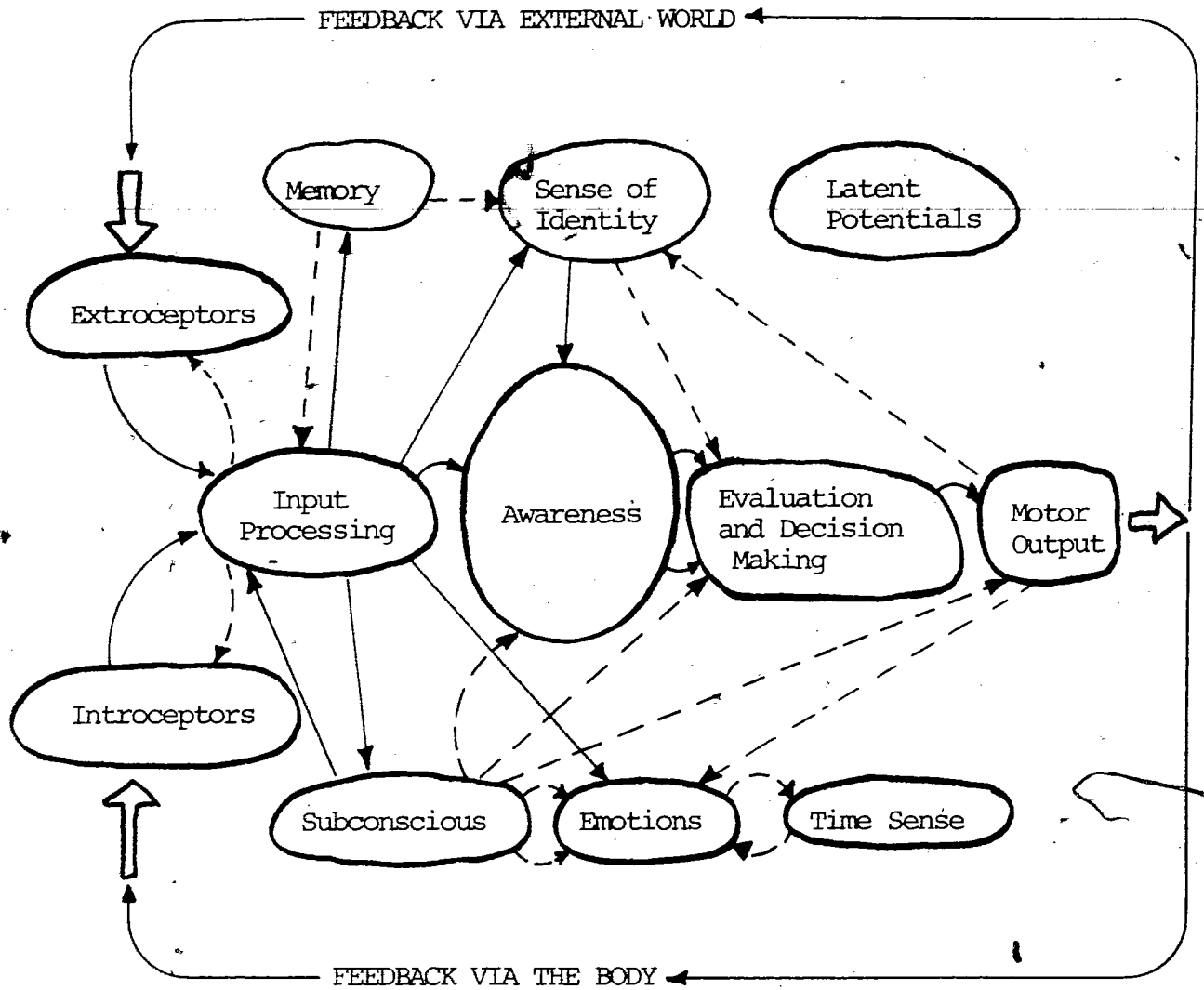


Figure 11

Subsystems comprising states of consciousness
(from Tart, 1976b).

necessarily correlating these directly with particular regions or physical structures within the brain. For example, all three of the vertical divisions of the brain are capable of independently receiving information directly from the environment without mediation from other regions.

The particular configuration of the interrelationships among at least these ten basic subsystems could serve to describe a particular state of psychological being. Certainly a great deal more research and investigation is needed before we may begin to speak in more definitive terms, but the beginning has been made. As the diagram indicates, and as discussed earlier in Chapter IV, the attention/awareness function serves a dual function. It is the nexus point for the individual's interactional matrix; and it is the phenomenal energy which organizes, promotes and maintains the individual's configuration of psychological subsystems which constitute the individual's discrete state of being.

The Attention/Awareness Function

Deikman (1976) describes the attention/awareness function as having two distinct "modes" of operation: the "action" mode and the "receptive" mode. In the normally acculturated individual, the attention/awareness function is directed toward the "action" mode. This mode is a state organized to manipulate

the environment. Psychologically it is characterized by heightened focal attention, heightened boundary perception, object-based logic, and the dominance of formal characteristics over the sensory; shapes and meanings have a preference over colors and textures. In contrast, the receptive mode is a state whose purpose is receiving the environment, rather than manipulation. Psychologically it is characterized by diffuse attention, a decrease in boundary perception, paralogical thought processes, and the dominance of sensory qualities over the formal. As the growth process proceeds, the receptive mode is gradually dominated, if not submerged, by a natural and culturally enforced emphasis on striving activity and the action mode that serves it (Deikman, 1976).

In the 'normal' acculturated individual, the attention/awareness function is not, for the most part, under direct, volitional control. Sometimes the individual is looking out through one set of windows and sometimes the other. As Bakan (1975) observed there appears to be a cyclic ascendance of the two modes of information processing over which the individual has little volitional control. Our Western cultural bias is definitely toward the action mode and the conceptual framework which supports it. Westerners tend to a great extent to repress or limit their perceptions which are produced via the receptive mode and, in fact, often find these sorts of perceptions confusing, disorienting and uncomfortable (Pearce, 1977). We occasionally go so far as to characterize information

from the receptive mode as, "pathological," "crazy," or "regressive," and condemn the entire area to the category of the "subjective" and, therefore, the "unscientific" (Deikman, 1976). However, as Deikman (1976) points out, "We gain nothing by restricting our functions to one mode or the other. Rather, we need the capacity to function in both modes as the occasion demands" (p.86). In order to do this, the individual requires volitional control of his own attention/awareness function. The direction and orientation of the attention/awareness function is critical to the propagation and maintenance of the individual's state of consciousness.

Conclusion/Synthesis

An individual human being's state of consciousness, his organismal state of being, is a product of several factors acting upon and interacting with a dynamic systemic structure which has vector, history and propensities. The human being individuates itself from a biological/ecological matrix which has been in the process of developing for some four billion years on this planet. The individual's physiological structure, his genetic coding and his biological propensities are a result of this long period of evolutionary development. They form a 'template' program which prepare and orient the individual to do and to be within a range of possibilities. The human hand is an extremely versatile instrument but it cannot, at least directly,

provide the human being with a means of flying.

While a human being individuates itself from the biological matrix, i.e. takes on all the characteristics of a living system, it cannot separate itself from that matrix. It remains tied to and an integral, functioning part of the larger biological matrix from which it emerges. This linking provides the individual with a pre-programmed developmental scheme, a set of propensities and a set of 'a priori categories of possible functioning'. These propensities, or possibilities stylize the individual's interactions with and orientations toward the world. They constitute what has been termed the individual's "intent" or his primary programming and form the basis for his primary perceptions and processing of information obtained from within and without. This set of programs constitutes, in effect, the stored experiential wisdom of a total evolutionary process. The greater portion of this activity takes place below the level of normal consciousness, below the limen of feeling.

The individual as well as being an integral part of a biological matrix is typically involved in a cultural/social matrix. Man is a social being evolutionarily and the human infant is unable to survive without intense care of both a physical and a psychological nature. The cultural agreement, the collective consciousness of culture, serves as the genetic basis of culture just as the DNA coding serves as the genetic basis for a taxon. Cultures like the ecosystem have history and

vector, and the individual enters into the cultural matrix over time through the process of enculturation. Cultural agreements about the world are assimilated by the developing individual in a symbolic and creative manner and form the set of schema patterns constituting the individual's secondary programming.

Just like the biological 'intents', secondary programs form a template program which limit, direct and constrain the individual's possibilities. A culture's cosmology, its agreement about the world, must arise from within the field of the biological/ecological matrix though it need not be totally consistent with it. The more divergent it is, however, from the systemic constraints extant within the biological/evolutionary matrix the more strain it places on the individual's functioning within it. It potentially provides the means for the expression and realization of the biological potential of its individuals. It is maintained and propagated through a system of interactions and communications which result from the orientation and direction of the various individual's attention/awareness functions.

The attention/awareness function has been shown to be the key to the matrix of consciousness for the individual. The specific orientation of an individual's attention/awareness puts him in touch with his world. It serves as a nexus point within the informational pathways with which the individual is involved-- both cultural and biological. It is a critical

factor in the process of enculturation and in the development and maintenance of the individual's particular discreet state of consciousness. By manipulation of the attention/awareness function the individual remains within, changes, alters, restructures and propagates states of consciousness. Most individuals do not have volitional control of their attention/awareness function to any great extent. Its orientation, for the most part, has become a function of the individual's secondary programming and has become oriented toward the cultural agreement about reality for its set of values--its patterns of behavior--and its purpose--its hierarchy of values which constitute the state of being it has learned to maintain. The gaining of volitional control by the individual of his attention/awareness function allows him to select out of the range of biological possibilities the state of being he will inhabit and thereby the range of possibilities he will have.

VI.

TUNE-UPS AND MODIFICATIONS

The Zen Example: a Curriculum of Consciousness

Zen practice is the direct expression of our true nature. Strictly speaking, for a human being, there is no other way of life than this way of life.

It is wisdom which is seeking wisdom.

Shunryu Suzuki (1975)

Introduction

The purpose of this chapter will be to examine, in the light of the materials presented in the preceding chapters, an example of a specific curriculum, a series of planned experiences designed to achieve specific learning objectives, which makes use of the functioning of human consciousness as its logical base and is designed to achieve a specific "state of being." There are numerous possible 'curricula' which could have been chosen for this chapter. The aim here is simply to examine an example which systematically and concretely demonstrates the attributes of a curriculum which is based on the functionings of human consciousness, which is well proven over time, which is reasonably familiar to many people, and which is reasonably free of extraneous esoteric riders. I have chosen to examine the practice of Zen Buddhist meditation on the koan as practiced within the Rinzai school of Zen.

The Zen Buddhist tradition is suitable for the purposes of this examination because its teachings have studiously attempted to minimise all forms of doctrine, philosophy, theory and dogma while providing a systematic method of practice. Herrigel (1960) emphasizes that Buddhist mysticism differs from other forms of mysticism in the emphasis it lays on a methodical preparation for the mystical life. He states that the tradition has performed the incalculable service of rescuing the practice of mysticism from the element of chance.

To provide a complete history or treatise on Zen Buddhism is not possible within the confines of this chapter. The reader is referred to the large and excellent body of literature on the subject for detailed information. Keeping in mind Shunryu Suzuki's (1975) admonition that, "There is something blasphemous in talking about how Buddhism is perfect as philosophy or teaching without knowing what it actually is," I begin.

Meditation

The aim of meditation is, above all, the pursuit of a certain state of mind. It cannot be equated with thinking or non-thinking, with doing or not doing, with stillness or movement. Meditation is concerned with the development of a 'presence' or a 'modality of being' which exists regardless of

the external situation in which the individual may be involved (Naranjo, 1971). The use of particular techniques, postures, methods and strategies is subordinated to the achievement of the particular modality of being which the discipline of meditation seeks to cultivate. Suzuki (1975) emphasizes that the practice and the goal of Zen meditation are the same. His statement is that the practice is the goal and the goal is the practice. Suzuki (1975) metaphorically describes the "state of being" which is the goal and method of Zen practice:

It is quite usual for us to gather pieces of information from various sources, thinking in this way to increase our knowledge. Actually, following this way we end up not knowing anything at all. Our understanding of Buddhism should not be just gathering many pieces of information, seeking to gain knowledge. Instead of gathering knowledge, you should clear your mind. If your mind is clear, true knowledge is already yours. When you listen to our teaching with a pure, clear mind, you can accept it as if you were hearing something which you already knew. This is called emptiness, or omnipotent self, or knowing everything. When you know everything, you are like a dark sky. Sometimes a flashing will come through the dark sky. After it passes, you forget all about it, and there is nothing left but the dark sky. The sky is never surprised when all of a sudden a thunderbolt breaks through. And when the lightning does flash, a wonderful sight may be seen. When we have emptiness we are always prepared for watching the flashing (p.84).

The basic method in all meditation techniques and particularly apparent in Zen meditation on the koan is the de-structuring and re-structuring of the individual's consciousness system to change the individual's state of being. Pearce (1976a) refers to this phenomena as "metanoia" derived from the Greek word for conversion, i.e. a "fundamental

transformation of mind." He writes that metanoia is a seizure by the discipline given total attention and a restructuring of the attending mind. The use of the koan within the Rinzai school of Zen is a very pointed example of this procedure. The system developed for altering, for re-structuring, the individual's consciousness system involves three major parts. I will concentrate on the third part-- meditation on the koan--but it is necessary to develop the first two parts briefly. Their function is to set the stage for the final and critical procedure of meditation on the koan. The three parts are (1) the isolation of the individual from every-day life and the routinization of his daily activities; (2) the learning of the practice of breath control and meditation postures; and (3) meditation on the koan.

The first step in the process of re-structuring the individual's consciousness system is to isolate him from his normal 'daily activities and to routinize his daily activity cycle. We have seen from the information presented in Chapter IV that culture and the cultural agreement which arises from the shared experience of individuals living and working together has a strong and pervasive role in the formation of the individual's consciousness organization. A key observation of Zen practitioners is that the normal waking consciousness of human beings is "ek-centric," or off balance (Herrigel, 1960). The normal state of man is oriented toward and derived from the cultural agreement within which he lives: secondary process

thinking. The first step in the training of a Zen initiate is to systematically isolate him from his normal cultural milieu in order to lessen the influence and input from that source.

The second aspect of this initial process is to routinize the initiate's daily cycle of activities. The time of awakening, eating, working, studying, meditating, and sleeping is controlled. The types of foods the initiate is served are controlled, as well, and are limited to a very few. The initiate is served virtually the same diet day after day. This procedure is designed specifically to limit the attention which is normally vested in making decisions about these sorts of concerns. The process is designed to separate the initiate from the normal daily activities and to reduce external stimuli to an absolute minimum (Ornstein, 1971).

The Zen tradition places emphasis on maintaining a specific posture, the lotus position, and for keeping bodily movements to a minimum and therefore out of awareness during meditation. In terms of the psychology of consciousness there are two major streams of meditation: those which involve the restriction of awareness, i.e. the focusing of attention on a specific object or sound or motion, and those practices which involve a deliberate attempt to "open up" awareness, i.e. making use of the stream of consciousness (Ornstein, 1971). The Zen method is to make use of the restriction of awareness. Naranjo (1971) refers to this strategy as "concentrative meditation." In order

to achieve the requisite level of concentration of the attention/awareness function Zen practitioners attempt to reduce to the absolute minimum any possible sources of extraneous stimulation.

The sitting posture which is taught is designed to enable the meditator to sit for prolonged periods of time with minimum attention to the body and with bodily motion reduced to a minimum. Breathing exercises are taught with the same object in mind--to still the extraneous sources of stimulation. As a first exercise in Zen meditation the initiate is typically asked to count his breaths from one to ten, and on reaching ten to return to one and repeat. When the student has developed to the point where he can concentrate completely on his breaths he will typically be asked to focus his attention on the 'process' of breathing itself. This is practiced until the initiate is able to completely concentrate on the process of breathing thus eliminating focus of attention on any outside or extraneous sources of stimuli.

These procedures are extremely important in relation to reducing what Pearce (1976b) refers to as "roof-brain chatter" or the constant stream of consciousness, the constant internal discussion of secondary processing concerns, which individuals typically engage in. Pearce categorizes this chatter into three major streams which are concerned with the past, the present, and the future, or guilt and resentment, hostility, and anxiety.

He suggests that roof-brain chatter makes up the bulk of the normal individual's "mental life" and actively constitutes a screen between the individual and the present moment.

Instead of being involved in living and perceiving in the moment the individual's attention is focused on guilt and resentment about past happenings, hostility about the present or anxiety about possible events in the future. The Russian physiologist Bykov (1957) demonstrated that the normally active state of the cerebral cortex arising from a constant focus of attention on the complexities of the internal discussion that an individual constantly engages in results in a greatly reduced conscious perception of the information being processed in the subcortical regions--the regions of the brain (see chapter III) which are concerned with direct perception of the present moment: the primary processing concerns. The result of this process is that impulses from the deeper regions of the brain, i.e. the limbic regions, do not normally reach the sphere of sensation.

Robert Ornstein (1971) describes the process of meditation in two metaphors. He states that meditation can be described as a process of calming the ripples on a lake. When the lake is calm, the bottom which is normally invisible may be seen. The process of meditation may also be likened to the night. During the night, stars, normally hidden by the massive amount of light given off by the sun, become visible. Concentrative meditation,

through a process of limiting the focus of an individual's attention, is designed to "turn off" the stream of irrelevant mental activities sufficiently that the fainter signals from the deeper regions of consciousness may enter the sphere of sensation--so that the individual may begin to live and perceive directly in the present moment unhindered by the functional screen resulting from the constant stream of mental chatter. The first two stages of the Zen practice are aimed at achieving this goal, this state of being. The initiate is now ready to begin meditation of the koan. Suzuki (1975) writes:

Most people have a double or triple notion of one activity. There is a saying, "To catch two birds with one stone." This is what people usually try to do. Because they want to catch too many birds they find it difficult to be concentrated on one activity, and they may end up not catching any birds at all! That kind of thinking always leaves its shadow on their activity. The shadow is not actually the thinking itself. Of course it is often necessary to think or prepare before we act. But right thinking does not leave any shadow. Thinking which leaves traces comes out of your relative confused mind. Relative mind is the mind which sets itself in relation to other things, thus limiting itself. It is this small mind which creates gaining ideas and leaves traces of itself (p.62).

Meditation on the koan is the critical stage in the process of Zen method. It is the keystone of the practice. Ornstein (1971) describes the koan as an extreme and compelling method of forcing intense concentration on one single thought. The koan becomes the single object of meditation. It is, in a sense, a problem statement which cannot be solved by any rational, logical system or association process. Its very nature forces the initiate to approach the condition known as

"one-pointedness" (Ornstein, 1971). The student is instructed to put his attention into the koan until he has mastered, or realized--made real to himself--its truth or meaning. The following is an excerpt from The Method of Zen, by Eugen Herrigel (Routledge and Kegan Paul, London, 1960) which describes the process of meditation on the koan:

The subject for meditation is the koan. It requires a supreme mental effort and permits of no lazy daydreaming. Here are a few examples of koans:

Show me your original face before you were born.

If you meet someone in the street who has attained to the truth, you must pass him neither speaking nor in silence. How would you meet him?

The priest Shusan held his staff before the eyes of the assembled monks and said: 'If you call this a stick, it is disgusting. If you don't call it a stick, it is wrong. What will you call it?

Hakuin held his hand up in the air and told his pupils to listen to the sound it made. What was it like?

With the help of this last koan I will try, as best I may, to show what course the meditant follows, and what is the point of the exercise.

For hours, days, and weeks, the pupil meditates on his task. Sunk in profound concentration, he thinks the problem through in all possible directions. One thing is clear: since only two hands striking together can produce a sound, the answer can only be: No one, with the best will in the world, can hear the sound of one hand. But the solution cannot be as simple as that. Would it not be more cautious to say: A single hand does not emit a sound that is perceptible to the human ear? But that does not get him any further. Obviously, the point is not the sound and its audibility, which are thrown in just to make the problem more complicated. The point is obviously: What is the significance of one hand in contradistinction to two? Is not this the same as the fundamental distinction between unity and duality? The hand must be a symbol of the principle: 'One

without a second.' This solution recommends itself to the pupil because it is a distinction that plays a crucial role in Buddhism and is so often discussed.

Having found such an admirable solution, the pupil hurries off to the Master. He has the right to ask him one question a day. He propounds his solution with pride and enthusiasm. The Master hears him out, shakes his head, and sends the bewildered pupil back to the meditation hall without a word. But it sometimes happens that he does not let the pupil utter a word and sends him away without a word when he has scarcely opened the door. The pupil, thrown back on himself, begins to concentrate anew. He will distinguish himself yet, astonish the Master. Meditating doggedly, he tries to force a solution. But however he twists and turns it, he can come to no other conclusion. Why, then, did the Master dismiss him? Perhaps he only expressed himself badly? He turns the formulation over in his mind. Once more he goes to the Master, who dismisses him again, this time with evident disapproval. But again the pupil fails to discover where he has gone wrong. He now gets into a state. If he is so far from the solution, will he ever be able to reach the goal? He pulls himself together. It is a matter of life and death! With passionate energy he throws himself on the problem, not with the discriminating intellect, but with the combined forces of body, soul, and spirit, so that it never lets him alone. It torments him during recreation, at meal times, at his daily work. It pursues him even in sleep. No need now to force himself to think about it! Even when he wants distraction, it goes on thinking in him. All in vain; the solution just will not come. He doubts his own ability, begins to despair and does not know where to turn. He is saved from utter despair only by the Master's admonition that he is to increase the concentration until he is no longer disturbed by moody thoughts. He must learn to wait, patiently and trustfully, until the solution is ripe and comes of its own accord, without being forced.

So now he sets about it a different way. It is no longer necessary to analyze the problem and think it out: he has done enough of that already. He no longer thinks in a circle, of this or that, of one hand, or two hands, of principles and suchlike; he does not even think about the solution in order to force it, and yet he is constantly related to it in an extraordinary spiritual tension. He longs for it like a man thirsting for a quenching drink. But he behaves like a man who is trying to remember something. He

feels like a person who is seeking something he has forgotten, something he has to remember at any cost, because his life depends on it.

In this state of spiritual tension, it may happen that the solution will suddenly come to him, quite unexpectedly. Or else a shout, a loud noise, or, in obstinate cases--as used to be done in earlier times--a painful blow will bring the tension to bursting point. How exciting is this moment! The pupil trembles, breaks out in a sweat. But rapturous too: what he has sought in vain comes to him in a flash. He now sees clearly where everything was a tangle before; he can see the wood in spite of the trees. The scales fall from his eyes. He feels saved. The moment is brief, like a flash of lightning, yet profoundly impressive. No wonder he cannot grasp it.

SATORI

In this frame of mind he goes to the Master, no longer proud and enthusiastic, but embarrassed and uncertain. He keeps silent, knowing he cannot say what is boundlessly clear to him himself. Or else he stammers out something incoherent, unwilling to offer it as a solution.

The Master looks through him at once. Possibly he knew, as soon as the pupil opened the door, that this was the real thing: 'satori', enlightenment. He calms and strengthens him.

What has happened? The pupil has not found any new interpretation, any new thought. Rather, in a flash of enlightenment, he has come to the solution as if a new, spiritual eye has been let into his head. The things he sees are no different from before, he just sees them differently. His vision--as well as perhaps he himself--has changed.

Hence there is no direct way from the ordinary mode of seeing and apprehending to this new vision conditioned by 'satori'. It is more like jumping into a new dimension. Accordingly this new vision cannot be compared to anything and is, strictly speaking, indescribable.

But is there no hope even of hinting at its characteristics? If not, there would be nothing but a vacuum, and everything that logically follows from this vision would be more incomprehensible than ever. For later and higher stages of Zen have their roots in

his fundamental intuition, in this realization at first glance. And so, for those who cannot go the way of Zen themselves and know about it only from heresay, an attempt must be made to describe the vision somehow, however inadequately. But--the finger pointing at the moon is not the moon itself, as the Zen Masters rightly observe.

Suzuki is very much aware of the need to do this. He calls it 'an illuminating insight into the very nature of things'. 'Satori is a sort of inner perception--not the perception, indeed, of a single individual object but the perception of Reality itself, so to speak.' 'If we want to get to the very truth of things, we must see them from the point of view where this world has not yet been created, where the consciousness of this and that has not yet been awakened.'

Arthur Deikman (1976) strongly suggests that mystics have been the guardians of a potentiality that has always been available and that it is now time for us to reclaim it. He suggests that we can integrate this realm with our present knowledge and that by so doing we can explore and regain a functional capacity that we may now need for our very preservation, as well as for the enlargement of our knowledge. Recent developments in the sciences dealing with the various aspects of consciousness and the development of theoretical frameworks for handling the data being collected have now begun to allow us access to what was once viewed as an area of mystery, subjectivity and intuition. Let us organize the Zen student's experience into a series of steps--a curriculum--so that we can analyze, in the light of what we know about the workings of human consciousness, what takes place.

1. The student is placed in a situation which effectively removes him from his normal every-day living situation and which routinizes his daily activity cycle.

2. The student is given instruction and practice in the methods of breath control and the concentration of attention which results from attaining that control.

3. The student is given instruction in meditation methods which include correct posture, breathing and direction of attention.

4. The student is given by his teacher a koan or parable which forms the subject and the object of his meditation.

5. The student meditates on the koan trying to 'solve' its mystery within the structure of his normal waking state of consciousness.

6. The student's attempts to devise an 'explanation' of the koan from within his normal waking state of consciousness. His explanation is rejected by his teacher.

7. The student works with the koan constantly until he finally reaches the point of despair.

8. The student gives up trying to penetrate the mystery of the koan, yet he is constantly aware of it. It fills his entire life and consciousness. Suddenly, and unexpectedly, the 'answer' 'comes' to him.

Deikman (1976) suggests that the changes which take place when an individual experiences a mystical union, an example of which is the Zen student's experience of 'realizing' the solution to a koan, is a consequence of the "deautomatization" and undoing of the usual way in which the student perceives and thinks due to the special way that attention is being used. Gill and Brennan (1959) who developed the concept of deautomatization formulated by Hartman (1958) explain the process as one of undoing of the automatizations of psychological systems--both means and goal structures--directed towards the environment. They state that the deautomatization process results from a "shake-up which can be followed by an

advance or a retreat in the level of organization." The direction of the attention/awareness function of consciousness is required to produce the requisite conditions for deautomatization to occur. Deikman (1976) writes:

The technique of contemplative meditation constitutes just such a manipulation of attention as is required to produce de-automatization. The percept receives intense attention while the use of attention for abstract categorization and thought is explicitly prohibited. Attention is 'reinvested' in perception.' Since automatization normally accomplished the transfer of attention from a percept of action to abstract through activity, the meditation procedure exerts a force in the reverse direction. ...Automatization is a hierarchically organized developmental process, and one would expect a de-automatization to produce a shift towards a perceptual and cognitive experience, involving a mode developmentally preceding the more analytic abstract intellectual mode typical of present-day adult thought (p.73ff).

As discussed in Chapter IV, the attention/awareness function of an individual is the key to his consciousness. It is the 'energiser' which makes possible the development and maintenance of the individual's d-SoC, his particular psychological/organizational structure. It serves to regulate all of the individual's interrelations and interactions with his environment, and it directs all incoming and outgoing information. The attention/awareness function is a dual function. The attention aspect of the function serves as a directional guide pointing the consciousness in a particular, or set of particular, directions. The awareness aspect of the function serves as a rheostatic device regulating the amount of attention being directed. As Deikman (1976) points out, Zen

method is designed specifically to make use of the student's attention/awareness function in order to achieve a re-structuring of the student's consciousness, his psychological organizational structure. Attention/awareness is directed to produce metanoia.

Once the individual's attention/awareness function has been directed and concentrated on the koan, he is left by his teacher to struggle with it. The problem information, the koan, is taken in, perceived, by the student, and the processing begins within the structure of the student's normal d-SoC. No matter how hard or long the student struggles with the koan within the structure of his normal d-SoC, he is unable to 'solve' it. This failure presents to the student a situation which produces sufficient tension/stress within the psychological/neurological system for the mode of operation to "shut down". Secondary processing modes which hold control of the psychological structuring of the normal individual have been built up over a long period of years and have behind them a long history of reinforcements from the cultural/social milieu. Sufficient stress is placed on the system to perform a task (solve the koan) which is simply impossible within the normal state of consciousness the initiate inhabits, that the individual's psychological organization is forced to shut itself down in defeat. This shutting down allows the primary process thinking mode to gain control of the structuring of the consciousness system. It is this which, in fact, prepares the way to

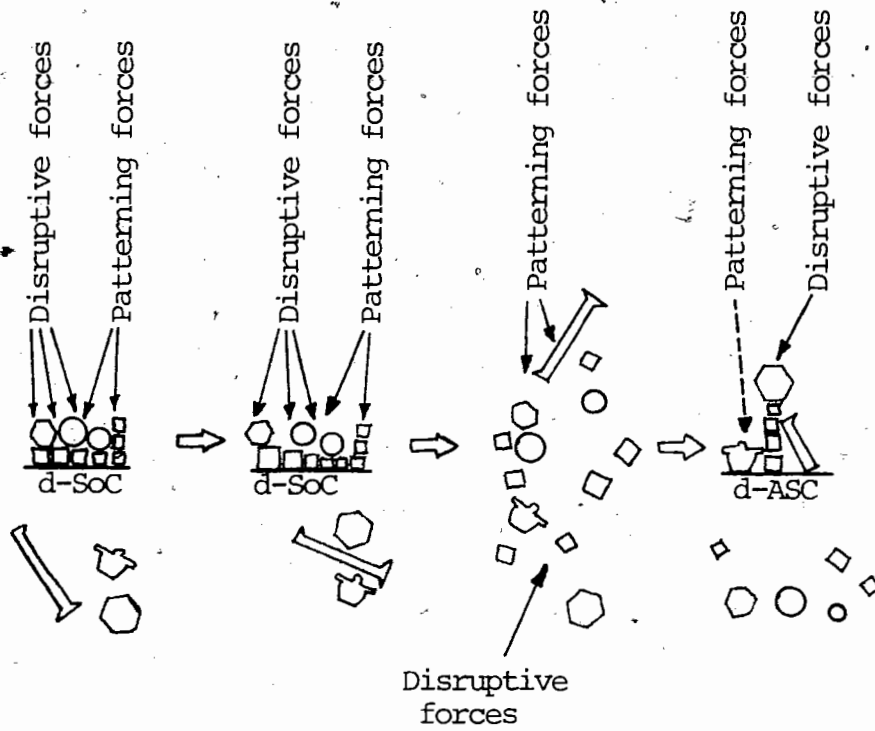


Figure 12

A schematic representation of a change in discrete state of consciousness (from Tart, 1976b).

'solution' of the problem.

Franklin Merrel-Wolff (1973) and Charles Tart (1976) both speak about the relationship between specific states of being--particular states of psychological/organizational structure--as being the source or root of particular characteristics and possibilities. The ways in which an individual is able to perceive, act, interact, understand and feel are all functions of his particular psychological/organizational structure. A change in the state of being of the individual's psychological organization produces a change in the entire constellation of possibilities for that individual.

Merrigel (1960) writes:

FURTHER KOAN MEDITATIONS

At the appropriate time, the Master will entrust more koans to his pupil. Not in order to complete the enlightenment bit by bit--for it is imparted at one stroke and as an indivisible whole, since the whole of Zen is contained in each koan--but to make the process of enlightenment more familiar, to let it take root, to exercise it. At the same time it is possible to explore the whole range of being with the help of koans; they can even be classified in this respect.

At this stage the pupil will not repeat the old mistakes when meditating. He does not look now for any rational solution, having learned by his previous failures that thinking is totally useless and must be eliminated. It is possible that he has hardly begun meditating when the solution comes to him at first go; it positively leaps at him and he 'sees' in a flash what was asked. He will be either confirmed or rejected. He submits to the Master's decision, not just in the spirit of humility and obedience, bowing

to decisions which he thinks are wrong, but in full assent, as if to the decrees of fate. This docility may not have been in him from the beginning. There may be times when he rebels against the Master's claim to see through him, until one day he realizes how wrong he was. After that, he submits willingly and has unshakeable confidence in the Master.

John Bowlby (1969) points out that, "...once a human being has had experience of reaching a consummatory situation the behavior that leads to it is likely to become recognized in terms of a set-goal and a plan hierarchy. ...In human beings psychological development is characterized not only by simple systems being superseded by goal-corrected systems, but also by the individual's becoming increasingly aware of the set-goals he has adopted, by his developing increasing ability to relate one plan to another, to detect incompatibility between plans and to order them in terms of priority" (p.22,194). Once the Zen student has had the initial experience of realizing a koan, of succeeding in his meditations, he finds it increasingly easier to work with his conscious organization, to allow it to re-structure itself to fit the particular task at hand.

In Suzuki's terminology, the student has had an experience of the 'Big Mind'. His consciousness system has entered into a new and different state of being (d-SoC) via his realization of the koan. The process of entering into the state of being required for realization of the koan involves a re-structuring of the student's consciousness; this re-structuring, this metanoia, involves the deautomatization of the individual's normal d-SoC, its re-structuring with reference to the

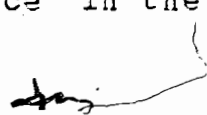
particular state of being to which the koan provides the key, followed by the re-automatization which allows the student to realize new koan problems with much greater ease and facility than was required by the first. The procedure is very much akin to learning to ride a bicycle. Once the individual has incorporated into his being the feelings, sensation, and requisite coordinations for riding the bike, no further difficulties to riding under normal circumstances will occur.

Conclusions

Zen Masters have developed over an extended period of time a series of techniques and procedures--an educational curriculum-- using the functioning of human consciousness as its logical base. Logical base is used here to indicate the set of "givens" from which decisions are made. It is the basis which allows one to make sense of and make decisions about phenomena. They have left nothing to chance, or luck, or fortuitous circumstances, but have relied on an extremely systematic, planned, sequential program to achieve predictable results. These procedures and techniques developed within the context of Zen Buddhism provide us with an excellent and time-proven example of how the workings and functions of human consciousness can be made use of in an educational situation as an example of a curriculum designed to deal with the state of being which the individual is engaged in.

As discussed in Chapter III, Gevarter (1976) has demonstrated that the three key factors in human behavior are (1) the nature of external stimuli; (2) the old and new brain value systems; and (3) the state of being of the individual's psychological organization. The procedures and strategies employed in the Zen system of meditation on the koan deal with all three of these aspects. They provide a situation in which extraneous external stimuli are minimized. They teach a systematic method of posture and breath control which allows the attention/awareness function of the individual to "centre" and to concentrate upon a single point and reduce internal strain and movement within the body. They provide, finally, an object for focus of attention which forces the re-structuring of the consciousness organization and thereby a re-organization of the individual's state of being. The koan itself is a product of and therefore a key to the state of being into which Zen Buddhism seeks to draw the student. It is, in a sense, like a joke statement which can be understood, grasped, only by one sharing the state of being of the individual who originated the koan. As facility is developed with these techniques, the individual finds it easier and easier to allow his consciousness organization to re-structure in relation to whatever situation is presented.

The final goal or aim of the practice of Zen Buddhist meditation on the koan is to produce in the psychological



structure of the individual participant a particular state or modality of being which is different from his normal, culturally derived, eg-centric mode of being. The aim is to produce a modality of being which allows, provides the requisite structuring for, a direct and unmediated perception of the individual's universe. Suzuki (1975) refers to this as the cultivation of the "big mind" which, says Suzuki, is to be realized and expressed, not figured out. The aim is to restructure the psychological/organizational structure such that, as Deikman (1976) suggests, attention is reinvested in perception--such that the semantic, roof-brain chatter screen normally standing between the individual and direct perception of the universe is eliminated. It is a state or modality of being which eliminates what Zen practitioners would consider irrelevant and detrimental mediants which prevent the individual from interacting with and perceiving directly the present moment in which he is living. It is an attempt, in Pearce's (1977) words, to regain contact with primary process thinking. All of the techniques and attitudes which are made use of during the process are subordinated to this final goal, a goal which Suzuki (1975) states is only "something" to those who have not achieved it.

The praxis of Zen Buddhist meditation on the koan is designed specifically to put the student back in touch with his own centre, to cultivate and develop a particular modality of being, and thereby re-unite him with the centre of being of the

larger eco-mind system. It is a practical and concrete curriculum designed to produce in its students a specific modality of being. It does not attempt to produce individuals who can "do" differently than when they began, although this is clearly a byproduct of the effort. Rather, it seeks to change the "state of being" in which the student exists. Whether the state of being which Zen practitioners seek is, in fact, Man's "true" state of being is an argument which I shall not attempt to either promote or refute. It is of little relevance to the purpose of this work. Zen Buddhist meditation on the koan is a curriculum designed to achieve a specific, discrete state of consciousness. As a curriculum designed to achieve a specific state of being, discrete state of consciousness, it makes use of as a logical base the functionings of human consciousness which create, maintain and regulate the individual's state of being.

VII.

CONCLUSIONS

An Aesthetic Appraisal

When all "directions" fail there arises in the darkness over the abyss the one true direction of man, towards the creative Spirit of God brooding on the face of the waters...

That is man's true autonomy which no longer betrays, but responds.

Martin Buber (1965)

The nature of this work is primarily theoretical. It has been in many respects an aesthetic exercise dedicated to form rather than content, approaches rather than specifics. Both its strengths and weaknesses lie therein. Any investigation must of necessity be a sampling of the total universe of possibilities; and this work is no exception. Any conclusions, therefore, must be viewed as resulting from that sampling, and must be taken to be, in large sense, formative. In any investigation, as a sign in a friend's office reads, facts are merely to mark the point where we have agreed to let investigation cease. As John Wheeler (in Lee, 1976) so beautifully put it:

...through our act of consciously choosing and posing questions about the universe we bring about in some measure what we see taking place before us.

Therefore, I think the word "observation" inadequate. A better word is "participation." We are going to come to appreciate that the universe itself in some strange way depends on our being here for its properties. "Depends" is perhaps not the right word, because there is a mutuality of relationship that needs to be stated.

As with beauty and truth, usefulness is in the eye of the beholder. The usefulness of an aesthetic activity is that it suggests a form, a configuration and a perspective for viewing the world. The aim of this work has been to provide insight into and form to an exploration of the underlying premises required for the design of curricula directed towards the achievement of particular states of being. Whether the conclusions drawn herein have applicability to current forms of mass schooling is not a question which has been entered into. The work is concerned, however, with questions pertaining to education in its broader sense and its applicability will be in that arena.

The birth of a human being is not, as some suggest, a starting point in a process any more than any other arbitrarily chosen point in the individual's life. The individual emerges, individuates itself, from a dynamic biological/ecological matrix which has been in process for some four billion years on this planet. The pre-conditions which led up to the beginnings of that developmental process undoubtedly extend back to the beginnings of the universe itself. In this sense, the notions of time and starting points become somewhat useless. Starting and ending points are simply arbitrary constructions.

Within the genetic coding and the physiological structuring of the human being are carried the results of the entire history

of the evolutionary process. The human being embodies, in this sense, the accumulated evolutionary wisdom, the experiential history of the universe. While the individual functions as though he were an independent entity in many respects, he remains linked to and a functional part of the larger biological/ecological matrix from which he individuated.

The results of this long period of evolutionary development has embodied within the individual's biological and psychical structuring a set of propensities, intents, orientations, requirements: a 'template' program which limits, directs and provides vector and mode to the possibilities of that individual. This phenomenon has been referred to as primary programming, its mode of operation has been referred to as primary processing. It is contained within the individual but may require environmental triggering for its development.

Man is a social creature, and typically individuals are born into and remain within a social context for their entire lives. Many of the genetic programs of human beings are oriented towards and triggered by social influences and interactions. A major portion of a human being's psychical and biological programming is left open and in wait for the influences of the social/cultural milieu. The programming which constitutes and is referred to as secondary programming is social in origin and is assimilated by the individual during the process of enculturation. Due to the relatively slow

development to maturity in human beings this process typically takes a major portion of the individual's life to complete, and possibly continues throughout life.

The nexus point in all the interactions in which the individual is involved is his attention/awareness function. It is a psychological function which serves to direct, monitor and control the processing of information flow and storage within the individual's consciousness system. It is the phenomenal energy which promotes, regulates, structures and re-structures the individual's discrete state of consciousness: the overall pattern/organization that is the individual's nature (Tart, 1976).

Confucius wrote that it is useless to take counsel with those who follow a different way. The word in English "premise" has a double meaning which is very apropos. It means both a basic principle and a place where one lives. In terms of consciousness this is very true. The premises one has and uses to justify a particular argument or line of reasoning are very much the place where one lives; they are the product of the space, the state of being, which the speaker is experiencing. The question at hand here is taking psychological states of being as valid phenomena, and considering them as potentially valid goals for educational curricula, and what are the basic premises, the basic processes and conditions involved in achieving them.

In the preceding chapters I have discussed the underlying premises which constitute and serve to describe states of consciousness. An individual's state of consciousness, his psychological state of being, is the gestalt result of a constellation of psychical and biological subsystems functioning in a particular pattern which is directed, monitored and maintained by the individual's attention/awareness function. The manipulation of the attention/awareness function is the key to re-structuring the individual's particular discrete state of consciousness. As discussed in Chapter VI, the process of re-structuring a state of consciousness is basically a three stage procedure. As exemplified by the curriculum involved in Zen meditation on the Koan, the three stages of the procedure are: 1) the stilling of the individual's physiological and psychological functionings so that concentration may be achieved; 2) the introduction into the individual's consciousness of a problem or statement which is the product of the state of being sought and is incomprehensible within the student's entry state of consciousness; and 3) the continued application of attention/awareness with total commitment until the student's consciousness system re-structures itself consistent with the state of being required for solution or realization of the problem statement.

The requirements for successful application of the curriculum are 1) a sufficient willingness on the part of the

student to commit his entire physical and psychical energy to the attainment of the state of being the curriculum is oriented to achieve; 2) a teacher who has achieved and exists within the state of being sought; and 3) a methodology and sequence of experiences which are consistent with and conducive to achievement of the state of being sought.

It is at this stage in the analysis where the crux of the entire line of thought comes under scrutiny. Clearly, any of the innumerable possible states of being which human beings can enter into could conceivably be suggested as equally valid goals for a curriculum. And so it is. Just as in the current institutions of mass schooling arguments are continually carried on concerning what is and what is not important or necessary for students to be able to do, so too arguments can be carried out as to what potential states of being should or should not be fostered or sought. Making use of the Zen curriculum as I have done in this work as an example for analysis suggests a bias inherent and underlying my aesthetic views on the matter. Gregory Bateson (1972) writes that members of the scientific community and many laymen as well are beginning to observe and realize that the:

...massive aggregation of threats to man and his ecological system arise out of errors in our habits of thought at deep and partly unconscious levels (p.487).

There exists no inherent or guaranteed need in the universe for a particular taxon which proves itself ecologically

non-viable to continue to exist. Numerous evolutionary "experiments," for example the large reptiles, have failed to maintain their ecological viability and have become thereby extinct. Man may soon find himself in a similar position.

C.S. Lewis (1962) writes:

There is something which unites magic and applied science while separating both from the 'wisdom' of earlier ages. For the wise men of old the cardinal problem had been how to conform the soul to reality, and the solution had been knowledge, self-discipline and virtue. For magic and applied science alike the problem is how to subdue reality to the wishes of men: the solution is a technique; ... If we compare the chief trumpeter of the new era (Bacon) with Marlowe's Faustus, the similarity is striking. You will read in some critics that Faustus has a thirst for knowledge. In reality, he hardly mentions it. It is not truth he wants from his devils but gold, and guns, and girls (p.48).

Merrell-Wolfe (1973) suggests that the serious citizen of the present may well blush when he thinks of what must be the judgement of future historians when they write of our age and note how the superb genius and skill of man served mainly his mundane needs and conveniences. He writes:

With our science we slash arbitrary cuts across that stream [of experience] and find innumerable relations intertwining indeterminate parts that we can define and organize into systems with considerable skill. But as to the ultimate nature of the parts in relation we know nothing at all. ... That is the question that centuries and millenia of knowledge grounded only in the empirically given has never been able to answer. Hopeless is the estate of man if the source of all he knows is experience and nothing more (p.3).

Pearce (1977) concludes from his research that the human mind-brain system is designed for functions radically different from and broader than its current use. He writes that human

beings possess:

An astonishing capacity for creative power built into our genes, ready to unfold. Our innate capacities of mind are nothing less than miraculous, and we are born with a driving intent to express this capacity (p.3).

Wisdom is the product of experience, of direct interaction between an organism and its matrix of existence. The human being embodies the cumulative wisdom, the cumulative experiential history of human evolution involving billions of years. Carl Jung felt that the process of evolution was teleological, that it followed plan, that it had order and sequence. The ancient Chinese referred to this as the 'Tao', the flow of universal energy; the Biblical Jews called it the 'Law'. They recognized that to separate oneself from the 'Tao' the flow of energy in the universe was to separate oneself from the process and purposes of life itself.

In making decisions about potential aims for curricula designed to achieve a state of being the hope must be that people will rely on the best wisdom available to them. Man is potentially a wise and knowing creature; the entire approach of Zen Buddhist method and other similar disciplines is based on this premise. He has embodied biologically and psychically the wisdom of ages and this wisdom is potentially accessible to him through his own choices about the use and direction of his consciousness. The 'Tao' may be ignored for short periods of time, and it appears that this is the case currently both in educational circles as in the larger body of modern society.

Ultimately, however, a high price must be paid for this form of disregard. Whether man will choose to re-unite themselves with their own embodied wisdom and from that base perceive and interact with the world or not remains to be seen. The potential exists; the methodologies for doing so exist; the premises for that orientation exists.

The promise is given...

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