VIEWING, IMAGING AND THE DERIVATION OF MEANING IN THE USE OF BLACK AND WHITE, STATIC VISUAL MEDIA: AN APPROACH TO PHOTOGRAPHIC INTERPRETATION IN THE CLASSROOM

by
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ABSTRACT

The author suggests a synergistic relationship between the processes of imaging and viewing and presents theoretical research to support the identification of the Gestalt theory of pattern perception as common cognitive constructs in both processes. Imaging is defined in relational terms, as a class of inferred constructs or processes, and examined as a critical component in the transactional theory of reader response. It is suggested that imaging functions as a stimulus for conceptualization and as a mnemonic prompt. Viewing is defined as visual thinking and examined as the sighted individual's natural response to visual perceptual stimulation. Photography is identified as a ubiquitous visual medium in Western culture and, for instructional purposes, a case is made for examining samples which are static and black and white. The limitations of photography as cognitive stimulus are examined. Black and white photographs are presented as exemplars to be analyzed and interpreted and the author suggests possible analyses and interpretations based upon the Gestalt theory of pattern perception. Instructional strategies for developing imaging and viewing skills are suggested. These strategies involve the production of both verbal and non-verbal student expression. Considerations for the assessment and evaluation of student imaging and viewing are discussed and a role for visual literacy within an inter-disciplinary curriculum is suggested. An appendix of resources for imaging, viewing and photography instruction is included.

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DEDICATION

This work is dedicated to all the family and friends who helped and encouraged me during the course of its production. I would most especially like to recognize the patience and mature support lovingly tendered by my daughters, Katrina and Chantal.

INTRODUCTION

The intention of this study is to examine some of the factors which empower some images with the potential to persuade and convince. In approaching this topic as an issue in education, the author addresses two basic questions. First, why do teachers need to know how to "read" non-print information, and secondly, what might be involved in acquiring such expertise?

Before engaging the reader in a fairly exhaustive theoretical study of the historical, physiological and philosophical factors which impact upon a person's viewing (and imaging) skill, the author wishes to provide an experience with viewing to serve as an exemplar of the potential which an image may have to shape a viewer's opinion. This experience, it is hoped, will provide insight into the basics of the viewing process, and suggest the scope of the problem which confronts educators who wish to teach visual literacy skills.

The discussion of the figures used in this first example contains numerous references to the Gestalt theory of form perception (Zakia, 1979). The author believes that the research (Sanders and Sanders, 1984; Randhawa and Coffman, 1978) detailed in Chapter One of the thesis, "Theoretical Foundations", will not only explain the relevance of these references to image perception but will also identify important linkages between the processes of viewing and imaging, and concept formation in general, particularly as it relates to print literacy. Such linkages may be of particular interest to teachers of communication process, that is, those who teach languages, reading, writing and media study.

ORGANIZATION OF THE STUDY

The discussion will be organized into four sections. In the first, there will be a thorough review of the terms "viewing" and "imaging", and, as educators, what we need to appreciate about the manner in which photographic process mediates images, in that the processing of film constitutes an often unrecognized intervention in the production of images. The second section will provide viewing experiences to demonstrate some of the basic principles discussed theoretically in the first. The third section will outline considerations and instructional strategies for the use of visual media, particularly black and white photography, in the learning environment. The last section will suggest possible further avenues of inquiry.

The discussion of visual media during this study will be limited to that pertaining to black and white, static displays which may be either line drawings or photographic in origin. The rationale for this limitation will be explained during the theoretical discussion of "viewing" and "imaging".

AN EXPERIENCE WITH VIEWING

Viewers of non-print graphics are often confronted with "eye- catching" experiences to which they may react with whimsy or curiosity. However, apart from providing some transitory visual stimulation, such images may not seem to be significant in terms of transmitting any consciously comprehensible message. A visual experience of this nature may have occurred for readers of the second edition of the Victoria *Times Colonist* on December 14, 1989.

THURSDAY Times C

December 14, 1989 Victoria, British Columbia, 132nd year, No. 4

Zalm 0 for 6 after

■ ELIZABETH CULL, right, became the first NDPer to win in Oak Bay-Gordon Head after upsetting Socred candidate Susan Brice, left.

Figure 1

THURSDAY **Times** C

December 14, 1989 ★ Victoria, British Columbia, 132nd year, No. 4

Cull wins anti-Zalm

Ian McKain and John McKay phot

■ VICTORIOUS Elizabeth Cull gets a hug from her husband Terry Wickstrom, while Socred Susan Brice applauds campaign workers.

Figure 2

The front page of the paper that day (Figure 1) *(Victoria Times- Colonist*, 1989, December) featured a story about Elizabeth Cull's upset victory over Susan Brice in a provincial by-election. The text of the first edition of the paper that day was accompanied by photos of the two candidates, each alone in the photo, each seemingly presenting an equally neutral, portrait-style image. However, these photos were replaced in the next edition of the paper (Figure 2) *(Victoria Times-Colonist*, 1989, December). The replacement photos were less neutral in terms of the images presented. One showed Elizabeth Cull being embraced by her husband, and the other showed Susan Brice, alone, with her fist upraised. The impact represented by the contrast in the second set of images, the impression given that one person was enclosed and protected, the other solitary and perhaps somewhat compromised, caused the writer to ponder the reason for the change. Of even more interest was the impact on the viewing public of such a change.

Educators of communication process perhaps should be concerned about the manner in which such incidents have the potential to shape the attitudes of a viewing public which is, for the most part, unaware to what extent, and in what contexts, such attitudinal manipulation is occurring. What motivated the editors of the paper to present in the revised version of the their lead story such different images for the two candidates is perhaps an issue related to the exigencies of political journalism, and not a question particularly germane to the topic of this thesis. The author includes these images at this point because the circumstances of their initial printing (the fact that the first set was replaced in subsequent editions) suggests that there is some message contained in the second set which is particularly noteworthy. Otherwise, the expense of the substitution would not have been deemed worthwhile.

What is the underlying message in these photos? What dynamic is at work to

make the image of one politician more "pleasing" than the other's? The answer lies partly in an understanding of the Gestalt laws of perception, a set of principles which work to help our eyes make sense of viewed phenomena. This thesis will attempt to demonstrate that an understanding of these principles is pertinent to the acquisition of visual literacy. An examination of the two photos in Figure 2 may illustrate the power of the Gestalt principles in influencing the meaning of a visual message.

Susan Brice's image may be compromised because of the overall impact of the juxtaposition of her head and the flag in the background. Although the cone-shaped headpiece might suggest to some viewers the crown of a medieval queen or perhaps even a bishop's miter, for many, a more contemporary and less authoritative symbol may be evoked. Specifically, the furled flag may suggest a "dunce's cap". In the context of such an unfortunate connection being made, viewers may not only see Susan Brice as a loser, but might also see her as a less than credible contender. This results from the connotation associated with the dunce's cap, defined as "a cone shaped paper hat worn by children as punishment for idling at school" (Irvine, 1956: p. 312). A dunce is "a dullard; a backward child" (p. 312) and duncery is "stupidity" (p. 312). The image of the dunce's cap, then, carries with it a wealth of negative connotations: ineffectuality, ignorance, laziness, naivite, some of which the viewer may unconsciously ascribe to the wearer. It is possible that such an applied connotation could compromise one's public image. It is tempting to speculate that the publication of this image of Ms. Brice is a blatant example of media bias working to discredit the losing candidate. It may also have replaced the first photograph because it was a more recent image. However, it is entirely possible that this photo was chosen because of its eye-catching appeal. It is so unusual in composition as to be noteworthy to many viewers; it is the kind of image which is memorable for its ability to make the viewer take a second look, because one may want to be sure that

what was perceived was in fact there to be seen and not simply a "tromp d'oeil" or illusion. It is the job of journalists to make "good copy", to cause a stir, or catch the attention of the reading public. We, as viewers, or particularly as educators of communication process, have the responsibility of reading such images knowledgeably enough to evade such visual bias, regardless of its intent.

What would a knowledgable viewer be aware of in looking at the photo of Susan Brice? One would possibly be aware that her image suffers substantially, not simply because of the composition of the photo, but also because her image is juxtaposed with one of Elizabeth Cull which is quite positive by contrast. Elizabeth Cull's photo presents an image which is positively reinforced by the Gestalt phenomena of similarity and closure. The photo is pleasing to the eye because it projects visual unity; it is an image of an affectionate, happy couple; both husband and wife are smiling broadly; to some, they may seem, with their eyeglasses and short hair, a matched pair; the arms of the husband create a frame to reinforce the effect. They are alike and enclosed within a visual construct which seems to present no tension or puzzlement.

On the other hand, Ms. Brice's photo may seem to present a negative impression because of the operation of the Gestalt principles of continuity, proximity and closure. The eye prefers to create unity (Zakia, 1979) and will include as part of a unified image features which are seen as close enough or continuous enough in line to be associated with a primary image. Moreover, the conical image of the furled flag, particularly when set on top of a head, is an image familiar enough to evoke closure, an effect created by the perception of a shape which resides in memory, but which does not necessarily exist in fact. Unlike the Elizabeth Cull photo, this image does not create a pleasing visual effect; there are too many discordant elements. An

upraised fist may be interpreted as a symbol of victory, but it is also often associated with defiance or rebellion, a notion which does not tally with viewers' perceptions of an electoral candidate as a responsible individual; the microphone and cables in the foreground "upstage" the central character and reinforce the role played by the media as the arbiter of image. Most crucially, the triangular dunce's cap illusion militates against the public's inherent need to have faith in the capabilities of its public servants. These factors tend to work against the image having unity.

The foregoing discussion is not intended to be inclusive in content. Viewers may react variably to any one stimulus. The Brice/Cull photographs are presented here as introductory examples to help the reader appreciate the scope and nature of the study. In Chapter Two, less localized examples will be used to develop further understanding.

THE POWER OF IMAGE

The casual viewer of these photos was unlikely to be aware of the extent to which such factors may have been influencing his or her appraisal. Yet the fact that the rather neutral, but reasonably acceptable, images of the first edition (Figure 1) were replaced by the second set stands suggests that such images do have the power to create reaction. It is one of the the jobs of editors to recognize factors which will raise the newspaper's profile in the community and thus perhaps improve circulation. Such photos are topical; the expert eye of a photo-journalist quickly recognizes their practical value.

The analysis of perceptual (viewed) image involves a complex set of under-

standings related not only to image interpretation, but also to an awareness of the linkages between eye and brain function and the mediating impact of photographic process. However, such understanding serves to shed light mostly on the viewing process; a further understanding of the linkages between the hemisheric function of the brain and reading process and concept formation is necessary to appreciate how internalized images (entecephalic or brain-generated ones as opposed to perceptual or eye-processed ones) may function to mediate the impact that any one perceived image may have. This thesis focuses on all of these concerns.

Arnheim (1969) maintains that educators are overlooking a powerful tool for concept development when they do not utilize visual thinking as instructional methodology. Postman (1985) points to the cognitive price to be paid if educators do not address the issue of visual literacy training in a disciplined, comprehensive manner. These authorities suggest that educators have inherited the responsibility of ensuring that the next generations is visually thoughtful and media critical. The author believes that educators should be familiar with visual constructs (such as Gestalt theory) because such understanding may provide a reasonable starting point for the development of a visual literacy curriculum. The author further believes that educators should be aware of the cognitive linkages provided by Gestalt theory between visual (or perceptual) thinking and linear thinking. In becoming aware of this information, hopefully they will recognize that visual literacy training may serve as a reinforcement, as opposed to a replacement, for print literacy training.

What content might a visual literacy training program cover? Essentially, we are dealing with the need for individual viewers to be trained to practise responding to images critically. Such viewer response should be first of all analytic, and address considerations such as overall composition. Secondly, the image should be inter-

preted for impact; here factors such as context and image connotation may be relevant. Finally, an evaluation of the image is required; here some reasoned statements related to quality should be made.

Visual materials are already used extensively in classroom instruction. Materials such as maps, charts, textbook photographs, video and film are commonly used to illustrate content in various disciplines. The problem is that such exposure does not automatically provide for the opportunity for critical viewing experience. Even if we can assume that all recently graduated teachers have had some training in visual literacy skills, still, there are many veterans working in the classroom who might benefit from some professional development which focuses on the fundamentals of critical viewing.

Teachers who use diagrams or line drawings of apparatus in science class or schematic representations of electronic circuits in the shop are comfortable in relying on such visuals as a part of the *content* of the curriculum, but those educators who find themselves expected to incorporate an appreciation or an interpretation of photographs or video materials into their exploration of fields such as the humanities, are often at a loss to do more than provide more than simple exposure to the visual display. The effective teaching of the viewing *process* may elude them. As a result, teachers may expect more from their use of such materials than is being realized in practice. When something is done simply because one feels it should be, without the person really understanding either how or why it should be done, results are naturally often frustratingly superficial or disappointing.

Such an outcome for media study would not be problematic if we could be sure that other skills being taught were up to the task of compensating for the defi-

ciency, that is, if the traditional skills being taught in the classroom were enabling learners to cope with the demands placed upon them in our highly visual environment. However, as many contemporary thinkers and critics of the media environment (McLuhan, 1968 and Postman, 1988) have noted, we have entered an age in which we can no longer depend upon print to carry the burden for the effective dissemination of knowledge. We should not assume that providing exposure to images ensures that students understand how to "read" them.

The author believes that, if we wish to minimize our frustration when attempting to use visual media, and to maximize its potential to help learning, it is imperative that we understand what "viewing" and "imaging" are, how the two relate to each other, and how we derive meaning during each process. Once the processes are understood, (as much as is possible, given the complex nature of the inquiry,) it will then be possible to suggest appropriate instructional strategies to maximize learning during viewing experiences in the classroom.

CHAPTER ONE

THEORETICAL FOUNDATIONS

THEORETICAL FOUNDATIONS - OVERVIEW

This chapter will first provide a brief discussion of the author's philosophic perspective in the preparation of the paper; this will be followed by a discussion of the relevance of right and left brain function to the topic. The meaning of the terms "viewing" and "imaging" will be explored in theoretical and physiological terms, and a case made for their recognition as cognitive processes. The fundamentals of Gestalt theory will be discussed and its possible connections to language acquisition and critical thinking suggested. Finally, the nature of photographic process, as it relates to the acquisition of critical viewing skills, will be discussed.

PHILOSOPHIC PERSPECTIVE

It is not an understatement to say that the study of visual literacy is a complex endeavour. The field is pockmarked with the efforts of those who have tried to grasp a concept which is both amorphous in its lack of definition (the term "literacy" after all derives from the Latin for "letter" and suggests print forms rather exclusively) and pandemic in the potential of its impact on human behaviour. Those who have tried to study the process whereby one derives meaning from image through

viewing, (the author included,) have been invariably impressed by the difficulty of making any progress by the traditional avenues of intellectual analysis, by those methods which depend exclusively on linear or linguistic reasoning for their support. The study of form, shape and composition seems to defy the categorizational potential of language or logic; there is an almost instinctive urge to try to grapple with the concepts on a pictoral level. "Let me *show* you what I mean!" becomes the operative reply to frustration in explaining an idea which mere words do not encompass. We seek then for symbols or metaphors which can somehow approximate by example that which we mean to explicate. The urge born out of frustration with the limitations of language compels us to seek out a solution for our communication problem in venues which are somehow suspect, the realms of intuition and perception. Arnheim (1969) endorses the exploration of intuitive cognition as an alternative to what he terms intellectual cognition. He suggests that much educational progress could be made if teachers would recognize the potential of non- linear thought process, particularly in viewing, as of equal value to the potential of language and traditional logic.

The study of visual perception is technically very complex; consequently, it is a field largely left to the expertise of the scientific community. Because the study of visual perception itself is seen as too complex for the average person to grasp, the related issue of visual literacy is also given a wide berth, perhaps because the assumption is made that such inquiry should be left to the experts. Few teachers have either the opportunity or the energy to isolate the research data which would be pertinent to the teaching of visual literacy skills. Such knowledge just does not seem very accessible.

On the other hand, the intuitive response seems to be actively avoided as a

study not only because its origins are shrouded in the mystery of little understood right brain function, but also because traditionally, western thinkers have placed a great premium on being in control, on reifying our universe in such a way that keeps the incidences of such forays into the world of intuition at a minimum. We prefer to ask our questions from a position of certainty where new ideas are accretions welded on to the already existing body of information. We are inheritors of a tradition of inquiry stemming from the Cartesian credo, "I think; therefore I am." That which does not derive from intellectualization is not, from such a perspective, "knowable". When hunches do work out they are seen as serendipidous. Little credence is given to the notion that there might be some advantage in deliberately seeking out a state of suspended judgement, in consciously letting go of preconception and academic bias. Little trust is placed in that which cannot be expressed in words and justified by logic.

So it is little wonder when confronted with situations or theories of great relativity or flexibility, where much latitude is possible in analysis, interpretation and evaluation, as is the case with visual literacy, that we should should perceive such theories as unknowable, unproductive and therefore perhaps stressful. Our reaction is to throw our hands up in dismay and hustle back to the the world of the knowable and seemingly finite, a world where our track record is at least respectable. It is small wonder that teachers resort to "chalk and talk" to cope with the demands of media inquiry. Most have few other tools at their command.

Unfortunately, we cannot *know* about images merely by reading or talking about them. We must experience them, and, as effectively as is possible, communicate that experience either in words or by producing reactive images. For most of us, words are more convenient. Furthermore, the process by which we seek the

understanding of images initially is a groping, global searching mode wherein we may be intellectually uncomfortable because we cannot delineate clearly the parameters of the inquiry; there is no familiar lock-step system in place to provide the comfort of intellectual structure.

The world of objective knowledge, of tangible reality is a solid place. Every bit of data we acquire gives it substance to which we try to attach meaning. But we are forever being confronted by the realization that the whole must be more than the sum of its parts, that the cataloguing of our perceptions only partially helps us understand it all. As Aoki (1986) points out, the inherent mystery of life, if there is one, eludes us because our view of it is essentially one-sided. We spend much time watching the ground so that we don't trip up, and with our vision thus foreshortened, are unaware of the possibilities which exist for great leaps of faith. It is only when caught in a crisis that the gap between knowing and not knowing may yawn before us and we may be forced to take a step we would not otherwise contemplate.

Some modern educators may be caught in a such a crisis, the proportions of which are written in the current controversy of content versus process as curricular focus. They are expected to provide students with the basic data to cope in everyday life; however, they are also expected to provide students with a methodology to access additional necessary data independently, to make them capable of independent learning. As both Arnheim (1969) and Postman (1985) maintain, the traditional faith in print as a medium to disseminate and process information, is misplaced. A more fruitful approach, according to Arnheim (1969), may be situated in the intuitive, as opposed to the intellectual, cognitive domain.

"RIGHT" AND "LEFT" BRAIN IN PERSPECTIVE

Part of educators' reluctance to delve into the mystery of what Arnheim calls "intuitive cognition" derives from the difficulty of accessing a capability which is not dependent upon logic for its existence or upon language for its expression. However, some of the reluctance may also be seen as a healthy skepticism towards a notion which seems to oversimplify right and left brain function, a notion which chops the brain into two seemingly disparate halves, rather than showing it as a mutually interdependent system, twin stars revolving around each other, dependent on each other for their optimal functioning.

The dichotomization of cognitive function, the notion that the brain shows evidence of hemispheric specialization, is useful up to a point. It is helpful to identify certain capabilities as "left" or "right" brained in the same way that it is useful to identify a collection of symptoms as indicative of a syndrome in medical diagnosis. The term "syndrome" denotes a collection of occurrences which tend to be associated with each other, whereas "disease" suggests a definitive condition with an identifiable cause. The separate functions of each hemisphere of the brain tend to be clustered together syndrome fashion; they are not discrete from impact on each other from one hemisphere to the other. Imaging activity is sited for most people in the right brain (Sanders and Sanders, 1984).

> In most people, the left hemisphere controls language, rational cognition, the sense of time and the right physical side of the body; the right hemisphere controls spatial relationships, intuitive thinking, imagery and the left physical side of the body. Critical to our design of teaching strategies is knowing that both hemisphere operate continuously--that they function independently and in conjunction with one another at all times. For example, dreams are primarily a right hemisphere "imaging" activity (and we "dream" when we are awake), but our left hemisphere contributes the dialogue of our dreams and controls sequencing. In contrast, during daily "awake" interactions,

> the left brain monitors our behaviour in a logical rational manner, often consciously obscuring the input of the right hemisphere. Sleeping reduces the dominance of the left hemisphere and limits the intake of data; it is, therefore, only in sleeping dream state that the right hemisphere actively exerts dominance over the left (Sanders and Sanders, 1984, p. 10).

The ability to access the right brain intuitive imaging faculty is at the heart of a viewer's becoming a competent interpreter of visual media. For a teacher, the committment to such a shift in mental process requires a leap of faith not unlike Columbus' voyage into the unknown western Atlantic. We are afraid we may fall into uncharted abysses, that what may be learned there is somehow "unknowable". It is the author's hope that this study will provide some of the signposts to make such a journey less daunting.

THE PHENOMENOLOGICAL SEARCH

For those seeking insight into the intuitive process, some suspension of judgement is necessary. One must be willing to let go of the Cartesian bias which insists that all knowledge derives from intellectual, logical processing of perceived data. In such a search, one can pursue instead an understanding which derives from the modern philosophic theory of Post-Constructionism (Jardine, 1988 and Aoki, 1987), where the seeker attempts to declassify and decategorize, not to create anarchy, but as an inherent part of the process of hermeneutic cycling, searching for meaning in a spiral which revisits old ideas and invests them with new insight. Educators such as Jardine, Aoki and Smith (1988) also believe that the modern concentration on scientific knowledge has created a wasteland wherein the human spirit is stranded in a complication of technological progress, and where, despite our

apparent mastery of communication media, we are increasingly inarticulate in the expression of a solution to our dilemma. Taking a cue from Martin Heidigger's notion that "we learn to think by giving heed to what there is to think about" (Heidigger, 1954), such thinkers point to the need to adjust our method of inquiry to suit the character of that about which we are inquiring. Forays into intuitive terrain require a "back to the basics" approach which is far removed from a revistiation of the three R's. What is required is a revisitation of the phenomena of human experience through hermeneutic inquiry.

In approaching this inquiry into the scope of understanding necessary to teach visual literacy, the author became aware that an appreciation of intangibles such as viewing and imaging could not be accomplished using quantitative research methods. The insight provided by hermeneutic inquiry provided a critical starting point for conceptualizing the nature of the processes under discussion. In order to appreciate the impact of image, we must start with the experience itself; we must recognize the potential of the "viewing" and "imaging" phenomena themselves to provide guidance for our search to understand them.

What follows is an exploration of the notions of "viewing" and "imaging" which seeks to outline some of the considerations which should be understood if visual media interpretation is to be even marginally effective. It must also be understood that the approach presupposes an agreement on the part of the lay reader or viewer to participate actively (where appropriate) in an experiential way, to accept the phenomenological challenge to give heed to the nature of what there is to think about, rather than to assume that the validity of the exercise rests only within the confines of logic and language. Words must be used to point the way; they need not limit that which the reader/viewer perceives.

VIEWING AS COGNITIVE FUNCTION

There is an assumption that if one is sighted, one must therefore know *how* to view. This assumption parallels the thinking that if one is literate one must know how to read. What is lost sight of here is the degree to which the individual is aware of the process by which the capacity was achieved. Learning to read print requires years of concentration and study. The reader learns about the process of reading experientially through conscious effort at a point in his or her development when oral communication with others about the experience is possible. Consequently, we all have some understanding about what is required in becoming print literate because we all remember learning to do it. A teacher can be expected to have some consciously acquired knowledge of the process simply by virtue of having had so much conscious interactive experience with it. Such is not the case with viewing. Learning to view occurs before one learns to speak; it is a process acquired in early childhood (Arnheim, 1969), one which is seldom analyzed afterwards. That is not to say that viewing cannot be described (at least partially) in familiar intellectual terms.

Rudolph Arnheim (1969) in *Visual Thinking* asserts that "visual perception is visual thinking" (p. 14). His contention that visual perception is an active process and not merely a "passive reception" derives from an examination of the kinds of operations performed by the eye at the visual threshold. The eye's capacity to select, confirm, reappraise, change and complete incoming data indicates a kind of intelligence or cognitive functioning which transcends the notion of the visual perceptive process as merely a relayer of information. Arnheim postulates vision as the "primary medium of thought" (p. 18) noting that subjects deprived of sensory stimulation replace the input

> by reminiscing and by conjuring up imagery, which soon becomes insistent and uncontrollable, independent of the person's will as though it were an impingement from the outside...These desperate attempts of the mind to replace the missing stimulation indicate that instead of a mere facility for reception, the activity of the senses is an indespensible condition for the functioning of the mind in general. The continuous response to the environment is the foundation for the working of the nervous system. (Arnheim, 1969: p.19)

Thus, we learn to view when we first begin to see, as infants, long before we have the ability to remember or communicate about what is entailed. Viewing, as a process, is the organism's automatic response to the visual field; it is so ingrained a response that when visual stimulation is denied, as in the sensory deprivation experiments, the organism will create internal constructs or images to "view". Furthermore, the perceptual process within which viewing takes place is not without a cognitive structure which is intellectually understandable.

For example, a baby's first effort with focusing or ocular fixation is an intelligent perceptual act in that it displays a kind of problem solving at a very rudimentary level. Arnheim states:

> An act of fixation can be described as a move from tension to tension reduction. The stimulus [e.g. a strong light] enters the visual field eccentrically and thereby opposes the field's own center with a new and alien one. This conflict between the intruding outer world and the order of the inner world [i.e. the infant's mental image of the visual environment as it already exists] creates a tension, which is eliminated when a movement of the eyeball makes the two centers coincide, thus adapting the inner order to the outer. The relevant item of the outer order is now centrally placed in the inner. (Arnheim, 1969: p. 24)

By identifying problem solving behaviour within the process of visual perception, it is possible to acknowledge perception as "intelligent". "Even this simple example shows why problem solving should not be assumed to be the cognitive level at which perception and thinking part company." (Arnheim, 1969: p. 24)

For educators, an acceptance of such perceptually situated cognitive process requires a significant re-adjustment of the notion of cognition in general. It requires an expansion of the notion of thinking well beyond the logical, linear and primarily language-based parameters most typically ascribed to it. Thinking becomes not just the activity our brain demonstrates when it organizes and processes incoming sensory data; thinking is also the activity demonstrated by our sense organs as they interact with and organize the stimuli. Because such an inclusion of sensory process as integral to the definition of thinking runs counter to Western philosophic tradition, it is useful here to explore briefly the history of the notion of "thinking" as it relates to "viewing" and mental image.

THE CLASSICAL CONCEPTUALIZATION OF THOUGHT

In order to understand the origin of the cerebral, as opposed to the sensory bias in the Western conceptualization of "thinking", educators should recognize the contribution made by classical thinkers such as Plato and Aristotle. The notion that the senses are not to be trusted as venues for cognition derives from the ancient Greeks' denial of the validity of sensory input upon the construction of "pure" thought.

The earliest Greeks, reinforced by the notion that there seemed to be no order to be perceived in the natural world, separated perceived existence into the perfect realism of the spheres, and a world which became more imperfect the closer one came to earth. Eventually, the difference between heavenly order and earthly

chaos was imputed to dysfunctional senses which were unable to transmit information accurately. When it was realized that all of the physical world, including the stars, had to be perceived through the senses, and since those faculties of perception were so obviously faulty, (refraction under water was cited as an obvious proof), then it seemed wise to view the whole world as incapable of being reliably perceived.

According to Arnheim, Plato's approach to the problem embodied an uneasy co-existence of two different perspectives. On the one hand, he maintained a deep belief in the wisdom of direct vision; for him such vision was of an almost pristine metaphorical nature, a vision which garnered true knowledge which was "the colourless, formless, intangible essence visible only to the mind, the pilot of the soul".(Arnheim, 1969, p. 11) At the same time, he believed that the stable entities of objective existence could be approached by logical operations; the generic character of something was thus perceived holistically, not by combining the elements of perception and mental image. This was an operation with only generic, mentally derived forms as referents, not ones perceived by the senses. "Pure" things such as mathematical concepts could be perceived thus. There was no speculation about the origin of sensory untrustworthiness. Whether the objects were changing or the senses inadequate was of little interest in a world where purely cerebral activity was considered to be the only true vocation of a thinker.

Aristotle introduced the notion of induction, the knowledge gained through the collection of individual instances. In his construct, those who remember what the senses have perceived, systematize those recurring experiences so that the concept clusters or gels, reinforced by each newly perceived incidence. Thus a "universal" was arrived at syllogistically by deriving abstractly from a higher genus and by pinpointing its characteristics or "differentia" from below. Such a "universal"

was seen as having "to impress itself upon the medium or substance which in itself was shapeless and inert" (Arnheim, 1969: p. 12), a generative process called entelechy. The matter of the universal (the cognitive image or construct) was what "mattered"; the substance (the perceptual input) merely "substantiated" it.

In this manner, there was a hierarchical relationship established between thought and perception; thought was seen as the father imprinting its characteristics generatively on the image, which was like the son, incapable of existence without the father. Contemporary thinking would characterize the relationship between perception and cognition more as that of siblings who work in conjuction, guided in their responses by even more deeply embedded "parental" cognitive constructs (Sanders and Sanders, 1984 and Piaget, 1976).

To the extent that the Judeo-Christian philosophic heritage of western civilizations has been influenced via the Greeks by this emphasis on the cerebral to the denigration of the sensory, Arnheim (1969 p. 12) believes we have allowed our notion of what thinking is to be truncated. Although the Greeks are credited with establishing the dichotomy between perceiving and reasoning, it is the "rigidity of the doctrine [of the dichotomy] assumed in recent centuries of Western thought" (Arnheim,1969: p. 12) that has denied us the legitimacy of the senses as venues for cognition. Such a bias must not be allowed to stand unchallenged, for increasingly we are required to depend on our senses, and particularly on viewing, to help interpret our environment. It is imperative that we gain insight into how viewed data is organized for us by the eye. As shall be discussed presently, such an awareness has profound importance not only for our ability to demonstrate visual literacy, but also for our appreciation and application of deep cognitive structures in general.

As demonstrated by Arnheim's discussion of ocular fixation or eye focusing in infancy, there is some logic to be observed in the functioning of the eye. The "grammar" of visual literacy can be seen to operate in the context of minimizing occurrences of visual conflict as the eye seeks to make sense of the display before it. It "problem solves" by creating structure from already existing elements or sometimes by superimposing structure in cases where elements are only partially in evidence. Part of what we understand by the term "viewing" needs to be explained in relation to this organizational structure.

GESTALT THEORY AS ORGANIZATIONAL STRUCTURE

Many contemporary visual theorists have noted the usefulness of the Gestalt school's model for interpreting visual structure and impact. The Gestalt psychologists, working in Europe in the first part of this century, were interested in examining the way in which form or shape (the meaning of the German word "gestalt" is closely related to "shape") impressed itself upon the conscious. They discovered, by exposing their subjects to split-second incidences of identifiable patterns, that, although the length of exposure was insufficient for any one viewing to be effective, the pattern could be identified through repeated exposures, albeit not without a great deal of difficulty and concentration. They identified perceptual cognition as functioning "in a process of manifold, mutually intertwined, selective, abstractive and even creative acts of formation" (Arnheim, 1969, p. 30) and that the process itself was "either organically consequent or intricate, ambiguous and meandering" (Arnheim, 1969 p. 30). Perception of shape was identified as the grasping of generic structural features

through a facility which could only be characterized as intuitive (Zakia, 1979). Such visual structuring is a function of which we are all capable, but of which we are minimally aware. It is a capacity learned in infancy as we learn to view, but unexplored consciously once it has been acquired.

It can be understood most easily by recognizing that the overall effect of an image is more than the sum of its parts. It represents what Dondis (1973) refers to as a kind of syntax for the language of visual literacy; it is the process by which the mind deals with the various elements (dot, line, shape) that it perceives. The mind is capable of registering the existence of many separate elements within a shape (such a facility would be the job of the discriminating left brain), but to function at optimum efficiency, it must also perceive the figure holistically, utilizing predominately the right hemisphere.

An example of the Gestalt principle at work is shown in Figure 3 (Zakia, 1979, p. 15). Here the immediate overall impact of the image is that it represents a camera. The individual component letters are most often noticed as a secondary feature because, on their own, they do not present as strong an identifiable image.

When such structuring occurs, a series of five discrete, but also combinatory, discriminating behaviours are postulated. These are: 1) the relationship between figure and ground, and the notions of 2) proximity, 3) similarity, 4) continuity and 5) closure. Much of the initial structuring which contributes to the derivation of meaning in the viewing process can be understood as resulting from the operation of these factors at the intuitive cognitive level (Arnheim, 1969 and Feldman, 1971).

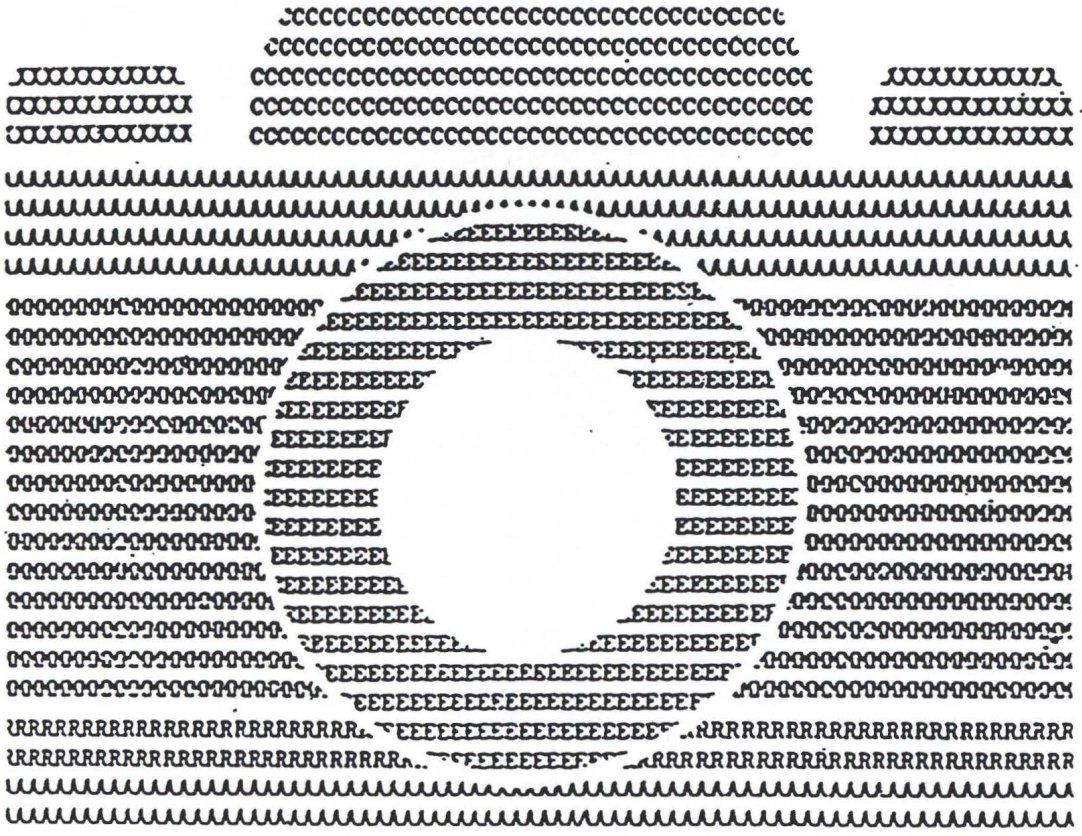


Figure 3

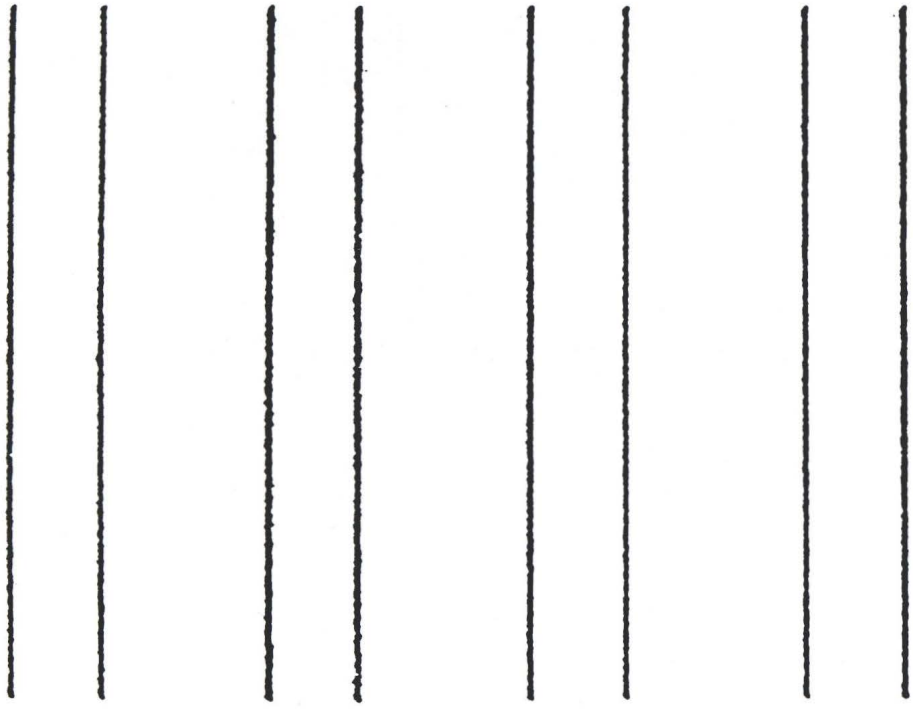


Figure 4

Figure and Ground

The equivocal fence phenomenon (Figure 4) (Zakia, 1979, p. 20) illustrates the concept of figure and ground. The first impression is of black lines against a blank ground. Here, the black lines are figure and the white space is ground. However, since the lines appear to be arranged in pairs, there is the illusion of four narrow white bars or fence slats. Now the four slats are figure and the remaining space is ground. It is also possible, although less easily so, to see three wider slats with a background. However, it is almost impossible to see both the wide and the narrow slats at the same time. In other words, it is not possible to have figure without ground. What happens here is that the eye tends to group together objects which are both similar and close to each other. The closer the objects, the more likely they are to be thus associated. Once grouped, they are seen as discrete from all else in the visual display; they become "figure" against a backdrop of "ground", regardless of whether there is an intellectual logic to such an organization.

Such visual structuring makes possible the intrigue apparent in illustrations such as Figure 5 (Zakia, 1979, p. 24), where one can discern either two profiles or a goblet, depending on which part of the display is seen as figure and which part as ground.

This concept plays a crucial role in visual literacy because it sets the field wherein we decide what constitutes the image to be examined as separate from others in the display. When there is confusion as to what constitutes figure as opposed to ground, unfortunate results such as the dunce's cap occur. (The furled flag was included as a part of figure when it should not have been.)

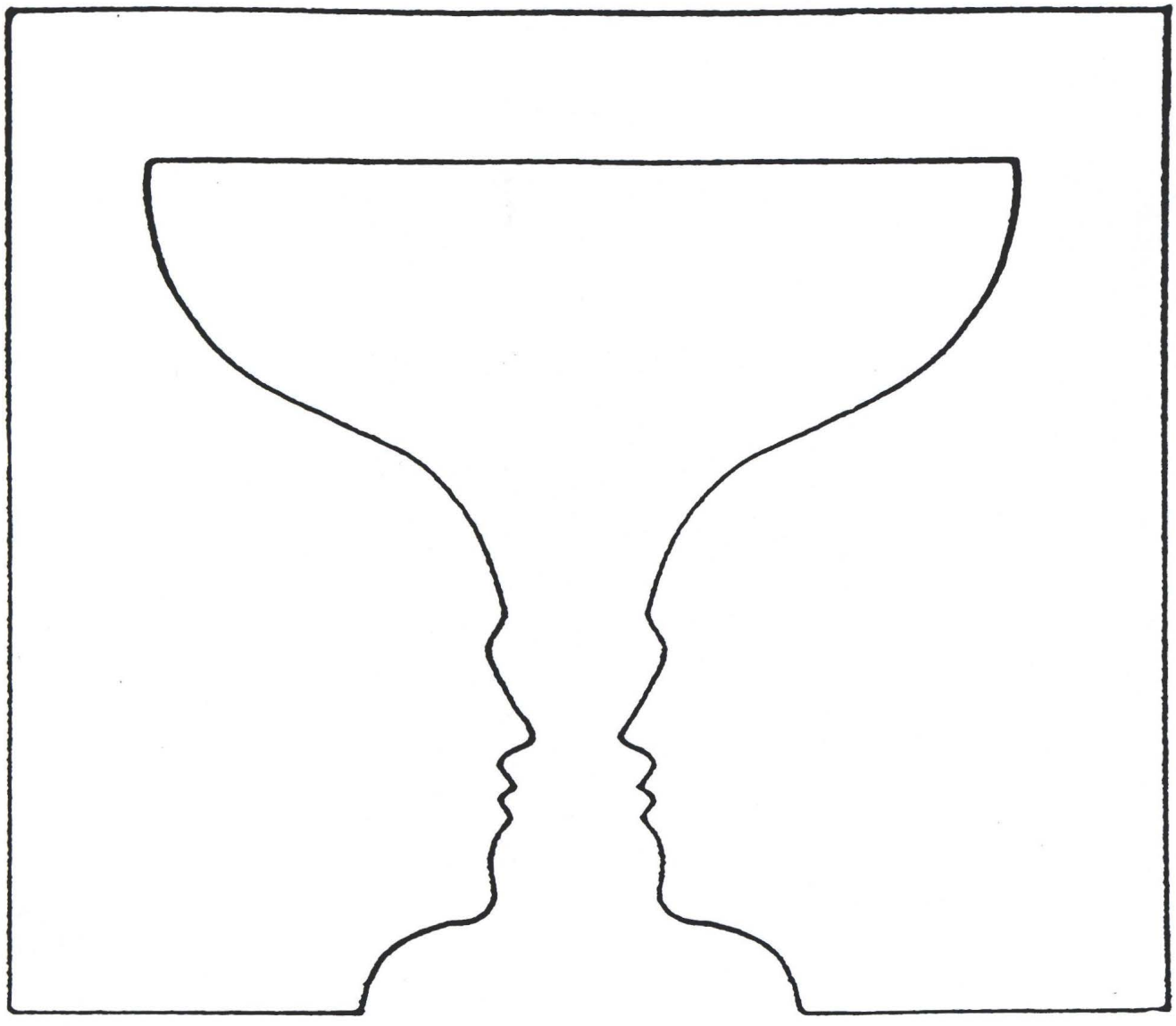


Figure 5

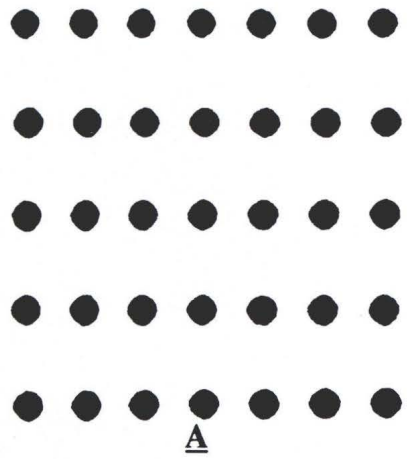
The other Gestalt laws all operate within the context of figure and ground; the eye naturally always tries to organize around a focal image as figure and relegates at any one instant all other images to the background. The form that the organization takes is dependent on a series of spatial factors represented by the remaining four "laws": proximity, similarity, continuity and closure. The manner in which each of these function to organize visual space may also provide some insight into the manner in which we conceptualize more complex cognitive constructs.

Proximity

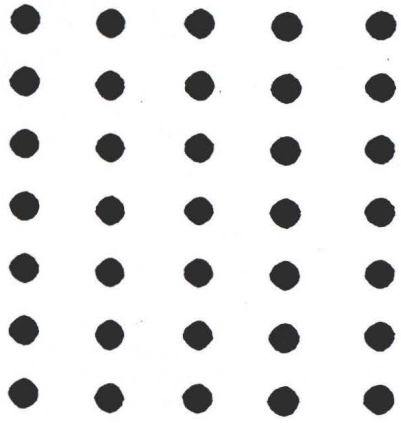
"The closer two or more visual elements are, the greater is the probability that they will be seen as a group or pattern" (Zakia, 1979, p. 32).

Figure 6 (Zakia, 1979, p. 32) illustrates this concept. The circles in each of A, B and C form a square shape. However, those in "A" are spaced such that horizontal lines within the square can be perceived; in "B" the circles are spaced to create vertical lines. In "C" the circles are equi-distant, with the result that no other pattern is evident. What is operating to organize the information is the relative closeness of the circles in each case.

When the notion of proximity is considered in relation to figure and ground, it becomes evident that areas whose perimeters are closer together are more easily seen as figure than are those with ones more widely spaced. Figure 7 (Zakia, 1979, p. 43) illustrates this concept. The segments of the circles which are smaller are more easily seen as figure against the contrasting colour as ground, regardless of which colour is used.



A



B

C

Figure 6

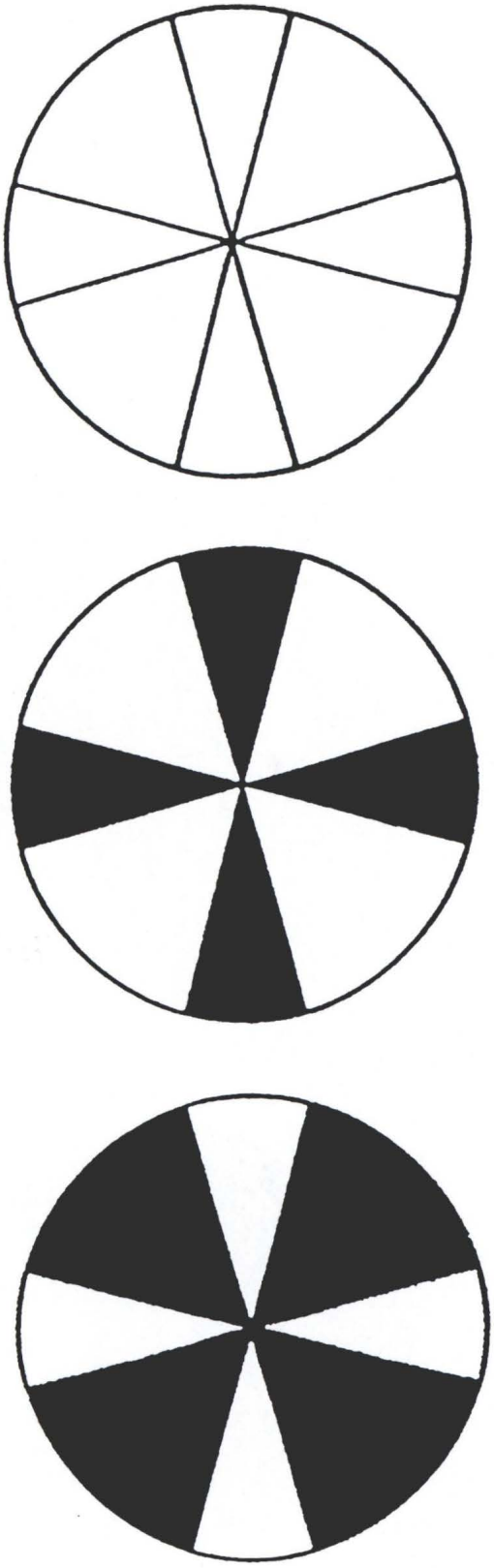


Figure 7

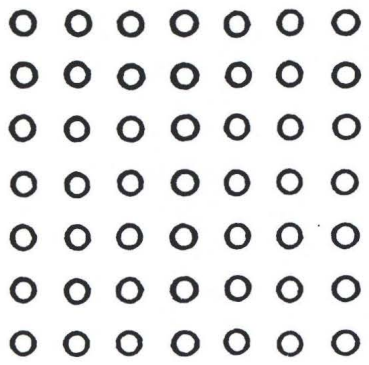
Because space is three-dimensional, but photographic imagery functions on a two-dimensional plane, sometimes images are captured which are amusing or perplexing by virtue of the implied proximity of objects which would not normally be seen together as figure. Such was the case with the dunce's cap effect.

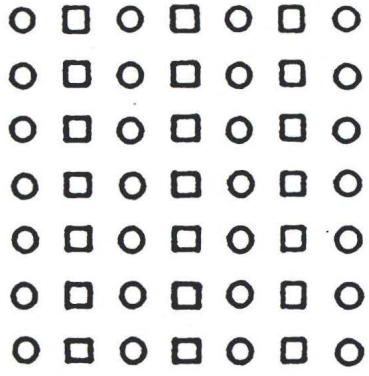
Similarity

"Visual elements which are similar (in shape, size, colour, etc.) tend to be seen as related" (p. 47.).

Figure 8 (Zakia, 1979, p. 47) illustrates association by similiarity (by shape) and Figure 9 (Zakia, 1979, p. 47) similarity by colour (A), texture (B) and size (C). Particularly with the blocks of figure in Figure 9, it is difficult to see any relationship except for that dictated by the similar characteristics.

The image of Elizabeth Cull, coupled with that of her husband benefited in the creation of a pleasing gestalt because of the similarities of their appearances. Facial features are similar is shape (noses and mouths); both wear eyeglasses and have short cropped hair so that their ears show. Such similarities work in the perception of the viewer to unify and strengthen their image as a unit working in concert.





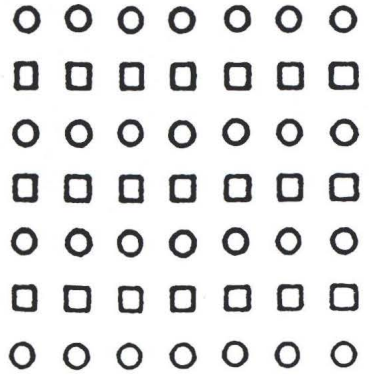
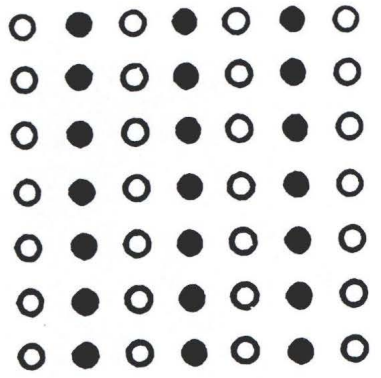
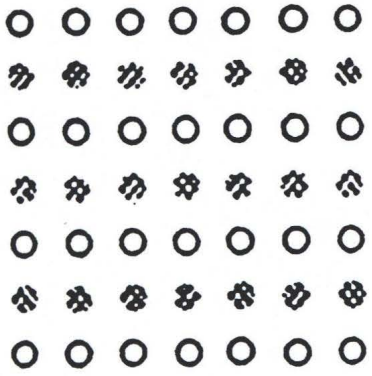


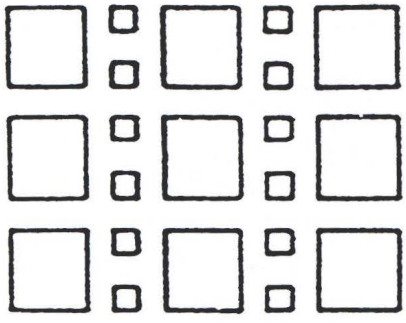
Figure 8



A



B



C

Figure 9

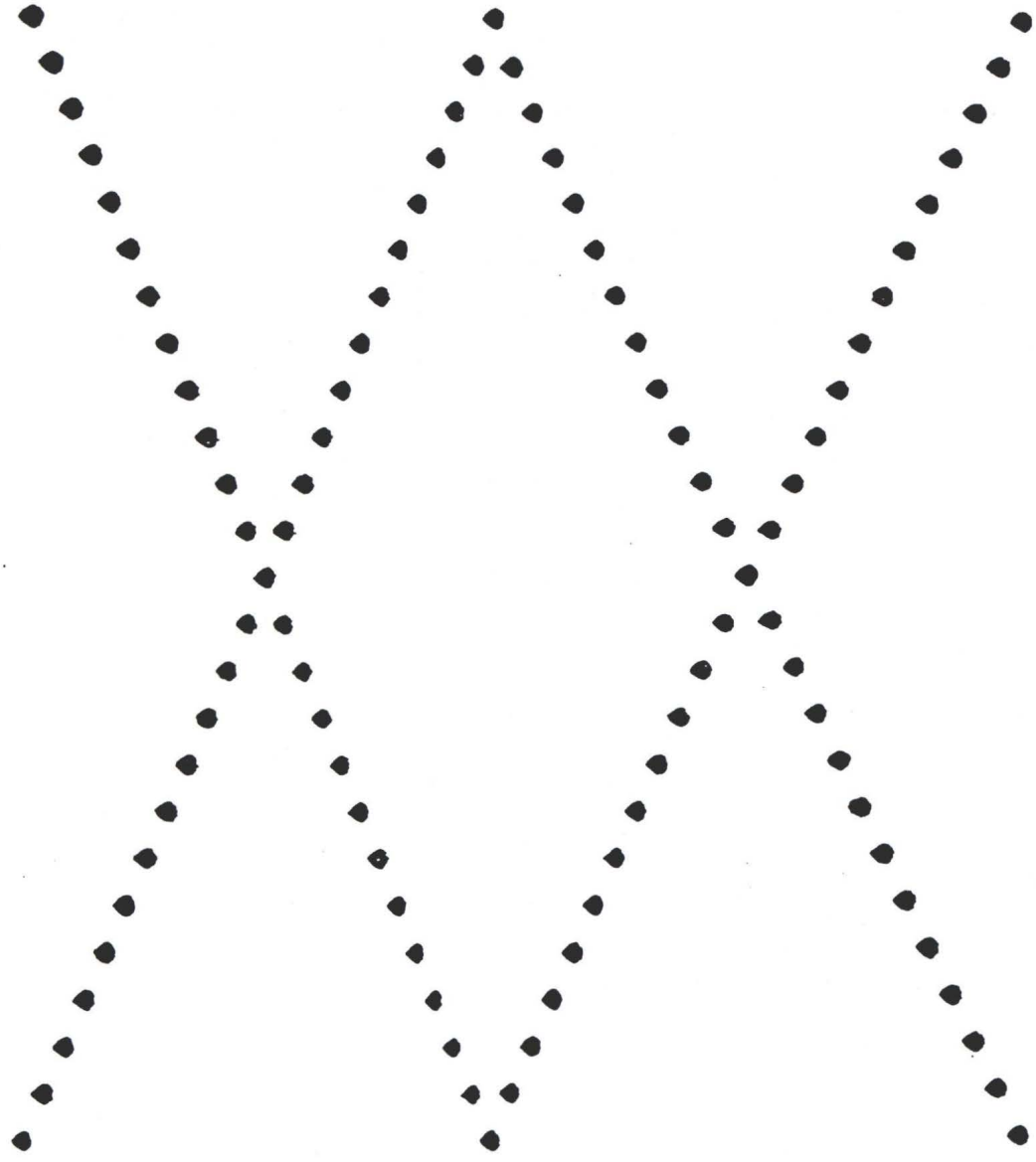


Figure 10

Continuity

"Visual elements which require the fewest number of interruptions will be grouped to form continuous straight or curved lines" (p. 59.).

Figure 10 (Zakia, 1979, p. 59) illustrates this concept. Most people on viewing this figure, tend to see two "x's" first or the central diamond because the eye needs to make fewer shifts in orientation to do so. (The diamond will also be perceived more easily because it is a closed figure.) Seeing the "w" and "m" formations initially occurs far less frequently because more changes in viewing orientation are necessary. The eye tends to group together on the basis of economy of effort. Just as with proximity, where pattern was perceived because less space needed to be traversed to do so, also with continuity, the eye seeks the pattern which requires the least effort to organize.

This notion also helps to account for the dunce's cap effect because the alignment of Susan Brice's head with the flag was such that the two could most easily be perceived as representing a continuous line in the total figure.

Closure

"Nearly complete familiar lines are more readily seen as complete (closed) than incomplete" (p.66).

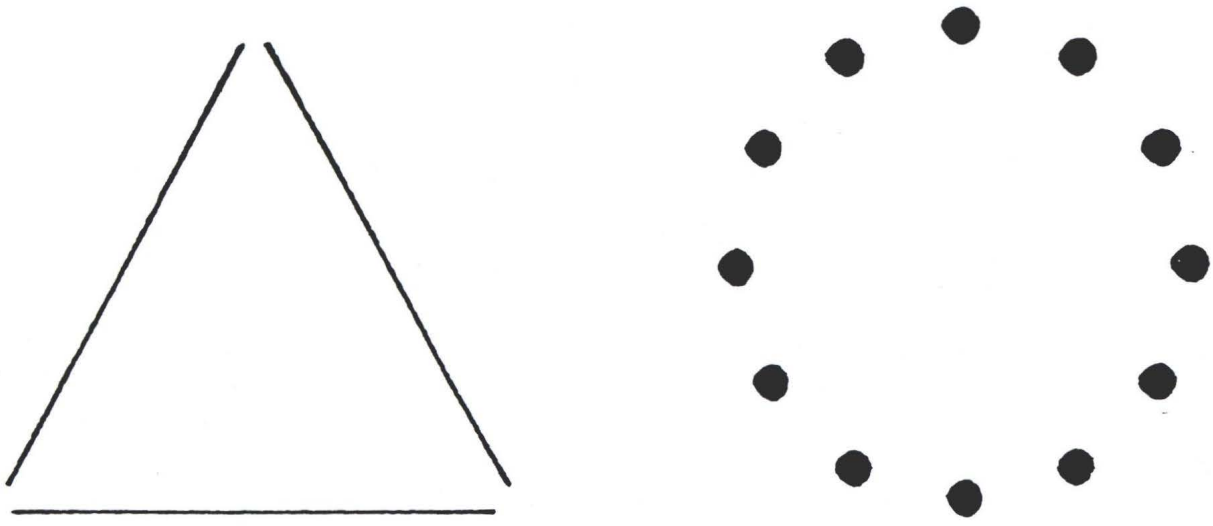


Figure 11

Figure 11 (Zakia, 1979, p. 66) illustrates two examples of closure operating to create figure from elements which are in fact not continuous, but merely familiar in shape. (The fact that the elements creating the figures are similar in shape also helps to reinforce the effect.) Closure operates to bring to bear images which are resident in memory, usually because of frequent previous exposures. As was noted earlier, such was the case with the dunce's cap effect.

GESTALT LAWS AS COGNITIVE ORGANIZATIONAL CONSTRUCTS

All of the foregoing laws have non-spatial applications and, as such, provide structure for the organization of thought. By appreciating and actively utilizing these connections, we may, as educators, profoundly improve our capacity to help our students formulate abstract thought.

Figure and Ground as Conceptual Organizer

Zakia (1972: p. 30) points out that figure and ground discrimination occurs in all forms of sensory perception. We can distinguish a familiar voice (figure) out of the hum (ground) of conversation at a social gathering; we can feel raised patterns (figure) on a plane surface (ground) such as occurs when one reads Braille. Our palates can isolate flavours in a melange of ingredients, and our noses distinctive odours in a pot-pourri of smells. Such capacities form tangible examples of this organizational construct at work.

However, as McLuhan (1964) suggested with his "The medium is the message" aphorism, the development of an ability to distinguish content (figure) from process (ground) in the more abstract sense is crucial if we are to come to grips with the complexities of modern technology. In western societies at least, we exist within a matrix of electronic process which most of us only dimly understand. We continue to concentrate our analytic faculties on what we perceive as the important content of acquired knowledge, and remain largely oblivious of the means by which that knowledge is transmitted to us. We fail to cope because it is not humanly possible to assimilate the wealth of data bombarding us. Content-addicted, and process-blind, we stumble along failing to see that in the Post-Industrial Era, what we used to conceive of as process must now be seen as a part of content; we must learn to recognize the "how" of information transmission as more relevant (as figure) than the "what". To do anything less will leave us incoherent victims of information implosion, a notion explored extensively by Alvin Toffler in *Future Shock* (1966).

As a cognitive organizer then, the concept of figure and ground plays a critical role in the decision making process wherein we determine what to select as focus for study. Any student who does not know how to narrow a topic for an essay, or how to select relevant data from a field of undifferentiated data, might benefit from exposure to experiences such as the aforementioned sensory examples. These illustrations would serve as metaphors to facilitate the conceptualization of the corresponding abstraction. Such instruction would not only reinforce the important linkages between perceptual and intellectual cognition, but would also provide a much needed screening mechanism to filter out unnecessary data retrieval, to help a student decide what content is relevant for a particular topic.

Proximity as Cognitive Construct

Non-spatially, proximity serves to provide connections between events which occur closely together. Such temporal proximity forms the basis for all narrative accounts. Our grasp of cause and effect would be far less secure without this factor. Moreover, the arrangement of ideas in close proximity to one other as we develop arguments provides the associative linkages that we look for in expository writing. Such connections are conceived of as logical because of the sequential order necessary for their verbal presentation, but we are all aware that the formulation of argument often occurs holistically rather than linearly, perhaps as a "mind-map" or diagram. Such images provide insight partially because of the spatial or temporal proximity of the elements within them.

Both in real life and literature, we are prone to make judgements or evaluations about characters based upon the context in which we find them. While we ought to be wary of the validity of estimations which suggest "guilt by association", nevertheless, we would be naive if we did not recognize the power of a setting to shape our perception of a particular person or element within its context. Once again proximity is working to make connections which are not necessarity logical. The politician makes a far more credible plea for the environment standing beside a river than he does standing behind a podium; the ruler seems more powerful when flanked by his subordinates; a mother seems more loving in the bosom of her family. None of these proximal relationships should be ignored if we are to grasp the full import of the message. The process of presentation has as much, if not more, impact than does the content of what the central character has to say either through individual image or in words.

Similarity as Cognitive Construct

Some of the most effective teaching techniques involve the creative use of simile and metaphor. Sanders and Sanders (1984), in *Teaching Creativity through Metaphor: An Integrated Brain Approach*, explore primarily the effectiveness of the metaphor as a facilitator of creative thinking. Their work illustrates the manner in which analogous relationships can be used to arrive not only at an understanding of complex intellectual concepts but also at a perspective from which fresh, new insights can be obtained. They note that creativity in thought depends on the adequate functioning of the whole brain. "Without the spontaneous input of the right brain's images and perceptions, the left brain analyzes old information; it does not allow new patterns to come forth. Creativity, then, requires being aware of the information emerging from both hemispheres- being open to the unusual moment of new connection and new ordering" (Sanders and Sanders, 1984: p. 25).

Gambell and McFetridge (1981) make a similar claim for both metaphors and similes as cognitive organizers. They recognize "associational links" (Gambell and McFetridge, 1981: p. 32) as the precursors of formal literary simile and metaphor and suggest that such links are the "basic associations that children make between two concepts or ideas, down [sic: "drawn"?] from previous experience and cognition" (Gambell and McFetridge, 1981: p. 34).

Symmetry, which is a special form of similarity, was a crucial construct in the formulation of Einstein's theories. He noted that "there is no logical way to the discovery of these elemental laws. There is only the way of intuition, which is helped by a feeling for the order lying behind the appearance" (cited by Planck, 1933: p. 10).

Similarity, then, whether as concrete simile or more abstract metaphor, is one of the most crucial cognitive constructs for the development of both critical and creative thinking. In its capacity to provide one-to-one comparative parameters, it functions as an analytic tool; in its capacity to provide hitherto unimagined connections, it serves as creative stimulus. Both capacities working together make the conceptualization of unfamiliar ideas possible. This notion will become even more relevant when the focus of discussion turns from "viewing" to "imaging". At this point, it is worthwhile to stress that the individual's capacity to internalize the notion of similarity can be enhanced by an experential background which allows for the sensory recognition of the concept. No more compelling argument can be made for the integration of the visual and performing arts into the mainstream of curriculum than this: children learn best by doing. And what they need to be doing more of is "planting" abstract notions in a well-prepared "bed" of sensory experience. The more opportunities they have to see and be taught to "view" visual fields which are organized around analogous relationships, the more likely it is that they will be able to make such connections internally.

Continuity as Cognitive Construct

Continuity acts like inertia in its capacity to propel our thinking processes along familiar lines with as few shifts in orientation as possible. In learning, the continuity construct makes possible the accretion of ideas arranged linearly, as when one encodes or decodes words on a surface. It is this notion which we apply when, in expository writing, we demand that an argument be coherent and "flow" from one point to the next, or when, in fiction, we reorganize flashbacks or foreshadowings to

agree with the temporal sequence of the narrative. In real life, or when viewing television or movies, the brain's preference for continuity effortlessly facilitates the transition from one proximal relationship to another so that motion can be perceived. Physiologically, this is the impulse which demands that the eye keep on moving; philosophically, it is the one that insists there are more vistas to discover. Without this capacity, human curiosity might not be the compelling drive that it so obviously is.

Unfortunately, there is a "down side" as well. Such notions as "tunnel vision" and "narrow-mindedness" owe much to the eye's preference for maintaining a uninterrupted course when establishing pattern. Indeed, it is, in all likelihood this tendency which has impeded our collective cognitive progress out of the Cartesian complex mentioned earlier.

Closure as Cognitive Construct

We are all familiar with the frustration experienced when we are left hanging at the end of an open-ended story, or when significant details are not adequately accounted for in the solution to a puzzle or a mystery. What we are experiencing in these situations is a lack of closure, a sense of incompleteness or even fragmentation. Arnheim (1969) suggests that the eye seeks pattern in all it surveys and accesses the right brain function to supply "templates" or possible prototypes for such patterns in the memory. (It was in this regard that a strong case could be made for the provision of a wealth of similarites in order to nourish the imaging capacity of the right brain function.) When a "goodness of fit" is established, the eye tends to perceive the image as associated with the mental construct resident in memory, even though

its perception of the image as such may not be consciously received by the logical, verbally expressive left brain.

Sanders and Sanders (1984) summarize experiments conducted with various individuals whose brain function had been altered either by the severing of the corpus collosa (the nerve fibres connecting both hemispheres) or by severe stroke to one hemisphere or the other. The results of these studies seemed to indicate that an individual could recognize by touch, objects corresponding to pictures flashed to the left eye (right brain). However, unless the object were touched by the opposite hand or the image flashed to the right (left brain) eye, the object could not be verbally identified. Yet it was clear that the subject knew the object in question. What had happened is that the subject had experienced closure in being able to recognize the object, but, because the right brain could not communicate that knowledge to the left brain, there was no reliable referent for the analytic left brain to use to access the correct verbal label. This seems to suggest that information can be present in the right brain to which the left brain may not have access. Indeed, in our highly charged visual environment, there may be far more visual content absorbed than the analytic function has the capacity to process. Consequently, closure may occur intuitively, perceptually, far more often than we are intellectually aware.

Such cognitive functioning has profound implications for educators who may not themselves be aware of the symbolic impact of some images for their students or even aware that the image itself is there to be perceived. Such instances can be discovered in a careful perusal of advertizing promotions, in cases where so-called subliminal projection has been utilized to promote a product. In the classroom, more common applications of the closure capacity occur when we encourage students to recognize the relationship between theme and symbolism in fiction and

when we demand that an essay have a conclusion which restates the central thesis. By avoiding such "tidying up" as a focus of instruction, we may be transmitting the message that closure is unimportant, that work may remain unfinished. On the other hand, too much emphasis on closure may reinforce the production of artificial or facile endings, and suggest that there is a formula ending or a solution for every situation regardless of complexity.

In somewhat the same fashion as continuity, the closure capacity militates against flexibility in response, causing the mind to seek containers for concepts when more open-ended structures might be more appropriate. Such is the tendency which provides for the stereo-typing of racial characteristics or cultural attitudes, for instance.

Here again the notion of implosion becomes critical, for we might liken the contemporary sensory (particularly the visual) field of our young to a plot of ground overgrown with marginally useful vegetation. Perhaps some judicious "clearing" is in order so that truly fruitful growth can be achieved. Certainly, the media environment is providing a wealth of opportunities for closure; perhaps we should be examining more thoroughly both the value and frequency of such closure experiences. While it is not my intent in this study to make any kind of a case for media censorship, still there may be some educational ground gained in our struggle to become more effective teachers if we were to be knowledgably selective in our use of visual stimuli in the classroom. This aspect of viewing will be explored more fully when we look at physiological eye function.

THE IMPACT OF PHYSIOLOGICAL EYE FUNCTION ON VIEWING

The collection of visual examples in this study is limited to black and white prints. The easiest rationale for limiting the study to media of this sort is based on simplicity. Colour and motion add complex elements which this writer wanted to avoid.

As indicated in the discussion of proximity and continuity as cognitive constructs, the perception of motion results from the eye's ability to recognize the relational pattern of elements which are close in sequence and which flow coherently. Of course, not all motion "flows" at a rate which the eye can diffentiate in measured sequences. Much motion is "quicker than the eye" and certainly a lot of it is sporadic, not following a necessarily predictable course. The eye fatigue one experiences when following a hummimgbird in flight might be a sufficiently cautionary example to emphasize the advisability of concentrating on static as opposed to moving images when one is intending to sharpen one's critical visual faculties. The eye wishes to make sense out of the display before it and will suffer serious strain when the demands to alter direction are too numerous or when proximal linkages are not capable of being grasped. Viewing critically is hard work; it is best not attempted under stress.

The avoidance of colour as a variable is to be understood from the way in which the brain and eye process images. "The light sensitive cells of the retina are a kind of exposed surface of the brain in confrontation with the visible universe" (Goldsmith, 1971: p. 33) The truth of Goldsmith's statement can be attested to by the recognized psychological and mystical impact that direct eye contact has (Eckman, Friesen and Ellsworth, 1972). No other sensory system occupies as large a

proportion of the cerebral cortex, about ten per cent (Martin, 1984: p. 40) as does vision. "No fewer than 60% of all the sensory nerves that enter the brain are optic nerves" (Randhawa and Coffman, 1978: p. 23). No other sense can claim the extent of access to the crucial emotion-influencing mid-brain section as does vision. Indeed, vision would appear to be the favoured child of the senses, a notion which might account for its being the dominant modality for most humans. An understanding of how images are transmitted to the brain from the retina helps to clarify the distinct advantage offered by black and white as opposed to colour media.

The eye is not simply a recorder of visual data; it is a high speed data processor which sorts, organizes and codes information, sending along to the visual cortex only the most pertinent (Goldsmith, 1971: p. 34). This filtering Gestalt activity takes place in the retina at the very threshold of visual perception (Arnheim, 1967: p. 22). There, two kinds of sensor cells, approximately thirty million in total, convert light into bits of electromagnetic energy. The two types of cells are specialized both by their rate of functioning and by the nature of the tasks they perform.

The smaller of the two groups, the cones, number about seven million. Most of these lie within the macula, which is in the center of the retina. The greatest concentration of cones lie in the mid-point of the macula, in a high focal point area called the fovea. This is the area where the best vision in bright light is achieved. Each cone receptor has an individual input tap to the optic nerve. The cones are responsible for the transmission of information concerning both fine detail and colour. When light hits them, they change shape and produce electrical activity which is relayed to the visual cortex. The cones contain a pigment which is sensitive only to red, green and blue light. They do not transmit information about the the wide mix of possible colours; that mix is accomplished in the brain. The cones'

transmission of data is information rich and as such, requires more time to relay than does that sent by the other receptor cells, the rods. This is even more the case because not only is the cones' data extremely data-intensive, but also each cone cell works individually to relay the information to the brain whereas the rods work in concert with each other. Thus the cones' capacity is taxed to the maximum when they must transmit both detail and colour. The elimination of colour as a variable allows the eye to concentrate on the transmission of other important data such as texture and shading.

The rods, on the other hand, lie mainly outside the macula and are responsible for peripheral and low-light vision. Like the cones, the rods contain the pigment rhodopsin, but they transmit information related only in shades of gray. They generally work in clusters of up to several hundred linked to a single optic fibre. They are not suited to the perception of fine detail, but rather to a more global gestalt kind of scanning.

An exclusive concentration on black and white in the study of visual media allows the eye to deal in images which will not occupy the cones' capacity for colour; they are then able to function with relatively uncluttered information channels on fine detail. The rods cannot transmit information about colour, but because of their wide angle capability, they are suited to the perception of form or shape far more than are the cones. It is also known that " although the central foveal region, packed tightly with functional cones, gives the best visual colour and detail, it is less sensitive than the more primitive rod regions of the retina. (Astronomers 'look off' the fovea when they wish to detect very faint stars so that the image falls on the region of the retina rich in sensitive rods)" (Gregory, 1978: pp. 61, 63) When working in concert on black and white images exclusively, the rods can transmit information far more

quickly than can the cones. Thus, the elimination of colour in visual media study makes optimal use of what capacity each receptor has to discern form and texture.

The structure of the human eye can also be seen to account for the tendency towards continuity noted earlier during the discussion of Gestalt principles. Wescott notes in Randhawa's and Coffman's *Visual Learning, Thinking and Communication* (1978: p.23) that "the foveal image is highly circumscribed; and the peripheral vision which permits perception of things that are out of focus is correspondingly weaker in us than in most other other animals. It may be, then, that both the 'narrow-mindedness' that intellectuals decry in popular stereotyping and the overspecialization that free-wheeling generalists decry in academia are predictable products of our ocular anatomy. What we see clearly we rarely see broadly, and vice versa." If such is the case, there is a real advantage in holding an image still so that the eye can scan at leisure and make the most of the foveal capacity for clarity.

A final note about the suitability of static images to develop visual literacy skills can be understood when we realize that:

> by moving from the center of the human retina to its periphery, we travel backward in evolutionary time; from the most highly organized structure to a primitive eye, which does little more than detect movements of shadows. The very edge of the human retina does not even give a sensation when stimulated by movement. It gives primitive unconscious vision (Gregory, 1978: p. 63).

This capacity of the eye's rod bearing retina to process visual data in the shadowy unconscious mode seems appropriate to the kind of imaging facility one would wish to develop in order to access the gestalt patterning, intuitive structuring of the right brain function.

THE IMPACT OF EYE-BRAIN LINKAGES ON VIEWING

A further consideration for the use of black and white images has to do with the degree of relatedness between the visual system and the limbic system of the mid-brain.

The rod and cone cells of vertebrate eyes are not positioned on the surface of the retina nearest incoming light. An intervening matrix of nerve fibres and supporting cells to the sensitive receptors route the incoming data through "three layers of cells which form part of the brain externalized in the eyeball". (Gregory, 1978: p.62) prior to the data's being processed by the receptor cells themselves. Thus on the very threshold of vision, linkages to the brain (and particularly to the relatively primitive mid-brain limbic system) are evident.

The limbic system is comprised of the thalamus, the hypothalamus, the amygdala, the hippocampus and a section of the cerebral cortex itself. Associated closely with these structures are colleculi, the pituitary and the pineal gland. Together these bodies form a wide looping system which is responsible for what we would characterize as the emotional component of thought formation. (Silverstein, 1986: p. 77) The nerve linkages from these various bodies directly to the eye are numerous.

The pineal gland, for instance, is often called "the third eye". (Silverstein, 1986, p. 75) Its function is to help regulate the cycles of the body in rhythm with the days and seasons, a job it accomplishes partly by recording the body's exposure to light. The characteristic emotional depression associated with lack of sunlight for extended periods of time can be appreciated in this context. The superior colleculi

are the remains of the optic lobes of our vestigial reptile brain. They control reflex actions such as the blinking of the eye and the focusing of the pupil and the lens. They are responsible for the fact that our pupils also widen or narrow in interest or shock at an image and not just reactively because of an increase or decrease in light (Silverstein, 1986: p. 75).

The amygdala channels information from the sense organs to the hippocampus, a structure responsible for the formation of long term memory. The amygdala is called "the window" (Silverstein, 1986: p. 79) through which the limbic system sees a person's place in the world. It gives content taken in through the senses an emotional colouring and relays this "coloured" message to the hippocampus for long term memory.

The role of colour in mood formation is a fairly well recognized psychological phenomenon. John Berger, in his book *Another Way of Telling*, speaks of the "stimulus to action--however tentative it remains [being able to] be provoked by the colour red" (Berger, 1982: p. 87). Similarly, colours from the blue ranges are known to have a calming effect. It would seem logical, therefore, that a concentration on black and white images in a program designed to initiate the development of visual literacy, would be beneficial in minimizing the kind of emotional coloration given the image-message by the viewer's amygdala. This would be especially important if one were trying to clear the image-message of as much of its affective content as possible. The control of colour as a variable makes even more sense when one considers that there seems to be an academic bias already operating to characterize right brain function as essentially affective as opposed to cognitive in nature.

PASSIVE AND ACTIVE VIEWING

A final concern related to the development of proficient viewing is the issue of mobility for the viewer. Arnheim (1969: p. 94) notes that recognition of something is "inseparably related to norm images the observer harbors in the mind". Having seen something from one perspective does not automatically guarantee its recognition from another. Whether a figure can be recognized depends on the flexibility and variety of norm images stored in memory. Gregory (1986) cites an experiment conducted with kittens which measured the relative visual perceptivity of animals who were allowed to move their limbs and of those whose movement was restricted. It was found "that only the active kitten gave evidence of perception, the passive kitten remaining effectively blind" (p. 212). The absence of observable vision may have been the result of an inadequate experience of correlations between vision and movement, proprioceptive deprivation. John Debes (1968: p. 962) refers to something of a similar concern when he notes that "appropriate proprioceptive (sensory interactive) involvement may for the large part be lacking in the developmental history of educationally at risk students". If adequate visual development (or more specifically, the development of wide selection of norm images stored in memory) is indeed proportionally related to the extent to which children move about and manipulate or view their environment from various perspectives, then we must be especially wary of the tendency to expose them to excessive two-dimensional viewing, such as is available on television. Perhaps those who demonstrate haptic deficiencies in reading have had few choices to make visually in a constant diet of T.V. viewing, where the cognitive ordering is far less demanding than is the case with watching and interacting in real life situations.

In fact, compounding the problem for modern parents and educators may be

the fact that most T.V. viewing occurs in motion and with colour. As already indicated, these factors, although highly motivational in the affective sense (in that they stimulate and maintain interest) are also stress-inducing in terms of eye function, particularly if we are expecting higher orders of cognitive processing as well. Wolfe in *Mass Media and Popular Culture* (Duncan, 1988: pp.104-107) speaks of the neural conditioning of viewers in terms of "jpm's" or "jolts per minute". He maintains that " T.V. shows keep audiences' attention by 'jolting' them. 'Jolts' include violent acts, rapid cutting, high decibels in the sound track, and sudden movements". (Duncan, 1988: p.104) Perhaps the vegetative state we note with prolonged television viewing results from data overload. In fact research conducted by Mulholland (cited in Randhawa and Coffman, 1978) indicated that:

> television viewing is not necessarily associated with a high level of visual attention. [He] noticed that while watching television, children often have low levels of EEG activity associated with prominent alpha [brain waves] and their facial muscles are often relaxed...[that] children may be spending huge amounts of time learning how to be inattentive (or operate at a low level of visual attention) while watching television. Thus, extremely complex and dynamic television displays may become conditioned stimuli for decreased EEG activity and low levels of visual attention (Randhawa and Coffman, 1978: p. 87).

What we must recognize when we select visual materials for teaching is that there is merit for some lessons in limiting the selection to black and white static displays. We must resist the tendency to regard such media as passe or inadequate; we must accept the responsibility to mediate the visual overkill and titillation of much of the contemporary viewer's diet with an approach which may seem tame by comparison, but which makes possible a more effective simplified analysis of some of the fundamentals.

SUMMARY OF VIEWING AS PROCESS

Viewing is far more than the passive reception of visual data via the eye to the brain. It is clear that considerable manipulation of incoming data is accomplished by the eye before the data is ever passed along to conscious perception. In fact, it would appear that much data is processed and absorbed by a complex network of brain structures without the viewer's awareness. Typically, such data would appear to be the kind necessary for reflexive, survival behaviours, but it is also probable that much of the structuring activity evident in the Gestalt patterning is absorbed sub-consciously, and forms deep cognitive structures for the organization of abstract thought. In order to access a conscious awareness of our intuitive ability to structure in such a fashion, we would be wise to be very selective about both the quality and quantity of images we use to facilitate cognition. Images which are static and black and white provide an educationally justifiable starting point for an exploration of the fundamentals in visual literacy.

IMAGING COMPARED TO VIEWING

Visual perception has been defined as "visual thinking" (Arnheim 1969: p. 14) in the sense that it is an active as opposed to a passive process during which the eye selects, confirms, appraises, changes and completes incoming data in accordance with an essential need to economize on effort. In this way the data which is shunted to the visual cortex for active intellectual processing is that which can be accommodated by sequential (either temporal or spatial) brain process. For this reason, our eyes focus on one spot at a time but scan constantly, giving the impression that a

large field of data is being viewed simultaneously, when in fact only a small area is in focus at any one time, the periphery being perceived but not attended to as selectively as the area being processed by the fovea. As indicated in previous discussion, the manner in which incoming data is processed displays a logic based on economy of optical effort, proximity being attended to in preference to lack of proximity in the organization of visual structure because less effort in terms of eye movement is required to connect elements which are closer together, a similar economy of effort occurring with regards to the operations of similarity, continuity and closure. In viewing, we may not consciously be aware of such structure, just as we are not necessarily consciously aware of what we see when our eyes are open and we are actively involved with the environment. (We are all familiar with the phenomenon of having found our way home while preoccupied in thought without consciously being aware of the turns made in the road.) Because viewing is a process displaying "intelligent", (i.e. selective, discriminating) behaviours, and not wholly a reflexive, automatic one, it is possible to speak of viewing as something which must be learned, and because it must be learned, it seems also to be a process whose performance can be improved.

Where viewing is mostly a voluntary activity engaged in simply by virtue of opening our eyes, (though that is not to say that we always view "well" simply by opening our eyes,) imaging is an involuntary activity which may occur regardless of optical excitation. Nancy Thompson (1990, N.C.T.E., p. 17) defines imaging as "the skill we have of picturing or hearing something in our minds, such as the mental pictures we form when we dream or read a novel. Metaphorically we can think of imaging as a mental cathode ray tube that turns electro- chemical brain activity into what it is we are conscious of when we think." The function of imaging is, in this sense, not directly dependent on the eye's capacity to scan and discriminate, but is more holistically related through access to the data gleaned by the eye (or other

sense organs). Furthermore, one might assume, this data bank includes not only discrete data, but also compositional spatial data, (Gestalt patterning) which is available to be used by the brain to create images.

TERMS OF REFERENCE FOR A DEFINITION OF "IMAGE"

Imaging is, of course, an intensely private and subjective experience and consequently one which has provoked an array of differing definitions. It is relevant at this point to identify the polarities of opinion existing in the academic community in order to place the author's in perspective for the reader. The foregoing discussion related to Gestalt structuring is intended as a beginning point for those wishing to gain some insight into the fundamentals of visual literacy as the term applies to viewing. What next concerns us is the relationship of "viewing" to "imaging", a process which, in its spatial functioning will be seen to have some correspondence to the manner in which Gestalt principles help to structure voluntary visual experience. First, however, an effort must be made to capture some sense of definition for this elusive capacity.

A simple way to conceive of imaging is to suggest that it is the internal mental counterpart of viewing. This would tend to suggest that all mental images were representations of stimuli already viewed through visual perception. This is an inadequate definition because imaging also occurs in situations where auditory or tactile stimuli act as prompts. Obviously, those blind from birth are also capable of imaging without ever having had the benefit of sight.

Scholars over the years have differed greatly in their attempts to define the term "image". The essential dispute has centered around the question of whether such conceptualization in representational form is a conditioned response by an organism constantly visually interacting with its environment (the behaviourist attitude which focuses on operational process) or whether it is a figurative construct "used to refer to a memory code or associative mediator that provides spatially parallel information that can mediate overt responses without necessarily being consciously experienced as a visual image" (Paivio, 1971: pp.135-136). The first approach is seen as associationism (S-R theory) and the second as some form of relationism (Gestalt theory) and as noted by Richardson, (*Imagery: Current Theory, Research and Application*, Sheikh, ed., 1983, p. 9) either theory is tenable depending on which facts are selected for interpretation. Both theories seek to account for the *origin* of the imaginal experience. Arnheim's position (Arnheim, 1969: p. 13) tended to debunk the behaviourist approach because it placed sensory processing outside the realm of cognitive function because such processing could not be empirically verified in behavioural terms. Some thinkers, such as Piaget, (Sheikh, ed. 1983) preferred to sidestep the issue by identifying images in *functional* terms as "one form of figurative element that may be used in the service of more abstract logical processes" (p. 9). The term therefore has a dual nature in that it "may refer to an inferred construct or process of an essentially nonphenomenal kind, or to an experienced event of a quasi-sensory or quasi-perceptual [phenomenal] kind" (Sheikh, 1983: p. 13). It may be purely a mental structuring without a specific experiential referent (relationism) or it may result from information absorbed by the senses (associationism).

For an educator attempting to isolate a working definition of the term, it may make more sense to concentrate on the manner in which the phenomenon occurs,

than to speculate about why it does. It is for this reason that Gestalt theory has become a primary focus in this study. Extensive introspection about why images occur in cognition seems relatively fruitless when what we wish to determine is how we might make the best use of this capacity to enhance learning. Gestalt theory concentrates on a global appearance of structure whereas S-R theory tends to wish to make logico-linear connections between empirically based observations. Obviously, in the case of a study of mental imagery, and particularly given the author's expressed preference for exploring in a qualitative as opposed to a quantitative fashion, the position preferred for defining image leans more towards the relational definition, that of class of inferred cognitive constructs or processes rather than towards the associational definition of a class of more or less percept-like experiences.

WHAT EVIDENCE EXISTS THAT IMAGING OCCURS?

Operating from such a definition, one cannot rely upon the traditional empirical structure of observable occurrences to verify the production of images. It is therefore fair to ask what case can be made for their actual existence. It must be acknowledged that direct evidence will not be available until we have discovered how to view the "moving pictures" inside another person's brain. Needless to say, even if such pictures exist in a form that observing human eyes could recognize, the debate about the existence of mental images would still not be over, because then one would have to agree on the point of origin for the image: is it being generated in the brain of the individual whose brain is being investigated or is the image simply the viewer's perception of that image? Such speculation, while philosophically fascinating, seems beyond the scope of the present study which is focusing on the experi-

ence, and not the origin of imaging. However, some argument for the existence of imagery may be forthcoming as the result of recent developments in brain-wave theory.

Hewes (cited in Randhawa and Coffman, 1978: p. 16) notes that whereas reading and writing and listening and speaking seem to have a commutative relationship, (one being a reciprocal process relative to the other) there seems to be no comparable visual outputs for visual inputs, unless one draws or paints something like what has been taken in (a capacity most of us lack the talent or the knowledge to do well). However recent research into brain wave behaviour may shed some light on what the human cognitive reaction to viewing is.

Although the notion of attentiveness to a mental construct is not an overt activity, in that it is not observable, nevertheless, research by Mulholland (cited in Randhawa and Coffman, 1978: pp.77-89) into the level of alpha brain wave activity with subjects who were described as "looking at" and not just "seeing" visuals, has determined that low alpha indicates a high level of brain activity. Correlations have been determined between low alpha output situations (low alpha activity indicates that the brain is actively processing) and situations where the subjects indicated that they were paying attention. Thus, if attentiveness to actual imagery can be measured to some extent, it may be possible to measure brain wave activity associated with the process of imaging. If that should be the case, then imaging could be construed as the process bearing a reciprocal relationship to viewing. The conceptualization of an idea in imagery may relate to viewing in somewhat the same fashion as reading does to writing or as listening does to speaking. In each case the former is an internalized activity where information is decoded within the brain; in each case the latter is a response mechanism where information is encoded. For imaging, the

essential difference is that direct evidence as to the quantity and quality of the encoded content is not easily available (unless one has access to and the expertise to use an electro-encephalogram, and even then the sensitivity of the equipment is not yet finely tuned enough to act as a qualifier of mental imaging, but only in the roughest sense as a quantifier). Sanders and Sanders (1983) in their discussion of the work of Galin and Ornstein, note that the processing of verbal tasks resulted in high alpha readings (low brain activity) in the right hemisphere of the brain and in beta patterns (active processing) in the left hemisphere, whereas the processing of spatial tasks (which would involve visual imaging) results in high brain activity in the right hemisphere and low activity in the left. Such findings suggest that the technology is in place to verify the existence of imaging activity, if such has not already been accomplished. What would be necessary would be EEG monitoring of subjects participating in imaging activities not directly stimulated by external conditions.

One can identify both writing and speaking behaviours quite easily. They are accepted as reciprocals of reading and listening respectively. Neither viewing nor imaging (the B.C. Language Arts - English K-12 Curriculum (1990 document prefers the term "representing" to "imaging") may be skills which can as yet be empirically tested by educators in the same way that writing and speaking can, but this is not to say that they do not exist as discrete behaviours which are cognitively significant as learning mechanisms. Even more to the point, that is not to say that we should not be attempting to increase our students' proficiency with them.

GESTALT IN THE IMAGING EXPERIENCE

Roger Shepard in Randhawa and Coffman (1978) identifies three main categories of images: perceptual, entoptic and entecephalic. The first is "the internal perceptual representation that is directly elicited by sensory stimulation resulting from the corresponding external object" (p. 160). Such images are those most commonly attributable to the experience of active viewing. It is these imaging experiences that the behaviourist (S-R theory) school would maintain are the only legitimate images to consider. The Gestalt perspective would include the remaining two as equally worthy of consideration. Entoptic images are those which result from processes "that originate within the eye" (p. 160) such as direct mechanical, electrical or optical excitation. Such images occur, for instance, when pressure is applied to the eyeball and one becomes aware of an "incessantly shifting and seemingly meaningless play of subtle lights, colours, textures and patterns" (p. 160). The identification of these kinds of images is important in order that they may be distinguished from the last type, the entecephalic, which are the more complex and hopefully more meaningful types of images which originate spontaneously within the brain.

Much imagery is of course isomorphic, in that it approximates structures familiar through experience. We can all close our eyes and visualize actual or imaginary or perhaps generic objects such as chairs or horses. Such imagery comprises the bulk of that associated with concrete thought. However, the visualizing of abstract concepts occurs less frequently in conjunction with such identifiable images. The structure associated with the derivation of complex abstraction is likely to be of either a symbolic (analogous) variety, as was the case when atomic structure was likened to the solar system, or of a more definite symmetrical correspondence, as is the case when feudal hierarchy is depicted as pyramidal in structure. It is this aspect

of cognitive structuring which the writer now wishes to explore more thoroughly.

As mentioned above, the kinds of imagery originating exclusively inside the human organism, which do not necessarily owe any debt to outer reality for the fact of their existence are called entecephalic (inside the brain) and entoptic (inside the eye). Documentation exists (Randhawa and Coffman, 1978: pp. 133-189) that analogic and symmetrical Gestalt-type structuring occurs spontaneously with both types of image formation.

"The relation between entecephalic and entoptic images is somewhat analogous to the relation between perception and sensation" (Randhawa and Coffman, 1978: p. 163). One can artificially induce a variety of visual sensations by externally applying mechanical pressure to the eyeball; entoptic images exist also as "various sorts of positive and negative afterimages precipitated by a brief intense flash of light". (Randhawa and Coffman, 1978: p. 161) Such phenomena are thought to be related to residual neural activity existing as background in the visual system even in the absence of optical excitation. Such imagery is generally disregarded as significant "because of its subtlety and lack of meaningful or memorable organization and because of its independence from external events and, hence, its lack of relevance for survival". (Randhawa and Coffman, 1978: p. 161) Roger Shepard, (Randhawa and Coffman, 1978: pp. 168-171) in his reconstructions of frequently experienced (over a period of several years) entoptic images, noted that those associated with external pressure applied to the eyeball, tended to be composed of an array of patterns consisting of alternating light and dark bars of a light amber or cream colour and a deep brown. He further noted a "well defined orientation and spatial frequency characteristic of each region, with horizontal and vertical orientations the most frequent." (p. 170) Of particular interest to him were flickering patterns of "

square or triangular arrays of light or dark dots...checkerboards and possibly, other more symmetrical or mandala like local patterns". (p. 170) What is perhaps significant about the quality of many of these entoptic images is the frequency with which symmetrical or geometric forms occur. Shepard suggests (p. 170) that the various forms of striations "may correspond to the spatial frequency analyzers that ... a number of sensory neuro-psychologists [believe] play an important role in the early stages of visual processing". (p. 170) Such structures may be closely related to, or may in fact be, manifestations of the Gestalt similarity principle at work on the visual threshold, in as much as such images display symmetry and symmetry is a special case of similarity.

Shepard's discussion of entecephalic imagery contains an extensive section recounting the externalizations of mental images attributed to a number of famous creative thinkers. Running as a common thread through many of these accounts are references to symmetrical formulations which acted to provide structure for the expression of the highly complex abstractions being postulated by the thinkers. Einstein, for instance, insisted on "a symmetrical relation between rest and motion, charge and current, electric field and magnetic field, space and time, matter and energy and gravitation and inertia. [Such insistence was] rooted in an aesthetic appreciation of a more concretely visual kind of symmetry". (Randhawa and Coffman, 1978: p. 136) Michael Faraday's electro-magnetic field theorem was arrived at as a symmetrical pattern of a family of curving lines "by a kind of intuition, with the security of instinct, without the help of a single mathematical formula" (p.137). Such analogic cognition is of the kind currently associated with right brain function, and of the kind which derives its coherence from Gestalt spatial processing. Similar cases are made for the manner in which scientists such as Helmholtz, Galton, Hadamard, Watt, Tesla, Watson, Herschel and Kekule derived their theories.

Some of the thinkers cited by Shepard were subject to hallucinatory entecephalic experiences of great vividness, during which their insights were achieved quite forcibly. Thinkers such as Descartes, Goethe, Pascal and Schopenhauer are listed as among those who achieved insights during incidences of dreams, hallucinations and delirium. (Interestingly enough, Pascal was diagnosed after his early death as having had a brain tumour in his left (logico-mathematical, linguitic) hemisphere (p. 143) and several people are noted by Carl Sagan (Sagan, 1977: p. 167) as having been able to produce poetry only after having lesions removed from the left hemisphere.) There are many documentations of symmetrical, geometric mandala formations experienced by Tantric artists while in a state of deep meditation (Randhawa and Coffman, 1978: p. 165), formations which are strikingly similar to ones noted by Herschel while under the influence of chloroform and by Jung (1964) in his study of the waking images and dreams of some of his patients.

All of the above point to the imaging capacity of the brain being sited primarily in the analogic, global, spatially processing right hemisphere. Many of the abstract formulations derived from the imaging experience are characterized by geometric and symmetric patterns, many being of a kaleidoscopic mandala-like formation. Shepard (p. 182) postulates that such visualizing capacities "may even be related to underlying neuroanatomic structures... a [potentially] identifiable cytoarchitecture" for the human brain. Such an architecture, if it does indeed exist, would be akin to the kind of deep cognitive structures which facilitate both intellectual and intuitive thought processes, in that the right hemisphere provides the structural framework (the skeleton, as it were) and the left hemisphere, the data to "flesh out" the cognitive construct. Such a notion once again reinforces the importance of seeing the brain's hemispheres as working in conjunction with each other, and not

discretely, and by transference, the importance of providing our students with a wide experiential background of non-linear multi-dimensional structures to act as frame-works upon which to hang the vast data bank of information at their disposal.

Piaget (1976: pp. 24-25) appeared to endorse the notion of such a "cytoarchitecture" when he asserted, "cognitive activity can be shown to have structural properties: certain broad structures underlie the thought process at different levels of development." Randhawa identifies "the attributional saliency of pictures" (Randhawa, 1978: p. 209) as an area of investigation which begs for answers. "Several practical research questions remain as to where, when and why imagery and internal representation of the visual would act as organizational strategies." (p. 209) The answers to these questions will have serious impact on the importance of multi- disciplinary studies, on strategies to improve creative and critical thinking, and on the manner in which language functions to mediate the expression of cognition.

THE ROLE OF LANGUAGE IN VISUAL LITERACY

Language as a One-Dimensional Construct

Much of the foregoing discussion may be of inherent interest to the philosophically or technically inclined educator, but one might be forgiven, if as a teacher of language or other humanities field, he or she was unaware of how knowledge of such underlying cognitive structures might benefit one in everyday classroom praxis. Most of us conceive of linguistic structure as essentially linear if not always logical in

formation; linguistic processing is associated exclusively with the intellectualizing, discrete data processing left hemisphere of the brain. Learning new languages often requires hours of rote memorization of frequently ideosyncratic letter or character formations. There seems to be little of the spatial, global right hemisphere capacity that can be practically applied to such tasks. To a great extent this estimation of language is appropriate.

Western languages particularly, with their lateral organization of letters to form words, impart a distinctly linear quality to the process of thought expression. Oriental languages, which often incorporate into their characters spatial relationships between the elements of the character, seem somewhat less linear in orientation, but even they express thought by a process of accretion, one idea following in sequence upon the other. In the reading of any kind of script, there seems to be an inherent incongruity between the process of thought formation in the brain, and the completely adequate expression of that thought through language. The disparity becomes more pronounced depending on the level of abstraction attempted. It is not that the thought is too difficult to be conceived of; it is often simply too multi-dimensional for a one-dimensional vehicle such as language to convey with facility.

Shepard in Randhawa and Coffman (1978) talks of Omar Snyder, one of the scientists who worked on the "Manhattan Project", who

> amplifying on his own experience of sudden illumination, emphasized its four dimensional character. He argued that the difficulty in externalization and communication of such an insight was the vast expansion in time required to unpack its four-dimensional structure into three dimensional space (in the form of a model operation over time) or the even vaster expansion to unpack it in the form of one- dimensional language" (cited by Shepard, Randhawa and Coffman, 1978: p. 159).

Thought must take place in time and it is our capacity to retain images through memory which makes our manipulation of complex thought possible. Can language ever be an adequate vehicle for the expression of multi-dimensional thought? On the one hand, linguistic determinists would even question whether such thought is possible without language, whereas psycholinguists point to the untapped potential of analogic structures to facilitate the process of abstract expression.

Arnheim (1969) maintains that language helps thinking, but that thought is not impossible without it. Examples cited are the tasks performed by animals such as apes. The point is made that such thinking for lower order primates or other mammals occurs in the present tense; such thinking is limited to coping with directly given situations. Future is an abstraction which requires more sophistocated mental manipulation, the kind of manipulation which a vehicle such as language facilitates. In Arnheim's view, language performs this service substantially, not by virtue of properties inherent in the verbal medium itself but "by pointing to the referents of words and propositions, that is, to facts given in an entirely different medium" (Arnheim, 1969: p. 228). That medium is the imaging capacity of the right hemisphere where countless norm images are stored in memory waiting to be evoked by the appropriate "trigger", the sufficiently specific word label stored in the left hemisphere data bank.

The transcendental nature of vision is suited to the storage of complex multilogic abstractions; language is the most easily accessible vehicle we have for their retrieval. What we must avoid is the assumption that all thought must be constrained by the limitations imposed by a dogmatic ethos which elevates language, and particularly the articulation of thought in written form, to the same level as

cognition itself. In its written form, language is a sophisticated and useful tool, a versatile excavator we use to get at the real "paydirt"; however, in focusing too narrowly on the potential of print, there may be too much bias favouring the role of linguistic mechanic, a role in which one becomes absorbed by seemingly interminable maintenance and service routines, (grammatical concerns for instance) with the result that the primary purpose of unearthing buried cognitive resources is overlooked. It may be time to re-evaluate such priorities, and to confirm the central purpose of language instruction as the facilitation of effective, original communication. In a society where the most valuable human trait seems to be adaptability, it should be recognized that there is another tool available which may be used as effectively as print to stimulate divergent, creative and critical thinking.

Edward DeBono, in *The Use of Lateral Thinking* (1967), identified the manner in which concepts became "frozen and immutable" (p. 72) once they acquired a name. He saw the naming process as the way in which the established, conservative point of view maintained its grip on human thought and prevented too much individual aberration from normative thinking:

> The availability of words and names fixes the way a particular situation can be looked at. The dynamic fluidity of lateral thinking - which is continually forming, dissolving and reforming the parts of the situation in ever different shapes [images] - is gone, and with it the chamce to find the best way of looking at the situation. Once the parts have been horribly frozen by words, the best that can be done is to put the words together in different patterns; but this is often inadequate (DeBono, 1967: p. 72).

Unfortunately, both Arnheim and DeBono produced much of their work before the publication of Sperry's split-brain research findings and perhaps before there was inarguable documentation of the anatomical interdependence of the hemispheric functions. Otherwise, they might have been more receptive to the notion of language as a recursive process, rather than characterizing its function as

"essentially conservative and stabilizing and therefore [tending] to make cognition static and immobile" (Arnheim, 1969: p. 244).

Language as a Recursive Process

Recent thinkers in linguistic process (Rosenblatt, 1984 and Holdaway, 1979) have looked at the reading process as one in which the reader brings to the experience a wealth of imagistic background which is called into play as a kind of safety net and resource bank for the reader groping for meaning through the initially arduous process of decoding. Holdaway (1979) states:

> Reading is a selective process. It involves partial use of available minimal language cues selected from perceptual input on the basis of the reader's expectation. As this partial information is processed, tentative decisions are made to be confirmed, rejected, or refined as reading progresses (p. 87).

A large part of the process involves being able to access an adequate semantic cue system. Again Holdaway (1979) indicates that:

> In order to derive meaning from language, the language user must be able to provide semantic input. This is not simply a question of meaning for words but the much larger question of the reader having sufficient experience and conceptual background to feed into the reading process so that he can make sense out of what he's reading (p. 88).

There is no doubt that the bulk of such a background is visually acquired and retained in the form of mental image. Print literacy is seriously dependent on visual/imaginal literacy. Such thinking was evident in the formulation of Louise Rosenblatt's transactional theory of reader response, (Rosenblatt, 1884) where her conception of "literariness" can be interpreted to include all the media as well as literary arts. Art educators such as Day (1979) likewise recognize the critical impact

of imaging on language formation. "Without imagery, and its diverse organic modalities, there would be neither discursive nor presentational expression" (Day, 1979: p. 15).

Although he did not envision language as the recursive medium in the same fashion, Arnheim (1969) recognized the potential of language to act as a facilitator for cognition:

> Words are like pointers that single out significant peaks from the unbroken contour line of a mountain range on the horizon. The peaks are not created by the pointers. They are given objectively; the pointers fortify the observer's urge to discriminate them" (p. 236).

What Arnheim deplored was the foreshortening of insight resulting from excessive reliance on language as the only acceptable vehicle for thought. It is as if we have been using the pointers for so long that we have forgotten what they signify.

Gestalt in the Reading Process

It is here where the value of similarity and analogy become evident. Such structures act to bear the burden of meaning which mere words cannot. The use of simile and metaphor, parable and fable, myth and legend, allegory and analogy evoke layers of meaning, conjuring up connotations through a rich array of imagery; such imagery, resident in memory through the Gestalt mechanism of closure, works to bridge the gaps between cognitive formulation and linguistic expression. They act to remind us that there is much in thought which mere words cannot encompass. They explode the illusion of the word as a finite entity and force the reader to concentrate instead on the multi-dimensional image conjured up by its metaphorical

usage. Thus the encoding of thought in words, whether by oral speech or by written word, is linear in form perhaps but, with the aid of imagery, need not be one-dimensional in function.

Such cognitive demands are made upon the reader of poetry, where generally speaking the image is everything, and grammar and syntax count for little. The most logical and well-organized student is often stymied by the demands of poetic interpretation. We tend to accuse such students of lacking "imagination", literally, the ability to image. Unfortunately, we do not reckon the deficiency a terribly serious one; poetic insight is not a saleable commodity and imagination tends to have an affective as opposed to cognitive value. As Clements (1982) notes, metaphoric writing in scientific disciplines is discouraged because they are seen as embellishments which lead the reader away from the theme. What Day (1979) calls the "ineluctable", the unavoidable, is the ability to image in this fashion. He sees the neglect of developing this capacity in students as indicative of a critical handicap... the inability of students to access the the global, and the multi- dimensional.

Holdaway (1979) suggests that "knowing how to operate imaginatively is learned behaviour, and highly complex learning at that" (p. 55). He notes that the significance of making meaning from metaphors, similes and analogies has been overlooked in the traditional teaching of literacy. "For such children [those who have not had enough experience in making meaning from metaphors and similes], half their motivation for becoming literate is paralyzed and so learning to read must be like learning to walk with one leg" (Holdaway, 1979: pp. 55- 56). Thompson (1981) makes the claim that the significance of metaphoric thinking goes well beyond the establishment of literary meaning, and suggests that a concentration on "frozen or dead similes and metaphors (cliches)" (p. 33) may even hamper the development of

abstract thought (presumably because such trite conventions have lost their capacity to evoke multi-dimensional images). Sanders and Sanders (1984) go even further in making a case for metaphoric thinking as an indispensible instructional strategy. They do not confine the significance of the metaphor to literacy learning but see it as critical for the development of cognition in general.

Of course, no one would be so naive as to maintain that all of the expressive shortcomings of language can be overcome by virtue of analogic structures. We cannot undervalue the importance of an adequately varied vocabulary or coherent syntax; such specifics are the irreplaceable "flesh" for the "skeleton". However, the point must be made that those who denigrate such colourful devices as similes and metaphors to the level of merely cosmetic or poetic "frills", are shortchanging themselves and others in opting out of access to powerful conveyances for meaning, which by virtue of their spatial character and evocative versatility, can offset the tendency language has to immobilize fluid thought.

THE ROLE OF PHOTOGRAPHY IN VISUAL EDUCATION

The Limitations of the Photogragh as Cognitive Stimulus

Having underscored the limitations of language as a stimulus for what Arnheim called intuitive cognition, in that it tends to immobilize thought, the author now wishes to make the point that pictoral stimuli suffer from the opposite effect. They make possible a very wide range of interpretations, a flexibility of meaning which must be mediated if we are to put their usefulness into perspective.

First of all, what kind of images would be suitable for a simplified analysis in the classroom? A case has already been made for static, black and white images as a kind of basal medium through which one could begin to develop visual/imaginal literacy skills. Obviously, simple line drawings would be suitable. However, the problem is that adequate samples may not be as available as one would suppose; few of us are competent draftsmen capable of producing the wealth of images necessary for visual instruction, and in any case, such drawings would not necessarily provide the variety of subject matter and texture that would be available through another commonly available medium.

Students recognize the photo as ubiquitous in modern culture; it is coherent with what they perceive of as "technological" in a way that the line drawing is not. Photos are as available as the daily newspaper; furthermore, they motivate attention by virtue of their perceived immediacy and social relevance or credibility. However, there are some considerations related to these last qualities which merit examination if we are to appreciate the enormous scope of the impact that photography has on human perception.

The camera itself has been compared to the human eye, a comparison McLuhan considered dangerously facile as he saw the camera as an extension of,and not in apposition to, the human eye (McLuhan, 1963: p. 173). Goldsmith notes, "The structure of the human eye and that of a camera resemble each other so closely that diagrams for one are frequently used to illustrate the functions of the other" (Goldsmith, 1971: p. 33).

Both have an aperture which can open and shut to control the flow of light.

The main difference is that the camera is less fully automatic in this regard. Most medium priced 35mm. cameras have a range of stops which allow a wide range of clear focusing capability. Furthermore, they can bring a wider range of objects into focus than the eye can at any one time. The eye compensates for its narrow range of focus with its fully automated focusing system. The eye alters its focus by changing the shape of the lens itself and the distance between the lens and the retina remains constant, whereas the camera changes the distance between the lens and the film plane. Although the camera has a wider range, it cannot alter its focus with anything near the speed or facility with which the eye can. Those who assume that the camera will see things exactly as the eye sees them have not considered the differential in focal capacity. What the eye sees appears to be in constant focus simply because the eye scans constantly and can focus sharply and almost instantaneously on objects from only a few inches away to those at a remote distance. However, the total picture can never be in focus all at the same time, a situation which is possible, although not always desirable with a good camera (Goldsmith, 1971).

This difference is relevant when considering why the photograph is considered to be a more reliable witness than the human eye. With much data in focus, frozen in time, the eye is at leisure later to analyze the total image, a luxury not available at the actual time of initial viewing. Such a facility is what makes the photo-finish or the instant replay such powerful authorities. The danger for the viewer in general terms is that such authority is attributed to the process of photography in general when, in fact, the intervention of the photographer and his or her intent should also be a consideration. For the impact of a photo is dependent on the function it is intended to fufill; if we, as viewers overlook intent as a possible variable, we run the risk of taking for a visual fact what is intended to be a visual statement of opinion. To overlook the role of the photographer in image creation is to

ignore the whole issue of authorship in visual literacy. We must recognize that the "truth" presented for us is often the truth as seen and captured by a biased eye.

One of the most important considerations for an appraisal of photographic impact is to examine the assumptions our society has about the veracity of the photographic image. The prevailing notion in our society is that "the camera does not lie", that "a picture is worth a thousand words". Photographic process, embedded as it is in a history of scientific and technological progress, has attained a similar aura of infallibility in positivist Western thinking. Susan Sontag echoes some of this view when she asserts, " Photographs really are experience captured, and the camera is the ideal arm of consciousness in its acquisitive mood" (Sontag, 1973: pp. 3-4). It is as if the photo were taken without the help of the photographer. The assumption so many of us have is that what is captured on photographic film *must be* reality itself. This is a predisposition which needs to be examined more fully.

John Berger (1980), in his discussion of Sontag's work, decries the reflexive stance with which most of us approach photo production and perusal. "In the first period of its existence, photography offered a new technical opportunity; it was an implement. Now, instead of offering new choices, its usage and its 'reading' were becoming habitual, an unexamined part of modern perception itself" (Berger, 1980: p. 49). Just as it could be seen that language, as a medium, became invisible, and inextricably identified with thought process itself, so too has the photographic medium replaced memory as the arbiter of reality. Berger (1980) asserts as much when he asks,

> What served in place of the photograph before the camera's invention? The expected answer is the engraving, the drawing, the painting. The more revealing answer might be: memory. What photographs do out there in space was previously done within reflection (p. 50).

It is another case in point for the truth of McLuhan's "the medium is the message". For as long as we are blind to the operational characteristics of the photography as a medium, we are in danger of being duped into accepting its content as the only message, when what is probably far more relevant is the process by which we get that message and the purpose for which the content was preserved. Also, of course, inherent in our understanding of that process will be an appreciation of the global and the Gestalt at work to structure image perception. It is as if modern technological advances which we have managed to accomplish primarily because of our left-brain logico-mathematical and linguistic expertise, are now demanding that we, as a race, forego our exclusive preference for that modality, or else miss the "big picture" altogether. It is an ironic development, that the methodology which has made our modern lifestyle possible is not up to the challenge of helping us understand how to cope with that lifestyle.

What Does a Photograph Mean?

How might we come to understand what photographic process is from a phenomenological point of view? What occurs, in terms of real meaning, when an image is captured on film? Berger says a photograph is not "a rendering, an imitation or an interpretation of its subject, but actually a trace of it...something directly stencilled off the real, like a footprint or a deathmask" (Berger, 1980: p. 50). It is a slice of the reality that was, a instance removed from the flow of appearamces that occurred, a moment preserved on film. "The camera saves a set of appearances from the otherwise inevitable supersession of further appearances, [something which], before the invention of the camera, nothing could do...except, in the mind's eye the faculty of memory." (p. 51) Our collective error, as a society has been to

valuate photographic images as replacements for memory; in fact, we have allowed them ascendancy over memory as arbiters of reality.

Such is the case with the use of the "instant replay" and the "photo finish" in sporting events. According to Berger (1982), such is an appropriate use for photography:

> When a photograph is used scientifically, its unquestionable evidence is an aid in coming to a conclusion: it supplies information within the conceptual framework of an investigation. It supplies a missing detail. When photographs are used in a control system, their evidence is more or less limited to establishing identity and presence (p. 98).

However, most photography is not used for the purpose of providing such empirical evidence. It is primarily used to communicate about a situation in context. The problem of supposed photographic infallibility occurs because we do not make the distinction between these two purposes. "As soon as a photograph is used as a means of communication, the nature of lived experience is involved, and then the truth becomes much more complex" (Berger, 1982: p. 98).

For instance, a photo which shows only the image of a person weeping, without any contextual background, cannot establish the circumstances surrounding that emotional experience, cannot even establish the quality of the experience, whether the person is overcome by sadness or joy, either of which could elicit tears. In the context of communicating experience, photographs can only lend appearances to be interpreted by the viewer. They cannot, unlike memory, preserve meaning. "They offer appearances - with all the credibility and gravity we normally lend to appearances - prised away from their meaning" (Berger, 1980: p. 51).

Just as in reading response theory, the reader must bring his or her experi-

ence to the reading in order to derive meaning, so too must the viewer of photographs bring his or her experience to interact with the image to produce meaning.

To do anything less imperils the importance of memory (experience). If we forget that the photographic process is essentially an interventionary one that requires our active involvement for its adequate interpretation, then what is created, Berger (1980) maintains, is:

> an eternal present [a lack of history or experience] of immediate expectation: memory ceases to be necessary or desirable. With the loss of memory the continuities of meaning and judgement are also lost to us. The camera relieves us of the burden of memory. It surveys us like God, and it surveys for us. Yet no other god has been so cynical, for the camera records in order to forget (p. 55).

Could it be that reliance on mechanical image-making can rob us of our own personal sense of history? Is it possible that what is needed is a more concerted effort to become more consciously aware of our own internal imaging capacity so that we can offset the tendency towards such blindness?

The Photograph in Perspective as a Classroom Resource

Educators who use visual media must be aware of the essential ambiguity of all photographic images and work to help their students reconstruct the meaning behind the content. They should be aware to what extent the photographer can shape opinion by framing selected portions of a display or can manipulate the impact of the visual message on the viewer by cropping the image in the darkroom, by altering the lighting, or by using tricks such as multiple exposure. An understanding of the cohesive or fractionalizing impact of the Gestalt principles of proximity, similarity, continuity and closure will alert the viewer to the manner in which images

can be made to appear to communicate messages which are not in fact contextually "true" in the scientific sense of the word.

Berger contends that photography has no language; he says, "Photographs do not translate from appearances. They quote from them" (Berger, 1982: p. 96). I would qualify this statement. Photography does have a language which is written in a little understood code of spatial composition, light and form. This language can partially be understood in terms of the Gestalt theory discussed previously. Not only does photography have a language, but an inbuilt bias as well. If we accept Berger's (1982) contention that images lend appearances to be interpreted by the viewer, then the viewer must take on the responsibility of recognizing the scope of bias possible. First, there is the bias created by the snatching of the moment out of context, then, the bias created by the photographer's preference for angle or focus, and finally the bias possibly created through darkroom engineering of image (cropping or variable light exposure). The instant has been frozen in time and space. It is discontinuous, possibly ambiguous and in some cases, a constructed lie. The camera does not lie, but neither does it always tell the truth, because it can record the lie and lend it credibility by virtue of the viewer's faith in scientific process.

For the teacher, the issue of image interpretation may not be so much the question of what *is* the truth. As Victor Burgin (transcript from C.B.C. "Ideas", 1990) points out when discussing the interpretation of an advertising image:

> We're never in a position of confronting pure fact. You know, there ain't no [sic] such thing, because any objective reality is instantly taken up into the world of human values and meaning, political contestations, personal preferences, all of these sorts of things. Now where is fact, where is reality in all of this? It's not there. It doesn't exist. And I don't think the question is then, 'How can we get it?' -- because you can't get it. The question is, 'How do you deal with that?' (pp. 5-6)

Burgin's solution rests within the adoption of a stance which Bertrand Russell called the 20th century's greatest invention, the state of suspended judgement. Burgin (1990) highlights the evidential nature of photography:

> The photograph can only be evidence; it can never be the truth. The evidence is presented in the context of other evidence, and then later we will decide on the basis of all the evidence what the truth is. We can't photograph the truth. So the photograph is up for grabs, and if it's taken up by plausible liars, then it can be made to lie. (p. 7)

Somehow, the teacher of visual literacy must be able to help his or her students be comfortable within the state of flux; such teachers must try to encourage students to adopt a healthy stance of suspended judgement, one which is skeptical, but not cynical. We are so swamped by photographic images, that it is difficult to get a critical distance on them otherwise. As McLuhan was fond of saying, " We don't know who discovered water, but we're damn sure it wasn't a fish." (quoted from C.B.C. "Ideas", 1990: p. 7) We can't evaluate the nature of image unless we can remove ourselves a step or two away from it.

One of the advantages of black and white photography in visual literacy training is that such images remove the viewer at least one notch away from such gullibility. Although most of us recognize that appearances can be deceiving, the more realistic the image, the less skeptical we will be of its veracity. The viewer knows that his eyes perceive the world in colour; consequently, a viewer of black and white photographed images will have in place at least one powerful agent to remind him or her that the image does not represent truth or reality in any "pure" sense. This is a worthwhile advantage when one wishes to be as objective as possible in an analysis.

A SUMMARY OF THE ROLE OF PHOTOGRAPHY IN INSTRUCTION

Photographs are so ubiquitous in Western society that their impact on one's perception may be taken for granted by many viewers. When photographs are used for instructional purposes, it is important that students be made aware of the need to consider not only the content of the image but also the mediating impact of the photographic process itself. Issues related to author's intent and possible bias may demand the assumption of a critical analytic distance on the part of the viewer. Such a stance may more easily be demonstrated initially by the use of black and white images.

CHAPTER TWO

GESTALT APPLICATIONS

CHAPTER OVERVIEW

The intent of this chapter is to present some visual examples of images in which the Gestalt principles can be seen to be at work. The study will focus on images which illustrate the principles of figure and ground, proximity, similarity, continuity and closure. In the process of viewing these materials, it is hoped that the reader/viewer will experience firsthand the organizational potential of visual composition. A discussion of the principles at work will accompany each image.

The discussion of the images is arranged in accordance with a salient organizational principle for each example. However, it will become apparent that other principles may be relevant organizers in any one image. If such is the case, these factors will also be noted in the discussion. In the interpretation of image, it is important to reiterate that not only the eye function but also the memory of the individual viewer is being called into play. The Gestalt principles determine to some extent how the eye will be guided as it tries to make sense of the display before it, but it is also important to recognize that the overall impact of an image or the thematic concerns attributable to it may be influenced both by the individual's breadth of experience and the extent to which norm images related to the display reside in memory. For this reason, interpretative reaction may be variable from viewer to

viewer. Thus, the interpretation of meaning contained in the following commentary should not be assumed to be inclusive. In fact, the reader/viewer is encouraged to arrive at additional or alternate insights. This is in keeping with the phenomenological approach advocated by Gordon (1989) who suggests that while viewing, the perceiver "is to be convinced, not by the results of some obscure experiment, but by what he or she actually sees" (p. 51).

Figure and Ground

When confronted with an image, the viewer's first need is to establish the boundaries of a figure which is discrete from the background. Such discriminating behaviour provides the parameters by which the viewer can then assess the content of the image. The establishment of figure within ground is not necessarily an automatic reflex, nor, once figure is established, is the focus on the figure image always permanent.

The photograph by Roger Remington of the Dalmatian against a backdrop of fallen leaves (Figure 12) (Zakia, 1979, p. 25) illustates how difficult the discrimination of figure can be. The markings on the animal blend so well with the dappled pattern of leaves in the background, that initially, one may not be able to discern any figure at all. A concentration on the proximity of the dark patches around the animal's ears may allow the viewer to arrive at closure around the animal's head. What is operating here is what Koffka (1955) called "good shape" or "Pragnanz" (p. 151). He maintained that closed or almost closed areas "seem to be self-sustaining, stable organizations" (p.151) more easily perceived as entities than are unclosed

ones. Zusne (1970) describes the phenomenon this way:

> Visual forms may be open or closed, complete or incomplete. An open form tends to change toward a "better" form. When a stable point of equilibrium is reached, the form has achieved closure (p.131).

It is possible that the dog's head provides the best combination of visual clues to facilitate discrimination. The relative proximity of the dark ears, eyes and snout may trigger the initial recognition, but it is also possible that the eyes have registered the upward curve of the dog's back and have consequently been led, through the principle of continuity, to focus on the head at the upper end of the curve. In either case, the principles at work have been operating to make sense out of the visual display so that a sense of figure and ground can be established. Once the animal has been discriminated, it is difficult to look at the image without seeing the dog. However, as Forgus (1966) notes there may be some variability depending on the viewer's experience with the image evoking the closure response:

> Factorial studies carried out by investigators such as Thurstone (1944) and Mooney (1954) have found individual differences in the ability of individuals to "close" certain structures. One of the possible reasons for this difference is that the subjects bring differential effects of past expereince to these unstructured figures (p. 114).

In this case, viewers who have never seen a Dalmatian dog may experience difficulty in discriminating the animal in the photograph. However, the ability to perceive closure is improved by practice. Zusne (1970) states:

> The perception of labile [unstable, shifting] figure-ground, polyfigurations, and of embedded figures is affected by practice, i.e., the frequency with which the observer has been previously exposed to one or the other of the two possible percepts or to the figure that is subsequently hidden in a masking context (p. 121).

This example (Figure 12) shows that the establishment of figure against background is not an automatic reflex which one can take for granted. The viewer does not always effortlessly see what is there to be seen.

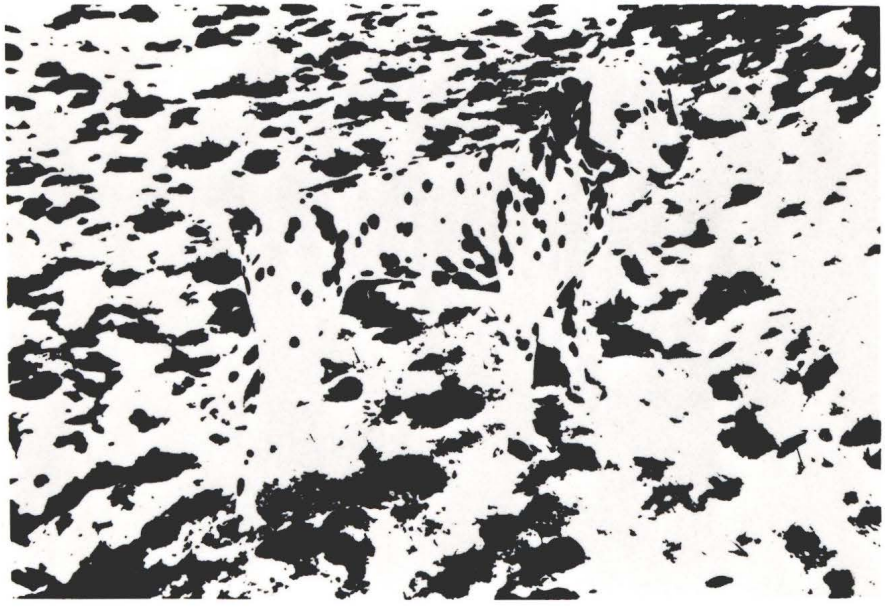


Figure 12

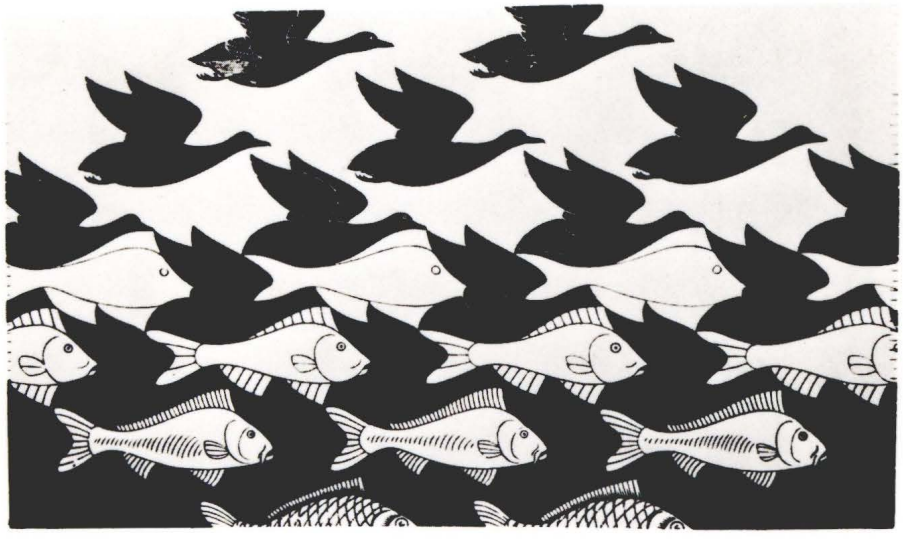


Figure 13

Nor is ground, once it is established, a permanent feature of a visual display. "Sky and Water" (1938) by Escher (Figure 13) (Zakia, 1979, p. 24) derives its appeal in large part from the intrigue resulting from the illogical juxtaposition and cross transference of two incompatible ground contents. The image displays a shift from a ground of sky featuring flying birds in the upper portion to a ground of water featuring swimming fish in the lower. Because the content of both figure and ground switch places in the image, the viewer must adjust his or her perception of which component constitutes the focus as the eye moves over the display. Such an image can serve to highlight the transitional nature of the parameters of figure and ground.

Also, because it creates an image wherein the transition is reinforced by the proximity and similarity of the elements, and by the continuity of black and white spacings, the Escher image tends to cause one first to question, and then to accept, the notion that one cannot see figure and ground simultaneously. In the medial line of the image (the fourth line from either top or bottom), the fish and bird elements are both recognizable, although admittedly stylized. Because the elements are recognizable as a series of objects in alternate juxtapositions, the medial line can be seen as one of uninterrupted figure without ground. This line serves to create the "horizon" between sky and water. It is possible that this piece of art work might have elicited more visual confusion than intrigue if this line had contained no internal markings for the birds and fish, but had consisted instead of a mere series of black and white silhouettes. Such an alteration might have created a transitional phase which could be construed as either figure or ground. Although the inclusion of such a phase might have been a logical development, perhaps Escher felt the indeterminate quality of such a line would have marred the overall artistic unity of the piece.

When considering each of the foregoing examples, it is also important to note

that one is photographic in origin while the other is purely graphic. The distinction is important because the impact of the author/artist's intervention in the process of viewing can be seen as essentially different in each case. Remembering Berger's (1972) notion of photographic image as a mediated slice of reality helps us to understand the distinction between the impact of photographic and graphic images on viewer response. Remington's photograph is a moment captured in time. The moment actually existed; the evidence of its existence has been interfered with through the technical processing of the film, but the essential nature of the image, that of a dog on a leaf strewn backdrop, ultimately emerges as the central message of the image. Remington can be seen as the agent who made possible our viewing of the image; he is the one who captured it for us to see. However, he did not create the elements which constitute the image; he merely recognized their potential to relay a message he felt worthy of transmitting and edited the content to maximize the effect he wished to create. By contrast, Escher both created the elements of his image and arranged them in space to elicit a desired response.

The viewer who looks at Remingtom's photograph tends to deal with the issue of figure and ground in realistic, empirical terms because photography, the medium through which the image is presented, is regarded as an infallible truth sayer. However, the image is not really truthful; it is black and white, and such an image would not exist naturally. Even if the animal were photographed against a backdrop of snow strewn with blackened, rotting leaves, still the image in its original colour composition would not have been purely black and white, but would perhaps have had elements of dark brown or grey. However, the casual viewer would tend to overlook this fact and accept the figure perceived for what it is. The parameters of figure and ground would always thereafter be distinguishable as such. The essential message of the image is a concrete, factual statement.

By contrast, Escher's image is a completely contrived one. It will never be perceived as realistic because the figures are stylized and because the elements are arranged in an unnatural symmetrical order. The viewer's perception of the principle of figure and ground in this case is not empirically based on a perception of reality captured in time. Instead, the issue of figure and ground becomes a question of philosophical perspective. The viewer is led by the composition of the image to alter his orientation to the figures in the image, and in so doing to recognize that one's "ground", (i.e. the place where one stands) is perhaps a transitory illusion, one which can be altered by what one is able to perceive within it. What is solid in the sky may be fluid in the sea.

Time and space are mutable concepts. The relativity of perspective suggested here is a 20th century phenomenon influenced by the scientific theories of Einstein. The essential message is an abstraction, and perhaps not so much a factual statement as one based upon opinion or personal philosophic bias.

The impact of Escher's image for the viewer concerned with figure and ground is much different than that of Remington's image. Whereas the photograph tends to reinforce the process we use in our daily experience to establish visual boundaries, the graphic causes us to question the reliability of unexamined perceptual process. Hochberg (1978), interestingly, uses to the work of Escher when he wishes to point out the limitations of the Gestalt school's theory about figure and ground. Hochberg notes that Escher's figures challenge the Gestalt assumption that figure cannot be seen without ground. (p. 154)

Proximity

Figures 14 and 15 (Zakia, 1979, p. 33 and p. 35) both illustrate the unfortunate effects which can result when the principle of proximity is ignored in image composition.

In Figure 14, the image illustrates how proximity facilitates grouping side by side. The child is standing in front of a wall on which are hung two decorative plates. The position of the child's head is such that the plates appear as oversized "Mickey Mouse" ears attached to her head. The tentative expression on the child's face tends to reinforce the eye-catching appeal of the image. The child appears unsure about her presence in the image or perhaps reluctant to be photographed at all. Eckman and Friesen (1975) suggest "questioning surprise" (p. 43) as the predominating emotion for a face displaying this expression. The presence of the ears appearing coincidentally, creates an irony in the situation of which she was possibly unaware at the time the photo was taken. It is as if she were wise to be wary of her photographer's capability, for the image may not seem flattering.

The viewer's reaction on seeing this image is likely to be variable; in all likelihood some form of humorous reaction will predominate among most viewers. It is possible, however, that individual viewers may experience a spectrum of reactions ranging from sympathy to derision for the subject of the photo. A sympathetic reaction may result if the viewer identifies with the position of the girl in the photo by virtue of having been similarly embarrassed by an unflattering photographic image. Here the principle of similarity may work to conjure up embarrassing self images resident in the memory of the viewer. Such a viewer may identify with the girl in the photo and be moved by a sense of compassion by virtue of similar experience.

Figure 14

The viewer's compassion may also militate against seeing the situation as humorous and prevent a derisive response.

It is also possible to envisage an age peer of the child in the photo gaining some perverse pleasure from another child being in a position of such discomfiture. Such a perception might also result from the operation of the similarity principle, in that the viewer may perceive himself or herself as having been similarly victimized by an unflattering photographic image and may consider it only fair that another should experience a derisive reaction in the same manner. In the sense that this viewer may be affected by the image in what he or she perceives to be a logical, consequential pattern, and in a manner which seems a natural, almost reflexive reaction to the given stimulus, the viewer can be seen as being influenced by the principle of continuity. Many natural human behaviours may be part of a rote patterning continuum which is reinforced by a tremendous backlog of norm images resident in memory. Such images, when they are left unexamined and undisturbed, provide ample data to fuel the continuity reflex.

In any case, it is unlikely that the viewer will ignore the juxtaposition. As Gordon (1989) notes in support of the validity of the Gestalt principles, "we do seem to respond to relationships among stimuli rather than to their absolute values; context influences perception; wholes are more than the sum of their parts" (p. 63). Nor, provided that the viewers have had some experience with similar images, is it likely that they will fail to recognize the potential of such an image to compromise the integrity of the individual portrayed. The extent to which the issue of the subject's personal image integrity is of concern will vary from viewer to viewer and will depend on the viewer's personal experience and psychological make-up.

Figure 15

Figure 15 (Zakia, 1979, p. 35) illustrates a similar effect which results from proximity facilitating grouping from back to front. Here the Lone Ranger appears to have a cactus plant emerging from his head. As with Figure 14, it is unlikely that the viewer will fail to recognize the inappropriateness of the juxtaposition. However, it is possible that the reactions of viewers will be quite different from those elicited by Figure 14.

First of all, it is probable that this shot originally existed as one frame in a series of many making up an action sequence. As such, it is less likely to have been viewed on its own without other similarly situated and properly composed shots to mediate the impact of the one inappropriate one. The concept of continuity will work in any action sequence to minimize the effect of an inappropriate proximal relationship in the still shot. However, once the image was isolated to be viewed on its own, its potential to create an impact was altered significantly.

There is a an important difference worth noting between this image and the previous one. Unlike the Mickey Mouse ears situation, the composition contains more than one figure so that the viewer will be distracted from sole concentration on the proximity of the cactus by the need to take into account the other figures in the display. Here the Gestalt principle of similarity will work to draw attention away from the Lone Ranger as a singular figure and include him in the composite duo.

Another factor which makes the impact of the proximal relationship less acute is the authoritative stance of the two central figures. They sit tall in the photo, the power of their mastery of the situation reinforced by the control they exercise over their mounts. Here the principle of continuity is working to make them units coherent with their horses. Reinforcing the effect is the fact that the Lone Ranger

rides a white horse. Jung (1955) identifies the symbolic value of horses in general as typifying "uncontrollable instinctive drives that can erupt from the unconscious" (p. 174), and white horses in particular, as symbolic of luck in life. "Children all over Britain (and elsewhere) believe it is lucky to see a white horse- which is a well-known symbol of life" (p. 98). Therefore, the positioning of the figure on the white horse may suggest, through application of the Jungian archetype, that the Lone Ranger is not only in control of his situation and emotions, but an individual blessed with luck as well. Such an association could do much to mediate the effect of having a prickly phallic shaped cactus spike emerging from his head.

Another consideration which the viewer might take into account is the impassive facial expression of the Lone Ranger. Because he is wearing a mask, he is able to obscure the emotional expression that his face and particularly his eyes might convey. Eckman, Friesen and Ellsworth (1972) note that of all the body parts "the face appears to be the best non-verbal communicator" (p. 23). Consequently, because the mask prevents the viewer from achieving closure around his face and particularly around the eyes, which are the usual focal point in any viewing of a face, the viewer is unable to capture any sense of his personal feelings as the photograph was being taken. Such is not the case with the girl in Figure 14.

All of the above considerations provide a sense of distance for the Lone Ranger from the juxtaposition with the cactus. This distance tends to make his image less likely to elicit either sympathy or derision.

A final connotation possibly to be drawn from this image is suggested by Jung's discussion of the phallus as an archetypal symbol of the creative principle. Jung (1955) maintains that the phallus should never be assumed to function only as a

symbol of fertility; it also functions as a symbol of the messenger, an entity which "penetrates from the known to the unknown, seeking a spiritual message of deliverance and healing" (p. 156). Such an image tallies quite well with the depiction of the Lone Ranger as the masked stranger who came anonymously to the aid of victims of oppression and criminal foul play. He may be seen as a messenger of law and order and fairplay in a wild West context where chaos was perceived to dominate.

Figure 16 (Zakia, 1979, p. 36) provides an example of proximity working to make a photographic statement about the scope of natural order and symmetry. This is a composite photograph which superimposes the outline of the stem-end portion of a substantially eroded leaf onto the base of a solitary, fully foliant tree. The positioning of the partial leaf suggests the underground root system of the tree. A casual viewing of the image initially might provoke the viewer to wonder how such a cutaway shot was achieved. The conformation of the leaf overall, with its veins converging to create thicker trunk lines at the apex where the leaf stem meets the bottom of the tree trunk, works very well to create a closure kind of effect which one can perceive of as a root system. However, careful scrutiny of the bottom portion of the image ensures that the viewer sees the "root-system" for what it really is. Once the bottom part of the image is examined, the patches of dried leaf tissue can be discerned still adhering in the spaces between the veins of the leaf. Such concentrations of tissue are not typical of a tree's root structure. Also, the uppermost part of the "roots" curve downward away from the soil surface on both sides of the image where a real root system would not. Even if the viewer is unaware of the unnaturalness of such a root configuration, these curving lines would tend to help to create closure around the superimposed leaf image and ensure that the viewer is not fooled by the verisimiltude of the initial effect.

Figure 16

Once both elements of the image are recognized for what they are, it is still possible to be intrigued by the image because of the Gestalt principles of continuity and similarity. The placing of the leaf in the subsoil, establishes a functional relationship of continuity between the decomposing leaf and its parent tree. As Zusne (1970) notes, "if there are several alternate ways in which a pattern may be included in the total pattern, the simpler and more regular way will be chosen" (p. 129). The leaf is appropriate in its placement because it configuratively can replace the root system; its positioning is an example of the principle of good continuation. It is a simple connection for the eye to make. Furthermore, there is a functional similarity between leaves and the root system because, there is a recognition that, once its initial job of photosynthesis is complete, the leaf in its rotting state continues to provide nutrients which are in due course made available to sustain the life of the tree. The principle of similarity reinforces the spatial and configurative relationships between the leaf and the root system. Not only does the leaf structure resemble that of a root system, but dead leaves do end up eventually in the general vicinity of the roots.

The image of the tree is also identified by Jung (1955) as having symbolically, "an incredible variety of meanings. It might symbolize evolution, physical growth, or psychological maturation [the tree of knowledge]; it might symbolize sacrifice or death (Christ's crucifixion on the tree); it might be a phallic symbol" (p. 90). This particular image (Figure 16) is quite evocative of the cyclical concept of evolution or maturation. Such an image might be an effective mnemonic tool for a teacher to use to help reinforce the notion of the natural cycle of death and rebirth, of decay providing nutrients for new growth.

Similarity

The principle of similarity works to provide visual echoes of images throughout a display. In cases where the configuration of the form is arranged so that the shape is repeated in exact or nearly exact correspondence on the opposite side, a state of symmetry exists. This is recognized as a special case of similarity. Similarity works to provide a relationship between elements which might not otherwise be connected. The correspondence may be derived from like shapes, sizes, textures or colours. Figure 17 (Zakia, 1979, p. 51) shows the familiar painting "American Gothic" by Grant Wood. In discussing this piece, Feldman (1972) suggests that the basis of similarity in the work lies in

> an ironic comparison [between] the soaring, complex qualities of Gothic architecture and the homely, simple, unadorned virtues of rural life. The pointed-arch window in the wood-frame dwelling in the background is an example of the so-called Carpenter Gothic style, the American version of the illustrious European style which is carved much more ornately in stone. But the ironic force of the work is based on the accurate and convincing likeness of a farm couple set in an environment of striving for Gothic style and splendor. Their plainness is severe, even pathetic, but authentic too. (p.176)

Feldman sees the thematic thrust of the work in terms of a contrast between avowed philosophy and actual lifestyle aspirations. In his view, the owning of a showpiece house seems out of keeping with the ascetic image of the farm couple.

Zakia's (1979) interpretation of the image centers around a visual element repeated within the picture. He suggests that the two figures in the painting can be seen as coherent with each other to a large extent because of the repetition of the shape of the three-pronged pitchfork in several places throughout the image. Perhaps the most obvious one can be seen in the shape of the pocket compartments on the bib of the man's coveralls. However, the curve of the pitchfork can also be seen rhythmically repeated in the upper part of the woman's apron and in the white

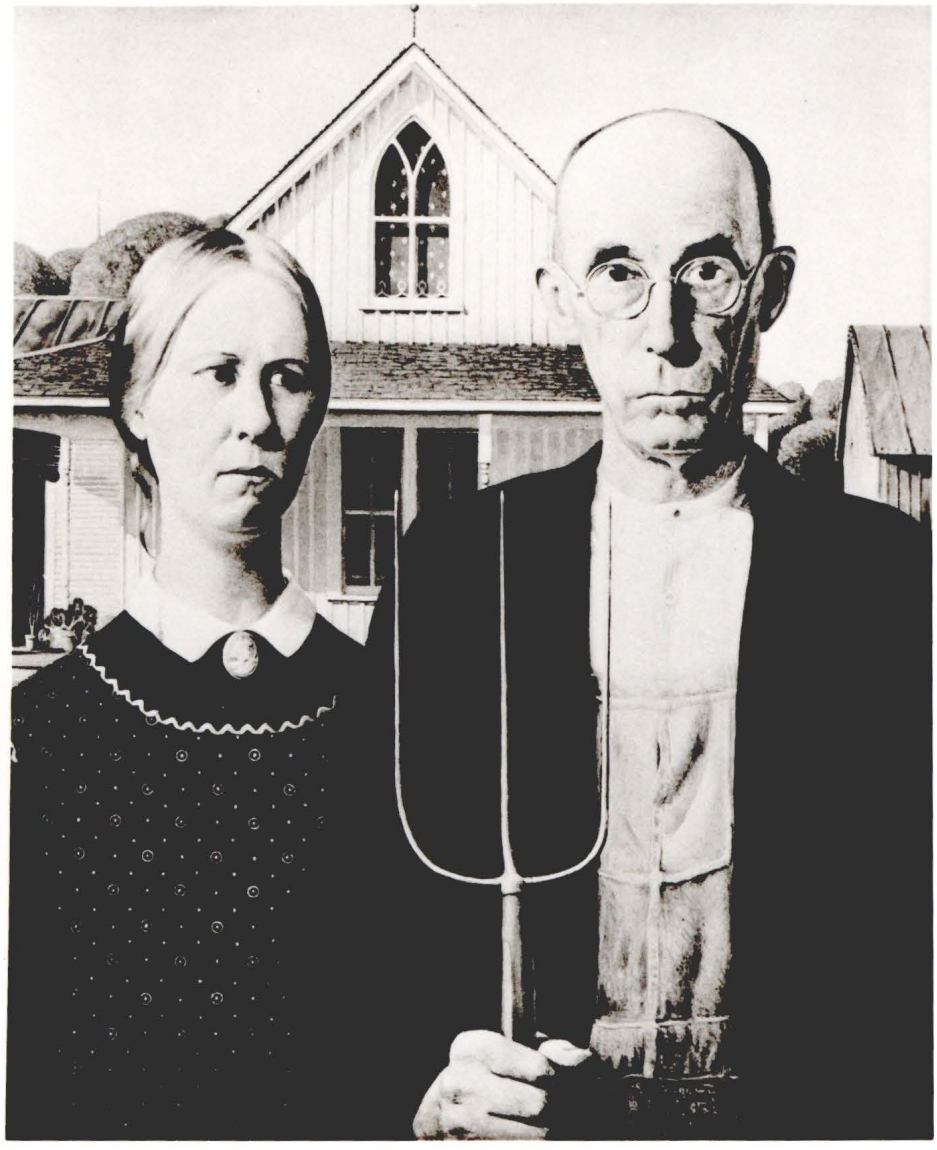


Figure 17

collars and chin lines of both husband and wife. The high domed foreheads of each figure can be seen as the obverse of the pitchfork curve. Additionally, the facial expressions of the couple show very similar indentations under the nose and lips.

The three-pronged pitchfork or trident design can be seen repeated in both the central figures and in the background detail. "The three vertical stripes in the man's shirt group with the three prong design in the coverall. Both faces are shaded in such a way that it is easy to group the nose and the area below it into the central prong of a trident (the outer prongs being the facial contour)" (Zakia, 1979, p. 50). The windows in the lower storey of the house in the background feature three parallel lines and the arched window in the gable resolves into a similar design in its lower extremity. This window's curve minus the peak can also be seen as essentially the obverse of the pitchfork's curve.

All of the above features help to create visual unity in the painting. However, to derive a theme from the piece, one may invoke closure around the central symbol of the fork. As Zakia (1979) suggests, "if one assumes that the pitchfork is symbolic of Satan [and]...if such symbolic assumptions are valid, then the expressions on the people take on new meanings". The pitchfork exists in Christian tradition as a tool used to torture and provoke the damned. Its presence in the hands of this man may suggest a similar function for him as an agent of retribution. Significantly, this painting's debut occurred at a time (1930) in American history when urban values were gaining ascendancy over traditional agrarian ones. These figures can be construed as prophets who may be warning a heedlessly progressive society about the dangers of eschewing the simple rural lifestyle in favour of a cosmopolitan, pluralistic one. Or conversely, these figures may be seen by progressive thinkers as the epitome of narrow-minded obstructionism and rigidity, the social element which is prepared to

use psychological intimidation or whatever means necessary to ensure the entrenchment of values it sees as fundamental for survival. "One can understand why this classic portrait of rural Americans precipitated an uproar among Midwesterners when it was first exhibited at the Art Institute of Chicago in 1930" (Zakia, 1979: p. 50).

Figure 18 (Zakia, 1979, p. 53) shows a woman in the foreground in an attitude of reflection. Her chin is being supported by her hand and her elbow is propped on the arm of the folding lawn chair she is sitting in. In the background can be seen a profile likeness of Richard Nixon who similarly sits, facing the same direction as the woman in the foreground; Mr. Nixon also has his chin propped in his hand. In this photo, both similarity and proximity between the poses of the two figures perhaps serve to highlight the function of Richard Nixon as a potential role model for his contemporaries. Reinforcing this effect is the image of the woman depicted within the frame in the lower left hand section of the photograph. This woman's face is upturned and her gaze appears to be resting on the likeness of Nixon; furthermore, this figure's subordinate placement within the overall composition of the photograph and her rapt facial expression tend to suggest an attitude of profound fascination or perhaps respect for the object of her regard. Thus Mr. Nixon may seem even more worthy of the emulation which the cental female figure seems to be indicating.

An additional factor which may be operating in this image is the familiarity of the chin-in-hand pose itself. Many contemporary viewers will be reminded of Rodin's "The Thinker" when they see this image and the memory will evoke closure around both the white haired woman and Richard Nixon. In this process of closure, the meaning derived from the viewing of this photograph may echo the theme of

Figure 18

concentrated contemplation associated with the image of the Rodin sculpture resident in memory.

Figure 19 (Zakia, 1979, p. 55) depicts a young child standing with his or her back to the wrought iron railing of a balcony. The background detail establishes the setting as an inner city high density housing area. It has the character of a tenement ghetto. No natural growth is seen to relieve the overall impression of a maze-like urban concentration of man-made structures. The figure of the child is delicate and slender. The backlighting of the photograph tends to accentuate the body's underlying skeletal structure; this is evident in the limbs, particularly in the arms of the child. Zakia (1979) suggests that:

> the photographer has captured a moment from our time and challenges us to relate it to a moment in time some 1900 years ago. He assumes we have seen paintings and statues of the cruxifiction of Jesus and that we retain in visual memory a cross and a limp figure of a man. By using similar design elements the photographer facilitates our grouping of these two events (the photograph and what is in memory). When this occurs the photograph takes on a much deeper meaning and feeling (p.54).

The deeper meaning may be the viewer's recognition of the child as a Christ figure, as a martyr-victim. The vertical and horizontal lines of the balcony railing serve to remind the viewer of the configuration of the cross. In addition, by seeing the wrought iron structures as bars and the enclosed space behind the child as box or cage-like, one can also construe the child as an innocent being treated like a criminal, a concept which is also reminiscent of the Christ symbol. The child's scanty apparel covering only the loins also helps to reinforce the similarity to the Christ figure associated with the cruxifiction. In speaking of the image of Christ, Jung (1955) notes that

> the general idea of Christ the Redeemer belongs to the world-wide and pre-Christ theme of the hero and rescuer who, although he has been devoured by a monster, appears again in a miraculous way, having overcome whatever monster it was that swallowed him (p. 72 - 73)

Figure 19

In this context, the child in the photo can be seen as Christ-like in the sense that he may represent the hope that the next generation can improve its living conditions.

Figure 20 (Zakia, 1979, p. 93) illustrates the unifying power of symmetry. The photograph is a double time exposure showing a woman seated in the corner of a room. On either side, in perfectly symmetrical formation, are two windows which admit intense light. Framing the shot for roughly two-thirds of its vertical length are diagonals; the slant of the diagonals is repeated both at the upper center of the image where an inverted "V" formation is located, and in the positioning of the woman's arms which hang down in the lower portion of the image.

This photograph serves as a good example of the effects which can be achieved by darkroom engineering. This image can be seen to have been manipulated most obviously by the fact that the woman's hands are featured twice, once folded in her lap and once draped over the arms of the chair and hanging limply down. This fact may alert the viewer to examine the image more closely. On doing so, one can determine with some certainty that the woman herself and indeed the whole setting, constitute a contrived symmetrical composition, one half of the image having been duplicated and flipped over to serve as the complement. The process has been accomplished with such expertise that the line of junction is not apparent. However, an examination of the detail in the shot should convince the viewer that the photo was not achieved merely through meticulous posing. First of all, the features of the woman's hair and face are unnaturally symmetrical. Human physiognomy is never without some variability from one side to the other. Secondly, the gathers and folds in her garment occur in exactly the same locations and conformations on either side of her torso, a highly improbable coincidence, Finally, blocking

out one half of the image reveals that the unusual dimensions of the setting originate with a window which is probably of a recessed dormer construction. The diagonals in the picture appear to have been created by the sloping roof lines on either side of the window.

This image is more self-consciously artistic than most of the examples discussed so far, in that the photographer has obviously gone to great lengths to manipulate the captured image in order to create a desired effect. The image is somewhat surrealistic in its unnaturalness, but also compelling in its studied effort to control the eye movement of the viewer. The power of the image is to a large extent dependent on the combinatory impact of symmetry. As Forgus (1966) notes:

> it is easier to respond to an array of elements by grouping the similar ones together than by grouping similar and dissimilar elements. This is a more efficient way of receiving information which is to a great extent redundant, and less effort is required. Likewise, it is simpler to differentiate structures which are spatially remote from those which are close together. We know also that if forms are symmetrical, we have only to respond to one important feature since the two are "mirror images" of one another (p. 119-120).

Thus, because of the presence of symmetry in the image, the eye is required to do less discriminating and will more quickly be drawn into following the lines of continuation. An initial viewing of this image may draw the eye upward. This is accomplished by the repetition of the series of progressively steeper upwardly slanting diagonals; these are formed by the woman's arms, the window sills and horizontal crosspieces, and finally the two sets of diagonals in the upper portion of the image. The upward path of vision is halted abruptly at the apex of the dark triangle and at that point, the eye's focus is likely to fall to the butterfly-shaped concentration of light in the woman's lap. Thus, the principle of continuity of line initially distracts the viewer's gaze from the hands, which function as the most obvious clue that the whole piece is a fabrication.

Figure 20

This photograph is a good example of the function of the artist as a manipulator of perception. Jerry Uelsmann has created an image to tease our powers of visual acuity. It is a kind of visual sleight of hand which demands that we pay good attention to what there is to be seen and not be unduly diverted by the most obvious visual path. Thematically, it may be said to be making a statement about the rigours of visual literacy training. On the other hand, it may simply be an exercise of a craftsman who enjoys entertaining his audience by visually teasing them.

Continuity

As noted above, the continuity principle works to lead the eye in a particular direction. In so doing, it can lead the eye to focus on some element within the display and thereby distract attention away from other elements. Continuity of line can also work to unify the elements within the display or to suggest hierarchical relationships for them.

Edward Weston's "Nude 1936" (Figure 21) (Zakia, 1979, p. 61) is a good example of the unifying power of continuity of line. This photograph shows a woman in a seated forward crouch position; her head is lowered so that only the crown is visible. By obscuring the features of the woman's face, the photographer has been able to concentrate on a composition created from the longer, cleaner lines of her limbs. The whole image has the quality of a sculpture; this is partially accomplished by the image being in black and white. However, more instrumental in this regard is the arrangement of the woman's arms and head so that they create a fluid oval frame which encircles her folded legs. All that remains outside the continuous circular line are her feet and a portion of her upper thigh partially obscured by

shadow. Her feet projecting to the lower left and middle right form a kind of pedestal base which helps to reinforce the overall sculpture-like impression.

The viewer's eye may initially be drawn into the picture by following the direction of the arrow suggested by the dark triangular shadow created by the bending of the left leg in the center of the image. However, the most compelling continuity of line results from the spiral effect created by the concentric lines formed by the inner and outer contours of her arms. (see Figure 22)(Zakia, 1979,p. 60). The dark arrow points to the part in the model's hair which serves to create the starting point for the spiral. Although the line is interrupted by the shadow below her head, the direction of the line of the part is continuous with the line formed by the inner contour of her left arm, her interlaced hands and the inner contour of her right arm. The coil of hair at the back of her neck helps to maintain the continuity of line across her shoulders so that the eye continues to be drawn around to repeat the circuit around the outer contours.

This nude is both chaste and self-effacing in aspect. Her identity is modestly obscured by the lowered head, and neither breasts nor pubic area is in view. The general posture might even suggest the attribute of subservience. Yet there is a power in the figure which might be traced to its potential to draw the viewer inward, as if into a vortex. This figure may be seen by some as symbolic of the power of women to seduce by the mystery of the unknown. As Key (1973) notes in *Subliminal Seduction*:

> Hidden anatomical details play an important role in art. The mind unconsciously, apparently, assimilates and structures unseen portions of the anatomy in a search for meaning. [An artist's] deeper meaning is often communicated through what is not seen but is logically there, the perception passing only into the viewer's unconscious (p. 42).

Figure 21

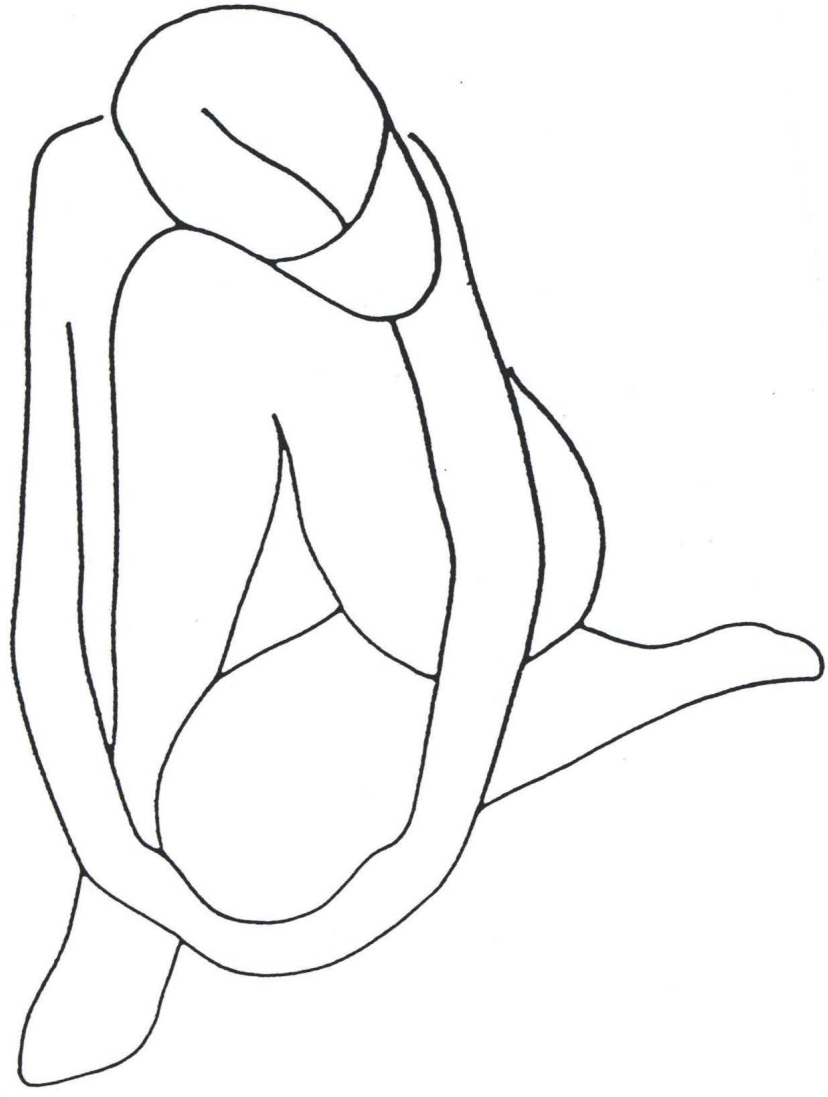


Figure 22

In the rounded contours of the image others may be reminded of the procreative symbolism of the spiral and by association, of woman's essential place in the cycle of procreation. Jung (1955) connects the spiral image with the mandala, a symbol which has a dual significance. He notes:

> Two important aspects of mandala symbolism emerge. The mandala serves a conservative purpose- namely, to restore a previously existing order. But it also serves the creative purpose of giving expression and form to something that does not yet exist, something new and unique. The second aspect is perhaps even more important than the first, but does not contradict it. For, in most cases, what restores the old order simultaneously involves some element of new creation. In the new order an older pattern returns on a higher level. The process is that of the ascending spiral, which grows upward while simultaneously returning again and again to the same point (p. 225).

Thematically then, according to Jung (1955), this image of a woman posed in a spiral conformation could be interpreted as one which typifies a being which is both a conservator of heritage and a creator of new life.

Of course, many viewers will simply see in Weston's "Nude 1936" an aesthetically pleasing interpretation of human anatomy.

Figure 23 (Zakia, 1979, p.60) shows a black and white version of the Union Jack, the flag of the United Kingdom. It is very easy to see the central cross and less easy to see the two X's which underlie it. The central cross predominates in this image because it is uninterrupted in line. Its image is continuous. The diagonals are evident but their force is diluted both by the fact that they are grouped together and thus share essentially the same space in the composition, and by the fact that their continuity of line is interrupted by the central cross being superimposed on top of them.

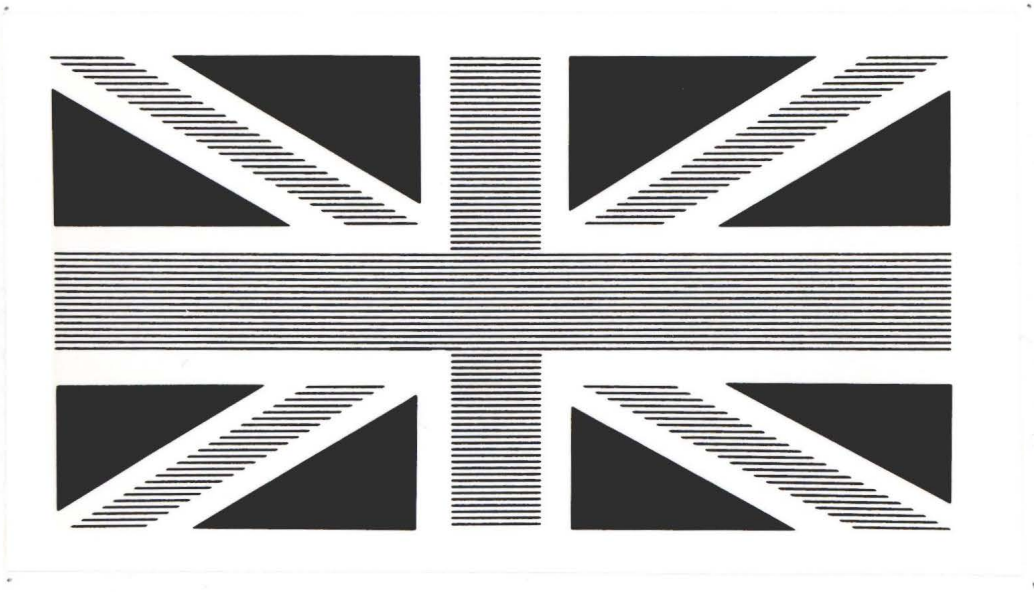


Figure 23

Historically, this flag is a composite of the three national flag symbols of the countries which initially comprised the United Kingdom. (Northern Ireland is not represented in the Union Jack.) The central cross, symbolic of St. George, England's patron saint, was originally a red cross on a plain white background. The underlying dark cross represents St. David, the patron saint of Wales. This flag featured the red diagonal cross on a plain white background. The white diagonal cross underlying the red one represents Scotland's patron saint, St. Andrew. This flag in its original form had a royal blue background.

Flags relay meaning on several levels. For instance, in speaking of flags in general, Key (1973) notes:

> A consciously perceived flag, for example, could be termed a *sign* denoting a particular nation. At the conscious or intellectual level we identify the flag *sign* with a large and complex reality- each in our own distinctive way. A storm flag beneath the national flag might be termed a *signal*, denoting an event shortly to come ... Signals are [also] perceived at the level of concsiousness and are intellectualized inputs into our nervous systems. Both the sihn and the signal have unconscious implications, but function primarily at the level of conscious discrimination (p. 57).

However, national symbols are also powerful agents for the cohesion of a country's identity. They achieve a dominant place in a citizen's memory bank of norm images by virtue of reinforcement through repetition. However, much of their power lies in their being images which are absorbed Gestalt fashion by the subconscious. In discussing the Stars and Stripes, America's national flag, Key (1973) notes:

> The emotional meaning of the U.S. flag's stars and stripes is symbolic. A portion of the symbolic meaning is conscious, but as with the iceberg, the largest and most meaningful portion lies beneath the level of consciousness. Unconsciously, the stars and stripes could symbolize security, clan dominance, self-sacrifice, loyalty to the ideals of a parental figure and so on. Significant symbols are culturally determined, condensed ideas which neglect the emotionally umimportant and exaggerate characteristics that are important to individuals. Symbolic indoctrination is believed to begin in early childhood. Several theo-

> rists [Jung notably] maintain that certain archtypal symbolic meanings are inherent within the human brain (p.57).

What is seen often enough is subconsciously reinforced through closure. The relationships suggested by the spatial arrangement of elements within a symbol are likewise reinforced by this visual repetition. In the case of the Union Jack, the dominance of England's national flag symbol is politically and historically coherent with the hierarchical position taken by England in the shaping of the United Kingdom's identity. Evidence for this dominance can be seen in the fact that English, and not Gaelic, is the national language, or by the fact that London, and not Edinburgh or Cardiff, is the nation's capital. Thematically, the image of the Union Jack makes it impossible for the Welsh and Scots to forget just who is "on top". The question of whether or not the positioning was intentional is perhaps rhetorical.

Closure

The principle of closure operates to evoke a recognition of whole shapes or patterns which are reminiscent of archetypes (Jung, 1955) or norm images residing in memory. Such closure occurs more quickly the more times the viewer is aware of having seen the norm image. However, it is possible that closure may occur without the viewer being aware that such is happening. It is this factor which makes subliminal conditioning possible (Key, 1981).

Like the Union Jack, the Canadian flag (Figure 24)(Zakia, 1979: p.140) provides an example of the manner in which one can derive unforeseen meaning through the application of Gestalt principles. In this case, what is operating is closure. The center of the flag contains a red maple leaf. However, as Zakia (1979)

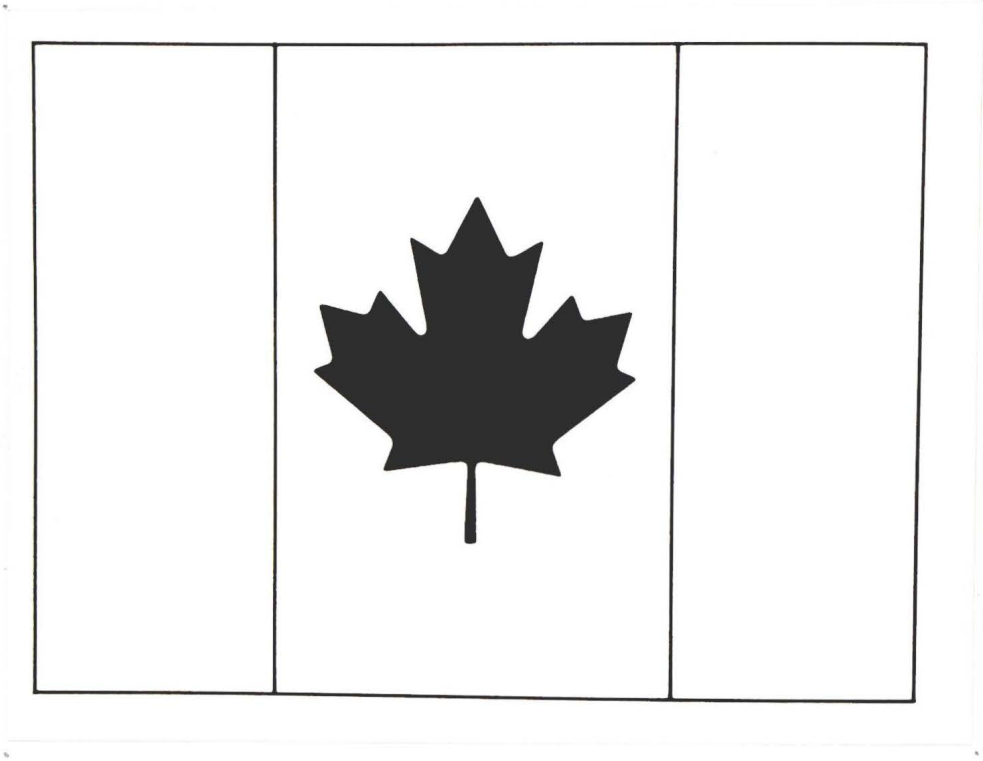


Figure 24

notes, "it also contains the profiles of two men that appear to be ramming heads in much the same manner that elk do" (p. 140). The two profiles, which share a common forehead, can be discerned when the two deep indentations in the leaf are seen as the noses of the figures. Then, one is able to see the two symmetrical silhouettes of men who appear, face to face, engaged in heated debate, with their brows knit and their mouths wide open. The quality of the silhouettes suggests intense emotional involvement, perhaps even anger.

Contemporary observers of the Canadian political scene will probably be struck by the unfortunate appropriateness of this closure effect. For a cynical viewer, the confrontational aspect of the two profiles may reinforce the polarities of opinion surrounding the issue of whether or not bi-culturalism is a feasible option for the nation, or may suggest the antagonisms which underlie the current debate around the scope of provincial versus federal jurisdiction. Historically, it is perhaps ironic that this flag, with its hidden message of divisiveness, was introduced immediately prior to the time of Canada's Centenary, during a time when there was a notable positive sense of national unity. One would hope that the hidden message was a mere oversight and in no way intentional.

Badges of office and promotional insignia often provide fruitful opportunities to discover the unifying power of the Gestalt principles.

Figures 25 and 26 (Zakia, 1979, p. 67) illustrate the symbols of the flags of the American Vice-President and President respectively. The two symbols are very similar in overall composition, but the Presidential emblem achieves a more forceful effect because of the closure resulting from its ring of stars. Jung (1955) notes that the circle is

> a symbol of the Self. It expresses the totality of the psyche in all its aspects, including the relationship between man and the whole of nature...it always points to the single most vital aspect of life- its ultimate wholeness" (p.240).

The circle of stars appearing so forcefully around the presidential insignia points to the importance of this position for the wholeness or well-being of the nation. The Vice-Presidential emblem has a ring of stars as well, but because they are too widely spaced to provide sufficient proximity for continuity, there is less closure around the central image of the eagle. Such a reduced impact is in keeping with the perception that the Vice-President is the less powerful official of the two.

Figure 27 (Zakia, 1979, p. 66) shows the flag of an American Army five-star general. In this image, the similarity and proximity of the stars create a continuity of line which provides for closure around the central element of a pentagon. It is appropriate that the "pentagon", which both figuratively and literally symbolizes the military hierarchy in the United States, should be featured as a central component of a general's flag.

Figures 28 and 29 (Zakia, 1979, p. 111) show graphics commissioned for promoting Winter Olympic sports, ice hockey and cross-country skiing respectively. Both are good examples of the operation of several Gestalt principles to achieve closure. Zakia (1979) notes:

> All four Gestalt laws are readily identified in these olympic graphics. The dark wavy lines are similar in contour, but vary in thickness. The closed dark wavy lines are narrower than the white lines and are, therefore more readily seen as figure. In certain areas the dark wavy lines become thicker (greater proximity) and facilitate the grouping of visual elements in that area. The dark wavy lines that vary in thickness and therefore proximity facilitate a continuation of line at the very edges where the thickness of the dark line changes.
>
> Similarity, proximity and continuation work together to facilitate the closure of a person in action. This closure provides meaning and psychological balance (p. 111).

Figure 25

Figure 26

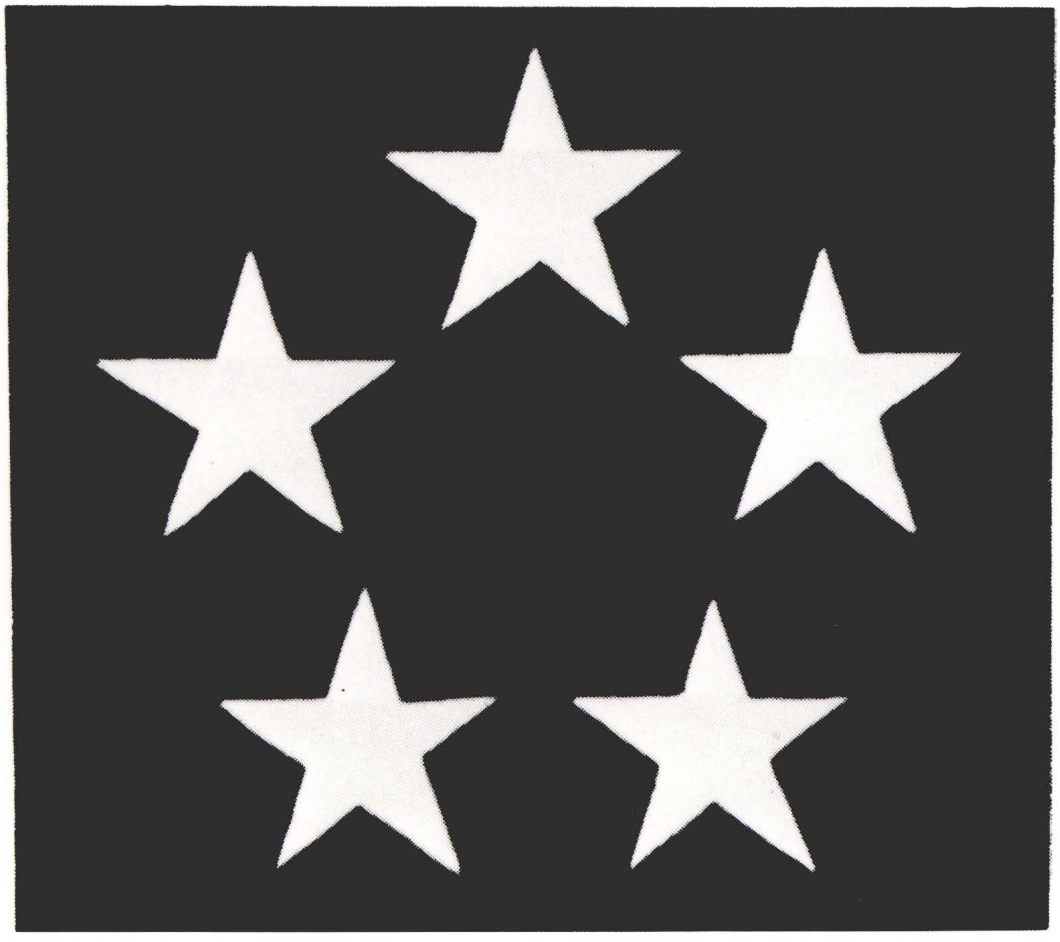


Figure 27

Figure 28

Figure 29

Figure 30 (Zakia, 1979, p. 68) provides a different experience with closure. The photograph features a multiple exposure of a golfer swinging a club. It is a photographic negative image, and all but the legs of the golfer are obscured by the multiple exposure effect. By following the continuation of line created by the arc of the swinging club, the viewer can achieve closure around an image which resembles a snail's shell. The central element of the image, the actual upper torso and arms of the figure, through multiple exposure resolve into an image which echoes the contours of the shell. Some may also see in the upper portion of this central figure an image reminiscent of an embryonic vertibrate creature. It may be seen as sitting in the center of its protective shell formation, somewhat like an embryo in utero. What may operating here are the two distinct norm images of snailshell and vertebrate embryo. Once again, the comments made by Jung (1955) related to the significance of the spiral as a conservative and generative symbol are relavent. The embryo is perhaps also sufficiently familiar to most mature viewers to evoke closure in this image.

GESTALT APPLICATIONS - CONCLUSION

Although these examples have been organized under discrete headings, it is important to note that in many images the Gestalt principles work in conjunction with each other and should not be considered as if they were separate functions. It is also valid to note that many effective images do not necessarily depend upon the operation of Gestalt to achieve their impact. The application of these concepts is just one strategy which can be used to unlock the meaning of visual image.

Figure 30

CHAPTER THREE

INSTRUCTIONAL STRATEGIES

OVERVIEW

The intent of this chapter is to provide the teacher with some practical suggestions for the implementation of imaging and viewing practice in the classroom. The underlying premise for emphasizing both these skills is that imaging and viewing are synergistic in nature, because they are to some extent reciprocal concepts (Cooper and Shepard, 1978). Thus both skills need to be practised in order to ensure the adequate development of either one.

Because imaging is a completely internalized activity, some attention will be paid to some appropriate methods for the stimulation of student imaging. Suggestions here will focus on non-verbally based strategies such as: lateral thinking, experiencing and drawing impressions of entoptic imagery, focusing on emotional and auditory cues and dream experiences as stimuli for entephalic imagery, and the mental manipulation of structure.

Verbally based strategies include: clustering, recursive reading, metaphoric teaching and free intuitive writing.

Suggestions to develop viewing skills will include discussion of the use of: visual

puzzles, recentering to avoid automatic visual stereotyping, pattern perception using Gestalt principles, drawing, camera practice, and exposure to photographic darkroom technique. A final section will suggest a theoretical framework for discussing the meaning of still photographs.

This chapter will also address the issue of assessing student progress in the acquisition of imaging and viewing skills and will suggest some considerations for the teacher who wishes to assess the effectiveness of a media instruction program.

A final consideration in this chapter concerns the place of media study within an interdisciplinary curriculum. Suggestions will be made concerning the appropriateness of media study as a vehicle to facilitate the integration of content subjects. The chapter will refer to an appendix of those resources which the author deems most useful for the teacher interested in implementing a visual literacy training program. This appendix can be found at the end of the document.

STRATEGIES TO ENHANCE IMAGING SKILL

A Discussion of "Right" and Left" Brain Function

Although there may be a preference to conceive of some of the imaging activities suggested below as primarily "viewing readiness" exercises, it should be remembered that productive imaging in itself is a critical skill for the learner (Arnheim,

1969), and one which the teacher should be prepared to facilitate for its own sake. The discussion of "imaging" in the classroom might most productively begin with a brief overview of the general differences in right and left brain function such as was outlined in Chapter One of this study. Student reaction to the concept will likely require that the teacher address two important concerns immediately. The first is the question of what evidence exists that the brain has the ability to organize information spatially as well as verbally; a second concern for students may be the issue around why one would want to work to improve the imaging capability. Both concerns can be addressed in the classroom using simple experiential approaches.

Establishing a Classroom Tone Conducive to Imaging Practice

Because imaging activity is best attempted in a distraction-free setting (McKim, 1982), the teacher may need to address the issue of student motivation first. Not all students may see imaging as a worthwhile skill to master. Students who value creativity, and who believe that accessing their right brain capability will help them to achieve more creative insights may be more inclined than others to work at concentrating on concepts or activites which may at first seem eccentric. Therefore, the teacher may wish to be somewhat selective when first attempting some of the imaging activities. Students who are very active or disruptive may require special consideration or alternate activities.

A Rationale for Imaging Practice

To demonstrate to students the value of accessing their right brain capability, the teacher could use the work of Edward DeBono which explores the creative potential of non-traditional cognitive analysis. In *The Use of Lateral Thinking* (1967), he outlines a program to help learners get out of the tendency towards habitual linear thinking. Because he recognizes that words tend to make concepts "frozen and immutable" (p. 72), DeBono organizes his program around the mental manipulation of simple black figures (pp. 31-66). He suggests that the mind's imaging capacity can be limbered up significantly through a playful approach of arranging and rearranging familiar figures into configurations which puzzle the viewer by virtue of the simple figures being hidden within an overall complex ground.

DeBono demonstrates how the thinker tends to analyze a problem by dividing it into recognizable elements. The process of working out the puzzles reveals that many viewers tend to perserevate in their approach to a solution. Once a figure has been identified several times as the key element in the solution, there is an expectation to find the same kind of figure always featured in the visual puzzle. This, of course, is not always the case. DeBono's exercises can be of value for the teacher because they can be used to demonstrate to the student, first, how the mind works in the process of linear analysis, secondly, how that process can be a limiting factor when new insights are being sought, and thirdly, how solutions may be found which are laterally, as opposed to linearly, related to past solutions. Furthermore, it can be argued that the origin of such diverse insights may lie in the right brain's non-linear imaging capability.

Such awareness is useful in visual literacy training because visual elements

within a display may often be obscured by the context, or because the viewer's expectations about what is to be found within an image may be prejudiced by what the image appears to be a likeness of. Much information may be transmitted through the process of sub-conscious closure which may be missed by the viewer's conscious imaging capacity. A student who has worked through some of DeBono's visual puzzles may be more apt to seek other connections within an image.

A Fundamental Imaging Experience: Entoptic Images

Once students understand the value of the imaging skill, they will hopefully cooperate in helping to create an appropriate instructional setting. McKim (1972) stresses that inner imagery is fostered by specific conditions, namely: a quiet environment, motivation, relaxed attention and the fixation on a locus for the imaging experience (p. 85). Students need to be free of external distractions, willing to participate, capable of quiet reflection, and prompted to imagine a "place", either inside or outside the body, to locate the image in. Once the first three conditions are met, students should be ready to experience some evidential proof for the existence of a common imaging capacity.

One of the most available "places" to seek images is behind closed eyes. In order to provide some evidence of the brain's pattern perceiving and structuring capacity, McKim (1982) suggests the teacher could prompt the students to explore the images which appear in the phosphene patterns created in the mind's eye when the eyes are closed and mild pressure is applied to them. Shepard (1978) refers to these phenomena as entoptic images and suggests (p. 169-170) that fluid geometric

patterns such as checkerboards and mandalas are often perceived. After experiencing these phenomena themselves, students could be encouraged to produce drawn facsimiles of the patterns to compare with those of their classmates.

The value of such an exercise is to make students aware of the existence of an internalized Gestalt-like capability within the eye and brain. Such an awareness would help to lend credibility to the notion that the eye is an organizer and not just a perceiver of visual information. If, as Shepard (1978) suggests, most people can experience these phenomena, then it is logical to assume that there will be a significant number of individuals in any one class who would experience similar kinds of images. They will also recognize that the images must have originated without external optical input (i.e. that the images are not perceptual), and that the place of origin for the images must be inside the brain itself. This realization should set them on the road to recognizing the distinctive nature of right brain function.

Once students have understood why imaging is valuable, and have shared common experiences with entoptic phenomena, they may be ready to concentrate on the more complex phenomena of entecephalic imagery.

There are a variety of non-verbal stimuli which can be used to evoke entecephalic imagery. The following discussion will consider emotional and auditory cues, dreams and the mental manipulation of structures.

Emotional Cues for Imaging

Although Gendlin's (1982) approach does not focus on visual imagery, but is intended to help in personal problem solving, the idea of using bodily sensations to stimulate the imaging capacity seems promising. Having students focus on feelings as a starting point for the evocation of image may be particularly useful in a situation where students are unused to the idea of exploring their intuitive thought process. Most youngsters can imagine themselves in situations of happiness, sadness, anger, confusion, frustration or fear. They can be encouraged to produce drawn images of objects or events which might epitomize such emotions (students should be encouraged to draw regardless of their perceived skill level) or perhaps they could select appropriate ready-made images from available picture collections which suggest such emotions to them. (This second option should be made available only if students are extremely reluctant to draw.)

Such exercises could accomplish two objectives. First, the students will display a wide variability of responses to any one emotional cue; the only common factor influencing the reponses is likely to be that of past experience; therefore, students will become aware of the concept of "norm images" resident in any one person's memory. Secondly, such experience could improve the students' awareness of the power of symbol and metaphor as representational agents, and reinforce the notion that such devices need not be sterile academic or poetic constructs; they will become aware that such images often function as mnemotic devices to aid in information retrieval or as mental constructs to manipulate to generate new insights. Here, some of the incidences of new ideas inspired or facilitated by the mental imagery experienced by famous inventors, and cited by Shepard (1978), could prove illustrative.

The actual bodily sensations associated with various emotions could also be explored imagistically. For instance, what different shapes would various kinds of laughter have, if one could imagine laughter in tangible form? What animal might resemble the prickly feeling along the spine that one associates with fear? If confusion were a building, what would the floorplan be like? Such questions may seem frivolous, yet in addressing the shape of such basic issues as human emotion, they may be useful in helping students to begin their active imaging in familiar territory.

Auditory Cues for Imaging

Bridges (1986) suggests that music is a useful stimulus to evoke imaging. The use of purely instrumental selections would allow for the best chance of free association, as the presence of lyrics might predetermine some responses. Again, the teacher could encourage the students to identify the "shape" of various segments within a piece by associating them with available pictures or by producing a drawn representation. Students could concentrate on the specific sounds produced by various musical instruments and imagine alternative sources for them. For instance, what kind of creature or event does the sound of a flute or tuba suggest?

Auditory stimuli other than music might also be effective. Audio tapes featuring sound effects such as running water or street traffic might be used to have students identify visual images associated with the sounds. In these situations, attention should be paid to the quality of detail in the student's mental image. For instance, if the sound effect is of a vehicle's horn, the teacher should prompt the

student to produce an image of the kind of vehicle involved.

Dream Experiences as Cues

Another resource for students to explore is their own dream experiences. They could be encouraged to make note of hypnagogic images (those which occur at the transitional stage between waking and sleeping) and produce a drawn representation of them such as Shepard (1978) attempted. Day (1982) also suggests the evocation of dream image stimuli to focus student attention on the imaging potential of the human mind. Day argues that a phenomenological approach to the evocation of image provides a valid method for "inseeing...the unstable, free, and unpredictable characteristics of the fantasy land of visual creating" (p. 7). McKim (1972) also suggests strategies for productive dreaming where the sleeper systematically concentrates on a specific problem or line of inquiry just before falling asleep, and upon waking, reviews the content of his dreams for possible solutions. Students should be encouraged to keep a log next to their beds so that their impressions can be recorded immediately upon waking.

The Mental Manipulation of Structure

Effective imaging demands that both external and internal structure be perceived. Students could gain experience with external structural visualizing by being challenged to draw familiar objects from memory. Such objects as their home telephone or television would provide good practice. Many students will be able to

produce vague renditions, but will likely be surprised to discover how little detail they notice about objects they manipulate every day. In what order are the dials on the stereo system? What is the distribution of letters on the telephone buttons or dial? McKim (1972) suggests the practice of X- ray vision on familiar opaque objects such as fruit or hands to sharpen internal visualizing. They could also imagine the floorplans of buildings from exterior views.

Students should also be encouraged to manipulate the component parts of an object, by mentally altering the proportions of selected parts, or by changing the spatial arrangement of parts within a construct. One example of the first might be to imagine a given room with larger or smaller windows and to predict the effect that such a change would have on shadows cast within the room. A simple example of the manipulation of spatial arrangement would be the mental rearrangement of furniture within a room or rooms within a building. Students could be challenged to redirect traffic flow within a space to improve its functioning, moving the walls or furniture mentally to accomplish this. Many games make use of the mental manipulation capacity, so that students who are challenged to think several moves ahead when playing chess or checkers are being required to practise this skill.

The Work of Robert McKim: An Invaluable Resource

McKim's *Experiences in Visual Thinking* (1972) is a particularly rich collection of imaging activities. In the fourth chapter of this volume "Imagining", he provides more practical suggestions "to strengthen the organ of inner vision" (p. 81) than any other resource uncovered in the author's research. These suggestions include: exercises to identify, clarify and stabilize mental images and after- images, exercises

to sharpen visual recall, the suggestions to promote productive dreaming mentioned above, exercises for group and individual directed fantasies, exercises in visualizing internal structures and manipulating mental constructs, and exercises to provide experience with the creation of abstract thought. Many of his suggestions seem appropriate for the intermediate and secondary level classroom situation. The acquisition of this text would be a logical first step for any teacher wishing to begin a program of visual literacy training. The comprehensive list of strategies provided at the end of the volume is especially noteworthy.

IMAGING AND LANGUAGE PRODUCTION

Although most of the above imaging suggestions involve the use of language to provide verbal stimulation or direction, the primary focus or product of the imaging experience thus far has been the image itself, and not any verbal representation of it. However, there are many strategies to enhance imaging skill which are also productive for print language development. Reading and writing processes are imagistic in origin, and require an image-rich data-bank of experience to fuel their growth. Reading in particular, is a recursive process (Rosenblatt, 1984) which requires that the reader's imagination and past experience be actively called into play in order that words acquire meaning as they are decoded. The following strategies serve a two-fold purpose: they focus on the production of mental imagery and they make use of that imagery to improve reading and writing skills. In the following section, the strategies of clustering, recursive reading, metaphoric teaching, guided fantasy and free intuitive writing will be discussed.

Clustering

Thom (1990) suggests the clustering of words in order to arrive at a coherent theme for the production of a piece of artwork. Brownlie, Close and Wingren (1988) use clustering as one of several imaging strategies to help students respond to informational text read by the teacher. As the students listen to the teacher reading, they

> privately create images [which are then] shared in a group cluster [written for all to see on the board], then re-organized to deepen connections and further socially construct meaning. On a re-reading of text, students create personal clusters, then write in role [from their own personal perspective]. This powerful strategy integrates the learner's personal knowledge with the collective knowledge and understandings of the group. Curriculum grows from the learners' experience (p. 37).

It should be noted that this strategy makes use of the organizing Gestalt principles of continuity and proximity. The cluster diagram created by the students follows a spatial pattern which for their conceptualization of the idea is appropriate. It can be seen as an externalization of a "mind-map" to which they can respond interactively.

Recursive Reading

Holdaway (1979) and Rosenblatt (1984) both identify the most effective approach to reading improvement as one wherein the reader is actively encouraged to create images from memory to apply to the content of the text as it is being read. A similar recursive process is identified by Brownlie, Close and Wingren (1988) as "ReQuest", a strategy which requires students to question reciprocally as they read.

Both teacher and students are involved in formulating questions about the text which are "on the line, between the lines and beyond the lines" (p. 83) "On the line" questions involve answers which can be easily found within the text. "Between the line" questions involve answers which can be inferred from combining ideas in the text; in order to arrive at such an inference, the students must call into play images from their past experience which would suggest such logical connections. Reading "beyond the lines" involves asking questions which anticipate outcomes which have not yet been stated or inferred. This skill also calls the imaging capacity actively into play because it depends on the evocation of images remembered from the reader's past experience in order to predict the author's intentions.

The ReQuest strategy can be used to help students focus on the potential of their own resource bank of images to help them comprehend more easily as they read. Such a strategy is powerful not only because it demands an active, as opposed to passive, involvement in the reading process, but also because it bases student comprehension in the fundamental unit of learning, the image itself. A further benefit of this approach is the emphasis it places on the possible multi-level meaning of a text. Students who recognize such complexity will be better prepared to handle metaphoric approaches.

Metaphoric Teaching

Brownlie, Close and Wingren (1988) identify the use of metaphors in instructional planning as one of the most powerful tools available to make connections between what is known and what is being learned. Clements (1982) assesses the effectiveness of teaching through metaphor this way:

> Metaphors firmly impress themselves upon the reader's mind; through their aptness and affinity, they forcibly persuade, at one and the same time as they give pleasure and strike his emotions (p.30).

The use of metaphor, of course, involves imaging of a very complex nature, thinking which is based in the right brain pattern-perceiving sphere. The characteristics of the concept being queried need to correspond quasi-dimensionally with those of the parallel chosen to represent it. The level of comprehension requires a grasping of the dimensions of the structure of the concept itself and of its correspondence to the construct to which it is being compared. Such a connection, because it is spatial, and not linear, requires an adaptiveness most easily achieved through a fluent imaging capability. Students who have been trained to recognize the multi-dimensional nature of meaning, through such strategies as ReQuest, would be less likely to seek only literal, as opposed to figurative, connections between ideas presented to them.

Sanders and Sanders (1984) observe that the metaphor has inherent value as an instructional medium because it, by definition, represents "change", a concept which is crucial for the adaptive learner (Toffler, 1966). They suggest that learners who are able to integrate new learnings through metaphoric models both achieve a greater depth of understanding initially, and retain the knowledge for longer periods of time, adapting and incorporating new inderstandings into the already existing metaphorical framework.

In *Teaching Creativity through Metaphor* (1984), they suggest, for instance, units of study which capitalize on metaphors such as "chains" to teach biological interdependence, "shoes" to teach empathy, "virus" to teach political insurrection, "rocks" to explore the concept of security and "balloons" to teach leadership and

goal-setting. Each of the metaphors chosen is imagistically generative (able to evoke several possible types) and functionally adaptive (able to be used logically in different contexts). The power of the strategy rests in the basic simplicity of the image-metaphor itself. Once students have learned that such images can be mentally manipulated, the metaphor can consistently be used to anchor their understanding of complex concepts. It serves as a kind of fail-safe mechanism, providing a concrete structure for an abstract concept which may be difficult to visualize or retain.

The Guided Fantasy

The use of fantasy to explore students' imaging capacity is an extension of metaphoric teaching. Here students are introduced to the concept of analogy by being involved in an imaginary journey designed to simulate a worthwhile learning experience.

McKim (1972) uses directed fantasies to help passive learners unlock the potential of their imaginations, to "write the script of the internal cinema of the mind's eye" (p. 99). When the objective is open- ended, that is, intended mainly to explore the imaging capacity, he suggests that the fantasy can initially be directed by a leader and then taken over by the participants. In this situation the experience of self-generated imaging is the desired outcome.

Sanders and Sanders (1984) use the guided fantasy in a more directive fashion, as a strategy to lead the learner to a pre-determined realization. For instance, they use the life cycle of the butterfly to provide students with an imagined experience analogous to the onset of puberty, and the water cycle to explore the idea of

perspective or point of view (how differently one might see the world as a drop of water in a lake or ocean compared with the perspective provided by being a part of a rainbow or a storm cloud).

The use of the guided fantasy in a classroom setting requires that the teacher prepare a carefully worded narrative which maintains the integrity of the fantasy. It also demands some narrative reading expertise. Taped materials would be an appropriate preparation as long as the students would respond to them as authentically as they would to a reader's live rendition. What is perhaps most important about the use of guided fantasy is the need to integrate it into an overall teaching plan which focuses on concept attainment. Students may find the experience inherently stimulating, but may wonder about its value unless appropriate follow-up is attempted to reinforce the learning.

Such follow-up could take the form of brain-storming and the kind of group clustering and discussion suggested above. Further individual responses could involve mind-mapping (individual clustering) or the sorting of details into categories. The students could be encouraged, for instance, to detail the appropriateness of the analogy used to the concept being explored. ("How is the larva stage in a butterfly's development similar to the infancy of a human?" or in the water cycle analogy, "If you were a drop of water, which position, the rainbow or the thundercloud, would give you the better vantage point for expressing how you are feeling at the moment? Why?") Such approaches are intended to produce some form of conscious analysis of the experience. A less directive approach for follow-up, and one which taps the sub- conscious reaction to the experience, might be free intuitive writing.

Free Intuitive Writing

One type of follow-up possible is what Rainer (1978) calls free intuitive writing. Other disciplines, such as psychology, refer to the process as free association, stream of conscious or automatic writing. Day (1979) derives his approach to the phenomenological describing of dreams from a similar source. He states that such a process of description "provides for a deep comprehension of the inner experiences associated with dreaming, such as imagery, mood-states, memory and metaphor" (p. 16).

Rainer (1978) describes this process as one which "releases the voice of the sub-conscious by removing or putting aside the control of the conscious mind" (p. 61). It is a process with important creative uses; some writers use it to warm up for other work; others use it as a strategy to deal with writer's block. For the student working to access his imaging capacity, "it is also a vital source of fresh imagery" (p. 62).

Trinstine Rainer describes the process this way:

> You relax and try to empty your mind. You don't think about anything. You simply wait for whatever comes, without worrying about whether it makes sense. You let your hand do the writing. You record what you hear from the back of your mind. Nothing is irrelevant. You try to capture every word and image that occurs to you. It may all seem silly, just nonsense, but you write it anyway. It may seem embarrassing, but you write it anyway. You write fast, so fast that you don't have time to think about what you are doing. You don't take time to censor or make sense. (p. 62)

Such writing need not concern itself with spelling, grammar or punctuation. There is no directional restriction; one may use the space available in any fashion which suits the flow of images. If the writer senses a break in the flow of the intuitive

response, Rainer suggests "that the last spontaneous word can be repeated, or that the writer can stop and try to relax completely, and wait for the conscious effort to subside" (p. 63).

The value of such an exercise in a visual literacy program is the opportunity it allows for the student to liberate some of the unconscious imagery being experienced so that it can be examined afterward. Students who participate in free intuitive writing may be impressed by the sheer volume of what they are thinking about. Many may be intrigued by the form or shape of the ideas, and by the connections what can be inferred in hindsight. Possibly, by exploring these new connections, some will arrive at new understandings about the concept initially being investigated.

The teacher should be sure to give the students some time to reflect at the end of the writing so that the importance of actively seeking for new insights is reinforced. Specifically, they should be encouraged to identify the various kinds of images experienced, and if possible, the role that imaging played in clarifying or reinforcing the insight.

IMAGING STRATEGIES - CONCLUSION

The foregoing discussion has focused on activities intended to heighten the students' ability to identify, clarify and manipulate images which are not necessarily generated externally. For this reason, little mention has been made of visual materials which could be used to stimulate the imaging capability. When no external visual input is provided, there is a greater likelihood that students will call upon the

resources of their memories, and through practice, will learn to recognize the vast extent of image data internally available. Without a specific visual stimulus in place, students are forced to generate their own. They should be encouraged to do so as often as is practically possible.

However, to address the more practical needs of formal visual literacy training and to teach students about the meaning of perceptual, as opposed to entoptic or entecephalic image, we must make use of viewed data. In doing so, the teacher should be sure to emphasize the value of retaining and of continually refining the imaging response; it is the fundamental skill upon which adequate viewing depends.

STRATEGIES TO ENHANCE VIEWING SKILLS

The Interactive Viewing Environment

Both Gregory (1978) and Debes (1969) identify the adequate attainment of viewing skill as closely linked with proprioceptive (sensory interactive) experience. Students cannot be expected to develop a expertise visually if the bulk of the stimuli presented to them is of a static, two-dimensional nature. To help students understand concepts such as perspective and proportion, it is important to provide experiences which present opportunities to manipulate form in space. Much of the media content students are encounter is of a two- dimensional nature (television and still photography); however, they cannot be expected to understand it visually without a background of interactive three-dimensional experience. It is for this reason that

much pre-school activity revolves around manipulating objects such as blocks or balls, or materials such as sand or water. Older students may need the opportunity to rediscover the process involved in such visual thinking. Some students (those, perhaps, who spent a large part of their early childhood playtime in viewing television) may never have had sufficient manipulative experience in the first place.

This need can be addressed with a wide variety of commercially available visual puzzles. Some appropriate ones are the interlocking wooden varieties (often Chinese in origin) which assemble to create spheres or cubes, the Rubic's cube, and games such as three dimensional tic-tac-toe and chess. Some useful puzzles, such as tangrams, origami figures and Soma blocks, can be inexpensively made in the classroom.

Visual Puzzles

Zakia (1979) and McKim (1972) both suggest the use of tangrams to provide experience with organizing geometric forms to create other figures. Tangrams are simple seven-piece Chinese puzzles similar to jigsaws (See Figures 31, 32 and 33.) (Zakia, 1979, pp.148-149 and 152- 153). Five large, medium and small triangles, a square and a parallelogram can be combined to produce a variety of stylized figures. In the process of doing such exercises, students are required to visualize internally in order to decide which geometric piece is appropriate for which placement, and to visualize externally to arrive at closure around the final stylized figure. Initially, they may need to see a silhouette of the final product before they can reproduce it. With practice, they should be able to recreate the figures from memory. Ultimately, they could be challenged to produce original designs.

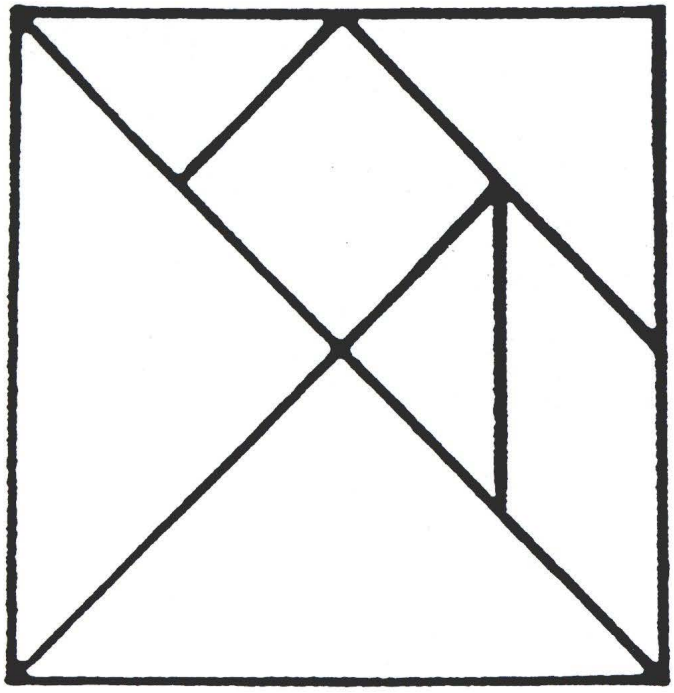


Figure 31

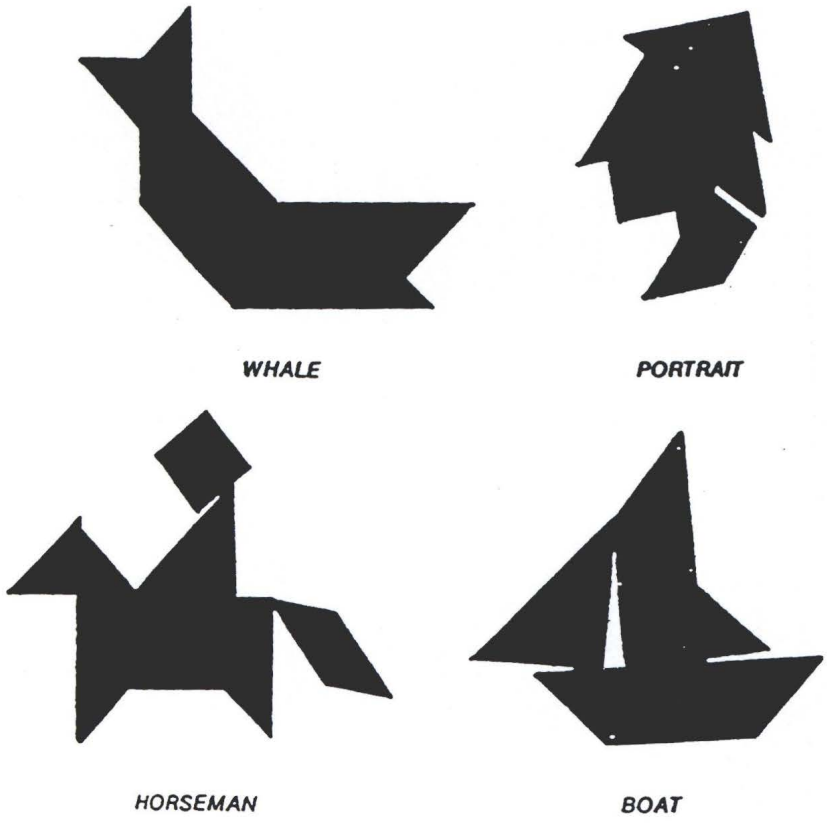
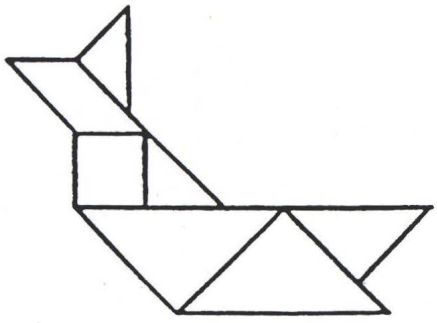
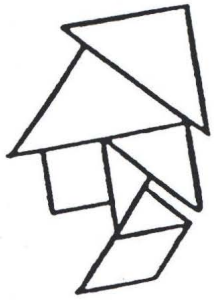


Figure 32

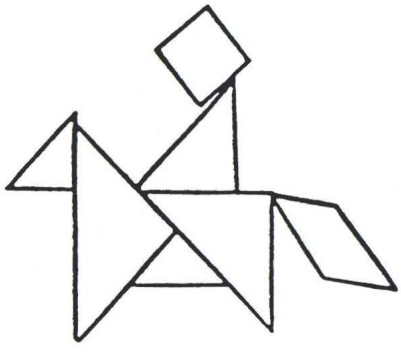
Answers to Tangrams



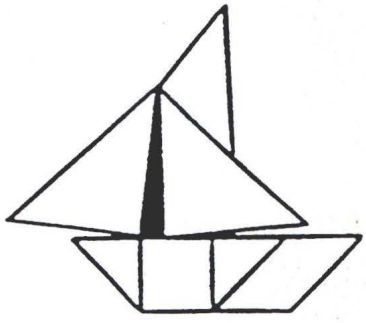
WHALE



PORTRAIT



HORSEMAN



BOAT

Figure 33

Similar kinds of skills are involved in the production of origami figures. Here a square of paper (often coloured on one side) is folded to produce a wide variety of three-dimensional figures. Origami requires more dexterity than working with tangrams and is more labour intensive. Also, because it is three-dimensional the imaging skill required is more sophisticated. It might be a good activity to provide for variety or enrichment.

McKim (1972) also suggests the use of the Soma cube, the puzzle created by Piet Hein who:

> discovered that when three or four cubes of the same size are combined into all possible irregular configurations within a 3x3x3 matrix (by joining their faces), the combined cubes can be fitted together into a larger 3x3x3 cube (p. 42).

The component pieces of the Soma puzzle can be recombined to create a variety of three dimensional figures. As with tangrams, students are practising internal and external visualizing, but because Soma blocks are three-dimensional, their manipulation requires more complex visual thinking.

McKim (1972) provides instructions for the making of Soma blocks (p. 42).

Recentering

Gendlin (1982) uses the term "focusing" to describe the process of finding a new perspective from which to view one's emotional state. McKim uses the term "recentering" to describe a similar reorientation in viewing perceptually. Gordon (1960) suggests making our response to the familiar "strange" in order to short-circuit the tendency by which the Gestalt continuity principle facilitates stereotyping.

Some techniques to try to help students recenter are the viewing of familiar scenes upside down or through distorting lenses. Watching a very close friend talk while the viewer is upside down can have a very startling effect. The familiar features of the face, particularly the mouth, are more mobile than can be imagined from the traditional perspective. When our expectations are shaken up by such reversals, our visual pattern seeking brain works quickly to make us aware of the wealth of detail to be noticed, where before, familiarity bred of long exposure had dulled our sensibilities to what was there to be seen.

Role-playing can be useful to help students recognize the wide variety of stances possible for viewing an object or activity. For instance, how differently might a sculptor, a women's liberationist or a cannibal view a nude model? What variable features of a house would an architect, a tax assessor or a burglar notice? For a somewhat similar effect, one might try the brainstorming activity of imagining as many uses as possible for a brick or a paperclip. Another resource which might offer atypical perspective experiences are collections of visual illusions such as those by Luckiesh (1965). Much of the work of M. C. Escher (refer to Figure 13) has a similarly disorienting effect.

The purpose for such activities is to free students' viewing habits from a dependence on stereotypical responses. Many youngsters have been over-exposed to the commercially limited variety of norm images made popular through mass exposure in the media and may automatically expect any given image to conform to these pre-packaged standards. They need experience with atypical perspectives to unlearn some of this conditioning (McKim 1972).

Pattern Perception

Hornung (1959) offers a compilation and classification of over 1800 basic geometric designs to analyze for composition and classification. Zakia (1979), McKim (1972) and Dondis (1973) suggest a number of activities which can be used to reinforce student awareness of the pattern creating effect of the Gestalt principles.

Students can experiment with closure by producing Rorschach ink blots and identifying images within them. Partial outlines can be made by tracing key contours from familiar figures and students can be challenged to identify the figures and then produce some examples of their own. Tachistoscopes can be used to flash images on a projection screen and give students a sense of the rapidity with which some closure experiences can occur. Another effective technique is one originated by DaVinci. He practised projecting his vision onto walls spotted with stains, attempting to create an image using the already existing figure as a basis. Students can attempt similar closure experiences by using scribbles or paint spatters as bases.

Fresh insights about closure can also be realized by examining the work of Eckman (1975) and Fast (1970) concerning facial expression and body posture. Eckman, for instance, identifies four or five distinctive facial expressions for each of these emotions: surprise, fear, disgust, happiness, sadness and anger. Students can be encouraged to distinguish between the various expressions and identify the kind of emotion being depicted. They will learn that the combination of particular mouth, eyebrow or chin conformations is indicative of the same kinds of emotional responses across cultures. Body language, although not so cross-culturally consistent, cues the viewer about the individual's emotional state and level of energy.

Students should be given practice in "reading" such non-verbal messages; the assessments they arrive at will represent very sophistocated closure experiences. The effect of grouping through proximity can be assessed quite easily using partially traced figures. Only six or eight essential elements in a complex figure such as a machine or a human body can be traced in a spatially correct representation and the students can be challenged to identify the figure. They will note how the proximal relationships of the various elements facilitate the process of recognition. As with the closure tracings above, students can then produce some of their own to share. Jigsaw puzzles also offer experiences with proximity and closure.

McKim (1972) suggests exploring the principle of continuity by using finger paints to capture the essential lines of a model's pose. The model can alter the pose several times in any one session and the viewer can reshape the line to correspond. Another possibility is to cut out a portion of a regularly repeating geometric design such as may be found in a mandala or arabesque and have the students fill the gap in according to form. Students could also create mazes for each other to solve.

The impact of similarity and closure together might best be attempted by making available a large variety of analogous norm images from diverse cultures for students to view as a regular part of their classroom experience. Providing visual examples from Jung's (1964) collection of visual archetypes of mother figures or death images might alert students to the universal nature of some kinds of images. Dreyfus (1972) provides a similar collection of symbolic figures which could be used for display. Williams (1963) suggests a number of practical ways that such display materials can be used to make the classroom a more visually stimulating environment. Her discussion (although somewhat dated) includes consideration of: the choice of pictures for various disciplines, displaying pictures effectively, the interpre-

tation of pictures, the production of pictures in the school setting, and a variety of resources to tap for appropriate pictoral materials.

Drawing

McKim (1972) notes that one of the most unfortunate assumptions in our society is that only those with artistic talent can learn to draw. Such disclaimers keep many students from accessing one of the most valuable aids in the attainmant of visual literacy, for learning to draw should be a natural extension of learning to see.

Perhaps the impossibly high standards we set for ourselves result from the plethora of exacting representational images around us. Many artists recognized that, with the invention of the camera, their role as recorders of image had been compromised, but this realization only prompted them to find new modes of expression. Rather than feeling outclassed by the technology which can reproduce such lifelike images instantaneously, viewers need to focus on the legitimate value of drawing as a discipline for the eye to improve acuity. Teachers need to ensure reluctant drawers that the process is what matters; the content of what is drawn is of secondary concern.

In using drawing as a strategy in visual literacy training, the teacher could concentrate on three basic concepts: the recognition of the visual elements of line, shape and texture (Feldman, 1972), the assessment of proportion and the appreciation of perspective.

Doodling is a natural beginning exercise to acquaint students with the impact of line, shape and texture. Students should be encouraged to experiment with as many line and form shapes as possible and to fill in the spaces with a wide variety of textures (stripes, dots, checker patterns). They should be encouraged to note the manner in which the forms created lead the eye across the page, to assess the effect of various lines and textures to facilitate grouping. Disciplined doodling exercises require the drawer to work within minimal pre-arranged lines or spaces or to limit the kind of line or shape used. For instance, they could be instructed to use only dots to draw a sphere or to create a knotty woodgrain effect using only lines. Dondis (1973) suggests a variety of exercises to explore an expanded list of visual elements including: dot, line, shape, tone, colour, texture, scale, dimension and movement. Many of these activities incorporate both drawing and collage construction.

The grasp of proportion can be facilitated in several ways. Using the principles of similarity and proximity, students can learn to recognize the groupings of elements within a picture, and their spatial relationships to one another, or they can assess proportion by using one element within the image as a standard. Grids can be superimposed upon an image and the essentials of the image copied.

An understanding of proportion is necessary in order to appreciate the impact that spatial distortion plays in creating meaning within an image. Recognizing distortion is a crucial factor in visual literacy training. Political and social satire makes use of the distortion of physiognomy to ridicule public figures; the fashion industry typically depicts unnaturally elongated human figures to create a more flattering effect for clothing. Students could be encouraged to collect images which display evidence of such distortion and to estimate its impact on the message being relayed.

McKim (1972) refers to a perceptual demonstration kit (p. 70) which uses fold-up figures to provide experiences with distortion and perspective. He also suggests a number of activities (p. 72-77) to acquaint students with the concepts of convergence (the notion of vanishing point in perspective) and foreshortening.

Students can also gain hands-on experience with perspective by being challenged to draw the three-dimensional forms which would correspond with flat pattern templates. For instance, many department stores provide light gauge cardboard boxes which must be assembled. Using these as prototypes, teachers could instruct students to produce various one-dimensional pattern templates from which three-dimensional forms could be created. Once these are available, the class could be asked to view the template and to draw the three-dimensional form as it would look if it were properly assembled. Such an exercise would provide students with practice in thinking and manipulating spatially, and would also sharpen their awareness of how perspective mediates the perception of objects.

An understanding of perspective is relevant to visual literacy training for two reasons. First, our notion of depth is called into play whenever we are required to identify the relative placement of objects within a flat plane presentation such as a photograph. We cannot adequately assess the size or proportion of objects unless our sense of perspective is stabilized. Secondly, because technologically advanced societies take such presentations of perspective for granted, they tend to assume that any reality-based perception which does not demonstrate this characteristic is primitive. However, Gregory (1978) notes that perspective is a comparatively recent perceptual acquisition, one which has less meaning for many developing cultures. Aboriginal people tend not to recognize the realistic quality of photographic repre-

sentation, often refusing to acknowledge a likeness of themselves even when it is instantaneously available (Gregory, 1978). Since the notion of perspective is a culturally determined one, students should be cautioned about this bias before they are called upon to view artifacts or artworks from developing cultures.

Still Photographic Process

Beilin (1983) notes that "the relationship between the perceiver and the photograph involves a number of component processes that vary depending on whether the perceiver is producing the photograph or attempting to understand it" (p. 32). Just as a keener appreciation of the written word is afforded to those who have struggled with learning to write, so may an appreciation of the derivation of meaning in photographic image be more easily achieved if students are able to produce their own pictures. Fransecky (1969) noted that disadvantaged students became more motivated to participate in classroom activities and improved their verbal abilities significantly when they were encouraged to express themselves on film. Cope (1981) cited a similar response with disaffected learners, noting that their inquisitiveness was generally increased when they had cameras to help explore their environment. Berry (1986) uses student photography as part of a methodology to respond to fieldtrip experiences and Lieberman (1986) uses teacher-made photos to help students focus on their learning process in the classroom. Emme (1985) sees photography as an ideal medium around which to build a viewer education program and presents two models (Attitude-Behaviour Classification and Aesthetic-Technical Axes) as frameworks to use.

Giving students practice with cameras requires careful planning and coopera-

tive effort. Students may be able to bring cameras from home, or the school system may have some which may be borrowed. Students should be cautioned against bringing cameras which are very complex or expensive; parents will be the natural arbiters here. If there are not enough cameras to go around, sharing amongst members of assigned teams could be arranged. Valuable learning often takes place when peers are encouraged to teach each other.

Film can be bought in bulk and, provided it is of a homogeneous type, can be less expensively processed in bulk. As indicated earlier, there are instructional advantages in using black and white images at the outset of a visual literacy training program. Since the popularization of colour photography, black and white processing is not available through all commercial outlets; however, with bulk orders of black and white film, specialty photography shops might be able to offer reasonable rates. Having the teacher responsible for keeping track of the developing of prints makes it possible not only to keep costs down, but also to monitor the progress made by students as they experiment with their cameras. With teacher involvement with the processing agency, arrangements can be made to have contact prints developed and avoid producing finished prints of dubious quality. Or, conversely, with an eye to the "teachable moment", the teacher can arrange for the printing of pictures which the processor would not otherwise print, and which the class could evaluate for faulty or eccentric composition, focus or lighting.

Several inexpensive self-processing cameras are available which offer the advantages of convenience and instant feedback. However, the cost per print is higher. A decision to select such a system will depend on the financial resources available and the age and attention span of the student involved. Cope (1981) suggests that the costs of instant photography can be minimized through corporate

sponsorship of visual literacy programs. He cites (p. 44) The Polaroid Education Project in Cambridge, Massachusetts as one resource. Self-processing film would be a good choice for younger children where quick reinforcement of learning is a priority. However, as will be discussed presently, film which may be darkroom processed (either professionally or non-professionally) offers distinct advantages for more mature learners.

Once students have camera and film, the question of what to photograph demands attention. There will be an almost automatic assumption on the part of the students that they should leave the classroom to take their pictures. This urge should be resisted until the teacher is reasonably sure that the students can perform basic operations with the camera; loading and advancing the film, focusing, releasing the shutter, and unloading the film are the simplest of these. Those who have manually operated aperture mechanisms will need extra time to experiment with changing the *f*-stop positions. All of these considerations make staying in the classroom for the first session or two quite advisable.

Much interesting and relevant photography can be accomplished within the classroom setting itself; collections of objects with interesting contours and textures can be brought in to provide still life subjects, and of course, the imaginations and energy of the students themselves will provide innumerable portrait opportunities. However, if lighting or space is an issue, additional supervision, or the cooperation of the school authorities may be required to avoid upsetting school routine when students are allowed to leave the classroom.

When such expeditions are undertaken, a guiding precept might be provided as a focus for the picture takers. They could be given a theme to work within, one

which is either relevant to a topic under study in another discipline, or related to theoretical concerns of visual literacy. For instance, they could be challenged to capture on film as many interesting textures as possible, or to find examples of the Gestalt principles at work.

One excellent strategy to help structure the experience for the students is to have them keep a written record of their photographic efforts. Each shot could be recorded according to location, date, time of day, subject, photographer, type of camera, type of film, *f*-stop setting, and the particular effect (if any) that the shot was intended to achieve. Such a journal would be an invaluable aid later when the prints are assessed for clarity or lighting, or when descriptors are needed for displays.

Fransecky and Debes (1972) provide some practical advice for implementing camera practice in the classroom. In *Visual Literacy: A Way to Teach - A Way to Learn*, Chapter Four is devoted to topics such as: the acquiring of cameras, lessons for students about camera usage, and film processing. Fransecky and Debes do not recommend student processing of film as very reliable, but suggest that darkroom experience might be more appropriate in senior grades or in schools where there are camera clubs. Because it is recognized that photography can be an expensive undertaking, several resources for inexpensive or free materials are suggested.

Such works as Shipman's (1974) *Understanding Photography* might provide the teacher with a more comprehensive overview of camera usage. Shipman uses a very readable style to explain some reasonably technical topics. Goldsmith's (1971) *The Photography Game* is also noteworthy for its treatment of the subject in layman's terms.

Although darkroom experience for students does present some logistic difficulties related to supervision, expense and safety, some effort should be made to acquaint students with the manner in which an image captured on film can be manipulated through blowing it up or cropping it, or by altering the amount of time that the print is immersed in developing solutions. The development of black and white prints is reasonably simple and with adequate funding, the equipment is not difficult to obtain. However, if regular access to a facility is not possible, perhaps the learning can be achieved by proxy, with the students walked through a darkroom experience as observers. The author's experience with darkroom technique suggests that both time and cost factors present significant barriers to general classroom involvement. Therefore, a "fieldtrip" approach which minimizes the amount of material and time which must be consumed, but which still provides experience with the essentials of the process itself, seems an achievable compromise.

"How to" books about darkroom technique are available in many bookstores.

Photographic Meaning

There are many considerations which the teacher may wish to include when deciding on an approach to the unlocking the meaning of photographic image. First of all, it should be recognized that this endeavour falls within the realm of critical thinking, and as such requires at least three separate cognitive operations: analysis, interpretation and assessment or evaluation.

The kind of analysis undertaken in Chapter Two of this study, "Gestalt Appli-

cations", represents one possible model for identifying the elements which contribute towards the meaning of an image (analysis) and for deriving meaning from their combined impact (interpretation). Other approaches may focus on the process of picture taking itself or the various kinds of functional contents which photography makes available.

Barrett (1986) offers a comprehensive approach to photography which would be most effective as an information base to supplement the students' hands-on experimentation with their cameras.

In the first of his three part series in *Art Education*, "Teaching about Photography" (1986), Barrett focuses on an explanation as to why the photo is a unique medium. Through practice with cameras, and class discussion about their product, students can learn to appreciate the characteristics of *selectivity*, *instantaneity* and *credibility*.

Photography must be selective because so much is available to be captured on film that one must first discriminate in the taking of the image. Then, because of the relative ease with which photos can be taken, one must be selective about the quality of image which finally sees print. During the process of analyzing the effectiveness of their first exporatory efforts, students should become aware of this characteristic. Because a lot of picture taking may be necessary in order to facilitate this learning, the teacher should be prepared for a significant consumption of film in the beginning (hence the recommendation to order and process in bulk).

Photos are instant in the sense that what is captured on film occurred during a point in time which cannot be repeated. They are also instant in the sense that the

finished product can be available very quickly (at least when compared to the amount of time that it takes to produce a realistic drawn representation). Having students replicate a given shot exactly may demonstrate the truth of this instantaneity. The use of instant processing film would also be effective to emphasize the rapidity of the process. Appreciating this factor will reinforce the need to evaluate photos differently than drawn images, and to recognize the different dynamics at work in the eye of the producer of each kind of image.

Finally, the notion of credibility could be addressed by having students take pictures that supply information which could then be used empirically to arrive at conclusions based on quantifiable evidence (parameters such as size or speed of objects). The use to which such data is put could then be contrasted with the impact of images which are used to communicate qualifiable conditions (issues related to the context in which the photograph was taken or the intent of the photographer who took it). Such inquiry could reinforce the need to interpret as well as analyze images.

In the second section of the series, Barrett identifies context as an important consideration for photographic interpretation. Three types are described: *internal*, *original* and *external*.

Internal context involves "the identification of the subject matter, consideration of its form, and relationships between the two" (p. 33). Barrett identifies the work of Feldman (1972) as a source who "clearly stipulated...methodologies for investigating the apparent in a picture" (p. 33). As mentioned previously, the work of Zakia (1979) is also noteworthy in this regard.

Dondis (1973) is another invaluable resource for the teacher seeking lesson exemplars for internal context. He identifies the psychological influences of balance and stress as causing viewers to level and sharpen their perceptions of image, and provides a variety of examples to demonstrate these influences at work. His discussion of "Techniques for Visual Communication" (pp. 110-127) is particularly illustrative of the strategies deliberately used by producers of image to attract attention and relay non-verbal messages of balance or stress. Students who work through discussions of these examples will learn how most visual communications techniques exist within a continuum of approaches, one purpose of which is to evoke reactions which cause the image to be memorable. Because of the eye's propensity for seeking balance in a composition, ("Pragnanz" in Gestalt terms), the image which requires more visual processing to achieve balance tends to be more memorable. The techniques identified by Dondis represent a catalogue of visual methods to evoke a variety of reactions on the pychological continuum between balance and stress.

The visual communications polarities identified by Dondis are: balance and instability, symmetry and asymmetry, regularity and irregularity, unity and fragmentation, economy and intricacy, understatement and exaggeration, predictability and spontaneity, activeness and passiveness, subtlety and boldness, transparency and opacity, consistency and variation, realism and distortion, flatness and depth, singularity and juxtaposition, sequentiality and randomness, sharpness and diffusion and continuity and episodicity. Students could be encouraged to identify these forces at work in images or collect examples of their own to share with their peers.

With specific reference to the analysis of photographic image, Barrett (1986) suggests that:

> photography brings its own set of formal elements and terms...that ought to be learned and investigated. Focus, depth of field, angle of

> view, shutter speed, types of illumination, grain size. tonality, contrast range and other photographic variables should be explored to see how they effect (sic) the subject matter and how form and subject combine to express (p. 33).

Students, in the course of taking photos, will discover the effect of many of these variables and will learn to recognize some of the impact that they have on any image produced. It is for this reason that the teacher should be able to arrange for substandard images to be reproduced for instructional "post-mortem" purposes.

A consideration of original context is needed in situations where the information supplied within the image is not sufficient to appreciate the context from which the image was taken. An example might be an image of a rapt face in a crowd. In order to understand the reason for the facial expression, we would want to know the cause of the person's attentiveness. Viewers' estimation of the image and its impact would be different if they knew that the person was listening to a symphony compared to how they might react if they knew that the person was watching an execution.

To facilitate this learning, the teacher could make available a variety of images to interpret. Students could be encouraged to sort them into those which are mostly self-explanatory and those which require additional contextual information. Students might also gain an appreciation of this issue by noting the effect achieved when an image is cropped to eliminate a crucial component. For instance, the face in the crowd could be a close-up shot; the wide angle could show the focus of attention, whatever it happens to be.

The last type of context considered is external. Here the students need to learn that the presentational environment impacts on its meaning. Barrett provides

some excellent examples:

> The *National Enquirer* is infamous for its misleading, deceptive and seductive headlines, captions and stories that surround its photographs of celebrities. A Photograph of Eldridge Cleaver on the dust-jacket of *Soul on Ice* or on a FBI poster would carry very different but persuasive messages. Similarly, the same photograph of a hunter and a slain deer would trigger opposing orientations if it appeared on the cover of *Sports Afield* or *The Vegetarian Times* (p. 35).

Examples of such juxtapositions can be created through collage for classroom use or collected over time from various print media. It might be a useful exercise to have students produce examples of their own where they insert the same image into a variety of contexts and poll their peers about the impact that each image generates.

Additional external context clues to consider are the print information which accompanies many photos, for instance, whether an image originates with a wire service or comes from a gallery, or how it has been captioned or titled. Students could experiment with providing captions or titles for untitled photos or provide the same photo with contrasting captions to observe the difference in impact.

In the final section of his series, Barrett outlines six categories to identify the purpose for which a photo might be used. He points out that the categories should not be seen as necessarily discrete entities, because in the use of any one image there may be some overlap. Students who are familiar with these categories will have a theoretical framework to provide structure for their interpretive activities. Barrett's categories are: *Descriptive*, *Explanatory*, *Interpretive*, *Ethically Evaluative*, *Aesthetically Evaluative* and *Theoretical.*

Examples of photographs whose prime function is to describe are given as I.D photos, medical X-rays and surveillance photos. Such images are intended

merely to convey information; they are not intended to be convincing or flattering.

Photographs which seek to explain depend upon descriptive information to provide answers to questions which are of a scientific nature. Examples of such images are those produced in science labs to document the progress of an experiment, or those taken by anthropologists to document the living conditions of a culture.

Interpretive photos offer explanations about the phenomena of the world from an ideosyncratic, non-scientific point of view. Barrett describes them as "fictive, poetic and metaphoric, usually using actors, models or situations directed by the photographer" (p. 42) The subjects of such photos are often emotionally evocative, dealing with issues such as death or spirituality. Barrett suggests the work of Jerry Uelsmann or Ralph Gibson as good examples of the type.

Ethically evaluative photographs "make moral judgements, take political stances, promote social causes, and are often passionate pleas to right wrongs" (p. 42). Advertising images belong in this category as they can be seen as promoting what some would believe is the good life. Campaign posters for political candidates and land or seascapes showing environmental deterioration would be other examples.

Aesthetically evaluative photographs offer images which present the photographer's view of an either pleasing or displeasing aesthetic. Such works are generally categorized as "art photos"; they include subjects such as nude studies, landscapes and still lifes. Barrett suggests the work of Alfred Steiglitz, Edward Weston, Ansel Adams and Minor White as typical of the type.

Theoretical photographs are described as those which are "not so much about life as they are about art, functioning as visual art criticism, art about art, or photographs about photography" (p. 43). Included in this category are the Post-modernist works which are collages of photographs or re-photographs. The work of Sherrie Levine and Richard Prince are suggested as representative of the category.

Barrett emphasizes that students must realize that in attempting to place a photo within a category, they are performing an interpretive act. As such, the decision may be open to dispute. The defence of a particular placement will depend not only on the content of the image, but also on the external context, what surrounds it in the gallery or magazine in which it is found. Other factors which should be considered are the other work of the photographer and how critics have assessed his or her work. When the background information for a photo is unavailable, it "can be run through all six categories to see where it might fit best or where it does not fit at all" (p. 43).

Students can use these categories to interpret the function of ready-made photographs. After making the interpretive decision, and defending their choice, they can be asked to evaluate the effectiveness of the image. That is, if after deciding that a particular likeness of person is a portrait depicting that individual in a negative light (i.e. that it belongs in the ethically evaluative category), the student can then be asked to judge the effectiveness of the image in its negative presentation of the individual.

Such thinking moves them from interpretation to evaluation. The categories can also be used to provide a framework for the students' own photographic efforts.

They can be challenged to prepare a portfolio of images which are representative of each of the categories, and be prepared to defend their placement decisions. Their peers can be involved in an evaluation of the effectiveness of the images. In this situation, their expertise as photographers should not be the primary concern. What should be considered is how clearly the students have estimated the function and impact of the images they have created. Barrett suggests that:

> the assignment would not be to make a good or beautiful photograph, but to use the camera and darkroom to express something significant about what they are photographing. An assigned category leads photographers to bases for making judgements about the effectiveness of their photographic expression. [For example] a descriptive photograph of an object shot from too far away does not describe well, and an ethically evaluative photograph of suffering, made to conform to aesthetic criteria, may be so attractive as to distract from the suffering it is meant to express (p. 44).

House (1980) endorses Barrett's belief that aesthetic forms can only be evaluated validly in terms of their efficacy. House suggests that, unlike literal meaning, which can be assessed in terms of truth or falsity, artistic meaning must be assessed in terms of its adequacy or inadequacy. The use of Barrett's categories provides a structure within which students can attempt such evaluation.

The use of student photography to teach about visual meaning has the advantages of personal relevancy and experiential immediacy for the learner. However, the teacher should be sure to provide exposure to a wide variety of professionally produced exemplars as well. Some resources for such classroom displays are included in the appendix at the end of this chapter.

Much critical thinking about photographic image can be accomplished through verbal expression. Duncan (1988) provides a wide-ranging overview of the impact of popular culture on the individual. The text contains a wealth of brief,

contemporary, readable articles taken from a variety of popular print media. Although the text does not address the still photographic medium directly, its treatment of such topics as advertising, journalism, violence and gender roles may suggest the applicability of similar themes in the discussion of still photography.

Leavitt and Sohn (1979) and Sohn (1969) both provide a variety of black and white photos which are organized to provide opportunities to respond to images through discussion and writing.

VIEWING STRATEGIES - CONCLUSION

It can be seen that viewing encompasses a vast field. Unlike imaging instruction, which requires little in the way of apparatus and supplies, viewing instruction involves the acquisition of a variety of appropriate teaching materials: cameras, film, catalogues of pictures, puzzles, and so forth. Systematic viewing instruction may involve a fair amount of interactive, mobile behaviour whereas the products of imaging instruction tend to be of a more reflective nature. Unlike imaging, viewing occurs within a context where data can be externally examined. Although they cannot really be quantified, viewing skills may be qualifiably evaluated on the basis of adequacy or inadequacy.

ASSESSMENT AND EVALUATION

Assessment and Evaluation of Student Progress

A systematic approach to estimating student progress should begin with a clear understanding of what the program is intended to accomplish. Only then can the teacher gather data to serve as evidence of student involvement and mastery of the concepts. The Ontario Ministry of Education (1990) provides a list of purposes and skills which could be used as a resource to establish goals and objectives. Once the aims of the program are clarified, the teacher can select activities which involve practice with the identified skills. The students' participation and grasp of the concepts will provide assessment data. Such assessment needs to be distinguished from the process of evaluation.

The Ontario Ministry of Education (1990) defines assessment as "the gathering, recording and analysis of data" (p. vii) and evaluation as "the application of judgement to the data gathered and its analysis" (p. vii). Teachers needing assessment strategies will find a variety of suggestions in the "Media Literacy" section (pp. 289-318) of the Ontario Ministry document. These suggestions include the compliation of media folders, the keeping of media journals and the application of student and group media literacy profiles. The evaluation of student progress is not addressed in this document.

A document entitled *Fine Arts Assessment: Visual Art* (Zuk, 1989) which was compiled for the British Columbia Ministry of Education provides an even more

thorough list (pp. 23-25) of possible diagnostic tools and strategies for assessing student competencies in this area. Here, suggestions are made for the place of tools such as rating scales or strategies such as participant observations or contracts.

Many of the activities suggested in this study would be appropriate components in an assessment process and could form the content for individual student folders. In keeping with the process orientation of the topic, involvement and participation should be considered as crucial for progress. Mastery of technique is of less concern than is evidence that the student is attempting to interact with image in a thoughtful, critical manner. Evidence of this cognitive effort could be garnered from individual or class journal entries. The teacher may wish to judge the quality of this interaction in terms of mastery of the theoretical concepts pertaining to visual literacy training. However, the teacher should be cognizant at all times of the complexity of the field in general, and temper his or her intellectual expectations accordingly.

The extent to which participation and actual, measurable productivity figure in the teacher's evaluation process will be variable and dependent on personal educational philosophy. However, both factors should be considered and accounted for. *Fine Arts Assessment: Visual Art* (Zuk, 1989) discusses considerations for the role and application of diagnostic tools and techniques.

Assessment of Imaging and Viewing within the Curriculum

The Ontario Ministry of Education (1990) provides a format for the diagnostic, formative amd summative assessment of media literacy. These instruments

could possibly be adapted to provide feedback for teachers wishing to assess their students' level of expertise with imaging and viewing. Such assessment may provide a basis upon which to build a case for implementing a visual literacy program within a school setting.

The British Columbia Ministry of Education's (1990) *Language Arts English Primary-Graduation Curriculum Guide* suggests a variety of learning outcomes which would involve activities to integrate media studies into language and English programs. This document does not identify any specific program assessment methods for media related activities, but the inclusion of media as content within these curricula would seem to lend support to the notion that media study is an appropriate vehicle to use to foster inter-disciplinary approaches in curriculum development.

CHAPTER FOUR

SUMMARY AND RECOMMENDATIONS

SUMMARY

This study addressed two basic questions. The first was why teachers needed to know how to "read" non-print information and secondly, what might be involved in acquiring such expertise?

In attempting to address the first issue, the author identified a phenomenological stance as a worthwhile perspective from which to investigate the nature of viewing and imaging experiences. It was suggested that the nature of the phenomena requires some "letting go" of the traditional suppositions about the nature of knowledge, and specifically, of the notion that knowledge can only be acquired and processed through the accumulation of discrete data. It was further suggested that hermeneutic inquiry, which invests data with new meaning through reference to symbolic or metaphoric constructs, might also be a productive avenue for "in-seeing" the significance of image as a phenomenon.

Imaging was seen to be a process sited mostly in the right hemisphere of the human brain; as the process which provides cognitive structure to (i.e. is an encoder of) incoming perceived data, it was identified as a critical component in learning process. Viewing, as the process which decodes structures perceived externally, was

identified as a reciprocal of imaging. Viewing was seen as a critical skill for the absorption of non-print information. It was suggested that the nature of knowledge has changed qualifiably since the advent of photography and electronic media so that being merely print literate is no longer an adequate preparation for becoming an adaptive learner.

It was suggested that viewing and imaging have not hitherto been recognized as critical learning skills because the traditional Western conceptualization of learning has emphasized logico-linear, intellectual cognition to the detriment of the spatial, global, intuitive construct. This has occurred because there has been a preference for a scientific, empirical, quantifiable approach to the acquisition of knowledge in Western societies. As a consequence, those skills which were not quantifiably measurable, were regarded as unteachable.

In recent years, viewing and imaging have been investigated using empirical parameters so that there is now a growing body of research which tends to suggest that imaging can be proved to exist, and that its functioning is synergistically linked with viewing, although this is by no means an exclusive relationship.

Contemporaneous with the split brain research which verified the existence of imaging, was a re-evaluation of reading process which identified imaging as a crucial factor in the acquisition of reading comprehension skill. Reading was no longer seen as linear in nature, but rather as recursive, in that the effective development of reading process was dependent on the existence of a rich data bank of experientially based imagery to which the reader could refer to reinforce the impact created by the printed word.

A teacher, then, could appreciate the importance of visual literacy not only on terms of its function as a decoder, and analyzer of the physical world of non-print information, but also in terms of the impact of imaging on learning process in general, and on reading in particular. The identification of imaging as a basal component in learning process led the author to identify a theoretical construct derived from viewing process which might have a reciprocal application to imaging. The Gestalt principles of figure and ground, similarity, proximity, continuity and closure were identified as possible constructs to provide a theoretical linkage. The principles were examined visually and their application to cognitive process and reading outlined.

The purpose here was to provide some tangible evidence that the structuring made internally possible through imaging could be translated into a process that was perceivable in viewing. If such was the case, then cognitive gains made in viewing might be reflected in more acute imaging, and the result might be a better overall ability to think and learn using the right brain capability.

The incorporation of reading into the overall attack on the problem had two purposes. First, reading process was included as a logical consequence of its being considered a primarily left-brained capability, but one which is now seen as depending on right brain function for its adequate development. It was hoped that an instructional approach which incorporated both hemispheric strengths would tend to have a greater chance of success in cognitive terms. Also, the author sensed that in many educational circles, visual literacy is seen as a kind of adjunct to print literacy. Therefore, making the notion of visual literacy training relevant to language and reading teachers would hopefully provide the motivation for an inclusion of the concepts in their classroom practice.

In order to address the second issue, that is, how teachers might go about acquiring some expertise in visual literacy, the author first limited the scope of inquiry related to viewing to those media which were static and black and white. This was done not only because such a limitation simplified the parameters of the inquiry, but also because there are sound educational rationales for teaching about line, shape and the relationships between them, without the interference of colour and motion as variables. These are related to physiological eye and brain function.

Secondly, the process of viewing was presented as one which was best improved in an environment where physical mobility was acceptable. Again there is research to support the notion that perception develops more satisfactorially in situations where the viewer can move about and absorb visual data from as many perspectives and modalities as possible.

Thirdly, photography was presented as a medium which made possible a learning experience which could, at one and the same time, incorporate the behavioral need for mobility, with practice in imaging and static viewing. The relative availability of black and white photographs was also seen as an advantage.

The selection of photography as an instructional methodology demanded that the teacher have some appreciation of the unique nature of the medium and the limitations that its use entailed. These concerns were outlined in terms of photography's credibility, instantaneity and selectivity.

Having established the general content and process for a visual literacy program, the author next provided some visual black and white examples to give the

reader/viewer an opportunity to experience the interaction of Gestalt principles in viewing and imaging. The accompanying discussion was intended to exemplify the analytic, interpretive process by which one could use the theory to "read" non- print information.

Finally, the author provided a variety of strategies which could be used in the classroom to provide practice in imaging and viewing. The suggested strategies incorporated both verbally and non-verbally based stimuli and involved both reflective and materials-manipulative kinds of activities. A possible classroom assessment process was suggested and the place of visual literacy within the established curriculum was briefly discussed. An appendix of suitable resource materials was provided.

RECOMMENDATIONS

Specific Theoretical Concerns

What theoretical constructs within the study require further investigation? What role can the classroom teacher play in furthering this study?

In the author's view, the articulation of a role for imaging within the instructional context represents the greatest challenge for further study. The ephemeral nature of the concept itself and the dearth of easily accessible empirical data to verify its existence tend to militate against its being seen as a teachable skill. Teachers are perhaps in the position of the early medical researchers who postulated that

bacteria existed, and who had not caught even a fleeting personal glimpse of the organisms to support their assumption. These researchers had to depend on circumstantial evidence, (the effect of antiseptic procedures on the incidence of infection) to support their belief that a cause would eventually be identified and isolated. Teachers, at least, have personal experience with imaging to refer to, and language as a marginally effective tool with which to communicate its nature. They do not need a microscope to prove to themselves that the process exists.

What teachers need to be able to do is to strengthen the learner's belief in the efficacy of imaging as a fundamental learning skill. If a body of research is accumulated which suggests that deliberate imaging practice has spin-off benefits for reading, writing, creativity and critical thinking, there may be no need to fashion the "microscope" to allay the scepticism of the doubting Thomases. Therefore, research should be conducted which identifies the variety of imaginal experiences which can be produced in the classroom, and strategies should be identified to stimulate such experiences. Then a long range assessment of the linguistic and cognitive development of sample populations who undertake such instruction could be compared and contrasted with results from sample populations for whom such instruction is not available. If imaging is as fundamental a skill as the author believes, then its active encouragement should result in statistically verifiable improved learning.

A second theoretical concern relates to the suitability of the Gestalt principles as exemplars of cognitive structure. The relative effectiveness of their function as organizational precepts for both linguistic and spatial cognition must be tested in classroom practice. Specifically, more models of metaphoric teaching units need to be developed; the use of analogy to provide structure for abstract concepts needs to be investigated further. The roles which continuity and closure play in reinforcing

stereotypical response and rote thinking need to be better understood so that students can be taught how to avoid such reactions in situations where they are counter-productive.

General Program Concerns

What are the most central concerns related to the implementation of visual literacy programs in contemporary schools? How might these concern most effectively be addressed?

In the author's view, a primary concern is that there is not a great deal of awareness of the fundamental importance of viewing and imaging to learning in general. Indeed, the central purpose of this study was to isolate information and strategies which would make the pursuit of visual literacy worthwhile, attractive, but above all practical, for language teachers particularly. If the value of the learning can be sufficiently proved, and a methodology to promote that learning clearly articulated, the author hopes that the study may serve to arouse interest in the field and encourage others to incorporate some of its findings into their classroom practice.

This study, however, addresses a limited scope of viewed media. Research should also be conducted to articulate instructional and assessment strategies for the various kinds of television programming, films and computer graphics. The potential for imaging experiences related to auditory stimuli (music lyrics, for instance) should also be explored. Massive changes in attitudes and behaviours are not accomplished without broad general awareness of the issues needing to be ad-

dressed or without a practical means by which to effect change. A wealth of approaches to visual literacy which are expressed in layman's terms may encourage the kind of groundswell of support which a solution to the problem demands.

However, even if such an educational groundswell transpired, it would accomplish little if, at the same time, there were not a broad public acceptance both of the benefits to be derived and of the costs to be borne in promoting the learning. In the case of visual literacy, there is a vague general awareness that training involving technical equipment tends to be expensive, both in terms of time and money. However, the incorporation of such content into already existing language curricula may also be seen as too impractical because the existing resources of teacher energy and expertise may already be strained to capacity in coping with the public's perceived need for print literacy. What the public need to become aware of is the manner in which visual literacy training can augment and reinforce learning in general and reading in particular. A publically funded campaign, "Participaction" (Canada Ministry of Health and Welfare, 1983) was used to promote national fitness a decade ago. Physical fitness was identified as a worthwhile national goal because of the likely spin-off benefits for health, safety and national productivity. Perhaps a similar approach with visual literacy would serve to promote reading, writing, creativity and critical thinking.

The apparent complexity of the field also presupposes both interest and motivation on the part of a teacher who might be expected to undertake such instruction. Therefore, there needs to be further research to establish the applicability of visual literacy precepts to curricula in general, so that teachers in all disciplines will see the relevance and benefits specific to their fields. Such studies should not only establish the theoretical linkages between visual literacy and the specific disci-

pline, but should also suggest content-specific strategies for instruction and assessment.

The administrative structure of the school system must also be seen to have an adaptive philosophy to support the integration of visual training skills across the disciplines. Such integration was highlighted as a priority in *Year 2000: A Framework for Learning* (1989) so that there is room to believe that such an adaptive thrust is already in place in British Columbia at least. In their capacity as facilitators of change, administrators should actively promote the involvement of resource personnel in the libraries and media centers in order to help classroom teachers access the equipment and materials needed for effective implementation. This process is already occurring in the case of computer literacy skills, so hopefully the precedent which will serve as a model is already in place. Some research could be undertaken to identify the effectiveness of the integration of computer literacy programs, with a view to avoiding any perceived difficulties for visual literacy implementation.

At this time, the general feeling in British Columbia seems to be that media study in its own right is a worthwhile, but prohibitively expensive field to promote. Until the funding situation is redressed, there is a danger that media study may continue to exist as an underdeveloped component within some of the traditional curricula. Therefore, research should be undertaken to assess the relative cost effectiveness of programs which teach the field as a discrete discipline as compared to those which incorporate it in a cross-disciplinary approach. Related to this study might be an investigation of the relative merits of designating such a course as an elective or as required study.

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APPENDIX

Resources for Imaging

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