Drawing on the Artist Within

"The mind in creation is as
a fading coal which some
invisible influence, like an
inconstant wind, awakens to
transitory brightness; this
arises from within . . . and
the conscious portions of
our natures are unprophetic
either of its approach or of
its departure."

PERCY BYSSHE SHELLEY

An Inspirational and Practical Guide to Increasing Your Creative Powers

Drawing on the Artist Within

Betty Edwards

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PREFACE

Drawing in the Dark

Writing this book has been a process of discovery. I started with a glimmer of an idea that visual perception, drawing, and creativity might somehow be linked. The writing took the form of a search, a hunt for clues that might allow me to capture bits and pieces of this concept and fit them together finally into a comprehensible whole.

At the start of writing, I was far from clear in my mind what shape the final manuscript might take. And in fact, as the writing progressed, it seemed somehow to take on a life of its own, leading *me* in my search rather than vice versa. In a strange way, therefore, I found myself writing *about* creativity while at the same time engaged in the very same process—the search and the object of the search becoming one and the same.

My search began with an investigation of the written words of many creative individuals. And there, by their own assertion, I learned that words alone were often inadequate to describe the creative process as they had experienced it. Some individuals advised that to be truly creative we must somehow turn ourselves away from usual modes of thought in order to see things differently, to look at the world from a different point of view. Still others expressed serious concern that verbal language can be inappropriate for certain creative tasks and that words at times can even *hinder* thinking.

My friend mathematician J. William Bergquist invented the adjective "numerate" (as a parallel to "literate") to describe the ability to understand and use numbers. "Numerate" has gone into the language and is now frequently used. What new word would describe the ability to understand and use visual information?

Yet verbal language and analytic thought have dominated human life for so long a time now that it is hard to imagine that there might be other means of translating experience, valuable for thinking yet altogether different. We have grown used to the idea of other languages, to be sure: the languages of music, of dance, of mathematics and science, the relatively new computer languages, and of course the language of art itself—certainly not a new idea. But the notion that we might benefit from a visual, perceptual language as a parallel to verbal analytic thought processes is, perhaps, an idea of our own time. It is an idea derived from the pioneering research, first published in 1968, of psychobiologist and

Nobel Laureate Roger W. Sperry, whose discoveries about the dual nature of human brain function and human cognition have radically changed modern conceptions of thinking. In fact, the global, visual, perceptual mode of the human brain is gradually being accepted as a partner equal in value to the sequential, verbal, analytic mode in the thinking process.

Thus, everywhere I looked I seemed to find confirmation of my belief that *direct perception*, a different kind of "seeing," is an integral part of the thinking—and hence the creative—process. And if that was, indeed, true, I thought it would be helpful to have a means to access that vision, not in words but in a form appropriate to vision. Therefore, in searching for a key to creativity, I also began to explore ways in which to express the visual, perceptual thinking mode of human brain function. Not surprisingly, I found such a language already in use—the language of drawing, which can record what we see, either in reality or in our mind's eye, in a way not totally dissimilar to the way we record our thoughts and ideas in words. Drawings, like words, have *meaning*—often beyond the power of words to express, but nonetheless invaluable in making the chaos of our sensory impressions comprehensible.

Thinking in a Different Language

With that realization, I believed I had found the link I sought between visual perception, drawing, and creativity. But my search was not yet over, for now I faced the further question of what role the visual language plays in the creative process, and how, if possible, it could be put to *use*. That, in essence, is the purpose of this book. In it, you will learn how to draw—but that is only the means, not the end. For in learning how to draw, I believe you will learn how to *see differently*. And that, in turn, will enhance your powers of creative thought.

You will be surprised, I think, to discover how quickly and skillfully you will be able to learn to draw; equally surprised to learn how much of the language of visual, perceptual thought you already know, right at this minute, perhaps without realizing it. And it is my hope that you will also discover that this new language, when integrated with the language of verbal, analytic thought, may provide the ingredients essential not only for true creativity—that is, new or novel ideas, insights, inventions, or discoveries that have social value—but also for useful creative solutions to the problems of everyday life.

The exercises in this book look like exercises in art, but they are not really intended as such. Art is something different—just as poetry is something different from basic instruction in reading. Professor Don Dame, artist and teacher, suggested that perhaps a new word is needed:

"The word 'art' is muddied. What you need is a word for 'order,' 'health,' 'beauty,' 'balance,' and 'quality of relationship.' What you are talking about in your book is a much more natural process than art. That natural process is orderly, constant, available, dispassionate. Seeing is totally different from looking. Looking is for survival on a more mundane level.

"Drawing is the time-bound activity of seeing. It stills the brain's noise and gives us a window to a process as independent as the autonomic nervous system. It seems peculiar that the process should be so elusive.

"If you have found a door to the process (with the exercises in this book), I think your discovery has little to do with art. Art is a specialist's activity in this culture, and is just a *symptom* of the process of seeing."

In conversation, Santa Monica, California, September 15, 1984.

LEONARDO DA VINCI
Detail, *Study for the Angel's Head.*
Silverpoint pencil on paper.
Biblioteca Reale di Torino.

Part I

A New Look at the Art of Seeing

"There is something antic about creating, although the enterprise be serious. And there is a matching antic spirit that goes with writing about it, for if ever there was a silent process, it is the creative one. Antic and serious and silent."

JEROME BRUNER
On Knowing: Essays for the Left Hand, 1965.

1 Creativity: The Chameleon Concept

What on earth is creativity? How can a concept be so important in human thinking, so crucial to human history, so dearly valued by nearly everyone yet be so elusive?

Creativity has been studied, analyzed, dissected, documented. Educators discuss the concept as if it were a tangible thing, a goal to be attained like the ability to divide numbers or play the violin. Cognitive scientists, fascinated by creativity, have produced volumes of bits and pieces, offering tantalizing glimpses and hints, but have not put the parts together into an understandable whole. To date we still have no generally accepted definition of creativity—no general agreement on what it is, how to learn it, how to teach it, or if, indeed, it can be learned or taught. Even the dictionary finesses definition with a single cryptic phrase: "*creativity*: the ability to create," and my encyclopedia avoids the difficulty altogether with no entry, even though another admittedly elusive concept, "intelligence," is allotted a full-length column of fine print. Nevertheless, books abound on the subject as seekers after creativity pursue a concept that seems paradoxically to recede at the same pace at which the pursuers advance.

As an example of the contradictory nature of accounts of creative processes, the wife of Robert Browning, the poet, reported that "Robert waits for an inclination, works by fits and starts: he can't do otherwise, he says." But later, W. M. Rosetti, speaking of Browning's writing procedures, said that Browning wrote "day by day on a regular, systematic plan—some three hours in the early part of the day."
F.G. KENYON
Life and Letters of Robert Browning, 1908.

Drawing on Treasure-Hunt Notes

The trail, fortunately, is at least marked with pointers to guide the chase. Letters and personal records, journals, eyewitness accounts, descriptions, and biographies are in abundance, gathered from creative individuals and their biographers over past centuries. Like clues in a treasure hunt, these notations spur the quest, even though (as in any good treasure hunt) they often seem illogical and indeed frequently contradict each other to confuse the searcher.

Recurring themes and ideas in the notes, however, do reveal some hazy outlines of the creative process. The picture looks like this: the creative individual, whose mind is stored with impressions, is caught up with an idea or a problem that defies solution despite prolonged study.

A period of uneasiness or distress often ensues. Suddenly, without conscious volition, the mind is focused and a moment of insight occurs, often reported to be a profoundly moving experience. The individual is subsequently thrown into a period of concentrated thought (or work) during which the insight is *fixed* into some tangible form, unfolding, as it were, into the form it was intended to possess from the moment of conception.

"I can remember the very spot in the road, whilst in my carriage, when to my joy the solution occurred to me." From *The Life and Letters of Charles Darwin*, 1887.

This basic description of the nature of the creative process has been around since antiquity. The story of Archimedes' sudden insight, while he was sitting in the bathtub mulling over the problem of how to determine the relative quantities of gold and silver in the king's crown, has put his exclamation "Eureka!" (I have found it!) permanently into the language as the "Ah-Ha!" of creativity.

A Scaffolding of Stages

Successive steps in the creative process, however, were not categorized until late in the nineteenth century, when the German physiologist and physicist Herman Helmholtz described his own scientific discoveries in terms of three specific stages (Figure 1-1). Helmholtz named the first stage of research *saturation*; the second, mulling-over stage *incubation*; and the third stage, the sudden solution, *illumination.*

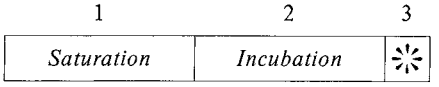


Fig. 1-1. Helmholtz' conception of creativity.

"The formulation of a problem," said Albert Einstein, "is often more essential than its solution, which may be merely a matter of mathematical or experimental skill. To raise new questions, new possibilities, to regard old questions from a new angle, requires creative imagination and marks real advances in science."
A. EINSTEIN and L. INFELD
The Evolution of Physics, 1938.

Helmholtz' three stages were supplemented in 1908 by a fourth stage, *verification*, suggested by the great French mathematician Henri Poincaré. Poincaré described the stage of verification as one of putting the solution into concrete form while checking it for error and usefulness (Figure 1-2).

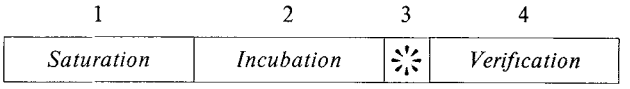


Fig. 1-2. Poincare's conception of creativity.

Max Wertheimer echoed Einstein's point: "The function of thinking is not just solving an actual problem but discovering, envisaging, going into deeper questions. Often in great discoveries the most important thing is that a certain question is found. Envisaging, putting the productive question is often a more important, often a greater achievement than solution of a set question."
M. WERTHEIMER
Productive Thinking, 1945.

Then, in the early 1960s, the American psychologist Jacob Getzels contributed the important idea of a stage that *precedes* Helmholtz' saturation: a preliminary stage of problem *finding* or *formulating* (Figure 1-3, page 4). Getzels pointed out that creativity is not just solving problems of the kind that already exist or that continually arise in human life. Creative individuals often actively *search out* and discover problems to solve that no one else has perceived. As Albert Einstein and Max Wertheimer state in the margin quotations, to ask a productive ques-

The five stages of creativity.

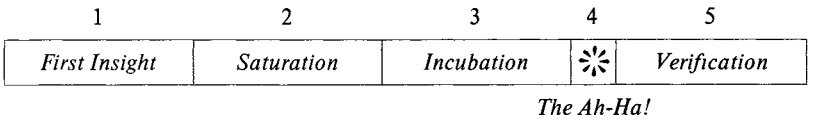


Fig. 1-3. Getzel's conception of creativity.

tion is a creative act in itself. Another American psychologist, George Kneller, named Getzel's preliminary stage *first insight*—a term that encompasses both problem solving (of existing problems) and problem finding (asking new and searching questions).

Thus we have an approximate structure of five stages in the creative process: 1. First Insight 2. Saturation 3. Incubation 4. Illumination 5. Verification (Figure 1-3). These stages progress over time from one stage to the next. Each stage may occupy varying lengths of time, as indicated in the diagrams below (Figure 1-4), and the time lengths may possibly be infinitely variable. Only Illumination is in almost every case reported to be brief—a flash of light thrown on the subject. With the notable exception of the Gestalt* psychologists, for whom creativity is an unsegmented process, a single consistent line of thinking for the purpose of solving a *whole* problem, researchers have generally agreed on the basic concept that creativity involves progressive stages which occur over varying lengths of time.

*A school of psychology, active first in Germany in the 1930s and later in the United States, which interprets phenomena as organized wholes rather than aggregates of distinct parts and maintains that the whole is more than the sum of its parts.

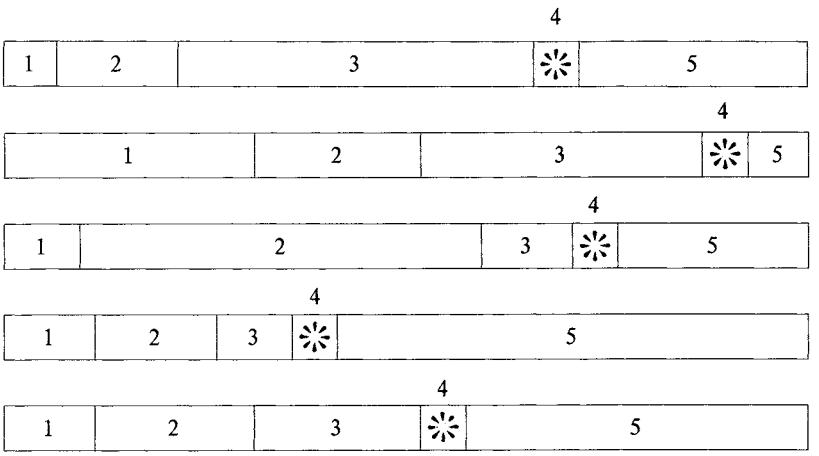


Fig. 1-4. Variations of the creativity process.

Except for the Illumination, which is usually brief, each stage may vary in the length of time required. Also, one project may require repeating the cycle of stages.

Building on this sketchy outline, however, twentieth-century researchers have continued to embellish the elusive concept of creativity and debate its various aspects. Like Alice in Wonderland, it has undergone one transformation after another, thus increasing one's sense that despite a general notion of its overall configuration, this chameleon concept will forever change before our eyes and escape understanding.

And now the concept is metamorphosing again. Changes in modern life, occurring at an increasingly rapid pace, require innovative responses, thus making it imperative that we gain greater understanding of creativity and control over the creative process. This necessity, coupled with the age-old yearning of individuals to express themselves creatively, has markedly enhanced interest in the concept of creativity, as is shown in the growing number of publications on the subject.

In these publications, one question explored by many writers is whether creativity is rare or widespread among the general population. And the question "Am I creative?" is one we all ask ourselves. The answer to both questions seems to depend on something we usually call "talent"—the idea that either you have a *talent* for creativity or you don't. But is it really as simple as that? And just what is talent?

Before embarking on his life as an artist, Vincent van Gogh wrote of his yearning to be creative, which caused him to feel like "the man . . . whose heart is . . . imprisoned in something. Because he hasn't got what he needs to be creative. . . . Such a man often doesn't know himself what he might do, but he feels instinctively: yet am I good for something, yet am I aware of some reason for existing! . . . something is alive in me: what can it be!" Quoted in BREWSTER GHISELIN, ed. *The Creative Process*, 1952.

Talent: The Slippery Concept

The drawing course I teach is usually described in the college catalog as follows: "Art 100: Studio Art for Non-Art Majors. This is a course designed for persons who cannot draw at all, who feel they have no talent for drawing, and who believe they probably can never learn to draw."

" 'Talent' is a slippery concept." GERHARD GOLLWITZER *The Joy of Drawing*, 1963.

The response to this description has been overwhelming: my classes are always full to overflowing. But invariably one or more of the newly enrolled students approaches me at the start of the course to say, "I just want to let you know that even though you've taught a lot of people how to draw, *I am your Waterloo!* I'm the one who will *never* be able to learn!"

When I ask why, again almost invariably the answer is "Because I have no talent." "Well," I answer, "let's wait and see."

Sure enough, a few weeks later, students who claimed to have no talent are happily drawing away on the same high level of accomplishment as the rest of the class. But even then, they often discount their newly acquired skill by attributing it to something they call "*hidden* talent."

Turning the Tables on this Strange Situation

I believe the time has come to reexamine our traditional beliefs about creative talent—"hidden" or otherwise. Why do we assume that a rare and special "artistic" talent is required for drawing? We don't make that assumption about other kinds of abilities—reading, for example.

What about so-called "naturally talented" persons? I believe that these are individuals who somehow "catch on" to ways of shifting to brain modes appropriate for particular skills. I mentioned my own experience in my 1979 book *Drawing on the Right Side of the Brain*:

"From an early age, perhaps the age of eight or nine, I was able to draw fairly well. I think I was one of those few children who accidentally stumble upon a way of seeing that enables one to draw well. I can still remember saying to myself, even as a young child, that if I wanted to draw something, I had to do 'that.' I never defined 'that,' but I was aware of having to *gaze* at whatever I wanted to draw for a time until 'that' occurred. Then I could draw with a fairly high degree of skill for a child."

What if we believed that only those fortunate enough to have an innate, God-given, genetic gift for reading will be able to learn to read? What if teachers believed that the best way to go about the teaching of reading is simply to supply lots of reading materials for children to handle and manipulate and then wait to see what happens? Such a teacher would, of course, never tamper with a child's spontaneous attempts to read for fear of spoiling "creativity" in reading. If a child asked, "How do you read this?" the teacher would respond, "Just be free! Do what comes into your head. Use your imagination and just enjoy it! Reading should be fun!" Then the teacher would watch to see which children showed "talent" for reading—the idea being that it's no use trying to teach the skill of reading because if a child isn't "talented," instruction won't help.

It's easy to see that if this were the situation in reading classes, probably only one or two or perhaps three children in a class of twenty-five might somehow manage to learn how to read. *They* would be designated as "talented" for reading, and no doubt someone would say, "Well, you know, Sally's grandmother was good at reading. Sally probably got it from her." Or "Oh, yes, Billy's good at reading. The family is quite literate, you know. It's in the genes, I guess." Meanwhile, the rest of the children would grow up saying of themselves, "*I can't read.* I haven't got any talent for it, and I'm sure I could *never* learn."

In an obscure 1916 book, two insightful teachers recommended intensive drawing instruction in the early grades as an aid to learning other subjects. The book offers evidence that good instruction *counts* at least as much as "talent."

The authors showed drawings before instruction by four children representing "*A*, the best; *B*, somewhat above the average; *C*, somewhat below the average; and *D*, the poorest in a class of thirty-five." (Figure 1-5). They then showed drawings done after instruction by the *same four children.* (Figure 1-6).

The authors reported that "the difference between the two drawings was often so great that the children were highly amused at their first drawings."

WALTER SARGENT and
ELIZABETH MILLER
How Children Learn to Draw, 1916.

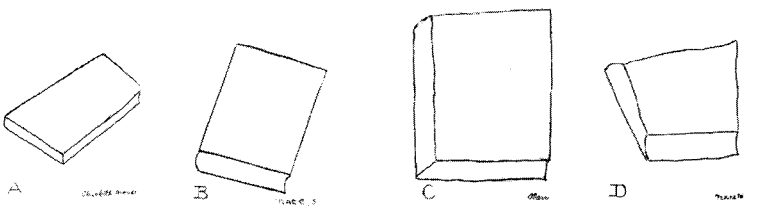


Fig. 1-5. First drawings of a book from the object.

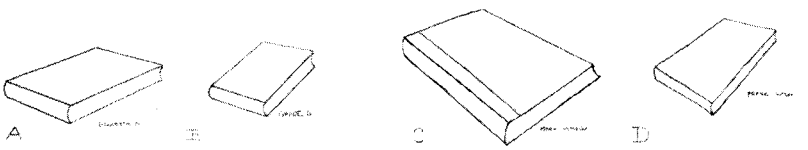


Fig. 1-6. Second drawings of a book from the object.

What I've described, of course, is more or less the way it is with drawing. Surely parents would object mightily if the concept of talent were used as a roadblock in learning to read the way it is used in learning to draw. But for some reason, most people, parents *and* students, accept the verdict "No talent for drawing" with quite surprising meekness and even crestfallen agreement.

This situation continues right up to college art classes. There, anxious students, already worried because their drawing skills are weak and fearful that they have no talent, are sometimes confronted on the first day by an instructor who might start the course with "Well, there's the still-life setup. Do a drawing of it." All too often the students fear an implied warning: ". . . and we'll see which of you should stay in this class."

A comparable situation might be to enroll in a beginning French conversation class and to be told at the start, "Go ahead and talk in French," with an implied warning that if you can't already speak French, you shouldn't bother to stay. Very few college students in art classes, I imagine, would stand for that. Yet students usually don't object to noninstruction, as they surely would in almost any other course, perhaps because they feel so bad—almost guilty—that they have no "talent" for drawing.

Talent is, indeed, a slippery concept, no matter what the form of creativity. But perhaps "artistic talent" has always *seemed* rare and out of the ordinary only because we *expect* it to be rare and out of the ordinary. We have become accustomed to thinking of artistic ability as basically unteachable, and teaching methods have remained unexamined. Moreover, many educators, parents, and students have shared an unspoken belief that artistic abilities are largely nonessential in our modern, technological society.

Yet we do value creativity. We constantly seek ways in which to be more creative ourselves, whatever our occupations or fields of interest. But must we have a mysterious God-given talent to be creative? Or is it possible that creativity *can* be taught?

A paradox: Teachers fear that teaching drawing skills will harm or hinder a child's "creativity in art"—yet the criterion for selecting children who are "gifted in art" is usually *ability to draw realistically.*

A further paradox: Picasso, the most prolifically creative artist of our century, was systematically trained in classical drawing skills to the point that, as has been said, he "could draw like an angel."

And even a further paradox: all the major artists in the history of art had learned how to draw without, apparently, any damage to their creativity. Only in this century—specifically, post-Dewey and post-Gestalt psychology—have fears of "damage to creativity" prevented instruction in drawing.

The Basic Skills of Thinking

In my work with groups of artistically untrained people, I have discovered that any person of sound mind can learn to draw; the probability is the same as for learning to read. It is simply a matter of learning basic perceptual skills—the special ways of seeing required for drawing. I claim that anyone can learn enough *seeing* skills to draw a good likeness of something seen "out there" in the real world.

Once these basic perceptual skills are learned, their use can be as varied as subsequent uses of basic language and arithmetic skills. A few individuals may stay with art and eventually become artists, just as a

Educator Victor Lowenfeld shared a belief with many scholars that creativity itself is a common human trait, often existing as a potential ability awaiting release into outward expressions of latent talents. Lowenfeld cautioned educators:

"We have to regard it as our sacred responsibility to unfold and develop each individual's creative ability as dim as the spark may be and kindle it to whatever flame it may conceivably develop."

V. LOWENFELD
"Basic Aspects of Creative Thinking," 1961.

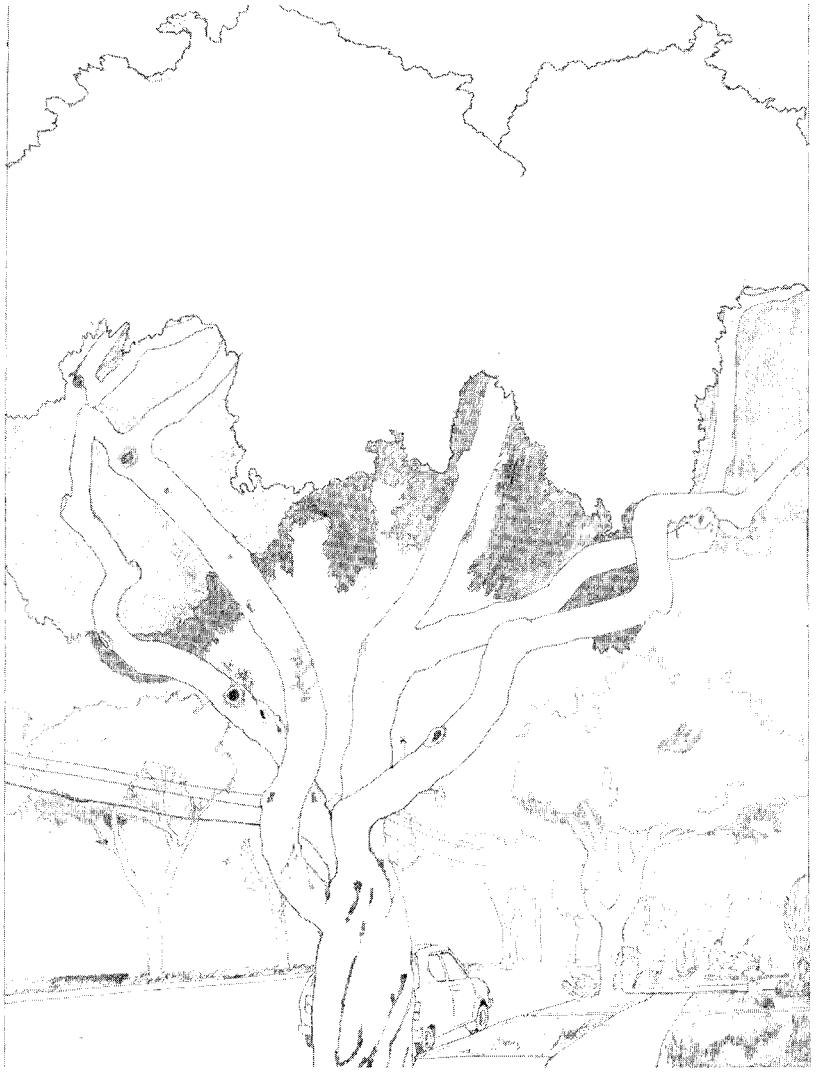
few stay with language or mathematics and eventually become writers or mathematicians. But almost everyone can use perceptual skills—again, like language and math skills—to enhance *thinking* skills.

To go a step further, I propose that perceptual skills are deeply involved in the five stages of the creative process. I also propose that visual, perceptual skills are enhanced by training, just as the verbal, analytic skills benefit by education. And finally, I propose that learning to see and draw is a very efficient way to train the visual system, just as learning to read and write can efficiently train the verbal system. That is not to say that the visual system is better, morally or otherwise, than the verbal system. But the two systems *are* different. And when trained as equal partners, one mode of thinking enhances the other, and together the two modes can release human creativity.

Summing Up a Point of View

At present, our culture provides few opportunities for such training. We are used to thinking by means of the language system of the brain, and that mode has proved its effectiveness over the centuries. But we are only now beginning to understand the complex dual functions, verbal *and* visual, of the human brain, and new possibilities are opening up. As I see it, unlocking the doors to perception and releasing the potential for creativity is a twofold process: first, removal of the deterrent concept of talent as a requirement for learning basic perceptual skills; second, teaching and learning based on new knowledge of how the human brain works.

My claim is quite modest: if you can catch a baseball, thread a needle, or hold a pencil and write your name, you can learn to draw skillfully, artistically, and creatively. Through learning to draw perceived objects or persons, you can learn new ways of seeing that guide strategies in creative thinking and problem solving just as, through learning to read, you acquire verbal knowledge and learn the strategies of logical, analytical thought. Using the two modes together, you can learn to think more productively, whatever your creative goals may be. The products of your creative responses to the world will be uniquely your own, your mark on the world. And you will have taken a giant step toward attaining a *modern* brain. For in the years ahead, I believe that perceptual skills combined with verbal skills will be viewed as the basic necessities for creative human thought.



Through learning to draw perceived objects and persons, you can learn new ways of seeing. Drawing by student Kevin Bresnahan. "Street Scene," November 7, 1984.

2 Drawing on Gleams from Within

"A man should learn to detect and watch that gleam of light which flashes across his mind from within, more than the lustre of the firmament of bards and sages. Yet he dismisses without notice his thought, because it is his.

"In every work of genius we recognize our own rejected thoughts; they come back to us with a certain alienated majesty. Great works of art have no more affecting lesson for us than this. They teach us to abide by our spontaneous impression with good-humored inflexibility than most when the whole cry of voices is on the other side. Else tomorrow a stranger will say with masterly good sense precisely what we have thought and felt all the time, and we shall be forced to take with shame our own opinion from another."

RALPH WALDO EMERSON
"Self-Reliance," 1844.

Following Emerson's advice, I am taking a chance on one of those gleams from within. Largely on the basis of a hunch, a persistent idea, plus evidence from the notes and journals of creative individuals; on my own experience in attempting to do some original work; and on what seemed to be an illumination—an "Ah-Ha!"—about the connection between seeing and creativity, I believe that learning to draw *can* enhance creativity.

The fairly recent but now familiar research on how the human brain halves differ in style and function indicates that drawing ability relies mainly on the visual, spatial functions of the right hemisphere. A brief review of that research will perhaps be helpful. I have found that for some of my students, the information seems somehow to slip out of their minds and lose its aura of interest and importance. My half-serious theory about why this happens is that perhaps the left (verbal) brain does not necessarily want to know about its silent partner and, having heard the message, perhaps proceeds to forget it as soon as possible.

The Right and Left of Thinking

The two major modes of human brain-hemisphere function (which I call simply L-mode and R-mode) were first described by psychobiologist Roger W. Sperry in his pioneering work during the late 1950s and early 1960s. Sperry's research, which was honored by a Nobel Prize for Medicine in 1981, has shown that the right and left hemispheres of the human brain use contrasting methods of information processing. Both thinking modes are involved in high-level cognitive functioning, but each brain half specializes in its own style of thinking and each has its own special capabilities. The two modes are able to work in a cooperative, complementary way while at the same time retaining their individual styles of thinking.

Nevertheless, these styles of thinking are *fundamentally* different and can cause each mode, in a sense, to view reality in its own way. Thus, in response to an event "out there," one brain half or the other may "jump in" first and dominate conscious awareness—or, in other instances, the two modes may have different and even conflicting responses to the same event. In some situations, one response or the other may be somehow suppressed and kept out of conscious awareness. A child, for example, whose angry mother says through clenched teeth, "I'm disciplining you because I love you," may, as a subconscious protective device, choose to believe the words and deny (at the conscious level) seeing the anger. On the other hand, conflicting responses to an event may both reach conscious awareness and both views may be expressed in words. For example, someone who has just viewed a televised political speech might say, "The words sound okay, but there's something about this person that I just don't like."

L-Mode: Linear, Logical, Language-Based Thinking

The left hemisphere (for the majority of human beings) specializes in verbal, logical, analytic thinking. Naming and categorizing are among its favorite things to do. It excels in symbolic abstraction, speech, reading, writing, arithmetic. In general, its system of thought is linear: first things first, second things second. It tends to rely on general rules to reduce experience to concepts that are compatible with its style of cognition. Its preference is for clear, sequential, logical thought, uncomplicated by paradox or ambiguity. Perhaps because of its bewildering complexity, our culture generally tends to emphasize L-mode thinking, thus funneling complexity down into manageable words, symbols, or abstractions and enabling us to cope, more or less, with many aspects of modern living.

A good example from everyday life of a task appropriate for L-mode's style of thinking is balancing your checkbook. Using words and numbers and following a prescribed procedure, checkbook balancing is a language-based, sequential, linear process.

At the start, the assumption is made that if you have kept all the records straight, you can expect to end with a balance of $0.00. If in fact you end up with a balance of, say, $1.06, R-mode (which is not interested in this process) may nudge you with the (unspoken) impulse "Let's just erase that and write in $0.00. It doesn't really matter." L-mode, however, would feel that it *does* matter and would respond indignantly, "No, no, *no*! I must go back to the beginning and go through the procedure step by step until I find the error." L-mode, of course, is the appropriate mode for balancing a checkbook, as its style of cognition is suited to the task. R-mode is simply not equipped for this L-mode job, and surely the last thing wanted is creative checkbook balancing.

"It is a common condemnation these days of our Western educational system that it discriminates against the right hemisphere. There is no doubt that our educational system is half-brained, but is it left-brained? To be sure, there are important differences in the learning styles of the two cerebral hemispheres: the left is constructive, algorithmic, stepwise, and logical. It benefits from narrow examples and from trial and error; it can learn by rule. The right hemisphere, on the other hand, does not seem to learn by exposure to specific rules and examples. Our studies show that it does not have an internal model of its own solution processes, which it can then interrogate and update. It needs exposure to rich and associative patterns, which it tends to grasp as wholes. Programmed instruction is certainly not for the right hemisphere, but I am not sure what is the proper method of instruction for our silent half. It is part of the elusiveness of the right hemisphere that we find it easier to say what it is not than what it is."

ERAN ZAIDEL

"The Elusive Right Hemisphere of the Brain," 1978.