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The development of creative thinking and its educational implications

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THE DEVELOPMENT OF CREATIVE THINKING AND ITS EDUCATIONAL IMPLICATIONS

by

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This dissertation proposes a theory of the development of creative thinking in the context of major psychological, philosophical, and religious perspectives on thinking and human development. This study then suggests some implications of the proposed theory for educational theory and practice.

Two aspects of thought are proposed and referred to as qualitative thought and quantitative thought. It is argued that qualitative thought is our most direct experience of reality. Qualitative thought has emotional and intuitive aspects, and it precedes and provides the shaping power or meaningful context for quantitative thought. Quantitative thought is seen as a secondary thought process that defines and delineates experience by dividing it into distinct objects, properties, names, and relationships.

This dissertation suggests that qualitative and quantitative thought together comprise creative thought. Creative thought is the most natural form of human thought. Human beings are born with the ability to think qualitatively, and quantitative thinking ability expands rapidly from birth.

Theories dominating the field of human development today generally understand thought as quantitative thought and omit qualitative thought. This misunderstanding leads to developmental perspectives that are hierarchical in

nature and that value later stages of development more than earlier stages of development. This dissertation examines each stage and discovers a unique way of understanding and valuing each in the context of whole, creative thinking.

This study concludes that the majority of traditional and current educational practices emphasize the development of quantitative thinking skills and discourage the development of whole, creative thinking skills. Educational practices are recommended for each stage of development that encourage the development of creative thinking.

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CHAPTER ONE

THE PERSONAL JOURNEY

> ... what exactly was Anna? A child certainly, a very intelligent and a very gifted child, but what was she? Everybody who came in contact with Anna recognized in her some strangeness, something that marked her as different from other children... Certainly Anna had a gift, but it turned out to be nothing spooky, nothing out of this world. In a very deep sense it was at once as mysterious as it was simple. She had an immediate grasp of pattern, of structure, of the way that bits and pieces were organized into a whole. Unexplainable as this gift might be, it was always well and truly earthed in the nature of things. As simple and as mysterious as a spider's web, as ordinary as a spiral seashell. Anna could see patterns where others just saw muddles, and this was Anna's gift.1

This dissertation is about ways of thinking and knowing. The meanings and common usages of these words are both different and overlapping. The word *think* usually implies using the mind in logical ways, the process of conscious rational activity. However, it is also used to mean less considered mental activity, such as beliefs of which we are unsure or unconscious mental activity of which we are unaware. It has been used less frequently but for centuries in certain philosphical and religious systems to mean a depth of thought, a uniting of "heart, mind, and soul" in an understanding of some basic truth.

The word *know* is also used in a variety of ways from the more mundane, such as "I know how to do algebra

problems" to the more profound, like "I know my child well" or "I know God." But the word *know* does tend to be used in a way that is less dependent on rational thought processes than the word *think*. It often implies direct perception, direct experience of the nature of something, deep awareness of truth.

In this dissertation the words *think* and *know* become synonymous because of the nature of my theory. I am proposing that there are two profoundly different aspects of thinking that are in relationship to each other approximately as the visible tip of the iceberg is to its massive hidden underside. The visible tip might be thought of as logical thought and the hidden mass might be referred to as a depth of knowing. But in actuality both can be referred to as aspects of thinking or kinds of knowing. Since most modern psychological theories do not postulate the existence of this hidden depth of thought, this profound depth of knowing, a great misunderstanding about the nature of human thinking and knowing exists in our culture today.

I will also be writing about the repercussions of those misconceptions about thinking and knowing on the fields of developmental psychology, child rearing and education. I believe that current practices based on incomplete theories lead to a limiting of the immense possibilities for thought and achievement innate in all human beings.

I believe that those human beings who grow up

retaining access to both aspects of thinking mentioned above are those that we call geniuses or gifted individuals, those with remarkable talents who have the potential to make major contributions to some area of human endeavor, whether artistic, scientific, business, academic or humanitarian. These people may be well-known internationally or nationally, or they may be merely "famous" in their workplace, school, community or home for their ability to create and accomplish. They are characterized by the presence of a sense of purpose, a deep conviction that their lives have meaning, and their ability to see with fresh and broad vision, to discover new ways of understanding the world and doing things. The introductory quotation to this chapter is about such a person, a young child named Anna. *"Anna could see patterns where others just saw muddles, and this was Anna's gift."*

Anna's informal education was overseen by a young man who understood and respected the ability of this child to absorb and make sense of the world. He provided her with access to information; she demanded more information, digested it, constructed her own meaningful patterns out of it.

> After the evening meal I always read to Anna, books on all manner of subjects from poetry to astronomy. After a year of reading, she ended up with three favorite books. The first was a large picture book with nothing in it but photographs of snowflakes and frost patterns. The second was Cruden's Complete Concordance, and the

> third, of all the strange books to choose, was Manning's Geometry of Four Dimensions. Each of these books had a catalytic effect on Anna. She devoured them utterly, and out of their digestion she produced her own philosophy.
>
> One of her pleasures was my reading to her that part of the Concordance given over to the meaning of proper names. Each name was read in strict alphabetical order and the meaning given. After each name had been tasted and thought over she made her decision as to its rightness. Most times she shook her head sadly and disappointedly; it wasn't good enough. Sometimes it was just right; the person, the meaning, all fitted perfectly for her and, with a burst of excitement, she would bounce up and down on my lap and say, "Put it down, put it down." This meant writing the name in large block capitals on a slip of paper, which she would stare at with complete concenration for a minute or two and then place in one of her many boxes.2

This type of approach to thinking and learning is not the prevalent one in this country or in most educational systems of the world. Most people in formal educational systems are fed information but are not encouraged or allowed to think, to know in the deepest sense, in the way that we are born able and equipped to do. The result is a profound alienation from our truest inclinations and abilities, a form of intellectual and emotional suicide.

Martin Buber wrote: "The simple truth is that the wretchedness of our world is grounded in its resistance to the entrance of the holy into lived life."3 The word holy is derived from the word whole. When we abandon our connection to our whole selves and to the whole of life, we betray our deepest selves. I believe that we all come into

life equipped with the capacity to experience a "holy" connection with our particular life's purpose and with all of life. The particular methods of socialization common to technological Western culture encourage us to abandon this connection in our earliest years and to remain ignorant of it for the rest of our lives.

I believe that this profound misunderstanding about the nature of human knowing has greatly contributed to a short-sighted, narrow vision of human beings and our role in the world that has resulted in rampant destruction and needless suffering, including such well-documented phenomena as the hurried-child syndrome, the rise of depression, drug abuse and suicide among children and adolescents, the break down of family and community support systems, and the emphasis on material success rather than emotional, social and spiritual well-being in modern enacted value systems. I believe that this constricted vision of human knowing is also partly indirectly responsible for the massive build-up of nuclear weapons and the destruction of the natural resources of the earth.

This dissertation will not attempt to deal directly with the more overt political aspects of this situation, but I do not deny their existence. I accept the argument that a part of the reason that we socialize children to obedience and conformity in school systems is that our nation requires a great number of obedient and conforming

workers to keep the factories and the McDonald's running smoothly. However, I do not believe that these values are explicity held by most educators, nor do I believe that it is the main reason why we usually opt for conformity over creativity, alienation over deep self-knowledge.

I believe that the primary cause is ignorance about the true nature of our humanity and the deep repression and denial of it that has followed this ignorance. Adults who have repressed and denied their own deepest sense of knowledge and meaning of the purpose of their lives have a great deal of unconscious investment in denying it and repressing it in children. There is tremendous pain in recognizing that we have missed a vast beauty and meaning in our lives, a sense of deep purpose and connection with other lives and with the universe. Thus we deny the potential holiness, wholeness of our lives and the lives of others to protect ourselves from the pain of that knowledge.

It is difficult to separate ignorance from denial. To what degree does increasing knowledge allow us to change our behavior? This is a critical and debated isssue in psychology, philosophy and history. I believe that the more we know about the true nature of thought, and the more we reflect upon its repressed aspects in our lives, the more we will be able to overcome our resistance to genuine thought and to encourage it in ourselves and in others.

The two aspects of thinking that I propose are not

two distinct kinds of thought. They are two different components of the type of human activity that is called thought or cognition or mental processing, the activity through which we seek to understand ourselves and the world. Philosophers, psychologists and educators have attempted to comprehend these different aspects of thought by postulating contrasting modes of understanding, dualities that attempt to come to terms with the wide scope of our thinking abilities. These include: logic/intuition; conscious thought/unconscious thought; right brain thinking/left brain thinking; ontological reason/ technical reason; mystical thought/logical thought; explicit knowing/tacit knowing; feminine thought/masculine thought; and qualitative thinking/quantitative thinking. Although I am not claiming that all of these metaphors are analagous, they do all attempt to come to terms with the contrasting aspects of thinking, and I believe that they grapple with overlapping, and in some cases identical, concepts.

I have spent many years of my life exploring the meaning of these contrasting metaphors about thinking. My conscious involvement with an attempt to understand the processes of human thought began during my high school years when I collected and studied the dreams of hundreds of children and adolescents in my school system. I was struck then by the existence of two very different modes of thinking. Like mild-mannered Clark Kent by day, our

conscious minds reported the "daily news" of our personal lives. But at night the "unconscious" featured Superwoman or Superman fighting lions or monsters, powerful emotional knowing alchemically changed into vivid imagery.

My college psychology studies focused on two main themes: cognition and its development, centering around the acquisition of rational, sequential analytical thought processes; and personality and its development, including the ego and emotions. After achieving a basic understanding of the principles of behavioristic psychology, I avoided courses grounded in behaviorism. Behaviorists were interested only in observable behavior, which omitted all of the areas that interested me the most: dreams, ideas, imagination, thoughts, feeling, personality. Behaviorists argued that human activity can be explained without these mystic concepts that can only "muddy the water."

However, in turning to the field of cognitive psychology, I was disappointed to find a corresponding bias. Cognitive processes were generally defined as logical, linear thought processes, and there were few attempts to relate or include the role of such things as emotion, intuition, or imagination. Cognition and emotion seemed to be accepted as two distinct processes, minimally and mechanistically related. Ironically, my studies took place in William James Hall, named after the psychologist-

philosopher who had written this about the process of thinking:

> It is by the interest and importance that experiences have for us, by the emotions they excite, and the purposes they subserve, by their affective values, in short, that their consecution in our several conscious streams of ours as 'thoughts' of ours is mainly ruled.4

This tendency to separate cognition from emotion may be even stronger today in academic psychology than it was twenty years ago. In his 1985 book The Mind's New Science: A History of the Cognitive Revolution, Howard Gardner describes the distinguishing features of cognitive science:

> The third feature of cognitive science is the deliberate decision to de-emphasize factors which may be important for cognitive functioning but whose inclusion at this point would unnecessarily complicate the cognitive-scientific enterprise. These factors include the influence of affective factors or emotions.5

It seems to me that cognitive psychologists have turned the same blind eye to emotional factors in cognition that behaviorists had turned to mental factors in behavior.

I did briefly encounter the concept of intuition several times during my undergraduate years. My "cognitive processes" professor, Dr. Jerome Bruner, postulated the existence of intuitive thought in contrast to linear, analytic thought. He suggested: "Intuition implies the act of grasping the meaning or significance or structure of a problem without explicit reliance of the

analytic apparatus of one's craft."6 I also studied theories of personality with Dr. Alexander, a guest lecturer from The Jungian Institute in Zurich, learning about Jung's theory of four basic human intellectual functions: cognitive, intuitive, affective and physical-sensory. The ideas of Bruner and Jung gave shape to my quest for an integrated theory of mind. I began to realize that I was attempting to account for the relationship between rational cognition, emotion, and intuition in human knowing.

By the late 1960's a small but significant group of psychologists and philosophers were addressing questions pertaining to "altered states of consciousness" which included dreams, visions, drug-induced states, religious and mystical experiences, parapsychological experiences and intuition. I enthusiastically studied these theories, but I was concerned about the attempts of some to denigrate rational thought processes. I began to formulate a belief that a valid theory of thinking would give equal homage to all facets of the mind.

During my undergraduate years I also began a study of developmental psychology that has continued for twenty four years. My search for a comprehensive theory of mind dovetailed with my interests in the developing human being. I began to ask specific questions relating to mental abilities at different stages of development: What kinds of thinking skills are we born with? Which are acquired? To

what degree is the enfoldment of thinking skills innate and to what degree does it depend on specific experiences? Does individual variation depend more on heredity or experience? How do we consciously attempt to arrange experiences to affect the development of thinking in formal and informal educational environments? Do our limited models of the of thinking, our lack of understanding of its full scope, get translated into educational practices in ways which limit the possible results? Are we damaging minds by our lack of understanding?

For a few years I worked on research projects relating to the thought of young children. Then, after receiving a master's degree, I began a sixteen year teaching career with and about young children. I started schools, designed educational systems, taught young children, raised my own child, directed schools and trained teachers of young children. During all of these years I was teaching children. Obviously my relationships with children profoundly influenced the study and development of a comprehensive theory of mind. I believe that the most important implications of my theoretical constructs about knowing relate to an understanding of the human developmental process and to the implications of that for the ways in which we educate.

My relationships with children inspired a profound respect for their knowing. I felt that I was learner as

much as teacher, and that we were exchanging knowledge gleaned in different ways. I sensed the kind of knowing characteristic of children as I observed their enormous capacity to imagine, to wonder, to believe, to hope, to be joyful, to trust, to enter wholly and joyfully into learning and experience, and to absorb information that interested them rapidly. As I wrote during my first student teaching experience, "it's a cliche, but it's true. Being with little children brings honesty, simplicity, joy, energy. That's the way they are--and they bring out the hidden part in me that is still that way."

The longer I spent teaching young children, the more I became convinced that typical child development textbook descriptions of young children were missing an essential dimension of understanding. These textbooks are based on the assumption that human development procedes in hierarchical stages, with the attainment of increasingly higher and more complete levels being the goal of the developmental process. This way of thinking leads to the conclusion that adults are inherently better equipped to understand and experience the world than children are, that the main importance of childhood lies in its function as preparation for competent adulthood. My own experience increasingly told me that this was only partially true. Adults are not better equipped but differently equipped to understand reality. The "average" child and the "average"

adult of my acquaintance seemed to have strong comprehensions of different aspects of reality. Each seemed to grasp a part of what I felt to be the whole "truth" about the world. It seemed likely to me that these different understandings stemmed from different types of thinking.

Another observation that I began to make was that theories of child development seemed to consistently underestimate the abilities of the infants and children that I knew. For example, my college child development textbook reported: "By age two some children may play alongside others, but there is little interest in the activity of peers, cooperative games, or conversation...It is only during the preschool years (3 to 5) that more cooperative play begins and the child shows a desire for group activity."7 The majority of young two year olds in the schools in which I taught played cooperatively, and some two years olds related in ways that I felt were exceptional for people of any age. For example, as young two year olds, Seth and Naomi consistently waited for the other to arrive each morning, shared toys and food with each other, played imaginative games with the other and protected and empathized with each other. The fact that they also occasionally argued and fought over toys, as "typical" two year olds do, only highlights their capacity to behave in more "advanced" ways.

Child development literature suggested that young

preschoolers are egocentric and unable to see the world from the perspective of another, developmentally unable to be anything but "selfish." Yet I and many others who live and work with preschoolers note the apparent ability of young children to sense the emotions of others, to offer empathy and support to those in need. This is true despite the fact that they frequently are "selfish" and do need to be taught methods of peaceful conflict resolution. I remember three year old Monty who would ask me each Monday how my week-end had been and ask me each lunch time if my sandwich tasted good, waiting patiently for and commenting thoughtfully on my answers.

Prevelant theories of child development also seemed to underestimate the cognitive capacities of many young children. Preschool children were not supposed to be capable of abstract theorizing and reasoning. Yet Consider these statements and behaviors of my daughter at three years of age, drawn from the journal I kept of her development.

3 years, 2 months: "The moon must have wheels because it follows us--or maybe it runs by its light--like the light in my body is helping me to grow."

3 years, 3 months: "I dreamed I cut myself on a piece of glass, but it really hurt for real." ("What do you mean?" I asked.) "I dreamed I cut myself, but I didn't really cut myself in this world (pointing down), it was in

this world (pointing up) where the cutting was real, but in this world (pointing down) the cut wasn't real, but the hurting was."

3 years, 3 months: (after a long period of silence while playing outside in the mud) "I understand! God controls everything in the world except people and he lets us do whatever we like so we can be like him!".

3 years, 4 months: (while working in an extremely concentrated and joyful way on constructing giant life-size people in a huge sand box, with a friend): "Now I know exactly how God felt when he made us!"

3 years, 5 months: (after working on a unit on Native Americans in her preschool) "Indians know that God is never far away but we forget it sometimes and it makes us sad. We think he's far away, but he's really not."

3 years, 5 months: "Is God dead?" ("No, God is not dead, I answer.) "I can't see _____ (naming a person who is dead) because he's dead. What's the reason I can't see God?"

3 years, 7 months: "Did God make himself?"

3 years, 8 months: (while driving up the driveway and noticing Elsie, the cow) "It's too bad about Elsie. She doesn't know that God is inside of her.

3 years. 8 months: (while contemplating a large mud puddle) "To an ant, this would be as big as an ocean, so I'll call it an ocean. Watch me jump across this ocean!"

This three year old was reasoning in a manner considered by the norms of developmental psychology to be many years beyond her predicted abilities. She was also expressing sophisticated philosophical and theological opinions. Skeptics may argue that she was merely repeating what she had heard adults say, but because I had been with her consistently since her birth I am convinced that this is not true. And at this time I also began to discover other accounts of young children expressing complex reasoning about scientific, philosophical and religious issues. Some of these findings will be discussed in later chapters.

In the past decade one aspect of young children's mental abilities has begun to gain academic and popular recognition as having more potential for acceleration than previously recognized. Adults began to discover that preschoolers and even some babies can learn nearly every known mental discipline. Books about how to teach your baby to read and do arithmentic began to be popular. Parents purchased a wide variety of toys and games and flashcards designed to accelerate the learning process. Many preschool programs featured formal teaching of reading, writing, math, science and foreign languages. Some parents began to show concern if children weren't reading before entering kindergarten. Kindergarten classrooms, initially designed to be "gardens" of play and informal learning, frequently became like the more formal first grades had

been, taking on the "3 R's" as the top priority. Experts in child development began to express concern over the pressures being put on babies and children. The "hurried child" syndrome emerged.

I was certainly not surprised to learn that young children are capable of thinking in ways and performing skills requiring great complexity and sophistication. The question for me and for many other child development professionals increasingly became "What is appropriate for us to teach young children to enhance thinking and overall development?" rather than "What are young children capable of learning and doing?" My interest in the process of thinking also led me increasingly to reflect on the question "What is it about the thought of young children that allows most of them to be so open to learning?"

I believe that human beings are born with the ability to think in a way that I will call qualitative, borrowing a term from the philosopher John Dewey. Qualitative thought has characteristics that we may refer to as emotional or intuitive, but I am not necessarily using these words in their most commonly understood forms. Qualitative thought is our most direct experience of reality. It is the shaping and integrating force that guides quantitative thought, the secondary thought process that defines and delineates experience by dividing it into distinct objects, names, properties, and relationships. Logical thought is one kind

of quantitative thought. Quantitative thought begins immediately after birth (or before) and continues to expand and be refined throughout adulthood.

In Chapter Two I will further describe the concepts of qualitative and quantitative thought. I will also examine a variety of other psychological, religious and scientific metaphors and theories that attempt to come to terms with this duality. I will demonstrate that most of these theories are concerned with the same dual aspects of thinking.

Creative thought is the result of the combination of qualitative and quantitative thought. Creative thought allows human beings to make meaning of the world and to change the world. In Chapter Three, I will describe how the qualitative and quantitative thought unite in the richness of the creative processs.

The development of quantitative thought has been extensively researched and documented, particularly by Jean Piaget. Piaget's theories have made an invaluable contribution to our understanding of how thinking in young children changes and develops. Similarly Freud has offered tremendous insight into the growth and development of emotions in the human life cycle. In Chapter Four, I will briefly outline the contributions of these and other contemporary developmental frameworks to our understanding of development, and I will also argue that the

misunderstanding of the whole creative nature of thinking has led a profound misunderstanding about the process of human development. Some developmental theorists have attempted to view thought in a broader, more wholistic sense. This distinct minority of theorists emerges from a variety of traditions, including clinical psychology, philosophy and religion. I will summarize the offerings of these "alternative" thinkers in the field of human development.

In Chapter Five I will examine each unique stage of human development in light of my theory of creative thinking, describing the basic ways of thinking and knowing characteristic of each stage. I will suggests ways in which traditional developmental theorists have not adequately understood the development of thinking.

Then in Chapter Six, I will write about the implications of this theory for the ways in which we raise and educate human beings. I believe that it is imperative that we consciously base parenting and educating children on an understanding of whole, creative thinking, because in neglecting this we are preventing access to our full human capacity, to our sensing of the wholeness of ourselves and others and to our abilities to create a more harmonious and beautiful world.

Footnotes

1. Fynn. Mister God, This is Anna. New York: Ballantine Books, 1974. pp. 61-2.

2. Ibid. p. 20.

3. Martin Buber. Hasidism and the Modern Man. New York: Horizon Press, 1958. p. 39.

4. William James. Essays in Radical Empiricism. New York: E.P. Dutton & Co., Inc., 1971. p. 79.

5. Howard Gardner. The Mind's New Science. New York: Basic Books, Inc., 1985. p. 6.

6. Jerome Bruner. On Knowing: Essays for the Left Hand Cambridge: Harvard University Press, 1982. p. 102.

7. Mussen, Conger and Kagan. Child Development and Personality. New York: Harper and Row, 1966. p. 157.

CHAPTER TWO

QUANTITATIVE AND QUALITATIVE THOUGHT

> I hold that association depends in a much greater degree on the recurrence of states of feelings than on trains of ideas. Believe me, Southey! A metaphysical solution that does not tell you something in the heart is grievously suspected as apocryphal. I almost think that ideas never recall ideas, as far as they are ideas, any more than leaves in a forest create each other's motion. The breeze it is that runs through them--it is the soul, the state of feeling. 1

John Dewey's Theory

Samuel Taylor Coleridge wrote the introductory words in a letter to a friend. Coleridge's theory, that intellectual thought is powered or run by "the soul," by feeling, is remarkably similar to John Dewey's theory about thinking. Dewey's theory describes two types of thinking, one of which is the "ground" out of which the other arises. Dewey names these two types of thought "qualitative" and "quantitative." Qualitative thought is like the breeze, an emotional power that shapes intellectual thought as wind rearranges leaves on trees. In Art as Experience and in the essay "Qualitative Thought," (in Philosophy and Civilization), Dewey asserts that a qualitative "background" underlies all types of thought:

> But any experience, the most ordinary, has an indefinite total setting. Things, objects, are

> only focal points of a here and now in a whole that stretches out indefinitely. This is the qualitative "background" which is defined and made definitely conscious in particular objects and specified properties and qualities.2

When the qualitative background is delineated into specifics, it becomes "quantitative thought." The qualitative background is experienced differently than is quantitative thought:

> If we designate this permeating qualitative unity in psychological language, we say it is felt rather than thought. Then, if we hypostatize it, we call it a feeling. But to term it a feeling is to reverse the actual state of affairs. The existence of unifying qualitativeness in the subject-matter defines the meaning of "feeling".3

Thus the qualitative background is feeling and is experienced as feeling. The feeling is prior to any cognitive effort to define or delineate it. Dewey calls this feeling "qualitative thought." He goes on to explain how quantitative thought rises out of qualitative thought:

> When it is said that I have a feeling or impression or "hunch" that things are thus and so, what is actually designated is primarily the presence of a dominating quality in a situation as a whole, not just the existence of a feeling as a psychical or psychological fact. To say I have a feeling or impression that so and so is the case is to note that the quality in question is not yet resolved into determinate terms and relations; it marks a conclusion without statement of the reasons for it, the grounds upon which it rests. It is the first state in the development of explicit distinctions. All thought in every subject begins with just such an unanalyzed whole. When the subject matter is reasonably familiar, relevant distinctions speedily offer themselves, and sheer qualitativeness may not

> remain long enough to be readily recalled. But it often persists and forms a haunting and engrossing problem. It is a commonplace that a problem stated is well on its way to solution, for statement of the nature of a problem signifies that the underlying quality is being transformed into determinate distinctions of terms and relations...4

Quantitative thought makes explicit various parts of the qualitative background by defining it and delineating it into objects, properties, distinct qualities, names, relationships and so on. In other words, all intellectual thought, including the perception of distinct objects, language and number is called quantitative.

In Art and Experience Dewey goes on to say that emotion is the qualitative force that selects and cements quantitative aspects of thought. The emotion operates like a magnet, drawing to it material appropriate because of its emotional affinity and excluding all material that is uncongenial to it. This is true for both the perception of an object and the construction of an idea. Ideas form coherent trains of thought because "they are phases, emotionally and practically distinguished, of a developing, underlying quality."5 We cannot grasp any idea until we have felt and sensed it "as much so as if it were an odor or a color."6 Compare the following passage by Dewey to the opening quotation by Coleridge:

> Different ideas have their different "feels", their immediate qualitative aspects, just as much as anything else. One who is thinking his way through a complex problem finds direction on his way by

> means of his property of ideas. Their qualities stop him when he enters the wrong path and send him ahead when he hits the right one. They are signs of an intellectual "stop and go." If a thinker had to work out the meaning of each idea discursively, he would be lost in a labyrinth that had no end and no center. Whenever an idea loses its immediate felt quality, it ceases to be an idea and becomes, like an algebraic symbol, a mere stimulus to execute an operation without the need of thinking. For this reason certain trains of ideas leading to their appropriate consummation (or conclusion) are beautiful or elegant.7

A model of thinking proposed recently by a psychiatrist and a brain systems analyst seems to echo both Dewey and Coleridge. The Grey-LaViolette Model suggests that thoughts are always imbedded in emotional codes. When an emotional code, or feeling tone, becomes strong enough, it develops into an idea. The stronger the feeling behind the idea, the more powerful and meaningful the idea can become.8

Dewey described both mystical and religious experiences as those that give us an intense feeling of belonging to a larger, inclusive, qualitative whole. "Any experience becomes mystical in the degree in which the sense, the feeling of unlimited envelope becomes intense."9

John Dewey was not religious or mystical in any conventional sense of these words; on the contrary, he was one of the originators of the Humanist Manifesto, which expressly denied the existence of a deity. This is a critical point since the next group of theorists I will invoke in developing the distinctions between two aspects of

thinking are specifically religious and mystical. Dewey recognized the existence of a basic type of thinking that, by its very nature, makes us feel connected with a vast, inclusive qualitative whole. He did not ascribe any kind of "ultimate reality" to this feeling of the whole. Some people believe in this whole as more than a feeling and do see it as the basic reality of the universe. These people include both mystics and scientists, as we shall see. Some describe this whole in deistic terms, others in scientific terms. My point is that there are these two types of thinking, one of which essentially connects us with some type of underlying whole. No matter what kind of metaphors are used to describe them, the two ways of thinking remain the same.

I have chosen to use Dewey's terms, qualitative and quantitative thought. According to the Unabridged Random House Dictionary, the word quality derives from a Latin word meaning "of what sort" and the word quantity derives from a Latin word meaning "how much." Quality means the character or nature of a thing and quantity means the amount or measure of a thing. These definitions capture the essence of the distinction that I am making here. Qualitative thought is about the nature or essence of things; quantitative thought is about the measurement or description of things.

Qualitative and Quantitative Thought and Other Dualities

As I stated in Chapter One, there have been a variety of metaphors and theories proposed to explain the duality of human thought. I will examine in some detail a number of them in the following sections of this chapter. I will demonstrate that most of these are concerned with the same basic duality that Dewey proposed in the qualitative/quantitative thought distinction, although they may be explained, elaborated and applied in various ways. This is important because I am equating a number of theoretical constructs that are not usually seen as having a common ground. The fact that the majority of these constructs can be seen through one particular lens, even though they may also be able to be seen through others, underlines the significance of this way of seeing the duality of thought. Some of the other constructs are not equatable in this way, but they are worth discussing because of their relationship to the qualitative/quantitative duality.

Pure Experience and Reflective Thought

Both John Dewey and William James were pragmatists. Pragmatism encourages individuals to derive philosophy from their own personal experience of the world rather than from a prior set of theoretical premises. It encourages an orderly, experimental approach to understanding self and

world. The nature of the thought process is particularly important to the pragmatist. The effectiveness of various types of thought processes are ultimately judged by the results produced.

The role of direct experience is perhaps the key pragmatic concept. Pragmatists view experience as an immediate and nondualistic event, uniting mind and body, inner (mental) and external events and seemingly disjointed, separable experiences. It is our reflective, conceptutal intellect that attempts to separate experience, but actually all of life is *an* experience.

It is easy to see this concept in Dewey's qualitative theory. We *experience* life qualitatively. We *reflect on* it quantitatively. William James wrote about " a world of pure experience"10 as the primary, underlying process of human life:

> The instant field of the present is always experience in its "pure" state, plain unqualified actuality, a simple *that*, as yet undifferentiated into thing and thought, and only virtually classifiable as objective fact or as someone's opinion about fact.11

> Experience in its immediacy seems perfectly fluent. The active sense of living which we all enjoy, before reflection shatters our instinctive world for us, is self-luminous and suggests no paradoxes...When the reflective intellect gets at work, however, it discovers incomprehensibilities in the flowing process. Distinguishing its elements and parts, it gives them separate names, and what it thus disjoins it cannot easily put together.12

Like Dewey, James believed that it is the emotional component of an experience that guides its transformation into cognitive content. "It is by the interest and importance that experiences have for us, by the emotions they excite, and the purposes they subserve, by their affective values, in short, that their consecution in our several conscious streams as 'thoughts' of ours is mainly ruled."13 In other words, affect is the power behind thought.

Ontological Thought and Rational Thought

For Paul Tillich, the "ground of being" is the whole, an absolute that underlies all other absolutes.

> This "being" transcends everything particular without becoming empty, for it embraces everything particular. "Being" in this sense is power of being, and it is an infinitely full, inexhaustible but indefinite absolute. It is the basis of truth, because it is the transcendence of subject and object. It is the basis of good, because it contains every being in its essential nature and (as we shall see) the norms of every ethical command. And it is identical with the Holy, the ground of everything that has being.14

We experience this Being as eros:

> the love of being as such, a mystical relation to being-itself. This is what Augustine called "amor amoris" ('love of love') and Spinoza called 'amor intellectualis' ('intellectual love'). One could also call it a feeling for the holiness of being as being, whatever it may be.15

Tillich characterized knowing as an act of love. He

distinguished between ontological reason and technical reason. Ontological reason is powered by love and is the structure of the mind that allows it to understand and transform reality. Classical philosophers from the Greeks to Hegel understood knowing in this sense. Tillich wrote: "The denial of reason in the classical sense is antihuman because it is antidivine."16

In the technical concept of reason, reason is reduced to cognition and the capacity for "reasoning." Reasoning in this sense is logical, linear reasoning. Tillich explained that this type of reasoning is one aspect of ontological reasoning. When it is elevated to mean the only type of reason, human understanding is gravely misunderstood, and this has been true in the last several centuries of intellectual thought.

According to Tillich, the depth of reason is the ground-of-being or being-itself. Our minds are equipped to experience this ground-of-being directly, although we can only describe this experience metaphorically. This experience becomes the source of truth, beauty, creative inspiration, justice, love and ultimately, meaning in our rational constructions and in our lives.

Mystical Thought and Logical Thought

Scholars of mysticism might note the danger of generalizing about a subject that takes diverse forms and

has been interpreted in many conflicting ways. However I have found that certain insights based on an interdisciplinary study of mysticism and on my own experiences have been fruitful for my conceptualization of the nature of knowing, and thus I offer these as my personal understanding.

The concept of mysticism revolves around a sense of unity, the essential unity of the entire cosmos and of the mystic with this entirety. William James suggested that "states of mystical intuition may be only very sudden and great extensions of the ordinary 'field of consciousness'."17 James also explained that "this overcoming of all the usual barriers between the individual and the Absolute is the great mystic achievement."18 Arthur Deikman wrote: "Experiencing one's self as one with the universe or with God is the hallmark of the mystic experience, regardless of its cultural context.19 Deikman suggested that mystical thought is due to the "deautomatization of the psycholgical structures that organize, limit, select, and interpret perceptual stimuli."20 By deautomatization, Deikman meant that habitual motor, perceptual and thought patterns are dropped, and attention is reinvested in a fresh way.

Combining these statements and using Dewey's terms, we could say that mystical experience involves dropping habitual quantitative thought patterns and reinvesting

attention on the qualitative domain, which vastly extends consciousness. Dewey's distinction between the feeling of qualitative thought and the logical delineation of quantitative thought also applies well to the ways in which mystical thought is frequently contrasted to logical thought.

Hazrat Inayat Khan, a Sufi mystic, wrote: "Mysticism may be considered as the essence of all knowledge, the way to realize truth...It is a fact that mysticism cannot be defined in words or in the form of doctrines, theories, or philosophical statements, for mysticism is an inner experience."21 Margaret Smith, a scholar of mysticism, asserted that mysticism is "an attitude of mind, an innate tendency of the human soul which seeks to transcend reason and to attain to a direct experience of God."22 The psychologist William Ernest Hocking wrote: "Mysticism...might be described as an organic cultivation of reason--though not of the 'reason which can (as yet) be reasoned': its fruit is an insight without reasons (without palpable roots in other insights)...The vital function of mysticism is origination, the creation of novelty."23

Knowledge attained through mysticism is felt-knowledge. The mystic "knows" by means of attaining a state of deep feeling in which knowledge is revealed. In The Varieties of Religious Experience, William James wrote:

"Although so similar to states of feeling, mystical states seem to be to those who experience them also states of knowledge. They are states of insight into depths of truth unplumbed by the discursive intellect. They are illumination, revelations, etc."24 Margaret Smith noted that "mysticism is the immediate feeling of unity of self with God."25 "God may be well loved, but not thought" stated the anonymous author of The Cloud of Unknowing, one of the best known mystical statements. Similarly, the philosopher Henri Bergson wrote: "God is love and the object of love: herein lies the whole contribution of mysticism."26

The philosopher Louis Dupre discussed the contribution of an understanding of mysticism to a general philosophical understanding of personhood:

> Thus the ultimate message of the mystic about the nature of self-hood is that the self is essentially more than a self, that transcendence belongs to its nature as much as the act through which it is immanent to itself, and that a total failure on the mind's part to realize this transcendence reduces the self to less than itself. It is in this dynamic view of potentially unlimited mind that I find the most significant contribution to a philosophical understanding of self.27

Intuition and Logical Thought

Dewey sometimes said that we intuit the qualitiative domain, and writers about mysticism often refer to mystical thought as intuitive thought. The word intuition is used

frequently in philosophical, psychological and popular writing. It is usually used to denote a type of knowing that contrasts with logical knowing, and it is frequently left undefined.

In The Encyclopedia of Philosophy, the philosopher Richard Rorty gave "immediate apprehension" as the broadest definition of the term. He goes on to say that apprehension can mean either sensation or knowledge or mystical union and that immediate has at least six meanings. Therefore the term cannot be generalized. Yet he did go on to distinguish four main meanings of the word.28

Jerome Bruner began with Webster for a definition of intuition: "immediate apprehension or cognition." He contrasted intuitive thought with analytic thought, which involves explicit, step-by-step logical methods. He said that "intuition implies the act of grasping the meaning, significance, or structure of a problem or situation without explicit reliance on the analytic apparatus of one's craft."29 Bruner did not grapple with the philosphical issues underlying the concept. Instead he assumed that it is a valid mental process and concerned himself with its practical applications. Conclusions arrived at using the intuitive mode are subjected to the "usual methods of proof" to confirm or deny their validity. Intuition acts like a broad map, outlining new areas of thinking that we will later define and refine using logical methods. "In the end,

intuition by itself yields a tentative ordering of a body of facts that is self-evident, aids principally by giving us a basis for moving ahead in our testing of reality."30

The Italian psychiatrist Roberto Assagioli gave a similar description of the role of intuition in mental functioning:

> We will consider intuition mainly in its cognitive function, i.e. as a psychic organ or means to apprehend reality. It is a synthetic function in the sense that it apprehends the totality of a given situation or psychological reality. It does not work from the part to the whole-as the analytical mind does- but apprehends a totality directly in its living existence...To speak more directly, and without metaphor, of the true relationship between intuition and intellect, intuition is the creative advance towards reality. Intellect has, first, the valuable and necessary function of interpreting, i.e. of translating, verbalizing in acceptable mental terms, the results of the intuition. Second, to check its validity; and third, to coordinate and to include it into the body of already accepted knowledge.31

Carl Jung is widely known for his theory about the four functions of consciousness -- thinking, feeling, sensing and intuiting -- and about the personality types based on these functions. Intuition is seen by Jung as an *unconscious* process. To appreciate the meaning of this term in its fullest sense, I will briefly examine Freud's concept of the unconscious.

The concept of the unconscious is at the heart of psychoanalysis. As Freud said, "Psychoanalysis aims at and achieves nothing more than the discovery of the unconscious

in mental life."[32] Both Freud and Jung were dedicated to bringing the contents of the unconscious to light. Today this does not seem like a revolutionary concept. The existence of the unconscious is so widely understood and accepted that it is not really necessary to define it in technical writing and in literature. But in the early twentieth century, this was not so. Clinical psychiatry of the time recognized only a psychology of consciousness. Psychoanalysis was a radical intellectual movement defined by the postulation of the unconscious mind and its massive effects on conscious behavior.

The unconscious in the most basic sense refers to all of the contents of the mind of which we are not conscious or aware. One of the major concepts upon which Freud and Jung parted ways was the origin of the content of the unconscious. Freud's belief was clear: "*the Unconscious is the infantile mental life.*"[33] (his italics). In other words, all of the contents of the unconscious arise from early childhood experience which has been forgotten or repressed.

Jung's unconscious contains a personal aspect that has the same antecedent as Freud's. However, it also contains "all psychic material that lies below the threshhold of consciousness, material that is not necessarily acquired in childhood, forgotten or repressed."[34] Part of the unconscious is material that "has *not yet* reached the

threshhold of consciousness."35

Another part of Jung's unconscious is the collective unconscious.

> The contents of the collective unconscious have never been in consciousness and therefore have never been individually acquired, but owe their existence exclusively to heredity. Whereas the personal unconscious consists for the most part of complexes, the contents of the collective unconscious is made up essentially of archetypes.36

Archetypes are "definite forms in the psyche which seem to be present always and everywhere."37 He gave the example of the dual mother, or second birth.

Jung defined intuition as an unconscious process:

> Intuition is an unconscious process in that its result is the irruption into consciousness of an unconscious content, a sudden idea or 'hunch'...It is a process analogous to instinct, with the difference that whereas instinct is a purposive impulse to carry out some highly complicated action, intuition is the unconscious, purposive apprehension of a highly complicated situation.
>
> The primary function of intuition is "to transmit images, or perceptions of relations between things, which could not be transmitted by the other functions or only in a very roundabout way."38

Jung also defined intuition as "perception of the possibilities inherent in a situation."39 Since the contents of the collective unconscious are accessible to the intuition, we have the capacity to draw on the inherited wisdom of all of humanity, expressed as archetypes. The intuition of archetypes allows us prophetic foresight

because the archetypes "represent laws governing the course of all experienceable things."40

Thus Jung offered two different kinds of uses of intuition. The first is similar to that put forth by Bruner and Assigoli. Intuition unconsciously precedes analysis in our ordinary thought processes by seeing the totality, all of the possibilities, and the relationships between things. The second type of intuition allows us direct contact with our ancestral knowledge. This aspect has more in common with the religious and mystical belief that intuition directly contacts an underlying reality, but it is somewhat different than this.

In Awakening the Inner Eye, Intuition in Education, Nel Noddings and Paul Shore presented an historical view of intuition in philosophy and psychology before developing their own theory of intuition and relating it to educational practice. Noddings and Shore were careful to distance themselves from mystical views of intuition, those which claim a direct apprehension of the nature of ultimate reality, or the noumena behind phenomena. For them the ground-of-being is Schopenhauer's *Will as thing-in-itself*. We each feel the Will in ourselves as "ultimately and basically real, as that which is more directly known than anything else."41 Intuition informs the Will, but the Will does not depend only on intuition for its knowing.

We prefer to regard an individual's relation to the

> Will as neither knowledge nor pure affect but something clearly beyond either. In its manifestations it comes to light through intuition as feeling or sensibility or insight. Sometimes it comes to us as pure feeling, as a sure sense beyond knowledge that we are and that we are in relation to other forms of being beyond their manifestations. We shall not be concerned with this fundamental *being- to- being* contact, for it must by its very nature belong to the mystical. This does not mean that we deny such contact but only that we cannot be concerned with it in the present context. We are concerned, rather with occasions that approximate such pure contact: when we feel what the other feels, when we are on fire with inspiration, when we see with breathtaking clarity. Each such situation occurs in the phenomenal world; what happens guides us and seems properly a form of intuitive knowledge or of intuitive feeling; the understanding that flashes upon us may be used to trigger activity in the instrumental world. We accept such occurrences as real not only because people say that they have experienced them but, also, because there are products resulting from them: tender acts of human love, symphonies, paintings, mathematical theorems. Now, of course, both analytic thinking and physical activity have also been involved in producing products that can be observed by others. But we are here concerned with that intuitive activity that, under the influence of a Will striving to manifest itself, presents us with vivid representations. We shall continue to use the term Will as a shorthand designation for the dynamic center of self--the heart of being.42

Will, as *thing-in-itself*, is beyond force, but it can act as a force to direct and support all of our activities, including intuition. Intuition is seen as a function that contacts objects directly (non-cognitively) and represents them to the Will. Sometimes intuition is represented more as a feeling and sometimes more as a cognition. Every thought is derived from an intuitive representation. Intuition "precedes and makes possible the experience from

which knowledge is constructed."43

Thus Noddings and Shore proposed another theory of knowing that resonates with those presented above. All offer a type of knowing that is experienced as some type of feeling-intuition and that is the basis of logical, cognitive knowledge construction. Noddings and Shore stopped short of saying that we are "mystically" contacting ultimate reality, but what was important for them was that we feel as if we are. We feel as if we know with certainty what someone feels, and this inspires us to act with great compassion. We become charged with an inspiration that seems to come from somewhere beyond us, and this leads to a grand symphony. Our intuitive feelings become a basis of love, justice, beauty and creativity for Noddings and Shore, as well as for Tillich, Dewey, and myriads of religious and mystical thinkers.

Tacit Knowing and Explicit Knowing

In The Tacit Dimension Michael Polyani proposed "a novel idea of knowledge from which a harmonious view of thought and existence, rooted in the universe, seems to emerge."44 His starting point was the fact that "we know more than we can tell."45 Polyani suggested a tacit power that shapes and integrates bits and pieces of information, isolated perceptions and facts, into wholes capable of comprehension. "This shaping or integrating I hold to be

the great and indispensable tacit power by which all knowledge is discovered and, once discovered, is held to be true."46 We can talk about the knowledge we have attained, but we cannot really talk about the underlying tacit dimension that has formed it. We attend from the tacit dimension to the external appearance of another thing, and this results in our apprehension of the meaning of the thing.

Research and the creation of knowledge in any field cannot be explained without the tacit dimension. "For to see a problem is to see something that is hidden. It is to have an intimation of the coherence of hitherto not comprehended particulars."47 We have a "tacit foreknowledge of yet undiscovered things"48 that allows us not only to make new discoveries but also to appreciate the fruitfulness of them, the magnitude of their possible consequences.

> We feel sure of this because in contemplating the discovery we are looking at it not only in itself but, more significantly, as a clue to a reality of which it is a manifestation. The pursuit of discovery is conducted from the start in these terms; all the time we are guided by sensing the presence of a hidden reality toward which our clues are pointing; and the discovery which terminates and satisfies this pursuit is sustained by the same vision. It claims to have made contact with reality: a reality which, being real, may yet reveal itself to future eyes in an indefinite range of unexpected manifestations.49

For Polyani, real does not necessarily mean *tangible;*

it comes closer to meaning *significant*. "And since I regard the significance of a thing as more important than its tangibility, I shall say that minds and problems are more real than cobblestones."50 Reality is that which yields meaning.

Thus tacit knowing underlies explicit cognitive knowledge and allows us to uncover more and more of the hidden reality. Tacit knowing is the power that allows us to shape and make meaning of bits of logical information. All creation arises from the relationship between tacit and explicit knowing. This resonates with the theories of Dewey, Tillich, various "mystics", Bruner, Assigioli, and Noddings and Shore.

Polyani also wrote about the sense in which all knowledge, including scientific knowledge, is personal. To engage in the search for scientific knowledge is to be

> deeply committed to the conviction that there is something there to be discovered. It is personal, in the sense of involving the personality of him who holds it ...The discoverer is filled with a compelling sense of responsibility for the pursuit of a hidden truth, which demands his services for revealing it. His act of knowing exercises a personal judgement in relating evidence to an external reality, an aspect of which his is seeking to apprehend."51

Polyani said that the positivistic ideal of objectivity is clearly a failure, yet it is difficult to find a plausible alternative. He suggested that his own theory of tacit knowing is a preparation for this task.

Waves and Particles

The theories of the "new physics" have shaken this positivistic notion of objectivity, this Cartesian split between the person and the thing observed. Fritjof Capra has written about ways in which the discoveries of the "new physics" parallel the wisdom of ancient mystics concerning the nature of the universe and human understanding.

"Classical" physics proposed that matter consists of small, solid particles, whose behavior could be explained and predicted by mechanistic laws. These laws were shattered when it was demonstrated that atoms were not solid but consisted mostly of space in which minute particles moved. Then quantum theory showed that these particles were not even solid, but more like "abstract" entities that have a dual aspect. Depending on how we look at them, they appear sometimes as particles, sometimes as waves.

> The apparent contradiction between the particle and the wave picture was solved in a completely unexpected way which called in question the very foundation of the mechanistic world view--the concept of the reality of matter. At the subatomic level, matter does not exist with certainty at definite places, but rather shows 'tendencies to occur.' In the formalism of quantum theory, these tendencies are expressed as probabilities and are associated with mathematical quantities which take the form of waves. This is why particles can be waves at the same time. They are not 'real' three dimensional waves like sound or water waves. They are 'probability waves,' abstract mathematical quantities with all the characteristic properties of waves which are related to the probabilities of finding the particles at particular points in space and at

> particular times. All the laws of atomic physics are expressed in terms of these probabilities. We can never predict an atomic event with certainty; we can only say how likely it is to happen.
> Quantum theory has thus demolished the classical concepts of solid objects and of strictly deterministic laws of nature. At the subatomic level, the solid material objects of classical physics dissolve into wave-like patterns of probabilities, and these patterns, ultimately, do not represent probabilities of things, but rather probabilities of interconnections. A careful analysis of the process of observation in atomic physics has shown that the subatomic particles have no meaning as isolated entities, but can only be understood as interconnections between the preparation of an experiment and the subsequent measurement. Quantum theory thus reveals a basic oneness of the universe. It shows that we cannot decompose the world into independently existing smallest units. As we penetrate into matter, nature does not show us any isolated 'basic building blocks', but rather appears as a complicated web of relations between the various parts of the whole. These relations always include the observer in an essential way. The human observer constitutes the final link in the chain of observational processes, and the properties of any atomic object can only be understood in terms of the object's interaction with the observer. This means that the classical ideal of an objective description of nature is no longer valid. The Cartesian partition between the I and the observed, cannot be made when dealing with atomic matter. In atomic physics, we can never speak about nature without, at the same time,speaking about ourselves.52

The "ground of being", using the metaphors of this "new physics," consists of wave-like patterns of probabilities of interconnections. Individual particles can be "seen" to rise out of this background, but the particles do not lose their wave-like patterns. They are not isolated building blocks, but parts of the whole. The classical notion that

the world is composed of independent parts is reversed. Quantum interconnectedness becomes the ultimate ground for particular forms. This whole process does not occur apart from the observer of the process. The existence of the observer is necessary to account for the properties of the object observed. In other words, things do not exist independently of our perception of them, or at least they do not exist in the same ways that they exist when we perceive them. We are a part of the entire interconnected process.

Another concept of the "new physics" relevant to this discussion is that of complementarity, introduced by the atomic physicist Niels Bohr. The principle of complementarity states that the nature of reality is such that several different but complementary descriptions of a particular aspect of it may be necessary to give a full desciption. For example the particle picture and the wave picture are each only partially correct and both are needed to give a complete description of atomic reality. Bohr applied the principle of complementarity to other areas than physics, such as psychology.

It is obviously possible to use the metaphors of physics in relationship to modes of thinking, and I intend to do that. However, I want to make it clear that I am using these as metaphors. It is not valid to claim that knowledge about the physical universe can be applied

directly to the mind. But quantum physics does show that these two things can never really be separated. And the appropriateness of the metaphorical application is striking. We could say that the wave properties of the universe, the underlying wholeness, are intuited by qualitative thought while quantitative thought apprehends the particle properties. In ordinary life most people are aware of neither the underlying wholeness nor our qualitative thought process.

Right Brain Thinking and Left Brain Thinking

In 1972 Robert Ornstein published a book, The Psychology of Consciousness, which contained the essay "Two Sides of the Brain." This essay prompted the massive popularization of the idea that right side of the brain is responsible for holistic, intuitive thought whereas the the left side of the brain takes care of linear, logical thought. Ornstein suggested that these two basic modes of consciousness are physically located in the two hemispheres of the brain. If this were clearly true, the qualitative-quantitative thinking distinction I'm making would have found a home in the body.

The most commonly reported research based distinctions between the functions of the hemispheres are the following: left hemisphere -- language, mathematics, logic, sequential information processing; right hemisphere -- spatial

orientation, musical orientation, some emotional functions, holistic thought, synthetic information processing. On initial inspection, this seems to support some overall delineation into two basic modes of consciousness.

However, there are two major reasons for not claiming that the two hemispheres represent the rational and the intuitive modes of knowing. The first is simply that the data is not all in yet. In his 1987 book The Mind's New Science Howard Gardner wrote:

> Many sentences have been written about the optimal way in which to describe the dominance patterns of the two hemispheres. Characterizations range from the mundane (language in the left, spatial function in the right) to the grandiose (science or rationality in the left, art or intuition in the right) to a distinction that captures current debates in neuroscience (localized function in the left hemisphere, synthetic or holistic functioning in the right.) The precise characterization of the functions of the two hemispheres--or, more probably, determination that such a neat dichotomization is simply not possible--awaits the results of further studies...Yet whatever the mission of each isolated hemisphere, there is clearly a clearly dynamic interaction between the two hemispheres. When the left hemisphere is aroused (for instance, by the sounds of language), it promotes certain kinds of analytic and linguistic functions. In contrast, arousal or stimulation of the right hemisphere brings spatial and holistic functions to the fore...53

The second reason is that if we do want to make a summary delineation, subject to change as more data is available, it would seem more accurate to say, as psychologist Ken Wilbur does, that the left hemisphere specializes in sequential-digital-logical thought whereas

the right hemisphere specializes in pattern-analogic-spacial thought. Although this certainly seems to bear a relationship to the qualitative/quantitative distinction, it is not precisely clear what the relationship is.

Separate and Connected Knowing: "Masculine" and "Feminine" Modes

The psychologist Carol Gilligan has written extensively about the absence of women as subjects in the research upon which most predominating psychological theories are based. Several theorists, including Gilligan, David Bakan, and Nancy Chodorow have suggested as well that psychologists have studied characteristics associated in the Western tradition with the more valued "masculine" rather than the "feminine." Thus we have a body of knowledge focused on autonomy and independence, abstact logical thought and the morality of abstract justice. We know little about empathy, interdependence, intimacy, and personal, connected ways of thinking.

In Women's Ways of Knowing, Belenky et al wrote:

> Nowhere is the pattern of using male experience to define the human experience seen more clearly than in models of intellectual development. The mental processes that are involved in considering the abstract and the impersonal have been labeled 'thinking' and are attributed primarily to men, while those that deal with the personal and interpersonal fall under the rubric of 'emotions' and are largely relegated to women.54

Both Gilligan and Belenky et al spoke of "separate and

connected knowing." Gilligan's concept refers more specifically to the relationship between self and other, whereas Belenky et al refer to the relationship knowers and the known, whether object or person.

I will draw on Belenky et al's concept since it relates directly to the theory that I am developing here. Separate knowing is "based upon impersonal procedures for establishing truth."58 It is based on analytic, critical thought processes, on traditional reasoning processes, on objectivity, on doubt. In connected knowing, on the other hand, truth emerges through care. Connected knowing is subjective, based on personal knowledge, on the capacity for empathy with the known, on a sense of connection between self and other, self and object, self and world.

It is clear that the characteristics of connected knowing overlap with qualitative thought. However, there is a difference in the sense in which these concepts are used by Belenky et al. The studies upon which this theory is based were a series of interviews conducted with adult female learners. The mode of connected knowing and separate knowing are presented more as different learning styles than as two aspects of the basic thought process. However, I believe that there is a strong connection between these understandings that merits further examination.

Knowing and Being

A direct relationship between the qualitative thought process and a prior given reality, the "ground of being" or "God" or "the wave properties of the universe," has been suggested by some of the theories described above. Plato, Aristotle, and Hegel believed that there is a depth of knowing inherent in the structure of the mind that allows us to understand reality directly. Tillich stated that ontological reason, powered by love, *is* the ground of being. The concept of mysticism is based upon a sense of unity with the Absolute or God in which one experiences the basis of all knowing. Some theories of intuition contain the belief that intuition allows us to contact reality directly. Other theorists discussed above do not make a direct claim for an ultimate reality but suggest that there is a type of thinking that at least makes us *feel* connected to a ground of being. Polyani's tacit knowing connects us with a hidden reality that *is* real simply because it yields meaning. Noddings and Shore do not know if we can contact ultimate reality directly, but what is significant is that intuitive knowing makes us feel as if we do. For Dewey, the context for human knowing is the qualitative background, the feeling of reality as being an inclusive but unlimited whole.

Is there an ultimate ground of being that we experience directly through what I am calling "qualitative thought," or does the process of qualitative thought merely

give us access to a wider consciousness, a wider frame of reference? Does qualitative knowing rise directly out of being? And does this knowing automatically give us access to some kind of ultimate reality? All of the theories discussed above seem to have in common the assumption that qualitative thought (ontological thought, mystical thought, intuition, tacit knowing) is automatic, relatively unconscious and always a part of the entire thought process. In this sense we could say that these theories suggest that knowing does rise out of being, in the sense of an individual human being.

But does being imply Being in some ultimate sense? This is where the theorists divide. Clearly one can offer no conclusive "proof" one way or another. The theoretical concept of "qualitative thought" is useful in either case.

Qualitative and Quantitative Thought Revisited

I have presented a number of theories that I believe express the same basic understanding of the process of thinking. I will review the key elements of this understanding, suggesting my own beliefs and making explicit any contradictions or differences among the variety of ideas outlined.

1. There is a mode of knowing that is prior to logical, intellectual, cognitive thought processes. This

mode of knowing is our most direct experience of reality, whether that reality is seen as "ultimate" reality or personal reality, or some combination of both. Although I am calling this mode of knowing "qualitative thought," it is not thought in the way in which that word is generally used. It is experienced more as an emotion or an intuition.

2. Qualitative knowing precedes and makes possible logical or quantitative thought. Every explicit thought is derived from an an underlying, prior feeling-intuition.

3. Qualitatitive thought has a shaping and integrating power that provides the *meaningful context* for quantitative thought. Qualitative thought energizes and guides quantitative thought along lines that allow us to make explicit sense of our experience. Just as in quantum physics where particles have no meaning as isolated entities but only have meaning when seen against the framework of interconnected waves, quantitative thought only has meaning when seen against the background of qualitative thought.

4. Quantitative thought is a secondary thought process which gives us indirect knowledge about our experience. This information is necessary for complete understanding. Quantitative thought defines and delineates experience by dividing it into distinct objects, properties, names and relationships.

5. We cannot fully understand self and world without quantitative thought just as we cannot make meaning of

quantitative information without the underlying qualitative thought. This is analagous to the complementarity principle of physics: the nature of reality is such that several different but complementary descriptions of a particular aspect of it are necessary to give a full description.

Qualitative and quantitative thought together allow us to make meaning of our experience. Taken in its fullest sense this process of making meaning is the creative process.

Footnotes

1. Harold Rugg. Imagination. New York: Harper and Row, 1963. p. 197-8.

2. John Dewey. Art As Experience. New York: C.P. Putnam's Sons, 1958. p. 163.

3. John Dewey. Philosophy and Civilization. New York: Minton, Balch and Co., 1931. p. 99.

4. Ibid. p. 100.

5. John Dewey. Art As Experience. Op.cit. p. 37.

6. Ibid. p. 119.

7. Ibid. p. 120.

8. Grey and LaViolette. Brain Mind Bulletin. 7,6, 1982.

9. John Dewey. Art As Experience, Op.cit. p. 193.

10. William James. Essays in Radical Emperialism. New York: E.P. Dutton and Co., Inc., 1971. p. 23.

11. Ibid. p. 41.

12. Ibid. p. 49.

13. William James. Op.cit. p. 79.

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CHAPTER THREE

THE MAKING OF MEANING: THE CREATIVE PROCESS

> The making and surrendering of meaning, it is suggested, is a 'universal' activity; but not because Someone remembers to make each person this way. It is universal because it is a single activity, there where the dance is, an activity which may itself be the Someone.1

The Making of Meaning as Creative Experience

During this century the view that the making of meaning is the central activity of the human being has began to influence the fields of philosophy and psychology. Between 1910 and 1930 "Gestalt" psychologists Koffka and Kohler challenged traditional views of perception by suggesting that even the simplest visual perception involves a creative and personal insight. Existential philosophers such as Sartre and Frankl posited the individual human being as the source of all ideas, ideals, values and institutions, the creator of all "reality". John Dewey and Jean Piaget theorized about the development of our ability to make meaning and the change in the process through time in an individual life-span.

I believe that to be a human being is to desire meaning and to attempt to make meaning, or more accurately, as psychologist Robert Kegan said: "Thus it is not that a person makes meaning, as much as that the activity of being

a person is the activity of meaning-making."2 There are myriad variations and levels of depth of meaning-making, from habitual perceptions or the dry memorization of word meanings for a vocabulary test to profound experiences of a sudden grasping of the meaning of one's existence, "conversions" that literally change one's life.

The making of meaning is always an emotional and intuitive as well as a cognitive experience. Or, in the terms I developed in the last chapter, the making of meaning involves both quantitative and qualitative thought since all thinking involves both a qualitative and a quantitative dimension. Thoughts vary along the ranges of the strength of intensity of the qualitative, and the complexity of the quantitative. Thinking that is strongly rooted in the qualitative and varied and complex in the quantitative allows full participation in life; it is creative, which is to say that it is involved in the business of making, inventing, producing and discovering new forms, fresh avenues of understanding and expressing meaning.

Creative experience involves bringing something new into being, discovering a new form that meaningfully conveys information. We can be creative in any number of ways, such as words, perceptions, mathematical symbols, artistic symbols, body movements or human relationships.

A creative experience is not necessarily one that has never been experienced by any one else before. It is

creative because it contains meaning that is fresh and new for a particular individual. I can perceive the tree outside my window habitually without really experiencing it, or I can perceive it creatively, a novel and emotional experience every time I look at it, an experience that feels meaningful. Each three year old child who discovers that blocks or stones stack one on top of each other to make towers is making a tremendously exciting discovery, even though this discovery has been made millions of times throughout history and will be made millions more. Whether or not the form a person uses is totally new historically may be significant in the long run, but in the esthetic sense it is our own personal discovery of it that is important.

All types of experience are potentially esthetic, including intellectual experience. Esthetic experience is characterized by its immediate quality. Ideas, no matter how complex, must be immediately and intuitively felt and sensed if they are to be fully understood. Creative thinking is with relations of qualities, not just with signs and symbols. Intellectual experience is different from artistic experience only in that it uses signs and symbols to express itself instead of physical materials. Both are based on emotional, imaginative thought. Scientific, philosophic and artistic creativity all proceed by "means of meanings that exist immediately as feelings having

qualitative color."3

In Art and Experience Dewey was concerned with esthetic or creative experience and thought, in contrast to experience and thought that has become mechanical, lifeless and routine. For Dewey the esthetic experience was one that combines qualitative and quantitative thought. He saw esthetic experience as natural, and ordinary experience as the result of the artificial conditions of modern times that have separated art from life. Dewey believed that human beings are "programmed" so that all thought and experience should be creative, characterized by full immersion in the qualitative and appropriate expression in the quantitative. In other words, all thought and experience is intended to feel meaningful. However, this does not characterize the experience of most people in the world today. Creative thought and experience have become separate from everyday living. At one time the central function of the arts and religion was to "intensify the sense of immediate living." For example, domestic utensils were works of art, and dancing and theater were a part of religious and civic celebration. Dewey believed that the rise of capitalism, industrialization and technology, as well as increasing compartmentalization of occupations and interests, have separated art from life. Dewey was trying to recover "the continuity of esthetic experience with normal processes of living."4 He began by attempting to understand those

processes. What are the essential operations of a natural life?

All of life consists of the interaction of organism with environment. The gap between organism and environment must be narrow enough to keep the organism alive but wide enough to support growth. Growth occurs when the organism encounters tension in the environment, and in reacting to it, forms a new equilibrium and a greater order around a more extensive balance of energies. This kind of internally developed order brings a harmonious feeling to living creatures. The constant rhythm of disequilibrium with the environment and then recovery of union with it is characteristic of all of life, but humans become conscious of it. This consciousness is the basis of the esthetic or creative quality. It is the basis of meaning.

Dewey said that there are two kinds of worlds in which esthetic experience could not occur:

> In a world of mere flux, change would not be cumulative; it would not move toward a close. Stability and rest would have no being. Equally is it true, however, that a world that is finished, indeed, would have no traits of suspense and crisis, and would offer no opportunity for resolution. Where everything is already complete, there is no opportunity for fulfillment...Because the actual world,. that in which we live, is a combination of movement and culmination, of breaks and reunions, the experience of a living creature is capable of esthetic quality...The moment of passage from disturbance to harmony is that of intensest life.5

Alfred North Whitehead also discussed the necessity for

both order and expressive change. In deciding which civilizations are both stable and creative, Whitehead said: "Order is not sufficient. What is required is something much more complex. It is order entering upon novelty; so that the novelty is always reflected on a background of system."6

Dr. Ilya Prigogene won the 1957 Nobel Prize in physics for his theory of dissipative structures. This theory explains how creation comes from chaos. Prigogene said that all life in the universe is part of a dynamic state that fluctuates between rest and perturbation. Periodically, living sysems become so perturbed that they seem to dissipate, and in fact, their existing form is destroyed. At that point they either die altogether or are recollected in a less frivolous state, one with a more coherent, "higher" order of organization. The greater the turbulence, the more complex the structure, the more often it seems to go into perturbation.7

These three theoretical constructs illustrate the idea that the process of esthetic or creative experience has parallels at all levels of life, from subatomic to societal. What is potentially unique about the esthetic experience of the human being is the consciousness of the meaning of the experience.

Experiences all consist of receptive and active phases, which Dewey referred to as "undergoing" and "doing". In an

authentic experience, these phases are united. William James compared the course of a conscious experience to alternating flights and rests of a bird, which are intimately connected with one another: "Like a bird's life (thought) seems to be made of an alternation of flights and perchings."8

The "undergoing" or resting phase corresponds to qualitative thought while the "doing" or active phase corresponds to quantitative thought. However, in actuality these phases are so united as to be inseparable. In an interview on the day before he died, Niels Bohr said this his understanding of quantum mechanics was greatly influenced by this idea of James. The "flights and perchings" as well as the inablity to separate the two seem to suggests Bohr's theory of the behavior of atomic particles as well as the principle of complementarity.

When applied to thinking, the principle of complementarity suggests that several different but complementary descriptions of thought are necessary to give a full description. These different but complementary descriptions have been named here qualitative and quantitative thought. Not only are they both necessary to make meaning of our experience, but they are usually virtually inseparable in terms of the way that we experience them. They are the two intertwined components of meaning making, of our natural human ability to transform raw

experience into our own unique creative existence.

Esthetic experience is the conscious fulfillment of the human being in her struggles and achievements in the world. For fulfillment to occur, successive parts must flow together, must comprise a unity: "There are no holes when we have an experience."9 The unity is constituted by the qualitative background, which unites emotion, senses, perception, intellect, body, purpose, interest and action in a single experience, the transformation of a form. The form may be be a thought or concept, as in the intellectual experience; it may be the body, as in athletics, dance or theater; it may be material substance, as in painting, sculpture or architecture; or it may be a relationship with a living being. In any case, esthetic experience implies full participation in and communion with the world around us. Self and object cooperate so fully in experience that each disappears. Dewey quoted Goethe: "Nature has neither kernel nor shell."10

Another way of saying this is that qualitative thought provides the underlying unity that guides creative production in the quantitative domains. Or in Polyani's words, tacit knowing shapes and integrates explicit creative discoveries. Or in Capra's words, intuition guides logic in the creative process.

Every complete aesthetic experience develops an appropriate expressive form. Form is inherently connected

with substance in esthetic experience because it is not imposed from without but rather created from within as the most perfect consummation of a particular experience available to its creator. Technique is the skill with which the inner form is outwardly displayed. Advances in technique grow out of the need for new kinds of experience or out of a desire to express a novel kind of experience.

The Creative Process

The term "the creative process" is generally used in a more specific sense than the way in which I have referred it. I have suggested that by its very nature all experience is potentially creative experience. I have also suggested some of the forces that interfere with this natural process.

But now I am referring to the use of the term as the process that results in the production of some definite, tangible creative product: a symphony, a mathematical model, a child's painting, a recipe, a new solution to a human relations dilemma, etc. This creative processs has been extensively pondered on by a variety of philosophers, artists, scientists and psychologists during the past several thousand years. Plato and Aristotle both speculated about it; such artists as Blake, Wordsworth, Coleridge, Shelley, Keats, Henry James and Van Gogh pondered it; Einstein and Poincare are among scientists and mathemeticians who have instrospected about their own

creative processes; and in the field of psychology, Arthur Koestler, Jerome Bruner, Rollo May, Carl Rogers and Howard Gardner are among many who have had a good deal to say about the subject in recent years.

Naturally there is a great variety in theoretical orientations and conclusions about the creative process. Yet the differences allow certain widespread agreements to stand out vividly. Most theorists agree that creativity is based on these two kinds of thought processes: conscious, logical, systematic ones and unconscious, inspired, intuitive ones, those which I am calling qualitative and quantitative thought. One of the more fascinating aspects of recent creativity literature is the reporting of careful analysis of the accounts of hundreds of artists and scientists concerning their own individual creative process. The results of this analysis have been synthesized into general agreement on four steps in the creative process of adults working on a problem in a field in which they are already proficient. The steps are the following: 1) a preparatory period of conscious effort to grasp the solution to a problem, 2) a period in which the person "gives up" and turns to another activity, theoretically allowing deeper parts of consciousness to work on the problem, 3) the "flash of insight" in which the solution to the problem is intuitivly understood, and 4) a period of verification, testing, and rational understanding.

Capra wrote about scientific research: "The rational part of research would, in fact, be useless if it were not complemented by the intuition that gives scientists new insights and makes them creative. These insights tend to come suddenly and, characteristically, not when sitting at a desk working out the equations, but when relaxing, in the bath, during a walk in the woods, on the beach, etc. During these periods of relaxation after concentrated intellectual activity, the intuitive mind seems to take over and can produce the sudden clarifying insights which give so much joy and delight to scientific research."11

The writings of great theoretical mathematicians and physicists abound with examples of how intuitions guided their discoveries. Einstein had great gifts in both the fields of mathematics and physics; he wrote about his decision to pursue physics: "...my intuition was not strong enough in the field of mathematics...In (physics) however, I soon learned to scent out that which was able to lead to fundamentals and to turn aside from everything else, from the multitude of things that clutter up the mind and divert it from the essential."12

The mathemetician Henri Poincare wrote about the process of creation in mathematics:

> In a word, my memory is not bad, but it would be insufficient to make me a good chess player. Why then does it not fail me in a difficult piece of mathematical reasoning where most chess players wouldlose themselves? Evidently because it is

> guided by the general march of the reasoning. A mathematical demonstration is not a simple juxtaposition of syllogisms, it is syllogisms *placed in a certain order,* and the order in which these elements are placed is much more important than the elements themselves. If I have the feeling, the intuition, so to speak, of this order, so as to perceive at a glance the reasoning as a whole, I need no longer fear lest I forget one of the elements for each of them will take its allotted place in the array, and that without any effort of memory on my part.
>
> We know that this feeling, this intuition of mathematical order, that makes us divine hidden harmonies and relations, can not be possessed by everyone. Some will not have either this delicate feeling so difficult to define, or a strength of memory and attention beyond the ordinary, and then they will be absolutely incapable of understanding higher mathematics. Such are the majority. Others will have this feeling only in a slight degree, but they will be gifted with an uncommon memory and a great power of attention. They will learn by heart the details one after another; they can understand mathematics andsometimes make applications, but they cannot create. Others, finally will possess in a less or greater degree the special intuition referred to, and then not only can they understand mathematics even if their memory is nothing extraordinary, but they may become creators and try to invent with more or less success according as this intuition is more or less developed in them.13

Some examples from the writings of artists show the same process at work. In a letter to his brother, Van Gogh said: "emotions are sometimes so strong that one works without knowing that one works, and the strokes come with a sequence and coherence like that of words in a speech or letter."14 In analyzing the process of musical composition as discussed by famous composers, Howard Gardner presented Aaron Copland's view as representative:

> The sole element of the mystery, in Copland's view, is the source of an initial musical idea. As he sees it, themes initially come to the composer as a gift from heaven, much like automatic writing. And that is the reason why many composers keep a notebook around. Once the idea has come, the process of development and elaboration follows with surprising naturalness, eventually with inevitablity, thanks in part to the many techniques available as well as to the accessibility of structrual forms or "schemes" that have evolved over the years.15

The poet Amy Lowell described the poetic process in similar terms:

> Let us admit at once that the poet is something like a radio aeriel--he is capable of receiving messages on waves of some sort; but he is more that an aerial, for he possesses the capacity of transmuting these messages into those patterns of words we call poems.
>
> It would seem that a scientific definition of a poet might put it something like this: a man of an extraordinarily sensitive and active subconscious personality, fed by, and feeding, a non-resistant consciousness. A common phrase among poets is, 'It came to me.' So hackneyed has this become that one learns to suppress the expression with care, but really it is the best description I know of the conscious arrival of a poem.
>
> Sometimes the external stimuli which has produced a poem is known or can be traced. It may be a sight, a sound, a thought, or an emotion. Sometimes the consciousness has no record of the initial impulse, which has either been forgotten or springs from a deep, unrealized memory. But whatever it is, emotion apprehended or hidden, is a part of it, for only emotion can rouse the subconscious into action.16

Scientists, poets, musical composers, mathematicians, and artists have all described the creative process peculiar to them as a powerful underlying feeling or

intuition, a qualitative thought, that transmits some kind of information that is translated into the quantitative language of the particular discipline.

Imagination

Two of the definitions of imagination given in Webster's Dictionary are these: 1) "the act or power of forming a mental image of something not present to the senses or never before wholly perceived in reality; 2) creative ability." Creativity and imagination are thus linked by definition; they are also closely linked in most theories about creative process. In Imagination Harold Rugg says: "Imagination is the instrument of discovery. The poet and the scientist agree. Discovery is conceiving in imagination, or, more succinctly, discovery is imagined conception."17 In writing about the creative process Arthur Koestler said: "Artists treat facts as a stimuli for imagination, whereas scientists use imagination to coordinate facts."18

Imagination can be experienced as visual images, as auditory sounds, as tactile or kinesthetic experiences, or even as tastes or smells. Albert Einstein described his process of imagination as it linked the qualitative and the quantitative:

> The words or the language, as they are written or spoken, do not seem to play any role in my

> mechanism of thought. The psychical entities which seem to serve as elements in thought are certain signs and more or less clear images which can be "voluntarily" reproduced and combined.19

Imagination allows us to hold a mental image of a thing or event not present before our physical senses. This thing or event can be an actual remembered one or one not yet created, existing only as a picture in the mind. Thus imagination is the process that allows past and future to impact on the present. All esthetic experience involves the use of imagination.

In the terms we have been using, imagination links qualitative and quantitative thought. Thoughts begin as emotional, intuitive, qualitative experiences. They are translated into concrete forms through the use of imagination.

Esthetic Experience and Morality

By definition qualitative thinking gives us the capacity to feel a profound sense of connection between self and the entire world outside self. This sense of connection can be a part of a feeling of caring and commitment to all of life, as well as specific manifestations of life. I do not believe that the feeling of qualitative connection is sufficient to guarantee moral feeling and action, but I do think that the presence of a strong sense of qualitative knowing can be one important component

of commitment to the welfare of others.

The imagination can also contribute to moral sympathy. The poet Shelley suggested that "the great secret of morals is love, or a going out of our nature and the identification of ourselves with the beautiful which exists in thought, action or person not our own. A man to be greatly good must imagine intensely and comprehensively."20 In this sense sympathy through imagination can be seen as *one* of the roots of friendship and a just society. Dewey said that morals are shared values, and since both esthetic experience and morality are based on felt values, he believes that they are nurtured simultaneously.

Herbert Read believed that esthetic experience is a tool that helps the individual to achieve an inner discipline combining organic growth, harmonious form, and the self-knowledge that leads to selflessness. He asserted that esthetic experience reconciles individual uniqueness with social unity by enhancing awareness that self-expression arises from organic wholeness of community. He argued that the purpose of education should be the same as that of esthetic experience, "to preserve the organic wholeness of man and of his mental faculties, so that as he passes from childhood to manhood, from savagery to civilization, he nevertheless retains the unity of consciousness which is the only source of social harmony and individual happiness."21

I believe that esthetic experience contributes to morality in the ways suggested by Dewey and Read. I also recognize that there are many other contributing factors outside of the major focus of this dissertation, such as critical awareness of the roots of injustice, and strength of personal will and commitment. But I think that this theory of the development of creative thinking can contribute to an understanding about the way human beings can live together harmoniously.

Creative Imagination in Children

The creative imagination is commonly recognized as being strongly present in two groups of people: creative geniuses such as Einstein, Poincare, Van Gogh, Aaron Copeland, and Amy Lowell; and young children. As Howard Gardner, who studies children's creativity, said: "The preschool years are often described as a golden age of creativity, a time when every child sparkles with artistry... Step into almost any nursery school and you enter a world graced with the imagination and inventiveness of children."22

What is the link between the creative imagination of childhood and the imagination of later adult genius? Edith Cobb spent many years searching for the childhood roots of genius in autobiographies of well-known creative adults. In The Ecology of Imagination in Childhood she suggested that

there is an "ecology of imagination in childhood from which all later creative activities evolve."23 Since it is the genius who is responsible for leaps in human consciousness, it is the creative imagination of childhood that is the root of human evolution.

What is the relationship of creative thinking to the human developmental process? How and when do qualitative and quantitative thought develop and combine? Why do most children seem to lose their ability to think creatively as they grow older? Why are exceptional adults able to retain the power of the creative imagination? These are some of the questions that I will address in the next chapter.

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CHAPTER FOUR

QUALITATIVE AND QUANTITATIVE THOUGHT AND THE PROCESS OF HUMAN DEVELOPMENT

> Person is understood to refer as much to an activity as a thing--an ever progressive motion engaged in giving itself a new form. 1

> For, unlike all other animal species, the human child displays a spontaneous striving to go beyond biological fulfillment and maturation and to add form and novelty to the environment. 2

> Every child is an artist. The problem is how to remain an artist once he grows up. 3

Human Development as an Idea

What do we mean when we talk about human development? The concept of development suggests growth, progress and evolution. In Religious Education Development, Gabriel Moran suggested that this is a decidedly modern and Western view. In fact, he said: "The very existence of the word *modern* is probably linked to a doctrine of progress."4 Ancient philosophers saw development as proceeding backward and downward or in a circle, as well as forward and upward. Kegan called developmentalism "the cultural symbolic of our time." 5 The modern meaning of development implies not only progress but evolution through predictable stages. As Kegan put it: " organic systems evolve through eras according to

regular principles of stability and change."6 The idea of development applied to human beings results in the concept that we evolve from birth through predictable stages.

Main Schools of Human Development

Two distinct approaches currently dominate the field of human development. The psychoanalytic approach to personality development once reigned supreme but in recent years has lost much of its power in popular and academic circles. The most prominant psychoanalytic developmentalists are Freud and Erik Erikson.

Freud's developmental theory is based on the concept of a biological energy, libido, present at birth in a fixed amount and moving to different areas of the body -- mouth, anus, genitals -- in a predetermined timing that fixes the psychological stages of the human being. Intense emotions arise from the relationship of the libidinal energy at any given stage to the human beings in close proximity. Freud saw thought as largely subject to this intense emotional experience. The massive unconscious content of the adult mind that Freud postulated results largely from the repression of infantile thoughts commingling with overpowering emotion.

Erickson retained the concepts of libido and the dominance of emotionbut made social experience primary to biology in determining the course of development.

Erickson's stages are based on the outcome of a psycho-social issue dominating each period of development. For example, in the first stage the infant struggles to attain "basic trust" of the world. Whether the outcome is trust or mistrust depends on the infant's social experiences.

For Freud, Erickson and other psychoanalytic theorists, emotion is the critical force in the developing human being. The mind is subservient to emotion as the organizing energy.

The other major approach to human development, the cognitive developmental approach, asserts that the mind is the major organizing force in the developmental process. Piaget, the dominant theorist of this approach, charted stages of mental growth resulting from the interaction between the internal structure of the mind at any given time and the outer environment. In other words, he believed that thinking develops in stages through the dialectic between the inquiring human mind and unresolved questions in the environment.

When Piaget theorized that thinking is the organizing and developing force in all human experience, he meant what I am referring to as *quantitative* thinking, the ability to abstract reality into symbols, to analyze it into smaller component parts, to delineate it into objects, properties, distinct names, relationships and so on. Piaget saw this type of thinking as leading and controlling emotional growth, social growth, and moral growth. He viewed the

developing human being as basically rational, a philosopher or scientist.

Many psychologists have followed in Piaget's footsteps, building corollary theories based on his stages of development. For example, Lawrence Kohlberg theorized about moral development; James Fowler wrote about the development of faith; Howard Gardner is concerned with esthetic development. In these theories, cognition leads and all else follows. The development of morality, faith or esthetic ability in any person can proceed no farther than that person's level of ability in quantitative thinking.

The Hierarchical Nature of Developmental Theory

The cognitive developmental perspective is a hierarchical one. Development is seen to proceed through sequential, ordered, increasingly complex stages. As Kohlberg and Mayer explained in "Development as the Aim of Education," "The educational goal is the eventual attainment of a higher level or stage of development in adulthood, not merely the healthy functioning of the child at the present level...A more developed psychological state is more valuable or adequate than a less developed state."7 The child's view of the world becomes more accurate, in a scientific sense, as development proceeds.

If the ultimate criteria for judging the objective truth and thus the validity of any mental, moral, religious

or esthetic experience is its place on the cognitive hierarchy, then childhood experience is always subtly denigrated. This remains true despite the great contribution of cognitive psychology in demonstrating the uniqueness of each stage of development.For a child does not come into the world knowing how to quantify it. Her increasingly complex ability to do so, in many different forms, is evidence of mastery of critical developmental tasks. However, if a certain level of quantifying ability is taken as the "entrance requirement" for a more valuable and adequate cognitive or moral or religious or esthetic experience, then the experience of childhood will never be viewed as complete.

Psychoanalytic stage theories of development are also hierarchical. If the intended outcomes occur, the intense libido-powered emotions of infancy and early childhood increasingly come under the control of the ego and superego. Desires are tamed in the service of society, although the danger for regresssion to the intense emotional desires of infancy is never completely vanquished. In psychoanayltic developmental theory, as well as cognitive developmental theory, we have the capacity to become "better" as we proceed toward adulthood.

But this idea follows inherently from the modern meaning of development as progress. In this sense, development is inherently hierarchical.

Relevant Alternative Theories of Development

There are some theories of human development that attempt to come to terms with human knowing in a broader sense than the quantitative one. Some of these cast a different light on the hierarchical nature of human development. Since a complete review of this literature is not possible in the scope of this chapter, I want to briefly discuss several of the most relevant.

In The Evolving Self Robert Kegan presents a theory of the psychology of human development that integrates the Piagetian cognitive perspective with the Freudian psychoanalytic perspective, or, to put this in other terms, personal meaning-making as thought, viewed from the outside, with personal meaning-making as feeling, felt from the inside. Kegan noted that no psychology has ever successfully integrated these two components. He certainly has begun the process. He wrote:

> Psychoanalytic theory is sometimes thought of as a theory about affect, and cognitive-developmental theory as a theory about cognition; but in truth each is a theory of both, and each makes one dimension the master of personality and the other the slave.8

Kegan's theory does not exactly overlap with mine since he was conceptualizing about personality development as a whole, whereas I am dealing with the development of thinking. As such I write about the emotions underlying

thought but not about emotional development as an aspect of personality. That these are not really separate is true and is also one of Kegan's major theses. It is more a matter of the particular focus or lens one is using to view the human being. My lens in this dissertation is somewhat different than Kegan's.

Kegan viewed "person" as synonomous with "creative activity," as quoted in this chapter heading. He quoted Hegel as saying: "The spirit is never at rest but always engaged in ever progessive motion, in giving itself a new form."9 Kegan said that it is this motion he wrote about. It is the activity inherent in human *being*. A human being is inherently a maker of meaning, an active creator of self and world.

Kegan saw neither emotion or thought as dominant over the other but both as subject to a prior experience, that of meaning-making. "There is thus no feeling, no experience, no thought, no perception, independent of a meaning-making context in which it becomes a feeling, an experience, a thought, a perception, because we are the meaning-making context."10

In my terms I would say that qualitative thought is our initial and our most basic experience of ourselves as meaning-making context. This felt experience underlies all other more specific experiences, feelings, thoughts and perceptions.

In The Radiant Child Thomas Armstrong presented a dual theory of child development that integrates traditional psychological frameworks with religious and spiritual perspectives.

> According to Geoffrey Hodson, an esoteric philosopher, 'the child like all human beings, is primarily dual: an immortal spiritual being in a mortal spiritual body.' Within this context, I can begin to speak of two different dimenstions or lines of development within the child. One line describes the growth of the child ultimately in biological/material terms. This strand has been very well explored and documented by contemporary developmental psychology. I call this line the development of the child from the body up.
>
> I would claim that there is a second line of development which parallels, interacts with, and may even ultimately support the development of the first line of growth. This hidden line of development I call the growth of the child from the spirit down.11

According to Armstrong, spirit down development has its roots in some realm of existence beyond explanation, a realm of spirit postulated by various religious and mystical traditions. He also mentions the Jungian concept of collective unconscious as a way of conceptualizing the realm.

Hazrat Inayat Khan wrote about mystical beliefs of the spiritual origins of the human being:

> The infant that is born on earth brings with it the air of heaven. In its expression, in its smiles, even in its cry you hear the melody of the heavens. The Sufi point of view it that an infant is an exile from heaven, and that is why its first expression on earth is a cry. The soul that comes

> from above feels uncomfortable on the dense earth.12

This way of looking at development changes its hierarchical nature. In one respect, infants are more evolved than adults, because of their link with the roots of spirit or "heaven." Armstrong's imagery of development proceeding in two directions, "top down" and "bottom up" is more akin to that of the ancient rather than the modern philosphers: development proceeds in both directions, or possibly in a circle.

Although many religious and spiritual teachers have written about the process of human development, there are three who have written most extensively and whose works contain remarkable similarities. These are Hazrat Inayat Khan, the Sufi quoted above; Rudolph Steiner, a German Christian; and Aurobindo Ghose, A Hindu. In Educating for Wholeness: The Visions of Human Becoming and of Education of Rudolf Steiner, Aurobindo Ghose, and Inayat Khan, David Marshak examined and compared the theories of these men.

> Despite all the distinctions that draw the visions of human nature of Steiner, Aurobindo, and Inayat Khan apart, their common center holds fast. This commonality articulates a vision of human nature in which each of us consists of at least four separate yet integral sub-systems: a physical being, a life-force being, a mental being, and a spiritual being. Each of these sub-systems exists primarily though not exclusively on its own plane of being, each of which is composed of vibrations that grow higher and finer from the material to the life-force, from the life-force to the mental, and from the mental to the spiritual.

> Finally, this common center describes the true self within each of us as the spiritual being. This true self is a spark of divinity that seeks to emerge into consciousness, for such an emergence is the next step in the evolution of our species.13

Marshak noted that the discoveries of all of these teachers are in conguence with those of Piaget and other cognitive developmental psychologists, but they go beyond them. Of the four beings postulated by these three theorists -- physical, mental, life-force (which roughly corresponds to the emotional) and spiritual -- contemporary developmental theories only deal with the first three.

The theory of qualitative knowing offers a way of understanding our connection to an aspect of ourselves that could be called spiritual or religious. On the other hand, it does not have to be called spiritual or religious. It can simply be seen as our most basic way of knowing about the universe, one that can be explained with "scientific" and well as "religious" metaphors.

Ken Wilber is a psychologist who has spent many years writing about the integration of traditional views of human development with views of human development from the world's contemplative religious traditions. In "The Spectrum of Development," he summarized his nine-stage system, based on structures of consciousness that include the body, the mind, the emotions and the spirit. The ultimate stage of his system is the fundamental ground of being: "Strictly speaking, the ultimate is not one level among others, but

the reality, condition, or suchness of all levels."14

Wilber's first five levels of consciousness correspond directly to Piaget's. The last four are higher levels of knowing that include the most advanced levels of spiritual understanding. Wilbur's system is completely hierarchical. Infants begin by developing the rational mind; after that is developed, "higher" modes of consciousness can be attained.

Wilber explicitly denies that infants and young children are capable of true spiritual experience. He rejects the idea that the infant's feelings of connectedness have any spiritual basis. Infantile unity is based on fusion with the mother due to the lack of development of a separate sense of self. This material union is "the lowest possible unity of all--there is nothing metaphysically 'high' about it." 15

One of Wilber's best known concepts is that of the "pre/trans fallacy."16 This fallacy occurs in two directions. The first is when a theorist mistakenly reduces authentic adult spiritual experience to a lower infantile level. The classical psychoanalytic position on mystical experience as infantile narcissisistic regression illustrates this. The second is when the infantile material unity consciousness is elevated to the level of genuine religious experience.

I have found the pre-trans fallacy to be a useful one

in critiquing certain theoretical formulations. But I feel that it lacks sophistication due to the linear nature of Wilber's model. In Armstrong's terms, Wilber recognizes only the "body up" and not the "top down" line of development. In my terms, he believes that access to qualitative knowing can develop only after we have completely developed quantitative modes. I do not see any reason why this should be true, and I see plenty of evidence that it is not. Wilber's confusion is illustrated by the fact that he places "ultimate ground of being" at the top of his system, as stage ten, but then says, as I quoted above, that in reality it is the ground or suchness or condition of all of the levels. It seems to me that if it is the condition of all of the levels, it must be accessible from all of the levels.

In "A Transcendental Developmental Ideology of Education," James Macdonald proposed a system of human development similar to my own. He critiqued technical, rational, hierarchical thinking as an outdated way of viewing our contemporary world. He said that an understanding of quantum physics calls for a new interpretation of the physical universe and new understanding of modes of knowing. While the cognitive developmental perspective explains the linear rationality underlying mechanistic physics, only the new developmental perspective that he called *transcendental* can account for

the wave properties underlying quantum physics.

Transcendental development is based on intuitive, tacit, personal modes of knowing. Macdonald said: "A transcendental ideology would shift the predominant rationality toward the aesthetic, intuitive, and spontaneous in the mutual process of centering."17 Knowledge gained through centering is rooted in an ultimate "ground of being": "the possibilities of accessibility to knowledge from 'hidden' inner sources operating on a-causal, or integrative, or serial or synchronistic basis point directly toward the awareness of another ground of knowledge in human beings."18

According to Macdonald, knowledge occurs through a "dual dialectic." The first dialectic is the same as Piaget's, between outer world and rational mind. The second dialectic is between the inner self, the ground of being, and the rational mind. These two dialectics result in an expanded understanding of knowledge: "Thus, knowledge is not simply things and relationships that are real in the outer world and waiting to be discovered, but it is a process of personalizing the outer world through the inner potential of the human being as it interacts with outer reality."19

My understanding of knowing is consonant with Macdonald's. In my terms, qualitative knowing underlies quantitative knowing. Although knowledge can be acquired

through a purely qualitative mode, most of our knowing is a result of the relationship between qualitative and quantitative modes.

In The Original Vision, A Study of the Religious Experience of Childhood, Edward Robinson suggested that "the original vision of childhood" is a form of knowing that is indispensible to later adult knowing. The phrase is from a passage by Edward Muir:

> A child has a picture of human existence peculiar to himself, which he probably never remembers after he has lost it: the original vision of the world. I think of this picture or vision as that of a state in which the earth, the houses of the earth, and the life of every human being are related to the sky overarching them; as if the sky fitted the earth and the earth the sky. Certain dreams convince me that a child has this vision, in which there is a completer harmony of all things with each other than he will ever know again.20

Robinson suggested that childhood be seen as a dimension of life, rather than a chronological period. It is only as adults, exploring our childhood memories, that we can become fully conscious of the meaning of this dimension. Robinson's data is from an Oxford University study of religious experience in which 4000 adults who "felt that their lives had in any way been affected by some power beyond themselves"21 wrote accounts of the experiences and the effects they had on their lives. About 15% of these people offered experiences from their early childhood years. Studying these accounts led Robinson to the belief

that developmental psychologists, notably Piaget, typically underate childhood capacities for insight and understanding.

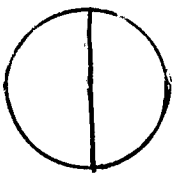
Robinson wrote : "The starting point for all Piaget's thought about childhood is the incapacity of children to see the world as adults see it...Piaget is in fact continually setting children an exam in a subject that adults are good at and children bad. Predictably, the children fail."22

Robinson associated the unitive vision of childhood with the adult process of inductive reasoning. Both synthesize, see relationships between the parts that form the whole. However, the first does not depend on logic, is immediate and holistic, while the second is logical, and he is not sure about the relationship between them.

Robinson concluded that there is a childhood faculty for knowing that exists in us throughout our lives, an organic unity that can be symbolized as an unchanging circle. We can return to this original knowing at any time in our adult lives. This knowing may be labeled religious, spiritual, mystical and esthetic, but it doesn't have to be called any of these. It is essentially a unitive understanding of the relationship between all things, the meaningfulness of life.

My theory is completely in line with Robinson's. I label his unitive vision of childhood "qualitative knowing " and understand it to be the given root of all thinking and knowing. I like his use of the symbol of the circle for

this type of knowing; we could add the symbol of the line to stand for quantitative knowing, and the picture would look like this:



We begin with the circle; the line develops as we mature, but the circle contains the line.

Images of the Developing Human Being

The cognitive developmental perspective has provided our culture with an image of the developing child as miniature scientist, determined to experiment with and understand the world. This image is slowly rising to dominance. It has supplanted the image of the psychoanalytic perspective of child as wild animal instinct demanding fulfillment.

Another prominent view of infancy and childhood comes from the behavioral psychologists. Behavioral psychology does not postulate regular stages of development. The newborn infant is seen as a "blank slate," which culture fills with its dictates. In this view, the child is completely molded according to her experiences. As behaviorist J.B. Watson said, "Give me a dozen healthy infants, well-formed, and my own specified world to bring them up in and I'll guarantee to take any one at random and train him to become any type of specialist I might select--

doctor, lawyer, artist, merchant-chief, and even yes, beggarman and thief."23 Behaviorial psychologists are not interested in inner experience of any kind, including thinking. The infant is her behavior; thus infants are conditioned through positive and negative reinforcement to behave in desirable ways. I would argue that the most accurate image depicting the behavioral view of infants is that of animals needing to be trained, domestic animals, rather than the wild animals I associate with the psychoanalytic view.

There is another very different image of babyhood and early childhood in Western culture. It is the mystical image of the exiled angel, or Robinson's image of original vision. Its best known source in Western culture derives from the Romantic movement. Wordsworth invoked this image in his "Ode: Intimations of Immortality from Recollections of Early Childhood:"

> Our birth is but a sleep and a forgetting
> The Souls that rises with us, our life's Star,
> Hath elsewhere its setting,
> And Cometh from afar:
> Not in entire forgetfulness,
> And not in utter nakedness,
> But trailing clouds of glory do we come
> From God, who is our home:
> Heaven lies about us in our infancy!" 24

In this view the infant, straight from "heaven," has a fresh view of world and can perceive what adults can no longer perceive. The baby communes with nature and lives in

kind of paradise, until the harsh realities of this world cloud her clear consciousness. In this sense the perspective of the child is not denigrated but elevated. Young children see a greater and higher reality than the one adults see.

Thus the mystical and Romantic view elevates infants to the state of angels; the behavioristic and psychoanalytic perspectives reduce them to the state of animals, and the cognitive developmentalist sees them as budding rational human beings, many steps behind adults but capable of full human status once the top of the hierarchical ladder of stages of thinking is reached.

The Child as Creator

I offer another image. I suggest that infants and children can be validly seen as sharing some characteristics of all of the images mentioned above: angel, animal, and scientist. Very loosely speaking, qualitative thinking can be seen as the mystical-Romantic angelic ability to percieve the world in a fresh and unconditioned way and to intuit the principles underlying "reality." Quantitative thinking fits well under the metaphor of scientist.

From my own perspective, the animal image is the least accurate and therefore the least fruitful as a metaphor for human beings. But I do not deny or belittle instinct, and

there is a small place for positive and negative reinforcement in my belief system. But also, since my theory is about an expanded vision of thinking and knowing, the Romantic and cognitive developmental images are more germane.

I would like to add a fourth image, that of infants and children as creative artists, not just "tuning into" or scientifically understanding the world around them, but doing both and also creating the world and themselves as they proceed. This view results from seeing the place of both qualitative and quantitative thought in human growth and development.

For as true and important as the cognitive developmental perspective on human growth and development is, I believe that it is flawed by the same "conceptual trap" that dominates most of psychology. The trap here is that the word "thinking" is nearly always used to mean "quantitative thinking." Qualitative thinking is not addressed because its validity is not recognized.

When qualitative knowing is seen as the context for quantitative knowing, we can approach the hierarchical nature of development in another way. The development of quantitative knowing clearly is hierarchical in nature. But I maintain that qualitative knowing is a given from our birth. Qualitative knowing is an aspect of the nature of human *being*. (As Kegan said:" a writer has to strain to

make the reader recover the process in the words 'human being.'"25)

One of the major theses of this dissertation is that infants come into the world with the ability to think qualitatively already fully in place. In other words, infants experience through feeling-intuition some kind of either ultimate or personal reality in a direct, unmediated way. In this sense, they are connected with and "know" the world in the Romantic sense. This qualitative knowing also provides the motivating and shaping and integrating power that guides the infant's subsequent explorations of the quantitative aspects of the world. It is the meaning-making power of the qualitative that defines us: "Thus it is not that a person makes meaning, as much as that the activity of being a person is the activity of meaning-making."26

We come to the world qualitatively ready to create. The world provides us with the raw material necessary to complete creation. Qualitative and quantitative combine; we are ready to continually give ourselves and our lives new shapes and new meanings.

The presence of the power of qualitative knowing gives infants and young children access to a kind of wisdom that connects them with all things and beings and drives them to exlore the world with wonder, curiosity, love and hope. Children do not have to "grow up" to attain a higher level of quantitative cognitive development, for their

understanding of the world to be real and valid. Each stage of development offers its own particular type of knowlege, resulting from various mixtures of qualitative and quantitative knowing. In the following chapter, I will examine closely the characteristic knowledge of each stage.

Footnotes

1. Robert Kegan. The Evolving Self. Cambridge: Harvard University Press, 1982. p. 7-8.

2. Edith Cobb. The Ecology of Imagination in Childhood. New York: Columbia University Press, 1977. p. 15.

3. Pablo Picasso, quotation on tea bag.

4. Gabril Moran. Religious Education Development. Minneapolis: Winton Press, 1983. p. 17.

5. Op.cit. Kegan. p. 13.

6. Ibid. p. 8.

7. Kohlberg, Lawrence and Mayer, Rochelle. "Development as the Aim of Education," In Curriculum. ed. James Gress and David Purpel. McCutchan, Berkely, California, 1978. p. 62.

8. Op.cit. Kegan. p. 15.

9. Ibid. p. 1.

10. Ibid. p. 11.

11. Thomas Armstrong. The Radiant Child. Wheaton, Ill: The Theosphical Publishing House, 1985. p. 5.

12. Hazrat Inayat Khan. Education from Before Birth to Maturity. Geneva, Switzerland, 1962. p. 15-16.

13. David Marshak. Educating for Wholeness. Unpublished thesis, Harvard University Graduate School of Education. 1985. p. 296.

14. Ken Wilber. "The Spectrum of Development," in Transformations of Consciousness. Boston: New Science Library, 1986. p. 7.

15. Ken Wilber. The Atman Project Wheaton, Ill.: Theosophical Publishing House, 1980. p. x.

16. Ken Wilber. "The Pre/Trans Fallacy." In Eye to Eye. Garden City, New York: Doubleday, 1983. pp. 201-246.

17. Macdonald, James. "A Transcendental Developmental Ideology of Education." In Gress and Purpel, Op.cit. p. 121.

18. Ibid. p. 112.

19. Ibid. p. 109.

20. Edward Robinson. The Original Vision. New York: The Seabury Press, 1983. Frontispiece.

21. Ibid. p. 11.

22. Ibid. p. 9-10.

23. J.B. Watson. Behaviorism. Phoenix books, 1930. p. 104

24. William Wordsworth. "Ode: Intimations of Immortality From Recollections of Early Childhood." In Armstrong, Op.cit, p 16.

25. Op.cit. Kegan, p. 8.

26. Op.cit. Kegan, p. 11.

CHAPTER FIVE

STAGES OF DEVELOPMENT OF CREATIVE THINKING

"It's only the idiotic way they have of talking," said John."I don't believe I'll ever understand Grown-ups. They all seem so stupid. And even Jane and Michael are stupid sometimes."

"Um," agreed Barbara,thoughtfully pulling off her socks and putting them on again.

"For instance," John went on, "they don't understand a single thing we say. But worse than that, they don't understand what other things say. Why, only last Monday I heard Jane remark that she wished she knew what language the wind spoke."

"I know," said Barbara. "It's astonishing. And Michael always insists-haven't you heard him?-that the Starling says 'Wee-Twe-ee-ee!' He seems not to know that the Starling says nothing of the kind, but speaks exactly the same language we do. Of course,one doesn't expect Mother and Father to know about it-they don't know anything though they are such darlings-but you'd think Jane and Michael would-"

"They did once,"said Mary Poppins, folding up one of Jane's nightgowns.

"What?" said John and Barbara together in very surprised voices. "Really? You mean they understood the starling and the Wind and-"

"And what the trees say and the language of the sunlight and the stars-of course they did! Once," said Mary Poppins.

"But-how is it that they've forgotten it all? said John, wrinkling up his forehead and trying to understand.

"Aha!" said the Starling knowingly, looking up from the remains of his biscuit. "Wouldn't you like to know?"

"Because they've grown older," explained Mary Poppins. "Barbara, put on your socks at once, please."

"That's a silly reason," said John, looking sternly at her.

"It's the true one, though," Mary Poppins said, tying Barbara's socks firmly round her ankles.

"Well, it's Jane and Michael who are silly," John continued. "I know I shan't forget when I get older."

"Nor I," said Barbara, contentedly sucking her finger.

"Yes, you will," said Mary Poppins firmly.

The twins sat up and looked at her.

"Huh!" said the Starling contemptuously. "Look at 'em! They think they're the World's Wonders. Little miracles I don't think. Of course you'll forget -same as Jane and Michael."

"We won't, said the Twins, looking at the starling as if they would like to murder him.

The Starling jeered.

"I say you will," he insisted. "It isn't your fault,of course," he added more kindly. "You'll forget because you just can't help it. There never was a human being that remembered after the age of one--at the very latest-except, of course, Her." and he jerked his head over his should at Mary Poppins.

"But why can she remember and not us?" said John.

"A-a-a-h! She's different. She's the Great Exception. Can't go by her, said the Starling, grinning at them both. 1

Ages and Stages

In the last chapter I introduced some developmental theorists: Freud, Erickson, Piaget, Kegan, Armstrong, Khan, Steiner, Aurobindo, and Wilber. Great similarities and differences can be found among these, but one commonality is striking: the approximate ages suggested as transition times for the developmental levels. All divide human life into approximately the same stages: the first lasting from zero to two years of age; the second from two years to six or seven years; the third from six or seven to eleven or twelve years; the fourth from eleven or twelve years to adulthood. After that the theorists may or may not divide adulthood into stages. Although these stages are called by various names, I will label them simply with age-names: infancy, pre-school, school-age, adolescent, and adult.

In all of the systems, passage from one stage to

another is marked by the acquisition of a set of characteristics rather than by simple change of chronological age. The chronological ages are approximate, and it is the sequence of the stages, not the actual age of change that is of most significance. Yet the fact that all the systems use similar ages as transition times is important.

All of these theorists who observed children closely noticed significant changes in constellations of behavior at certain times of human development. These changes were not merely quantitative -- children do more and different things as they grow older -- but qualitative as well -- each stage is characterized not merely by more or less of a variety of characteristics; it also has different *feel* to it. As Jerome Kagan wrote in The Nature of the Child: "But infants are qualitatively different from older children and should not be conceptualized as having less of some quality than ten year olds possess."2

The First Stage: Infancy

The initial passage of this chapter from Mary Poppins serves as a metaphor for the process of qualitative thinking in infancy. It also raises questions about who and why are the Great Exceptions, but those will be dealt with later.

In the last chapter I suggested that as infants we come to the world equipped to think qualitatively. What evidence

do I have for this assertion? What are the characteristics of this stage of development in terms of thinking and knowing?

Kagan wrote: "The properties of the infant are so distinct from those of the older child that it is not surprising that all societies regard the first two years of life as a special period of development."3 However, cultural and individual beliefs about human nature have historically greatly influenced the way infants are perceived by any given culture or theory. This is demonstrated by contrasting the views of Freud, Erickson and Piaget. Freud saw the infant in terms of oral instinctive desire; Erickson, in terms of the nurturing or non-nurturing relationship between mother and child; and Piaget, as active explorer trying to understand the physical universe.

In Piaget's system, this stage is called the stage of sensory-motor intelligence. The name of the stage refers to the belief that intelligence grows and is demonstrated through experiences of the senses and of body movement. Or, in other words, the infant thinks through movement and sensing. The first symbolic thinking that occurs is the gradual understanding of "object permanence:" the concept that when objects disappear from sight, they still exist in the world and therefore are subject to search. According to this theory, language and play begin but are purely

imitative and repetitive, engaged in for the joy of movement and sensory experience.

Noted Piagetian scholar Hans Furth said: "Apart from a few reflex movements and some vital self-regulated physiological activities, there is not much that the baby seems to 'know.'4 Cognitive psychologists believe that the baby begins life with merely some reflex movements. It is out of these reflexes that intelligence gradually develops. However, Piaget does not see this as the gradual accumulation of isolated reflex responses into an ordered intelligence, as behavioral theory would:

> Piaget points out that it is not in accord with biological thinking to consider these reflexes as isolated responses that somehow work and through association develop into more advanced coordinations. Spontaneous activity of the living organism that reveals itself in rhythmic, global movement is at the source of the reflexes; the innate differentiation of a reflex from global activity does not result in a rigid automatic reaction for itself. The biological function of the reflex for the total organism is indicated by the continuing changes towards more adaptive functioning of just those reflexes which are particularly important. Within a few days, the sucking behavior is stronger, more responsive, more functional, than on the first day. In fact, right from the start one can observe an active assimilation towards exercising and reproducing the reflex; this so-called functional or "reproductive" assimilation on the one hand prolongs the global rhythmic activity of the organism and on the other hand provides the intrinsic motor force that assures the consolidation of the reflex as a first sensory-motor scheme. A *scheme* for Piaget is here, as always, the coordination and organization of adaptive action, considered as a behavioral structure within the organism, such that the organism can transfer or generalize the action to

similar and analogous circumstances.5

The *scheme* is a behavioral structure that becomes a mental structure. The body adapts to the environment in exactly the same way that the mind comes to organize the environment. Essentially, intelligence was adaptation for Piaget. Adaptation and organization are not seen as separate processes: "From the biological point of view organization is inseparable from adaptation: they are two complementary processes of a single mechanism, the first being the internal aspect of the cycle of which adaptation constitutes the external aspect."6

This raises an interesting question about Piaget's theory as it relates to mine. How does does intelligence or knowing begin? How does mind develop out of reflexes? How does a behavioral structure become a mental structure? From a biological point of view, it is enough to say that they are complementary aspects of a single mechanism, but from a psychological point of view, it is not, for it is an external, not an internal explanation.

In "The Biological Problem of Intelligence,"7 Piaget wrestled with this question. He asked what "hereditary structures" exist from the beginning for mental functioning, presented five different points of view, and then argued for one of them. It is important to keep in mind that Piaget was theorizing and choosing his own preferred theoretical outcome to what he said is still an insoluble problem at

that time.

Piaget concluded that intelligence begins with an inherited organic propensity towards adaptation that presupposes the interaction between organism and environment. This propensity must be realized in the relationship between organism and environment:

> Intelligence does not therefore appear as a power of reflection independent of the particular position which the organism occupies in the universe but is linked, from the very outset, by biological apriorities. It is not at all an independent absolute, but it is a relationship among others, between the organism and things."8

Thus Piaget posited some *apriori* mechanism that allows intelligence to arise from the interaction of organism and environment. This mechanism is an inherited organic or biological propensity. But I would argue that theorizing an organic base does not explain the origins of the mechanism. This explanation once again seems to me to reduce psychology to biology. It does not explain the origins of the mechanism.

Obviously my position on this issue is the one that Piaget rejects. I am arguing that intelligence does begin as an independent power of reflection, an innate ability to know, which I am calling qualitative knowing. Since I think that Piaget's explanation begs the question,I would suggest that his *apriori* mechanism *is* qualitative knowing.

It can be argued that Piaget's greatest contribution to developmental psychology is the contruction of a stage theory based on in-depth observations of infants and conversations and experiments with older children. In the twenty years since the the bulk of his theory was formulated, many psychologists have turned to the study of the infant. We have more "hard research data" to theorize from than was available in the past. While there still remains vast room for individual interpretation, it is true that we now know more than we did about the infant's reality.

The infant is actually functioning in many modalities well before birth. From birth the baby can see, hear, smell, taste, and feel touch, pain, and changes in physical position. Furthermore, the infant can use this information to discriminate. Kagan noted:

> The infant can detect the difference between a pattern composed of stripes only one eighth of an inch wide and a completely gray patch, between vertical and oblique gratings, between linear and curved lines, and between richly contoured, in contrast to minimally contoured, designs. In the auditory mode, the young infant can discriminate between the musical notes C and C sharp and between the spoken syllables "pa" and "ba," and is acutely sensitive to rate of change in sound energy during the first half-second of an auditory event. If change is slow, the baby opens her eyes in interest; if it is rapid, the baby closes them in defensive avoidance.9

The infant's ability to discriminate one object from another is demonstrated by habituation/dishabituation

experiments. The idea behind these experiments is that the more an infant is exposed to one particular object or stimulus, the more used to it she becomes and thus the less she responds. This reaction is called habituation. When the original object is changed or a new object is substituted, the infant notices the change and responds more, or dishabituates. For example, the more an infant is shown a particular representation of a smiling face, the less she attends to it. But when a frowning face is substituted, the infant will look at it with interest.

Experiments have further demonstrated that the infant can not only make subtle discriminations but can form concepts, for example, the concept of *smile*. This is shown by whether or not an infant can discriminate a smile on any face, human or simple picture. If she can, then one can say that she has an abstract representation (or concept) of the unchanging properties of a smile, no matter what changing properties surround the smile.

In The Interpersonal World of the Infant psychiatrist Daniel Stern summarizes four general categories of information that we have about infants, based on experimental data:

> 1. Infants seek sensory stimululation. Furthermore, they do it with the preemptory quality that is prerequisite to hypothesizing drives and motivational systems.
> 2. They have distinct biases or preferences with regard to the sensations they seek and the perceptions they form. These are innate.

> 3. From birth on, there appears to be a central tendency to form and test hypotheses about what is occurring in the world (Bruner, 1977). Infants are also constantly 'evaluating.' in the sense of asking, is this different from or the same as that? How discrepant is what I have just encountered from what I have previously encountered (Kagan et al. 1978)? It is clear that this central tendency of mind, with constant application, will rapidly categorize the social world into conforming and contrasting patterns, events, sets, and experiences. The infant will readily discover which features of an experience are invariant and which are variant -- that is, which features "belong" to the experience (J. Gibson 1950, 1979; E. Gibson 1969). The infant will apply these same processes to whatever sensations and perceptions are available, from the simplest to the ultimately most complex -- that is, thoughts about thoughts. 4. Affective and cognitive processes cannot be readily separated. In a simple learning task, activation builds up and falls off. Learning itself is motivated and affect-laden. Similarly, in an intense affective moment, perception and cognition go on. And, finally, affective experiences (for example, the many different occasions of surprise) have their own invariant and variant features. Sorting these is a cognitive task concerning affective experience. 10

Stern goes on to present research evidence that infants have an innate capacity for *amodal perception*, the ability to take information received in one sensory channel and translate it directly into another. For instance, using two different kinds of nipples, researchers discovered that infants can recognize the nipple that they previously sucked without seeing. This is not accounted for on Piagetian theoretical grounds:

> A Piagetian account would have required that they first form a schema of what the nipple felt like (a haptic schema) and a schema of what the nipple looked like (a visual schema); then these two

> schema would have to have some traffic or interaction (reciprocal assimilation), so that a coordinated visual-haptic schema would result. (Piaget, 1952). Only then could the infants accomplish the task. Clearly, the infants did not in fact have to go through these steps of construction. They immediately "knew" that the one they now saw was the one they had just felt.11

Other experiments demonstrate amodal perception with different senses. Infants can also pick the particular face that is making the sound they are hearing, with the sound actually piped in from another place. Three week old infants can correlate sound intensity with light intensity. Two day old infants can imitate correctly one of three expressions on an adult's face.

Stern says that this capacity for amodal perception argues for the infant's ability to encode into an amodal representation that can be translated into any of the sensory modes. This is an example of the infant's ability to think abstractly from birth. Stern characterized the infant's mental reality as follows:

> Infants appear to experience a world of perceptual unity, in which they can perceive amodal qualities in any modality from any form of human expressive behavior, represent these qualities abstractly, and then transpose them to other modalities. This position has been strongly put forth by developmentalists such as Bower(1974), Moore and Meltzoff(1978) and Meltzoff (1981), who posit that the infant, from the earliest days of life, forms and acts upon abstract representations of qualities of perception. These abstract representations that the infant experiences are not sights and sounds and touches and nameable objects, but rather shapes, intensities, and temporal patterns--the more "global" qualities of experience. And the

> need and ability to form abstract representations of primary qualities of perception and act upon them starts at the beginning of mental life; it is not the culmination of a developmental landmark reached in the second year of life.12

Stern suggests, and I believe, that infants experience the world qualitatively, simultaneously as perception and emotion. Experimental research demonstrates that newborns show interest, joy, distress, disgust, anger and surprise as they begin relating to the world.13 They also show the ability to empathize by crying when they hear others crying.14 Since the 1970's the recognition of the possibility of an intense emotional experience between parent and newborn called *bonding* has been revolutionalizing birthing practices. It is now widely accepted that the most positive developmental outcome for both parent and infant results from allowing a deep bond of love to be experienced between them immediately after the birth. This bonding process includes a great deal of fascinated staring at each others faces, looking into each other's eyes, the classical behavior of lovers.

The picture of the newborn infant drawn from current research data is consonant with the theory I am developing. The baby experiences the world qualitatively as perception and emotion. This qualitative knowing also provides the shaping and integrating power necessary for the quantitative organization of the world that begins immediately. The process of creative thinking has begun.

The Second Stage : The Preschool Years

Fairies

I cannot see fairies,
I dream them.
There is no fairy can hide from me
I keep on dreaming until I find him:
There you are, Primrose--I see you,
Black Wing! (by Hilda Conklin, age 6)15

> The first approach to a spiritual experience which I can remember must have taken place when I was five or six years old at the house where I was born and brought up. It was a calm, limpid summer morning and the early mist still lay in wispy wreaths among the valleys. The dew on the grass seemed to sparkle like iridescent jewels in the sunlight, and the shadows of the houses and trees seemed friendly and protective. In the heart of the child that I was there suddenly seemed to well up a deep and overwhelming sense of gratitude, a sense of unending peace and security which seemed to be part of the beauty of the morning, the love and protective and living presence which included all that I had ever loved and yet was something much more.16

> Papa, how can we be sure that everything is not a dream? ... Well, I don't think everything is a dream 'cause in a dream people wouldn't go around asking if it was a dream. (said by Tim, age 6)17

Around the age of two the child's thinking makes a shift that seems to be based on rapid growth in the ability to symbolize. The child's language and play become less imitative and more symbolic. She can tell you "birdie flying" and then pretend that she is a bird flying. She can scribble on a paper and tell you that is a birdie flying. She can fashion a bird from clay. She has entered the golden age of creativity.

This shift is gradual rather than sudden. Before it takes place the child's interest and energy seemed bound up in exploring and understanding the world and her place in it. After the shift,the dominant activity becomes the creative transformation of the world. As Hans Furth noted about about the end of the first stage:

> The child emerges at the end of this stage as a person who by his adaptive actions shows that he can master means-end relations, explore new features of objects, understand spatial relations between objects in the mileau, and anticipate proximate events. Most importantly, through interlocking mutual coordinations of actions the child reaches the stage of the first basic invariant of all knowledge, that is, the formation of the object, of a thing "out there," independent in existence from his own action. At this point in development, we witness the beginning of a clear separation between the known thing, namely the object, and the knowing person. Knowledge, in the full sense of its human meaning, is found right between these two terms; for knowledge is but our way of expressing the mutual relation of the knower to the known.18

Knowledge must be expressed symbolically, and now that the child has the means to do that, the world seems to shift partially from laboratory to stage. Symbolic, creative, imaginative play becomes the preferred activity.

Piaget saw symbolic play as an example of pure egocentric thought, both idiosyncratic and lacking in communication:

> There are numerous examples, playing with dolls, playing house, etc. It is easy to see that this symbolic play constitutes a real activity of thought but remains essentially egocentric. Its

> function is to satisfy the self by transforming what is real into what is desired. The child who plays with dolls remakes his own life as he would like it to be. He relives all his pleasures, resolves all his conflicts. Above all, he compensates for and completes reality by means of a fiction. Symbolic play is not an attempt by the subject to submit to reality but rather a deforming assimilation of reality to the self.19

This passage reveals Piaget's limited exposure to preschool children playing symbolically in groups. Current research data that demonstrates that preschool children are not nearly as egocentric as Piaget thought. They are capable of communicating superbly and elaborately in complex imaginative play, taking a variety of social perspectives. In reviewing the research in this area, Rubin and Everett conclude:

> It is important that parents and teachers realize that the older, perhaps more traditional expectations that young children cannot learn to cooperate, or that they communicate ineffectively *because* of their egocentric views of the world are outmoded. Such perceptions may have led those who live with or teach children to believe that preschoolers and kindergartners are not yet ready to behave in more socially mature ways. Given the findings of recent laboratory studies and given those inferences concerning perspective-taking skill that can be gleaned from naturalistic observations, it is clear that young children do enter preschool and kindergarten with a fairly sophisticated social-cognitive repertoire. 20

I believe that the above passage by Piaget is also an interesting commentary on his attitude towards artistic activity in general, including adult artistic activity, which could certainly be described as "compensating for

and completing reality by means of a fiction." Howard Gardner pointed out that in embracing the logical rationality that underlies Western mechanistic science, Piaget neglected the aspects of human cognition that underlie the arts. 21 Gardner attempted to fill this gap by examining aesthetic cognition. He started Harvard Project Zero to study the creativity of children. He says it was called Project Zero because of "the sense of working in a new area of study where virtually 'zero' was understood."22 In "Exploring the Mystery of Creative Activity," he said:

> Step into almost any nursery school and you enter a world graced with the imagination and inventiveness of children. Some youngsters are fashioning intricate structuresout of blocks. Others are shaping people, animals, or household objects out of clay or Play-Doh. Listen to the singing: there are melodic fragments, familiar tunes, and other patterns composed of bits and snatches from many songs. As the children speak,you hear the narratives they weave, and their charming figures of speech.
>
> Beyond their obvious charm, some of these youthful creations are powerfully expressive. There is poetry: a youngster might characterize a streak of skywriting as "a sear in the sky"; a peer will describe her naked body as "barefoot all over." And, almost without exception, youngsters scarcely out of diapers will produce drawings and paintings that, in their use of color, richness of expression, and sense of composition, bear at least a superficial kinship to works by Paul Klee, Joan Miro, or Pablo Picasso.23

As Gardner noted, the creativity of the pre-school years is widely recognized. The poem by six year old Hilda Conklin that introduced this section is particularily

beautiful but hardly atypical of the creative understanding and expression that I have encountered in this stage. When my daughter was four years old, she spontaneously dictated this poem based on her recent experience:

> As I lay in the field looking up
> At the bright dark sky,
> "Oh-oh, I think its going to rain!"
>
> As I was safely inside:
> "Pitter-patter, pitter-patter,"
> Went the soft raindrops.

This creativity is widely recognized, but it is not fully understood. When Gardner turned to creativity, he did so with the typical hierarchical bias of the cognitive psychologist. He had no key to the mystery of artisic creativity in the preschool years; he has much more to say about why it disappears in the following stage. Preschool children are creative simply because they are compelled to play with their newly formed symbolic abilities. He assigned to this stage the achievement of a "first draft" of artistry.

Ultimately Gardner seemed to agree with Piaget, who asserted that true creativity cannot emerge until the final stage of cognitive development. He believed that until children have become cognitively and critically aware of the artistic standards of the culture and incorporated them into their work, they cannot be seen as full-fledged artists.

I would argue that children at this stage are complete human beings and complete artists. Their human and artistic vision will be different from that of adults and adult artists. But it is no less valid. Picasso once said, "I used to draw like Raphael, but it has taken me a whole lifetime to learn to draw like a child."24 Gardner used this remark to support his argument that a complete artist must be cognizant of the norms he is rejecting. I do not think that Picasso meant it this way. I believe that Picasso is talking about recapturing "the original vision" of childhood that Robinson described.

If the cognitive developmentalists cannot solve the mystery of creativity in the preschool years, I believe that I can. I have already described my thesis that creative thinking is the result of the combination of intense qualitative and complex quantitative thinking. Preschool children are usually still extremely rooted in the qualitative domain. They experience its meaningfulness and live in the world with a sense of purpose. Everyday discoveries and explorations are fresh and emotional. In addition, their ability to express quantitative meaning symbolically is exploding. Qualitative and quantitative combine in the ideal combination for creative thinking.

Piaget called this period of development "pre-operational." He defined an operation as "an internalized system of actions that is fully reversible."25 An operation

allows a person to understand the reciprocal relationship between two sets of events or ideas. Piaget called the child in this period pre-operational because she does not understand these reciprocal relationships. She does not know that the actions in the operations are fully reversible.

Piaget described the "everyday thinking" of the two to seven year old child as characterized by egocentrism, finalism, animism and artificialism. Egocentrism is defined as seeing oneself at the center of reality because one is not fully aware of oneself as being separate from the rest of reality."26 Animism endows everything in the world with life and intention, or consciousness: "not a consciousness identical to that of man, but the minimum knowledge and intention necessary for things to accomplish their actions and, above all, to be able to move and direct themselves toward their assigned goals."27 Artificialism is the understanding that "everything has been built by man or by a divine being who fabricates things in human fashion."28 Finalism is the belief that there must be a reason for everything, "there is no chance in nature and everything is 'made for' man and children according to an established and wise plan with the human at its center."29

Piaget's biases reflect the rational, technological basis of Western culture, as Gardner stated. Robinson

explained: "For a culture increasingly permeated with the control of its environment and permeated with the spirit of competitive individualism, nothing could have been more timely or more appropriate than Piaget's discoveries in the field of cognitive development."30 At the top of Piaget's hierarchy are the *opposites* of the beliefs that he attributes to young children: that we are individuals separate from the rest of reality; that many events in nature are random and fortuitous; that only humans and animals have consciousness, and that since human beings have the most consciouness they need to control the rest of the world; and that things in the world have *not* been fashioned by a divine being; they have either been fashioned by human beings or emerged through evolution, without the help of divinity.

These particular beliefs about reality are currently being challenged from a variety of directions. Compare the concept of egocentrism to Capra's earlier statement about the quantum theory of the universe:

> Quantum theory thus reveals a basic oneness of the universe. It shows that we cannot decompose the world into independently existing smallest units. As we penetrate into matter, nature does not show us any isolated 'basic building blocks', but rather appears as a complicated web of relationships between the various parts of the whole. These relations always include the observer in an essential way.31

Robinson's original vision of childhood, which he sees

as a basic faculty for knowing, includes a sense of connection and harmony of the child with all things and all things with each other. The second introductory passage to this section illustrates this. The egocentrism of the child can be compared to this sense of connection and harmony and can be seen as an aspect of qualitative knowing, intuiting the underlying *whole* of the universe.

There is an inherent paradox in the nature of the developmental process. In the quantitative dimension outlined by Piaget, the child is learning to separate herself from the world. Development in this dimension can be seen as a process of becoming increasingly less subjective towards reality. In the metaphors of the new physics, we are becoming cognizant of the "particle view" of reality. But this makes no less valid " the original vision," "the wave view." The principle of complementarity states that the nature of reality requires these two complementary descriptions to give a full view.The child's original vision is accurate, and so is the growing new vision.

Piaget said that the child believes that everything in the universe has consciousness. Well, so do many modern physicists. Sir James Jeans said in 1937: "Today there is a wide measure of agreement, which on the physical side of science approaches almost to unanimity, the stream of knowledge is heading toward a nonmechnical reality; the

universe begins to look more like a great thought than a great machine."32 In the five decades since this has been reiterated by many physicists, such as Heisenberg, Oppenheiner, Schrodinger, and von Weizsacker.

Artificialism and finalism are based on a belief in a divine being or a wise intelligence who has made everything according to plan, with humans at the center. Not only little children, but many religious or spiritual adults hold this belief. In addition, some views of science no longer are in opposition. In The New Story of Science, Augros and Stanciu noted:

> The properties of matter, then, on the smallest scale and on the scale of the whole universe appear uniquely suited to life. Not only are there many instances but in each case a slight increase or decrease in the parameter would render life impossible...Dyson, surveying this broad pattern, concludes that it argues purpose, no coincidence: 'The more I examine the universe and study the detail of its architcture, the more evidence I find that the universe in some sense must have known we were coming. Certain conditions necessary for life were built into the Big Bang from the beginning.'
>
> Wheeler stresses that 'no reason has ever offered itself why certain of the constants and initial conditions have the values they do except that otherwise anything like observership as we know it would be impossible.' Consequently, rather than resolving the issue to coincidence, he asks whether there is not greater likelihood that 'no universe at all could come into being unless it were guaranteed to produce life, consciousness, and observership somewhere and for some little length of time it its history-to-be?' Life is not accidental. On the contrary, Wheeler asserts that 'Quantum mechanics has led us to take seriously and explore the directly opposite view that the observer is as essential to the creation of the universe as the universe is to the creation of the

> universe as the universe is to the creation of the observer.' Though man is not at the physical center of the universe, he appears to be at the center of its purpose. According to Erwin Schrodinger, without man the universe would be a drama played before empty stalls.
>
> A universe aiming at the production of man implies a man directing it. For matter on its own cannot aim at anything. Hence, the New Story again leads to a mind that directs the whole universe, all the laws of nature and all the properties of matter, to a goal. To that mind we give the name God.33

I am saying that in a sense young children understood all along a view of the universe that some scientists are currently asserting. But *of course* there is a difference. Children knew, but they knew in a very different way. As Robinson pointed out, there is a vast difference between the unitive vision, what I am calling qualitative knowing, and the inductive reasoning of mature adulthood. I am not suggesting that one can or should substitute one for the other. In fact, I am saying that it is the dialectic between the two that results in creative consciousness.

Piaget also characterized the thinking of the preschool stage as intuitive. By this he meant simply that the child "constantly makes assertions without trying to support them as facts."34 This stems from her egocentricity, viewed as a lack of differentiation between self and other. Piaget did not see this intuition as valid, as leading to correct answers.

Yet it is this very lack of differentiation between self and others, between self and universe, this sense of

underlying connection with all things, that accounts for the *validity* of intuition as a mode of knowing. As I described in Chapter Two, intuition is another way of talking about qualitative knowing. It allows us to connect with reality in an immediate sense, to sense the totality of and the relationships between things. It is Bruner's broad map, which will later be filled in by quantitative thinking.

Thus, to say that the young child thinks intuitively has a very different meaning for me than it does for Piaget. He uses it to mean that the child guesses with no rational basis and is usually wrong. I use it to mean that the young child knows some things intuitively that adults come to know inductively.

The third passage in the introduction to this section is from Gareth Mathew's book, Philosophy and the Young Child. Mathews is impressed with the young child's ability to reason and to grapple with complex philosophical issues. He said: "In fact, such evidence that I have been able to assemble suggests that, for many young members of the human race, philosophical reasoning--including, on occasion subtle and ingenious reasoning--is as natural as making music and playing games, and quite as much a part of being human."35

Mathews, a philosopher, took Piaget severely to task regarding his research on young children's thinking about the world. He critiqued Piaget's The Child's Conception of the World, a study that focuses on young children's

responses to the following kinds of philosophical questions: What is thinking? What is the relation between a word and its meaning? What are dreams, and where are they located? What things are alive, and what things are conscious?

Piaget's usual technique was to chart the stages of progressive development in thinking about a concept and then to group children in the age-appropriate stage based on their responses to the questions. Mathews called this technique itself problematic. First of all, he explained, philosphical understanding is unusual in people of any age. Second, no one, child or adult, makes regular, predictable progress on philosphical questions. Third, Piaget discarded deviant responses, the very ones most likely to be philosophically interesting. Fourth, Piaget distinguished responses that he felt are convictions from those that he feels were "mere romancing." Mathews noted that this is a false distinction, since to philosophize is to invent, explore, joke and "romance." He showed how Piaget actually *discouraged* children from doing philosophy in the way he asked the questions.

But an even more basic problem lies in the way that Piaget ordered the stages. For example, Mathews said that Piaget's three stages on the notion of thinking each correspond to a classical theory of thinking in philosophy, each of which is considered a valid philosophical way to approach the issue. This leaves us with the dilemma that

Piaget would have to place many adult philosophers in his lowest stages. Mathews wrote: "In fact, all the concepts that Piaget claims to have found in children invite philosophical reflection. Moveover, that his third-stage notions are generally more nearly adequate or satisfactory than his first- or second- stage notions isn't at all obvious."36

Whereas Piaget said that real understanding of philosophical issues cannot take place until the stage of adolescence, Mathews argued that five, six and seven year old children are *more* likely than children of twelve, thirteen or fourteen to to be able to "do philosophy." He suggested several reasons for this. First, philosophical thinking calls for an innocence and naivete that is natural to children at this younger age. Why? Because real philosphical questions are the basic and important ones about life that young children naturally ask and that may come to seem naive as we grow older. The socialization processes of our society discourage us from asking these questions.

Mathews defined "doing philosophy" as "simply to reflect on a perplexity or conceptual problem of a certain sort to see if one can remove the perplexity or solve the problem."37 He said that adults and children do philosphy well together because although the adult may have a better command of language and concepts, "it is the child,

however, who has fresh eyes and ears for perplexity and incongruity. Children also have, typically a degree of candor and spontaneity that is hard for the adult to match."38

I would suggest that it is the child's connection to the qualitative domain that allows for continual freshness and spontaneity and lets her grasp the underlying connections that reveal the incongruities. In other words, it is the young child's ability to think creatively that allows her to be philosopher as well as artist and scientist.

The Third Stage: School-Age

Beautiful mountains,
Quick rising mists
Still horse dwells
At bottom of cliff.
(by 10 year old girl)

One device, the oscilloscope, held all the magic of a fairy wand for Anna. We'd sit in this room for hours on end playing single notes, watching the green spot on the 'scope do its glowing dance. The whole exercise of relating sound that one heard with the ears to the visual shape of those sounds actively seen on the little tube's face was a source of never-ending delight.

What sounds we captured, Anna and I! A caterpillar chewing a leaf was like a hungry lion, a fly in a jam jar sounded like an airship, a match being struck sounded like an explosion. All these sounds and a thousand more were amplified and made available, both in sound form and visible form. Amma had found a brand-new world to explore. How much meaning it had for her I didn't know; perhaps

> it was only an elaborate plaything, but her squeals of delight were enough for me.
>
> It was only sometime during the next summer that I began to realize that the concepts of frequency and wave-length were meaningful to her, that she did, in fact, know and understand what she was hearing and looking at. One summer afternoon all the kids were playing in the street when a large bumblebee appeared on the scene. One of the kids said,'How many times does it flap its wings in a minute? 'Must be millions,'said another kid.
>
> Anna dashed indoors humming a low-pitched hum. I was sitting on the doorstep. With a few quick prods at the piano she had identified the note, her hum, and the drone of the bee. Coming to the door again, she said, "Can I have your slip stick?" In a moment or two she shouted out, "A bee flaps its wings such-and-such times a second." Nobody believed her, but she was only a few counts out.
>
> Every sound that could be captured was captured. Meals began to be punctuated by such remarks as "Do you know a mosquito flaps its wings so many times a second?" or, "a fly, so many times a second?"
>
> All those games led inevitably to making music. Each separate note had by this time been examined minutely, and a sound depended on how many times it wiggled per second. Soon she was making little melodies to which I added the harmonies. Little pieces of music entitled "Mummy," "Mr. Jether's Dance," and "Laughter" soon began to echo around the house. Anna had begun to compose. I suppose Anna had only one problem in her little life--the lack of hours per day. There was too much to do, too many exciting things to find out.39

According to Piaget, during this period of mental development, the principles of artificialism, finalism, and animism disappear, due to the child's increasing ability to use reason to structure reality. Piaget noted that this change is similar to the historical process of the Greeks gradually substituting atomistic for mythological

explanations of reality. He says that the concrete operational child's world view resembles that of the first Greek atomistic theorists.40

The atomistic view suggests that the world is composed of small, simple indivisible particles whose behavior can be predicted by mechanistic laws. I have called this the "particle view" of reality. Indeed this stage seems to be the natural period for acquiring this understanding.

Piaget called this the period of "concrete operations." This period is called concrete because the child can use operations only to solve problems using real, observable objects. According to Piaget, she cannot yet use an operation on an abstract problem. She can think logically only about concrete things.

In Philosophy and the Young Child Mathews gives examples of children in the stage of concrete operations who used highly abstract reasoning. A skeptic may argue that his examples were drawn from children from highly educated families. However, Mathews said that whereas it may not be typical for a seven year old to discuss the infinite universe, it is not entirely atypical either. He has encountered many children in this stage who are extremely advanced in their ability to think philosophically.

My own experience leads to the same conclusion. My daughter and many of the children I have taught who are theoretically in the stage of concrete operations are able to

use operations abstractly. If they are in a minority, I believe that they should be regarded not as exceptions to the rule but rather as examples of what is possible for children, given a particular educationalenvironment.

Children in this stage are described by cognitive developmentalists as being literal, conventional, concrete, realistic and rule-oriented. The Guinness Book of World Records is a favorite book at this stage. This is the prototypic period of collections, including baseball cards, butterflies, stamps, model horses, dolls and bottle caps. Conformity to peer norms and "playing by the rules" strongly influence social behavior.

Psychologists and educators interested in creativity frequently note that the creativity so evident in the previous stage appears to recede dramatically during this stage. Opinion is divided as to whether this is an inherent part of the developmental process and/ or due to limiting socializing forces.

Howard Gardner believes that this is simply the nature of the stage:

> Let a few years pass and everything has changed. The penchant for succumbing to convention, for conforming to one's peers, comes to permeate children's activities. Even as children at play are determined to follow the rules exactly and to tolerate no deviation, so, too, in their use of symbols they will brook neither experimentation nor novelty.
>
> Children now typically limit their graphic efforts to the faithful copying of forms about them.

> Some stop drawing altogether. Their language also exhibits a conservative streak...
>
> Although artistic work by children appears impoverished during this period, the common disparagement of this 'literal stage' seems to me misguided. Far from being the enemy of artistic progress, literalism may represent its advance vanguard. That concern with realism that pervades the literal stage may be a crucial phase of development--the time for mastering rules.41

Or as Eleanor Ruma-Blofson put it: "The child has to give up something to get something else. S/he does lose spontaneity and magic temporarily to get realistic and literal. In adolescence and young adulthood there is the possibility of getting it all together, the poetry *plus* the rational."42

I have a different understanding of this stage of development. In discussing the development of quantitative understanding of the world, many of the above descriptions seem accurate to me. The purpose of this stage seems to be a connection with the "real world," including understanding its "particle" properties and its concrete physical nature, absorbing its rules and social conventions. However, that does not mean that spontaneity and creativity must be sacrificed. Their absence *is* due, I believe, to limiting socializing influences such as a materialistic society; rigid educational systems; a great deal of television viewing, computer game playing and other passive pursuits; and a continutally hurried, scheduled routine.

The poem that begins this section is an example of concrete poetic imagery. It is not the fantasy-laden imagery of early chilhood, but it can hardly be called impoverished. The next passage describes the activity of a very creative "concrete" child. Anna is involved in an intensely creative and meaningful way with exploring the mechanistic nature of the physical world. Her exciting discoveries lead to musical composition. When my daughter was seven years old, her creative efforts became less oriented toward fantasy and more based in scientific exploration. The following observations of my daughter during a one week period at seven years of age will illustrate this change.

Wed. Oct 30

This afternoon S. "played scientist." She lined a shelf with empty bottles, plastic containers, a thermometer, measuring cups, string, tape, magnifying glass, herbs and spices, etc. Then she began to devise her own experiments and to record the results on small pieces of paper. She was completely engrossed in this activity for several hours, without comment or help from me. Here are several of her records:

"If y pote watr in a cler plastek contanr and ethr pote it on the hot t.v. or pote it unr the lite it will evaprate." ("If you put water in a clear plastic container and either put it on the hot T.V. or put it under the light, it will evaporate."

"If you have some watr and you add a late it stas the same tamprechr. It works the same way if you -." ("If you have some water and you add a lot, it stays the same temperature. It works the same way if you subtract.")

Friday Nov. 1

S. uses paper plates and colored paper to construct the letters of her name, in giant size. She spells it out on my bed, as a present for me.

Saturday, Nov. 2

S. made two Halloween costumes for a stuffed dog. One is "Superdog," complete with cape and sword. The other is "Angel," with wings, halo and flowing gown.

Sunday, Nov. 3

S. and her friend R. played scientist with S's "scientist shelf." They spent half an hour concocting "medicines" out of herbs and spices and liquids. They announced that these medicines would cure any ailment, including diabetes, cold hand disease, and "spelumuk." After this they invented a better-smelling, cleaner-cleaning hand soap.

Mondau Nov. 4

S. designed a robot today. She said he will be "a maid." I asked if he will do our housework. She replied: " If I get him built before I'm old enough to move out--it will take years."

Tuesday Nov. 5

Today S. designed a "car for kids." She did the outside and the interior and said she would do the engine tomorrow.

When this child moved into the concrete stage, her creative output did not decrease. But it became increasingly governed by her interest in and knowledge about the concrete world. She realized that building a robot is complex and would take a long time. Her comments on the diagram of the inside of the robot reflected her understanding that she needed more knowledge of the physical

world: "Inside the robot is a bonch of whells and othr thegs. I miself do not undrstand these thegs but I will learn. This is what I think a robot loks like but some thegs are not rite...vary confuseg...not whte it relley loks like...it is like little people are telling the robot whte to do."

In this as in any stage, the ability to think creatively is governed by the combination of quantitative and qualitative thinking. The nature of the quantitative elements in this stage influences the direction of the thought; in this case, thought is often directed toward the physical world. The intensity of the qualitative dimension determines the degree of creativity in the thought. Children in this stage can continue to be highly creative. But this stage also coincides with formal schooling, which usually does not encourage creative thinking. And the materialistic, conformist popular culture as reflected in the media has a particularly strong effect in a stage that is concerned with absorbing social norms.

The qualitative dimension of thinking includes an intense sense of personal meaning, of our own interests, talents and ideals springing up from the deep feeling that impels us to make individual sense of the world. I believe that children in this stage of development thrive on strong encouragement and ample time to pursue their particular avenues of making sense of and creating in the

world, as well as the opportunity to learn skills and crafts. The lack of this encouragement and time leads to a severing of the qualitative from the quantitative. I am convinced that children who spend their time watching television, being shuttled from one externally structured activity to another, and attending schools that offer mainly rote learning gradually lose their connection to the qualitative dimension. The stage is set for an even deeper alienation during adolescence.

The Fourth Stage: Adolescence

> Milleniums from now a small girl named Serena would sit crying softly as the rays from the moon dance through the window. The door to her room opened, a tall man who wore a blue suit with gold stripes down the side walked in. 'What is the matter child?' said the man. The body looked up. 'I'm a Freak,' she said, 'I'm like no other person. Why was I bestowed with these awful powers?' she sobbed. 'You are not grateful for your powers?' said the man. 'No, I hate them. My parents bug me all the time, kids stare at me like...like...like...' The girl started crying again. 'It was me who bestowed you with those powers. I thought that you with your powers could save your planet from disaster.' 'Disaster?' thought the girl...
>
> 'You see, many years from now your planet could possibly die from pollution and nuclear waste. You see, many people call me Starlord. I can see into the future and have any other power imaginable. To you I gave the power to alter forces and change their course and to change into any shape as a chameleon would change color; therefore I gave thou the name Chameleon Girl.'
>
> 'You mean of all the people in the universe you picked me?" "Yes, I picked you because you already had a certain power that no one else on this unholy planet has.'

> 'And what it that?' 'Love.' 'Love?' 'Yes, I scanned your mind and noticed that you loved your planet and people.' 'Yes, but how do you know I love my planet?' 'Because years ago, as you many well remember, you could have gone to live on Mars but your love for this world helped you to stay.' 'But why did you pick this universe to look for someone like me?' 'I was on a journey through the universe when my powers started to fade. I landed on this planet and used the last of my power to turn you into what you are.' 'I'm beginning to understand,' said Serena. 'I am grateful to you. Is there any way I can help you.?' 43
>
> (by young adolescent boy)

In Piaget's system, the stage of adolescence marks the transition into adult thinking. He calls this final stage "formal operations." The child can now abstractly consider concrete events that might occur in the future. Thus operations can now be reversed in the mind; they are fluid rather than concrete. Piaget wrote about this stage:

> By comparison with the child, an adolescent is an individual who constructs systems and 'theories.' The child does not build systems. Those which he possesses are unconscious or preconscious in the sense that they are unformulable or unformulated so that only an external observer can understand them, while he himself never 'reflects' on them. In other words, he thinks concretely, he deals with each problem in isolation and does not integrate his solutions by means of any general theories from which he could abstract a common principle. By contrast, what is striking in the adolescent is his interest in theoretical problems not related to everyday realities. He is frequently occupied with disarmingly naive and chimeric ideas concerning the future of the world. What is particularly surprising is his facility for elaborating abstract theories. Some write; they may create a philosophy, a political tract, a theory of aesthetics, or whatever. Others do not write; they talk. The majority talk only about a small part of their personal creations and confine themselves to ruminating about them intimately and

> in secret. But all of them have systems and theories that transform the world in one way or another.44

Whereas the concrete child experiments with concrete objects and specific skills, the young person in formal operations experiments with ideas. Formal operations allow one to theorize about past, present and future.

As we saw in the above discussion of concrete operations, many children in that stage are capable of "doing" formal operations, but their focus is on learning about the physical and social world as it is. What signifies the transition into the next stage is an increasing focus on what is possible rather than what is. This may result in a new kind of focus on fantasy and mythology. Many adolescents are enthralled with science fiction, others with the tremendous variety of romantic possibilities before them. It is natural for adolescents to imagine and desire to create a better world for self and others. The capacity for formal operations also allows for an increasingly critical capacity. If one can imagine a better world, then one can also criticize the adults who created this one. If one can imagine a better self, then one may take ones current self to task.

During the period of concrete operations, the child has been focused on acquiring a variety of facts and skills relating to the physical and social worlds. In terms of artistry, Gardner postulated a "sensitive period" prior to

adolescence that is necessary for adolescent art to thrive. If the child has not accomplished some skill in her chosen craft, the critical adolescent will not continue her work.45 This may be true to some degree of all fields. The adolescent is capable of adapting the standards of the adult craftsperson by which to judge her efforts. If she does not feel that she is making progess in attaining these standards, she may abandon her efforts.

Piaget, Gardner and other cognitive developmentalists have argued that only with the advent of full formal operations are people capable of "real" creativity. This is because they include in their definition of creativity the capacity to judge artistic endeavors critically by accepted standards. Obviously my view of creativity is different. I believe that creativity occurs at all stages of development but varies accordingto the characteristics of the stage. The highly creative person at any stage is one who is deeply in touch with the qualitative domain and at the same time has mastered certain quantitative skills.

The adolescent and the adult may both be capable of formal operations, yet, these stages of development differ dramatically. Biologically and emotionally, the adolescent is in a time of intense turmoil and transition. According to Erickson, she is searching for self-identity and a sense of her place in the world. While it is true that this search may be a life-long one, it is the central theme of

adolescence. What is characteristic about the *thinking* of the adolescent that is tied to this theme are the dual qualities of criticism and idealism discussed above. Whereas the concrete child masters the world-as-it-is, the adolescent strives to create an ideal self and world.

The introductory passage to this section is a story written by an adolescent boy that illustrates the qualities of mind that I am discussing. The story is a science fiction fantasy that critiques the present world and imagines a different possible future. It also is about identity and life purpose. The protagonist is alienated from her family and friends and the values of her culture. She seeks to embody more idealistic values and to find her unique life mission to create a better world.

If developmental needs during the period of concrete operations have been met, the child enters adolescence with a variety of knowledge and skills about the world and confidence in her abilities to use them. She also has developed her own hobbies and interests and interacts creatively with the world with a deep sense of meaning and purpose. During adolescence she is prepared to continue developing skills in her areas of interest, to refine these skills even further and begin to judge them by accepted standards. She may also start to critique these accepted standards, to push the boundaries of what is possible in all

fields. Her natural mental idealism impels her to imagine and to begin to create new forms.

Ideally the adolescent should continue to feel a sense of mission and purpose that becomes more defined as she grows older. This may be a critical period for identifying a sense of "calling" to a field or craft, with the dual purpose of fulfilling one's self and making the world a better place.Adolescents can find their own individual sense of meaning and begin to contribute to any field.

Alienation from and criticism of adult standards in one's field can lead to meaningful development of one's own standards and ideals. The emerging creative thinking may eventually lead humanity forward into more aesthetic and moral ways of living.

When creative thinking has not been fostered, when the qualitative is divorced from the quantitative and developing human beings have not been encouraged to pursue and create in their areas of interest, the result is deep alienation in adolescence. Productive skepticism and criticism become negativity and rebelliousness. The lack of a feeling of individual meaning and purpose and connection with all of humanity leads to materialism and depresssion. Some adolescents make the decision not to enter adulthood; the rising incidence of adolescent suicide has been widely publicized. Others remain emotional adolescents throughout their adulthood, continuing to drift from job to job,

relationship to relationship, looking for and never finding meaning. Others settle into roles in family and job that offer an identity, yet they may always feel that their lives are essentially empty. And some find their way to the stages of adulthood with varying degrees of feelings of connection to the meaningfulness of life.

The Fifth Stage: Adulthood

> The interpretative framework of the educated mind is ever ready to meet somewhat novel experiences, and to deal with them in a somewhat novel manner. In this sense all life is endowed with originality and originality of a higher order is but a magnified form of a universal biological adaptivity. But genius makes contact with reality on an exceptionally wide range: seeing problems and reaching out to possibilites for solving them...the work of a genius offers us a massive demonstration of creativity...46

> The flute of interior time is played whether we
> hear it or not,
> What we mean by 'love' is its sound coming in.
> When love hits the farthest edge of excess,
> it reaches a wisdom.
> And the fragrance of that knowledge!
> It penetrates our thick bodies,
> It goes through the walls--
> Its network of notes has a structure as if a
> million suns were arranged inside.
> This tune has truth in it..
> Where else have you heard a sound like this.47

In the opening passage Michael Polanyi characterized genius as "a massive demonstration of creativity." The meaning of the word *genius*, as it is commonly used, derives from Sir Francis Galton, and refers to creative ability of

an exceptionally high order.48

The word *genius* can be used to refer to someone of any age. Many children are highly creative but not ordinarily thought of as geniuses. *Genius* is usually used to refer to someone who is highly creative in a particular field. A child who is a prodigy in some discipline will be thought of as a genius. There are well-known mathematical geniuses, scientific geniuses, literary geniuses and artistic geniuses. Then there are outstanding humanitarians, such as Mother Teresa, who are geniuses in another sense.

I would define a genius as someone who has mastered the quantitative content or skills of any discipline or area of human endeavor *as well as* being deeply in touch with the domain of qualitative knowing. Intense qualitative thinking implies a sense of profound connection with humanity. Thus in my conception, this genius has the sense that her creative expression is in some way contributing to the good of humankind.

Although it is rare for an individual to be outstanding in more than one field, many famous mathematicians and physicists have also been amateur poets and musicians. Physiologist A.V. Hill once remarked: "I've never known a good scientist who had broad interests...but I've never known a great one who did not."49A genius is outstanding in one area but often also seems highly creative in general. I gave examples in Chapter Three of creative geniuses in a

number of fields who recognized that intuition and emotion play a pivotal role in creative exploration. The underlying qualitative aspects of thinking can be focused on any area, but brilliance will particularly shine through in disciplines that the person has mastered quantitatively. The poem by Kabir in the introduction to this section illustrates intense qualitative knowing combined with mastery of the craft of poetry.

In The Ecology of Imagination in Childhood, Edith Cobb defined genius as "an evolutionary phenomenon, at biocultural levels, beginning with the natural genius of childhood and the 'spirit of place'."50 She saw the natural genius of childhood as the spontaneous creativity common to all children. This creativity is evolutionary because it is the source of human evolution when it continues into adulthood and manifests in individuals creating more beautiful, harmonious and just forms of human culture. Cobb understood creativity as a biological force that expresses itself in culture.

Cobb pointed out that the earlist usage of the term *genius* referred to the *genius loci*, the "spirit of place." She interpreted this as "a living ecological relationship between an observer and an environment, a person and a place."51 Thus for her, genius is the person's natural creativity in a living, dynamic relationship with her personal environment.

I am in agreement with Cobb's theory. I believe that all human beings begin life with the spirit of genius. One of the most critical questions in human development centers on what happens to this spirit of genius as we become adults. In this sense it is appropriate to begin this section on adult development with a discussion of genius. If thought remained alive qualitatively and grew in mastery and complexity in some areas or disciplines quantitatively, then all adults would be geniuses in a sense, great exceptions like Mary Poppins. This is, I believe, what nature intended.

To come to terms with this idea, we may need to change our customary vision of genius. Imagine any adult interacting creatively with all aspects of her environment and particularly bringing her creativity to bear in areas or subjects of her deepest interests. These could be cooking or gardening or helping other people, as well as sociology or mathematics or music. In The Possible Human, Jean Houston wrote: "...previous cultures have tended to deny some areas of development while acknowledging and encouraging others. With the present convergence of the findings of anthropology, cross-cultural studies, psychological research, and studies into the nature and function of the human brain, we are beginning to have in hand a perspective on human possibility as profound as it is provocative."52

One new perspective on the possibilities of the human mind worth noting in this context is Howard Gardner's theory of multiple intelligences. In Frames of Mind Gardner suggested that the human mind has areas of specialty, different intelligences, around which thinking is organized. In my terms, I would say these intelligences may be understood as an organizing force of quantitative thinking. Qualitative thinking underlies all of them. Gardner's scientific criteria for a specialty of thinking to qualify as a separate kind of intelligent are rigorous; he says that his list is probably limited by a lack of data. Some day other intelligences may be identified. His initial list includes linguistic intelligence, musical intelligence, spatial intelligence logical-mathematical intelligence, bodily-kinesthetic intelligence, and personal intelligences, including knowledge of self and others. Genius is possible and identifiable in any of these areas.

Gardner pointed out that the values of Western technological culture lead to an emphasis on educating and encouraging linguistic and logical-mathematical intelligences while virtually ignoring musical and other artistic intelligences, kinesthetic intelligences, and personal intelligences. I would add that our culture's values lead to nearly total disregard of qualitative aspects of thinking. Thus I do not find it difficult to understand why more adults are not "geniuses," in other words, why they

do not interact in a whole and creative way with their environment and contribute to the welfare of humankind.

If there is truth in the theoretical framework that I am presenting, the ways that we choose to educate human beings are critically important. In the final chapter of this dissertation, I will make some suggestions about how educational environments can encourage whole thinking, the qualitative and the quantitative in all human beings.

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CHAPTER SIX

EDUCATIONAL IMPLICATIONS OF A CREATIVE DEVELOPMENTAL THEORY

> Centering as the aim of education calls for the completion of the person or the creation of meaning that utilizes all the potential given to each person. It is no way conflicts with the accumulated knowledge of a culture; it merely places this knowledge in the base of ground from which it grows. As such, centering is the is the fundamental process of human being that makes sense out of our perceptions and cognitions of reality. 1

Educational Ideologies and Creative Thought

In "Development as the Aim of Education," Kohlberg and Mayer identify three main streams of thought in Western educational ideology, along with the three psychological theories underlying these ideologies.2 They define an ideology as "a set of concepts defining aims, content, and methods of education,"3 and I will use the term in the same sense. The three main streams--romanticism, cultural transmission, and progressivism--roughly correspond to the psychoanalytic, behavioristic, and cognitive developmental schools of human development discussed in Chapter Four.

Romanticism here is not the classical Wordsworthian romanticism raised in Chapter Four, although it is historically related to this. Instead, it is Freudian based romanticism, with an emphasis on the development of feeling

unfolding naturally from within. The metaphor of the angel has been replaced by the metaphor of the natural, organic growth of a plant or animal. As discussed in Chapter Four, both mind and emotions are seen to develop in inborn, biologically based stages, and emotional development is regarded as largely separate from mental development. Rousseau and A.S. Neill are examples of romantic educational theorists.

The cultural transmission ideology promotes the transmission of information, rules, and values from the past in order to maintain the stability of the culture. Classical academic traditions, current educational technologies, and instruction by behavior modification are all given as examples of cultural transmission. Instruction is based on the imitation by children of adult modeling of knowledge and values located in the culture. The majority of current education institutions are based primarily on this model.

The progressive model is dialectical; education occurs through the person's interaction with the environment in problem solving situations. Dewey and Piaget are the major architects of this progessive model of thinking. Kohlberg and Mayer's cognitive developmental ideology is a more recent version. They wrote: "Implied in the term 'development' is the notion that a more developed psychological state is more valuable or adequate than a less

developed state."4 Development consists of progression through ordered, invariant stages, and the goal of education is the attainment of "higher" stages of thinking and behaving.

James MacDonald added two other ideologies to these in "A Transcendental Ideology of Education."5 The first is the radical model, which is dialectical like the progressive model, but unlike the progressive model is weighted on the side of social reality rather than inner cognition. The radical model is primarily concerned with social and political structures as they impact on education.

MacDonald's final ideology is the transcendental developmental ideology. The psychological base of this model was presented in Chapter Four. Learning occurs through the "dual dialectic" between, first, the outer world and the rational mind, as in the progressive ideology, and second, the inner self and the rational mind.

MacDonald referred to the process by which we gain access to our inner self as centering. He meant this as a personal spiritual or religious experience. But he also used centering to mean a process that connects people to the outer as well as the inner world. He said: "The aim of education should be a centering of the person in the world."6 In the opening quotation of this chapter, MacDonald explained that centering is the fundamental or underlying process of human being that can be understood to

be the basis of all other modes of knowing and knowledge. In this sense, the transcendental developmental ideology of education can be seen to underlie but not exclude the others.

MacDonald said that a transcendental ideology is necessary because the source of value positions is inadequate in the other four ideologies. He wrote: "Values, I believe, are articulated in the lives of people by a dual dialectic of both reflecting upon the consequence of an action and sounding the depths of our inner selves."7 The other ideologies leave us with only three possible sources of values: 1) our biological nature, 2) conditioning from the environment, or 3) cognitive reflection on experience. But values are also personal and stem from our deepest intuitive experience of a greater reality--the ontological ground of being that is the ultimate source of human nature.

This inclusion of "God" in the theory vastly changes our perspective on what it means to be human; it widens our conception of human possiblities and introduces a morality based on our deepest feelings. In this educational ideology we are compelled to relate deeply to other beings, to care for and about them, both because our rational mind tells us that we should and because our experience of the inner depths of our being makes us feel connected to all other beings.

Of course, MacDonald is not new or unique in proposing that education should have a "religious" or "spiritual" base. All ancient and modern traditional religious cultures propose their own particular religious understanding as the basis of their educational systems. But MacDonald distinguished centering from other similar religious experiences:

> It is important that centering be recognized as a process that may occur in a religious context, but it is not dependent upon any sect or creed, whether Eastern Zen or Western Christianity, for its validation. It is a human experience facilitated in many ways by a religious attitude when this attitude encompasses the search to find our inner being or to complete one's awareness of wholeness and meaning as a person."8

MacDonald felt that the technical, rational, hierarchical thinking underlying the traditional radical perspective is outmoded because recent scientific discoveries and politcal realities demand that we take tacit, intuitive, qualitative, inner modes of knowing into account. But MacDonald certainly shared the concerns of the radical framework. He was deeply interested in the question "How shall we live together?" He used the phrase "personal knowledge" to mean not merely individual knowledge, but cultural knowledge, the common set of personal constructs. He did not intend for the centering process to remove the individual from culture and society; he intended for it to center the person in the world that includes culture and

society.

The Creative Developmental Ideology

As I wrote in Chapter One, the word "holy" is derived from the word "whole." I believe, as MacDonald, that it is our inborn capacity for qualitative knowing, or centering, that connects us with our capacity for wholeness and holiness. When this dimension of human being is ignored, discouraged, or punished, as it often is in educational environments, it becomes difficult to "complete one's awareness of wholeness and meaning as a person." I would like to join MacDonald in suggesting that this dimension, which I am calling the qualitative dimension, become the basis of education.

When I use the phrase "qualitative thinking," I mean it to include the spiritual base that Macdonald referred to. In this sense I see my theory as implicitly "spiritual" or "religious," although I do not feel that it is necessary to use those terms. I believe that assisting in the development of whole, creative modes of thinking is ultimately a holy task.

The educational ideology that follows from the development of my theory of creative thinking is similar to MacDonald's. I will call it the *creative developmental ideology*. I believe that this term describes the theoretical framework, including both quantitive and

qualitiative dimensions of thought. This ideology is relevant to the development of modes of thinking and knowing in educational settings. It also has implications for emotional, social and moral realms.

I embrace Macdonald's basic theoretical model, although I use different words to describe parts of it. My terminology implies less emphasis on transcendence and more emphasis on integrating the transcendent with the mundane. However, this is just in the words, since Macdonald's goal clearly was integration. I believe that the main contribution of my theory to Macdonald's work is the elaboration of a developmental theory. Of course, I don't know if Macdonald would embrace my model of development.

I do not exclude other educational ideologies from my perspective, but I would locate them in relationship to each other in a larger theoretical framework. For example, the progessive ideology is accurate when seen as describing one dialectic in the "dual dialectic" of knowing in the broader sense. Its hierarchical nature is descriptive when put into a context, in the sense that human beings do go through stages in the development of quantitative thought. In other words, although the development of quantitative thinking is hierarchical, the whole of human development ultimately is not.

The romantic ideology position is similar to the transcendental position in its stress on inner experience.

However, inner experience is largely conceived by romantics as emotional truth, rather than as a form of truth that encompasses both emotion and mind. Education is seen as a means to personal happiness and emotional stability. It seems to me that this ideology makes sense when applied to the realm of individual emotional development, but it offers limited insight about thought and society.

The cultural transmission ideology is not necessarily in conflict with the transcendental developmental ideology in the sense that much of the accumulated knowledge of the culture can be seen as important and worthy of passing on from generation to generation. One contribution of the cultural transmission model is this conserving function. But conflict may arise because the relative importance of any particular piece of knowledge and the traditional methods of teaching it are called into question when it is seen in a larger context. The various ideologies use different criteria for determining appropriate educational curriuculum and instruction. All of the other educational ideologies will challenge the cultural transmission's conserving assumptions, based on their own particular assumptions.

The central concern of the radical perspective: "How shall we live together?" results in an emphasis on social action, the tranformation of the social and political system in order to bring about social and educational reform. The

radical perspective teaches that it is impossible to separate an educational system from the culture in which it operates. Educational change can only occur on a very limited basis without a corresponding or preceding change in social and politial realities. On the other hand, the system is dialectical. The individual affects society, and society affects the individual. Education can be used as a tool for social change. Richard Shaull writes:

> There is no such thing as a neutral educational process. Education either functions as an instrument which is used to facilitate the integration of the younger generation into the logic of the present system and bring about conformity to it, or it becomes 'the practice of freedom,' the means by which men and women deal critically and creatively with reality and discover how to participate in the transformation of their world. The development of an educational methodology that facilitates this process will inevitably lead to tension and conflict within our society. But it could also contribute to the formation of a new man and mark the beginning of a new era in Western history.9

I would argue, along with MacDonald, that the development of the aspect of the radical education methodology that deals with thinking must be rooted in the qualitative domain, or in centering, because this is the basis of the thought process that allows us to deal creatively with reality and to transform the world. The transcendental and the radical ideologies are about different but overlapping realms. The transcendental is rooted in modes of knowing, in psychological and

philosophical views of reality. The radical is rooted in social values, in moral ideals of how societies should be, in a sociological view of reality. But I believe that the radical perspective needs to be based on a mode of thinking, just as the perceived truths of the transcendental perspective need to be applied to social justice.

The process of centering, or deep qualitative knowing, demands that all of our experiences be tested for the depth of their reality, value and truth for us against the background of our most profound being. Thus, although centering is not intended to separate us from our culture or society, it can lead us to question the validity of certain aspects of them. In this sense the transcendental ideology may find itself in conflict with the agenda of cultural transmission ideology and overlapping with the concerns of the radical perspective as it searches for modes of living together that are consonant with our deepest felt values of justice. In other words, both the transcendental ideology and the radical ideology may lead us to question the given order of human life.

But whereas a concern with justice is a necessity of the radical ideology, it does not automatically follow from the transcendental ideology. I believe that the process of centering, or qualitative knowing, leads to a sense of caring connection with others. But there is no guarantee that any particular feeling or ideal about a just society

will be reached through the centering process, or if it is, that appropriate action will follow. That is why the transcendental must work in consonance with the radical. It must depend on the radical to continue to ask questions and find solutions about the connections between society and schooling and about social justice in the classroom.

When the qualitative is accepted as the basis of the development of thinking and the corresponding educational ideology, the hierarchical nature of development and education disappears. The qualitative implies a whole and complete way of knowing that is reflected differently in each stage of development, as light is reflected differently through various lenses. The lenses correspond to the changing cognitive structures, the increasingly complex ability to quantify knowledge. Both the light and the lenses contribute to the particular type of reflection. The aim of education is to enhance whatever type of reflection, whatever type of knowing and being is possible at any given stage of development.

Curriculum Methodologies

An educational ideology must be formulated as specific curriculum methodologies before it can be translated into instruction in the classroom setting. I will briefly review a variety of curriculum approaches appropriate for promoting the development of qualitative knowing and creative

thinking in the broad sense described in this dissertation. First I will discuss the enhancing of the qualitative mode of knowing at all stages of development, since I am defining the qualitative as a whole mode of knowing, complete from the beginning of our lives. Then I will discuss the development of creative thinking by developmental stage. Because the development of creative thinking results from the relationship between quantitative and qualitative thought, it occurs in stages that demand varying approaches. In each stage, I will speak to both relevant curriculum processes and ways of structuring educational systems to promote qualitative and quantitative thinking.

Enhancing The Qualitative Mode of Knowing

As defined in this dissertation, the qualitative mode of knowing is our most direct experience of reality, whether we see that reality as "ultimate" reality or personal reality, or some combination of these. It provides the underlying shaping and integrating power that is the meaningful context for quantitative thinking. The experience of qualitative thinking is difficult to describe, but it is a kind of whole thinking -- feeling -- intuiting. Qualitative thinking gives us a sense of connection with the whole of life. In this sense, it may be described as spiritual or religious or mystical. Qualitative thinking can also be described as empathic, since it allows us to

feel deeply connected with other beings around us.

One of my major assertions in this dissertation is that the ability to think qualitatively is given to us from birth. In other words, this whole, meaningful, connecting quality of knowing about the world and other people is a natural part of human *being*. I believe that if this kind of knowing were recognized and supported at all stages of development, then we would automatically feel a sense of connection with and caring about the earth and all its manifestations of life. But our way of living and socializing human beings consistently ignores and/or violates this qualitative mode of knowing. It seems to me that many individual and group acts of violence are an expression of rage at the destruction of the sense of the whole holiness of self.

The qualitative mode of knowing can be enhanced in essentially the same ways throughout life. First of all, it should be recognized. Human beings of all ages, of both sexes, of every race, of all socio-economic classes, of all personality and character "types," are regarded as capable of this whole mode of knowing. Each person is fully respected and honored. This is true even though she may have committed "terrible" crimes against humanity or even though she may not demonstrate any signs of knowing anything. We can and should critique the actions of other human beings with the quantitative mind, but the qualitative

mind does not judge or reject. It connects with and includes everyone.

Educators who wish to promote qualitative thinking will of course honor and respect all of their students. They will also strive to promote an atmosphere in which their students honor and respect each other. Thus they will attempt to structure curriculum and instruction in ways that are continually promoting caring relationships between all persons in the environment. They will try to foster a sense of group identity, fairness in relationships, and positive connections between individuals.

Qualitative thinking is nurtured by a sense of peacefulness, relaxation and unhurried time. When we emphasize quantitative thinking, we become caught up in quantity rather than quality, in speed, judgement, separation, and eventually alienation. On the other hand, if we were to emphasize qualitative thinking over quanititative thinking, we would lack precision, clarity and critical thinking. Both are necessary for ideal human functioning. But our society seems increasingly to be caught up in an incredibly goal-driven, hurried, materialistic mode that doesn't allow time for either qualitative or clear critical thinking.

To retain access to qualitative thinking, each individual needs time to relax and to learn at a pace that suits her. She must have the freedom to discover her own

ideas and inspirations and to feel the sense of meaningfulness and connection inherent in qualitative thinking. She shouldn't be rushed frantically from activity to activity. She should be allowed to find quiet spaces to be by herself sometimes. She must occasionally be allowed the freedom to "do nothing."

Any experience that is deeply moving and inspirational for an individual will enhance her connection with qualitative knowing. Thus it is important that educators know each student well enough to understand the kinds of experiences that will encourage her to feel greatly inspired. However, there are also some general types of experiences that seem to inspire many people that I would recommend emphasizing in the curriculum in appropriate ways for each age, including infants. These include being outdoors, directly experiencing nature, and exposure to and creative participation in all forms of the arts.

MacDonald recommended these processes to facilitate what I call qualitative knowing, and what he calls centering: pattern making, meditative thinking, imagining, arts education, physical education (meaning understanding our entire biological being), and the education of the sense perceptions.10 I concur with this recommendation and suggest that all of these processes are relevant in different forms for each stage of development.

Dewey believed that the nurturing of the imagination

through esthetic experience should be the basis of educational practice because the imagination allows communication and participation in the values of life. He saw the shared values of a culture as the morals upon which a just society rests. Dewey asserted that the central dilemma of his book Art As Experience, that of reintegrating esthetic experience with everyday living, could be accomplished through education.

In this sense the nurturing of the imagination through esthetic education can be seen as having a moral as well as a spiritual dimension, even when the curriculum is described in terms of individual creative expression. This assumption underlies my description of the following recommendations for curriculum at various stages of development.

Infant Creative Thinking Curriculum

According to my theory, the infant is fully equipped to think qualitatively. In other words, the newborn comes into the world with the mental ability to shape and integrate the world theoretically. This qualitative knowing is experienced as an intense emotion that provides the motivation to experience and understand the world. In the beginning the world is taken in through sensory perceptions. But the qualitative mind immediately uses the sensory perceptions to form concepts that allow a more complex

understanding of the world. For the first several years of life, the infant seems "driven" to explore and make sense of the physical and social worlds. The infant begins to construct a quantitative map of reality. The construction of this map is the infant's primary mental activity.

Social and mental development obviously do not proceed separately. Although this theory is about the development of the mind, rather than the development of social relationships, these two processes are interconnected. The qualitative mind allows intimate connections with both people and objects. The infant feels qualitatively connected with everything and everyone. The fact that other people respond from their own qualitative center clearly allows for unique and complex relationships to occur. Parent-infant bonding results from a connection in the depths of both. In the social realm, a positive developmental outcome for the infant is dependent on the presence of one or more adults who are more or less continuously responsive to the infant's needs. Given this presence, the infant will develop what Erickson calls basic trust in the world. Without this presence, the infant will experience the world as more, rather than less, painful and hostile. The infant will find it necessary to defend herself by closing down emotionally. Because the qualitative mind is largely emotion, thinking is effected. The infant will not feel safe in exploring and theorizing

about the world if she does not trust it.

Thus a good infant curriculum begins with the presence of stable, loving, responsive adults. This, of course, remains true throughout life, but it is an especially critical factor during the earliest years. This issue is a particularly crucial one now as more and more infants are spending more and more time in child care arrangements outside the home, often from weeks after birth. Due to low wages and stressful working conditions, the staff turnover in child care centers is very high, and the quality of responsiveness in child care workers to any infant is often weak. I believe that the effects of this factor on social, emotional, and mental development of the infant are strongly negative.

Given the presence of a responsive adult, an infant curriculum should provide infants with access to raw materials for each of the senses. Infants need a variety of materials to look at, touch, mouth, and explore, and a variety of sounds and language experiences. They need free access to these materials in an environment that is safe for crawling, climbing, walking, and running. These raw materials provide the data that the infant's mind needs to develop quantitatively. The critical mental work of this period is to form and test hypotheses out of which a general map of the world is developed.

Thus far the educational environment is basically the

same as the one that a cognitive developmentalist would provide. But there is a vast difference in the ways that the cognitive developmentalist and the creative developmentalist regards the infant's learning and the infant herself. According to the cognitive developmentalist, the mind gradually develops out of reflexes and then is constructed "bottom up" from the relationship between itself and the world. There is no higher level integrating and constructing function present from the beginning. In other words, there is no "center". The infant's capacity for developing intelligence is respected, but still, the infant is regarded "at the bottom of the totem pole" in terms of intelligence, morality, aesthetics, and so on.

From the creative developmental perspective, the infant is regarded as having a fully functioning ability to feel, understand, shape, and integrate the world cognitively. This ability arises from the deepest center of being. What the infant is lacking is experience with the world, the experience that will gradually result in the emergence of an increasingly complex ability to understand the world quantitatively.

From this perspective, the infant is also understood to have the capacity to connect on a qualitative, empathic level with other infants. She will, of course, over time have to build up an understanding of the social realities of

getting along with others, which the educator will help her to do, but the capacity for connection derives from the given nature of the qualitative being.

This way of thinking about an infant results in a complete respect for her as an equal whose lack of extensive experience with the world naturally means a less developed understanding of it, but whose capacity for understanding and experiencing reality in her own way is as complete as the adult's. This perspective of the infant has very different educational implications than those of the cognitive developmental perspective. In the creative developmental perspective, an educator is there first to relate on a deep being-to-being level with the infant. Second, she is there to structure the environment to help the infant learn about the quantitive world and about qualitative connections with others. Third, she is there to teach directly when this is appropriate. But she also is aware that she will learn at least as much as she will teach. She understands that the infant's connection with the qualitative is strong, and she experiences that connection when she bonds with the infant.

The way that a teacher or parent sees a child has an influence on how that child develops. I believe that this way of seeing an infant results in a strengthening of the infant's capacity for creative intelligence and for connection with others.

Preschool Creative Thinking Curriculum

In this stage the child continues to explore the world actively and to increase the complexity of her conceptual understanding of physical and social realities. In cognitive developmental terms, by the end of the stage she will be able to perform operations, a thinking skill that will allow her to be less dependent on physical perceptions in her understanding of matter. In order to make these gains in thinking quantitatively about the world, the child continues to need free access to a variety of toys and materials.

In terms of this aspect of thinking, the creative developmental approach to curriculum would again be the same as the cognitive developmental approach. The environment would contain blocks, sand, water, clay, and many kinds of games and manipulative materials. By playing with these materials, the child naturally learns about shape, size, length, and height and how these change under varying conditions. She learns about sequencing these objects by size, shape, and color. She begins to develop an understanding of the concepts of number, quantity, measurement, and space. She learns that objects can be classified in a variety of ways.

In both the creative and the cognitive developmental curriculum, the child is also provided with a variety of

experiences with language. Adults converse frequently with children, and children are given continual opportunity to converse with each other. Children sing songs, listen to records, hear stories, and dictate stories. The rapid growth of language in this period is part of the basis of the child's increasingly complex ability to represent the world symbolically.

Both creative and cognitive curriculum environments would include games and materials specifically designed to teach particular cognitive concepts, such as puzzles, color matching games, and size discrimination boards, because both recognize the importance of developing the quantitative mind. However, unlike some specifically cognitive curriculums, the creative curriculum would allow children to play with these materials in imaginative ways. For example, with a puzzle of squares of decreasing size, the child could not only learn to put them in the right hole but could also have them become a "family" of squares.

The creative developmental curriculum differs from the cognitive developmental curriculum in this period in its emphasis on creative activity and the use of the imagination. In Chapter Three I suggested that it is the imagination that links qualitative and quantitative thought. Thoughts begin as emotional experiences that are translated into concrete qualitative forms through the imagination. In Chapter Five, Stern suggested that infants are making

"global" abstract representations from birth. By this second stage of development, these representations become specific images. It is this ability to think specifically in symbols and then to express these symbols in words and forms, combined with the still intensely strong feeling force of the qualitative aspect of thought, that allows for the tremendous burst in creative, imaginative thought and play that was discussed in Chapter Five.

The child's explorations and thinking in the first several years of life have resulted in a general "map" of reality. In the second stage, the child plays with materials by turning them into synmbolic representations in the imagination. A baby might pick up a block, feel it, look at it, put it in her mouth, stack it on another one, and knock it down. A preschool child would be more likely to build a house or a tower with blocks. As she does, she is learning about shape, size, length, height, number, quantity, measurement, and space. But learning about the properties of the world is no longer her primary mental motivation, as it was in the first state of development. It is a secondary result of the primary desire to imagine.

An educational environment based on a creative developmental curriculum would see the inclusion of raw materials such as blocks, sand, and water both as materials for the mind to play with imaginatively and as materials to teach about the physical properties of the world. Children

would have as much access as possible to the out-of-doors, the best possible place to learn about the natural world.

Most learning occurs through play during this period. This is true of both mental and social learning. Quantitative skills are best learned in the context of real life experiences and explorations, followed by opportunities for imaginative elaboration. For example, a visit to a farm to learn about farm animals is preferable to merely reading a story about farms. But in either case, putting toy farm animals in the block area allows imaginative exploration of the facts and concepts.

Some direct imparting of basic information, skills, values and rules, as in the cultural transmission model, continues during this period. But for this transmission to be effective, it must be expressed in a way that has an emotional or qualitative appeal to the mind of the child. Then the information can be used by the child in a creative activity to be fully utilized mentally. For example, if children are taught about the roles of firepersons and police in our society, they are also given opportunities to tell stories about, dramatize, and draw pictures about their activities.

It is important in this approach that the amount of time spent in creative activity far exceed the amount of time spent absorbing information. A four year old child might watch half an hour of educational television

programming on mountain climbing and then spent hours drawing and enacting what she saw. If a great deal of time is spent passively receiving information on a continual basis, the qualitive capacity of the mind and thus the overall capacity for whole thought will be diminished.

The creative developmental classroom would include an extensive play house area, many kinds of dress-up clothes, and other dramatic play areas on a rotating basis, such as store, doctor's office, space ship, airplane, bus, and restaurant. Children not only hear and dictate stories but also informally dramatize these stories daily.

An environment based on a creative developmental curriculum would include a large variety of arts and crafts materials so that children could imagine and design their own creations frequently. Materials would include papers of all types, cardboard, boxes of all sizes and shapes, rubber bands, tapes, glues, discarded food containers, cloth, ribhons, etc. On any given day, children might decide to design and make their own hats, a monster, a sword and shield, a queen costume, a town, or a mouse house. These creations often become props in dramatic plays and invented games.

The educator in a creative developmental curriculum completely respects the child's knowing and knowledge. As we have seen in Chapter Five, "average" children in this stage of development show remarkable creative abilities, are

capable of grappling with complex philosophical issues, frequently have deep "religious," unitive visions about the nature of the universe, and seem to intuit explanations of physical reality that concur with the latest scientific theories. Adults realize their role in helping to facilitate the development of the child's quantitative thinking, but they understand that the preschool child's thinking represents a vision of the world that is accurate in its own way. The adult is open to a reciprocal teaching and learning role.

In a creative developmental curriculum, the continual use of the imagination through art, play, creative movement and dance, story telling and dramatics teaches the child to see things from the point of view of other beings. As Friedrich Froebel, the founder of the kindergarten movement, said:

> What the child imitates, he begins to understand. Let him represent the flying of birds and he enters into the life of birds. Let him imitate the rapid motion of fishes in the water and his sympathy with fishes is quickened. Let him reproduce the activities of farmer, miller, and baker, and his eyes open to the meaning of their work. In one word let him grasp in his play the varied aspects of life and his thought will begin to grapple with their significance.11

In using their imaginations, preschool children will be developing greater empathy for all beings in the world, from various kinds of animals to various kinds of people.

Global awareness may start here by focusing on different cultures, using direct dramatic participation in their customs, stories, costumes, music, and dances. Thus children can call on their natural qualitative sense of connection with all peoples.

I have suggested that esthetic education encourages connection with others, caring, and creation of community through the development of the imagination. But I believe that educators should also continually encourage these attitudes and activities directly. Empathy and connection with other children begins in infancy, but in the preschool years, the potential for strong friendships, as well as negative social behavior, begins to emerge. At this stage of development, it is appropriate for educators to model for children the variety of skills necessary for understanding and getting along with others. Children can be shown how to communicate their feelings and desires directly, but with words instead of actions if these feelings would result in pain to someone else (to "talk instead of hit"). They can gradually learn to share, to take turns, and to take other people's perspectives into account. Educators can help them to experience themselves as part of a community in which each person is valued equally and uniquely, and individual differences are respected.

In a creative developmental curriculum, adults respect the choices and motivations of each child. Each child is

understood to feel a deep sense of meaning and purpose and to have a strong sense of what she wants to learn and create. Adults attempt to support the child's choices, to guide when necessary rather than to direct. Most of the direction for creative mental development comes from the qualitative mind of the child.

School-Age Creative Thinking Curriculum

The name for this stage derives from the fact that this is generally when children begin formal schooling. The vast majority of formal schooling is based on the cultural transmission model. Information, skills, values, and rules are transmitted in a behavioristic manner. The teacher, or the textbook, gives information, and the student absorbs it by memorizing, copying, and repeating in various forms.

Although, as we have seen, the qualitative is always an aspect of thinking, it can become compressed and repressed so that thinking is largely mechanical. In other words, some minimal emotion is necessary to have a thought of any kind. But when a curriculum assumes that thinking will be largely selected and directed from outside rather than inside the person, as in a traditional classroom environment, then either thought becomes lifeless or the person chooses to think about something other than the intended curriculum. What usually occurs is a combination of both.

I established in Chapter Five that this is a more

appropriate stage for children to learn skills and information than the previous stage. This is undoubtedly why the majority of cultures begin serious instruction at this time. The child becomes more interested in "mechanistic scientific" rather than "metaphorical" explanations of life. She wants to know about the particular rather than the general. She wants to learn facts about things she is interested in and learn the skills that allow her to do the things she wants to do. She wants to "play by the rules" and adhere to the norms of culture, particularly the peer culture.

As I wrote in Chapter Five, cognitive developmentalists call this stage concrete because the average child of this age is only supposed to be able to use reasoning in operations with concrete objects. But I have already pointed out that many children of this age are capable of highly abstract reasoning. I think that it is more accurate to say that the interests rather than the mental abilities at this stage should be characterized as concrete.

As with the first two stages of development, the child's mental capacity is influenced to a large degree by the kinds of experiences allowed her and by the attitudes of the adults who relate to her. Gareth Mathews discovered that children "do philosophy" better than most grown-ups or adolescents because he was willing to talk to children as if they could "do philosophy." He did not have a theoretical orientation

that limited his expectations or respect for children. He entered into a philosophical conversation with a child as a reciprocal relationship. He suggested that adults may have a better command of language and concepts, but that children have candor, spontaneity, and eyes and ears for perlexity and incongruity. In other words, adults many still have a better command of the quantitative in this stage, but children usually continue to have a stronger connection with the qualitative dimension of thinking.

It is extremely important to the self-esteem of the school-age child that she leave this stage feeling confident about her mastery of skills and knowledge in the areas that she and society deem important. But it is also critical that she acquire these skills and knowledge without losing touch with her center, with her deepest sense of knowing, with her ability to shape and make decisions about what she wants to learn and create.

One of the problems with cultural transmission based, behavorial educational systems is that they ignore or at least minimize the qualitative dimension of thought. The emotion of qualititive thought is the force that selects and breathes life into quantitative thought. The qualitative brings a sense of purpose into learning and living. Qualitative thought provides a deep inner motivation for learning. When qualitiative thought is omitted from planning in educational curriculum, then all that is left are

the facts, the skills, the rules, without the internal motivation to master them.

Yes, of course, there are those multiplication tables that simply must be memorized. And no matter how interesting the applications of mathematics to "real life" that a vital teacher might make, some children will never be particularly excited about mathematics. All children will sometimes need to learn certain things that they find boring.

But all children are excited about some things. I believe that the majority of a child's time in a formal educational setting should be spent on projects that the child chooses to do bssed on her own interests. When this happens, then education becomes Dewey's aesthetic education, no matter what disciplines the projects represent. There can be many stipulations about these projects that will insure that children learn the "basics". Children can be required to read and write some about all of their projects. They can be assigned a certain number of projects in basic curriculum areas, such as the sciences and social sciences, and the arts and crafts. They can be asked to do some projects individually and some in co-operative groups, to learn both to work well alone and to work well with others.

At this stage of development, it is approprate for the class as a whole to function as much as possible as "a just community" to give children an opportunity to learn to live well with others. Educators can continue to use real social

situations to model ways to help children understand and relate fairly to one another, to deal with conflict in a peaceful and effective way. Children in this stage have a strong sense of justice and fairness. It may be literal, as in "an eye for an eye," but they will want to see that "right" prevails. School-age children are capable of taking a great deal of responsibility in creating and administering the classroom community. They can assist in making rules, deciding on punishments for violations, and running the classroom as a semi-democracy (the educator claims final authority for the prevailing of justice), with the group making decisions about as many of its activities as possible.

I have suggested that qualitative thinking implies a connection with the entire earth and all of its beings. The preschool child experiences this connection through the use of the imagination, and so does the school age child. But it is also appropriate for the school-age child to begin a conscious study of and plan of action based on these connections. This would include a study of the various social groups in the immediate community, such as age, ethnic, and socio-economic make-up. Examples of actions based on realized connections might include collecting canned goods for poor people, "adopting" a lonely elderly person, or learning about the culture of African Americans. A variety of curriculum experiences that

promote global awareness could also be offered, focusing on studies of the many of cultures of our one world and ecological consciousness about the earth.

When children decide on many of their own learning activities, master the facts and skills as they carry them out in appropriate esthetic form, learn to peacefully resolve their conflicts, participate in as democratic a classroom society as possible, and become increasingly aware of their connections with the whole earth and all of its beings, then qualitative and quantitiative thought are united in living. Curriculum subjects are not kept artifically separate from each other or from the process of relating to other people. Thinking and living are united.

During the preschool years, no special techniques are needed to encourage creative thinking, although some may be fruitfully used. But there are several reasons why techniques are probably necessary and appropriate during the school-age years. First, by this time the qualitative aspect of thinking may have been stifled by limiting outside influences. Second, techniques for getting in touch with qualitative thinking appeal to many children in this stage. There are a variety of curriculum suggestions about these, and I can only mention a few in the scope of this dissertation.

To enhance the intuitive mode in education, Nel Noddings and Paul Shore recommend first acknowledging to students the

reality of intuition and intuitive modes. They suggest telling stories of the role of intuition in the creative processes of famous artists and scientists. They encourage teachers to tell students about the stages in the creative process and then to help them use preparation, incubation, and illumination as they work on projects and problems. They recommend the regular use of deliberate "warming up" excercises, such as relaxation and quiet meditation.12

In the last decade there have been many books and articles published about promoting creative thinking in children. The authors ususally point out that creative thinking is the opposite of the kind of thinking generally called for in traditional educational settings. Creative thinking demands flexibility, the abilitiy to come up with many possible answers rather than the one right one. Shilcock and Bergson offer this comprehensive definition of flexibility:

> --the ability to adapt to change
> --the ability to look at ideas and situations from different perspectives
> --the ability to make connections among apparently unrelated ideas
> --the ability to think about an idea, take a piece of it and shape it into a novel situation
> --the willingness to experiment and take risks without being preoccupied with other people's opinions
> --the ability to create new combinations of objects and ideas
> --the willingness to question assumptions and to reach past their apparent boundaries.13

The educator in the creative developmental curriculum

will be aware of trying to encourage these characteristics in herself and in her students. These characteristics are best enhanced in the general process of everyday life and learning in the home or classroom. They are certainly encouraged in the context of an integrated model of education. But there are also specific actiivities that can be used to promote them. For example, I have used brainstorming, inventing machines for specific purposes, combining random objects to form a new invented object, thinking of many interpretations for ambiguous pictures, making up different endings to stories, thinking of connections between paired objects that would not usually be paired, and asking questions that challenge current assumptions such as: "How would the world be different if everyone was one foot tall?" or "Which color is stronger, red or blue; why?"

If the child's ability to think both qualitatively and quantitatively, by herself and with others, is supported in this stage of development, she is ready to move into adolescence with self-confidence stemming from the feeling that she is a competent person with the thinking ability and skills to deal flexibly and creatively with her life choices. She feels that she is capable of making both connections and changes in her world of family, friends, school, community, and world. She believes that life has meaning and she has a sense of her ability to make a unique contribution to it based on her own interests.

Adolescent Creative Thinking Curriculum

Many of the recommended educational practices of the earlier stages continue in the later stages to be the most effective methods of educating qualitative and quantitative dimensions of thought. Adolescents continue to benefit by caring adults who respect their ways of thinking and knowing, can engage with them in supporting and challenging dialogues, and can teach them the skills and information that they want to know.

During this period the adolescent begins to measure herself by adult standards, and she starts to measure accepted adult standards by her standards. It is important for her to feel that she can contribute to some areas of knowledge and skill on an "adult level" in critical and creative ways. Therefore, it is approriate for curriculum to support the continuing mastery of skills and information that allows this to happen.

I believe that education should continue to have an aesthetic base, with the interests of adolescents as the guiding force in choosing and carrying out both interdisciplinary projects and projects in specific disciplines, individually as well as in groups. Some form of the same processes suggested in the previous section for enhancing intuitive modes and increasing flexibility in thinking continue to be relevant.

The organization of the educational environment into a

"just society" continues to be of critical importance. Adolescents are capable of taking responsibility for major aspects of the social organization of their schools. For example, Kohlberg experimented with "Just Communities" in several high schools. With adult guidance, adolescents attempted to establish their schools as communities committed to democracy. Although these communities had many problems, the high school students gained skills in using moral judgement and administering justice.16

In Chapter Five I stated that the hallmark of thought in this period is the adolescent's interest in experimenting with ideas and skill areas, with criticizing the past and finding new and better ways of living. If her connection with qualitative thought remains strong, it becomes increasingly important for her to act effectively on her sense of connection and her global awareness, to apply her ideals to improving the lives of other beings or healing the planet that is her home.

Ideally the adolescent has intense emotion and imagination that fuels her ideas, interests, and increasing quantitative mastery. She is idealistic; she believes that a better self and a better world can be accomplished. She passionately works at the things she enjoys and strives to create a better self and a better world. She is strongly rooted in the qualitative domain. It is important for her to have time and space to carry out her passions, to work on the

things she cares about, to discuss and argue and come to terms with various conceptions about self and the physical and social worlds. All of this does not mean that the adolescent is not struggling with the central issue of identity or that she is not sometimes in despair or rebellion. But despair and rebellion have a different feeling in the context of a deep sense of purpose and meaning.

Of course, the ideal is not the usual here. The majority of adolescents in our culture have participated in educational systems that have alienated them from using their deepest interests and passions to create poetry and paintings, to make new mechanical models, to write philosophical treatises about changing the world, to find ways of making their own high schools more compassionate places, to work at local "soup kitchens," or to advocate for ecological consciousness. As result, many adolescents feel either an overwhelming sense of alienation and despair, or a need to immerse themselves in the materialistic values of the culture, rather that a deep sense of personal meaning, connection with others, and creative possibility.

In general, high schools are structured to carry out cultural transmission methods of education. Most efforts at reform have attempted to revitalize the teaching of formal academic curriculum. There have been fewer attempts to institute new forms of education than at the elementary

school level. I would suggest that a great deal of intellectual and practical effort be directed towards finding radically different ways of structuring high school curriculum.

Adult Creative Thinking Curriculum

In Chapter Five, I suggested that all of us have the potential to be "geniuses," that is, the potential to be highly creative in a particular field. Another way of saying this is that each of us could achieve enough mastery in quantitative information and or/skills in some area or discipline that we love to contribute to it in a novel and evolutionary way. If we remain rooted in qualitative thinking and continue to experience a deep sense of connection and empathy with all of life, then we will want to feel that our creative contribution in some way enhances life for other beings.

This assertion will seem absurd if we assume that the current population of adults is representative of adult potential. But of course, I do not believe that it is. The limitations that culture and education have imposed on human thinking are so great that we can barely imagine the possibilities. I think that child rearing practices and educational systems, which are manifestations of the culture, damage the potential for genius and creative contribution to life in most of us.

Even so, the area of current adult curriculum seems somewhat promising to me. In the past decade or so, the concept of "lifelong learning" has taken root, and it continues to grow. Adults older than the traditional college age students are going to schools to get better jobs, to "improve their minds," to learn new skills, and to become more "whole." The new skills and information that they are acquiring are incredibly varied, and some of them deal directly with re-connecting with qualitative knowing. Many adults are learning techniques for meditation, relaxation, body integration and awareness, creative imagination, enhancing sensory perception, and enjoying aesthetic pursuits. But any skill or area of knowledge that is pursued with emotion and interest becomes an aesthetic pursuit.

One main difference between adult education and education at any other level is that adults for the most part have at least some degree of choice about whether or not to be in school and what to learn about once they are there. This is certainly more true for older adults returning to college or informal adult educational settings than it is for young college students, but there are also generally more possibilities for choices based on interest in colleges than at earlier levels of education. And although much college education is conducted along a traditional cultural transmission model, still much of it is not. Some college professors do try to incorporate the acquisition of critical

and creative approaches to learning. A variety of experimental approaches to curriculum at the college level and other adult levels do exist.

Adults who have been extremely damaged by their education experiences may never again want to attempt deep and meaningful learning experiences that lead to full creative thinking. Yet, the human spirit is not easily vanquished. Creative thinking may be repressed, but it may be revitalized at any time.

Whole creative thinking rests on qualitative knowing. Out of qualitative knowing rises a deep sense of connection and empathy with others. The full adult human thinking potential is not realized until the fruits of creative thinking are dedicated to the welfare of humanity. The fulfillment of the genius in each of us brings greater beauty, harmony, justice, compassion, or love to the world.

Conclusion

In Chapter One I articulated a number of social and ecological catastrophes that seem to increasingly characterize the state of the world. Through fear and ignorance we are losing the possiblity of the creative evolutionary contributions to the earth and humanity, the genius in all of us that could save us all. The ability to think creatively begins at birth, and our first educational experiences affect our capacity for whole, holy thinking in

either a nurturing or a destructive way. Our natural capacity for qualitative knowing is structured so that our thinking can connect us meaningfully with all of life. The creative imagination of childhood contains the roots of human evolution toward more aesthetic and just ways of living. Each stage of development is designed to contribute a unique dimension to human knowing and living. It is critical that the educational experiences of each stage grow out of whole and holy thinking about human development and curriculum. This dissertation is my attempt at a contribution.

Footnotes

1. James B. Macdonald. "A Transcendental Developmental Ideology of Education." In Curriculum. ed Gress and Purpel. Berkeley, California: McCutchan, 1978. pp. 113-4.

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