

Preface

*What I hear I forget*

*What I see I remember*

*What I do I know*

*Chinese proverb*

It began by digging a hole.

One summer, many years ago, I had a recurring image of a large round hole cut deep into the earth. I decided to enact this image of the hole, on a small scale, when I found myself house-sitting for a month at a friend's house in Vermont.

Shovel in hand, I walked the land and chose a spot in the upper corner of a gently sloping hayfield bordered by woods. I cut into the grass with the shovel, inscribing a circle three feet across. I peeled away the heavy mat of sod and staggered with large chunks of it into the woods nearby to leave the hole clear. What remained was a circle of raw, exposed soil. When I surveyed my handiwork, I realized I was moving too fast. My purpose was not to *have* the hole I had imagined, but to *make* the hole. I laid down my shovel, found a small blunt stick, and began to excavate the dirt slowly, like an archaeologist, grain by grain.

For a few hours every day over the next month, I slowly dug down, revealing the delicate roots of the nearby trees criss-crossing the hole, removing stones, and inching my way into the earth. Each day I drew and photographed the hole as it changed and deepened.

I was vaguely aware that this painstaking excavation was an enactment of my desire to dig below the surface of things. I had grown up as an active, athletic child who loved the woods and mountains. But I had undergone the usual splitting of mind and body, human and nature, matter and spirit, that our culture inscribes in us. I spent the decade after college exploring ways to re-enter my body and restore a reciprocal, sacrilized relationship with the natural world. I undertook an intensive somatic education by attending workshops and classes in sensory awareness, gestalt therapy, movement

exploration, Alexander, Rolfing, aikido and vipassana meditation. I learned how to pay attention to subtle bodily sensations; to differentiate mental states and qualities of attention; and to plumb imagery and sensation for meaning. I learned to respect and trust my body's intelligence.

All this brought me to digging a hole in the ground, literally enacting the need to engage with the natural world and my inner life.

That same summer, while looking at drawings by the Baroque Italian artist Federico Barroci, I was struck by the drawings' organic growth, like fungus or mold, from the colored, marked, stained paper. To mimic this fertile ground, I began laying sheets of white paper in the shallow waters of a beaver bog. Left for days at a time, the thick handmade papers, weighed down by stones, recorded the cumulative effects of the immersion: yellow, orange, rust-colored stains and layers of dirt adhering to the surfaces. I pulled the stained, mud-encrusted papers from the bog and dried them in the sun. Back in the studio I tore, cut and glued them into collages.

I turned to hand-papermaking as a medium that would allow me to bury the stained fragments of paper in the matrix of pulp rather than glue them onto flat surfaces. Papermaking provided a process that resembled the papers' sojourn in the mud. It let me sink below the surface, into the body of the medium, the way I had dug the hole in the ground. My hands could submerge in the thick slurry of water, pulp and pigments, build the image from the inside out, and dig back down through the layers when dry. The pieces I made were thick and large, the surfaces bumpy and textured. They had a tangible, physical presence. People always asked to touch them.

Since books are made of paper, it was natural to make a couple of handmade books. I was struck by the fact that the contents of books are hidden, revealed only through hands, opening the covers and turning the pages—digging below the surface.

At this time, an artist friend gave a talk at a museum about her drawings, attended by a gentleman who was blind; afterward he told her he wished she had described the images she showed of her work. This anecdote captured my attention—the notion that someone who is blind might actually be interested in art. I began to wonder how to convey an artwork to someone who cannot see it. This question, along with my

observation about handling books, led me to further wonder whether *touch* could be a way to know a work of art for a person who is blind.

I made a couple of small sculptures that functioned like books; they had to be handled and opened to be fully known. I took them to someone who had been a visual artist until he lost his sight to an inherited retinal disorder; I was curious to see what he would make of them. He spent hours with the two pieces, enthralled by the opportunity to touch an artwork to his heart's content. His reaction confirmed my intuition that touch could indeed be a way to know a work of art.

So I began to integrate my years of bodily exploration into creating a bodily experience for others. I decided to make sculptures that would work tactually as well as visually, that would integrate bodily, somatic ways of knowing into their making, and that people could touch as well as see. These sculptures would physically as well as imaginatively engage the people who encountered them.

To do this, I needed to learn a whole new language.

## Chapter One: Aesthetic Touch

*Knowledge is in the bone.*

Malidoma Some, Dagara medicine man

By making sculptures that people could touch as well as see, I am developing the concept and practice of *aesthetic touch*. Aesthetic touch simply means using touch to explore textures, forms and spaces for their qualities and effects. Like aesthetic sight, aesthetic touch departs from ordinary, functional, habitual touch. It notices shape, space and pattern. It transforms the object into alternative structures, concepts, or meanings. It welcomes associations. An enormous body of writing, thinking and teaching has evolved for aesthetic sight, yet next to nothing is known about aesthetic touch. Although it resembles aesthetic sight in the ways I just described, aesthetic touch differs in ways I will explore here. I will focus on the intelligence and creativity inherent in the sense of touch, especially the touch involved in making, knowing and understanding works of art, whether through actual touch or haptic imagination.

We tend to think of touch as fingers contacting surfaces, but touch always includes more than mere contact and more than just hands, creating effects well below the skin and far beyond hands. The whole body is engaged, from surface to depths: the skin, where it meets the world; the deeper layers of skin, where we feel pressure; the muscles, where we sense movement; the joints, where proprioception (self-sensing), conveys spatial location, motion and presence; and deeper still, the viscera, where we feel emotions.

In active touch, we move, so the body is in play. The combination of contact and movement is called *haptic* perception, a term which better describes the kinesthetic nature of touch. Beyond contact and movement, touch also includes proprioception, pressure, temperature, balance, pain and pleasure. These related sensory modes are called

the *somatic senses*, a term which suggests the complex, diffuse, *embodied* nature of the sensory system I am calling *touch*. What these senses have in common is the capacity to convey the conditions of the body-mind—conditions that are affected by the ambient environment as well as by activity within a person. In this function the somatic senses tell us more about the interior conditions of the body and the impact of external events than about the events themselves. The capacity to monitor and alter the conditions of the body-mind—whether generated from without or within—renders the somatic senses fundamental to human survival and wellbeing.

The somatic senses are deeply connective and reciprocal by nature, spanning outer and inner dimensions by their very structure and function, connecting the external world and inner conditions, creating dynamic loops of sensing, acting and being. The many components of somatic sensing communicate seamlessly with each other, fusing our awareness of the world with our innermost sensations and feelings.

Aesthetic touch draws from this deep well of sensory experience. It conveys impressions of what we are touching but also the conditions of the one who is doing the touching. Touch provides connections between the world around us and the world within us. When I reach my arms around a sculpture, such as a Rodin figure, I feel the textures of the surface, the temperature of bronze, and the dimensions of the figure. I also feel the length of my arms, the expansion of my shoulders and back, and the surfaces of my hands. Exploring the qualities of the sculpture I find information about my own qualities: the hardness reminds me of my vulnerability; the sculpture's stillness heightens my sense of mobility, the shape of my gesture resembles hugging someone. These haptic perceptions trigger a spectrum of qualities, emotions and memories. The shape of the figure may suggest a column, the stillness feel cold, the solidity reassuring. Complex and compelling, touching alerts us to the conditions of the environment and the conditions within us, forging a unified perception of both. Touch ripples outward and inward, fusing outer and inner realities.

In the experience of art, touch can function in two ways: as aesthetic touch and as implicit touch. Active, inquiring, aesthetic touch is integral to most artists' working processes but remains a rare phenomenon once the work leaves the artist's hands. Many artworks would not be appropriate to touch—they are too delicate, valuable, large,

complicated or dangerous. Many would reveal little to haptic exploration. Yet this kind of touch, applied to certain artworks, is possible, desirable and fruitful. Aesthetic touch activates the deep, complex dimensions of all the somatic senses. It creates an intimate bond between a person and an artwork. It complicates and amplifies the meanings of the artwork. It allows us to be touched, both physically and emotionally. It profoundly alters our understanding of an artwork and even of art itself. This is the kind of touch that can be used in combination with sight to augment the visual power of an artwork. This kind of touch can heighten and intensify visual perception itself, enriching what we see *after* we have touched.

We do not look with our eyes alone. We look with our entire bodies. Our bodies convey tactile, kinesthetic, proprioceptive sensations and memories that contribute to the experience of an artwork, usually at such a subliminal, unconscious level that we assume our experience derives entirely from sight. These somatic responses are integral to the depth and breadth of the effects of art. Looking at a Courbet painting of farmers, I recall the feeling of the smooth, worn, wooden shaft of a hoe, or the sensation of dragging it through dirt. Seeing a Rembrandt portrait, I remember the textures, resilience, and temperatures of silk, fur and flesh. Looking at a Pollack painting, I sense motion in my own body-mind as I trace the tangles of long, looping lines.

Seeing a Bontecou relief, I feel threatened, perhaps even frightened. The somatic senses feed emotional responses. The subliminal haptic, proprioceptive sensations that are evoked in looking at a work of art closely resemble, and often trigger, the sensations we call emotions. Sensation and emotion fuse in our experience. Looking at a Kandinsky painting, I follow jagged, truncated lines with my eyes and feel the unsettled anxiety they produce. Circling a taut, thin Giacometti figure, I feel my own core as a beleaguered refuge. Looking at an Agnes Martin painting, the faint grid of hand-drawn lines calms me. I feel steady, refined, unruffled. These somatic responses are subtle and pervasive. We take them for granted. We take them to be visual in origin. Yet bringing conscious awareness to somatic responses allows us to expand and develop these abilities at their source.

Visual comprehension is grounded in what we know through the somatic senses. We cannot truly see something unless we have touched it. How and what we see is based

on memories of haptic experience gained in the constant, lifelong dialogue between seeing, touching and moving. This process begins in the womb, where stimulus is tactile and global. The fetus swims in a sea of warm, amniotic fluid, gradually growing into the uterine embrace. The intense massage of birth galvanizes body systems into action. Infants gradually learn to coordinate what they feel all over with what they are beginning to see. Toddlers make sense of their expanding world through constant, polymorphous, whole-body exploring. Young children actively immerse themselves in their environments with as much of their bodies as possible, integrating information from all their sensory systems. In adolescence the haptic dimensions of the world have been largely integrated and internalized; the need to touch everything is no longer so compelling. Indeed, society's rules constrain the use of touch, and young adults, wishing to leave childish ways behind, focus their haptic exploration on the revelations of mating and reproduction. As adults we tend to relegate conscious touch to sex and intimate relationships, driving most of our haptic experience underground into the unconscious, where it affects us all the more powerfully.

We consider sight our primary sense, our principal means of grasping reality. Yet the somatic senses, which convey the conditions of the body-mind, support and ground all our sensory experience. We never outgrow our need for haptic stimulus. Nor do we lose the ability to develop haptic perception. Indeed, sight and touch remain inextricably intertwined. Memories of tactile experiences underlie visual perception. Touching evokes visual images. Conscious touching reveals dimensions of reality both familiar and hidden. It reacquaints us with childhood's multi-sensory ways of knowing and deepens our sensory abilities through adult experience.

Most of us live in a matrix of visual imagery that conveys an astonishing abundance of information. Images and words flood our minds and bodies. Although visual media seem to broaden our reach, they narrow our lives in the haptic dimension. Rather than engaging with people, grappling with materials, and exploring nature, we perform solitary, disembodied, hyper-visual activities: watching television and movies, surfing the Internet, communicating through email and other electronic means. Our notions of reality have been conditioned by sight's perceptual qualities of mobility,

distance and instantaneity. Not surprisingly, these qualities describe contemporary Western society.

The Western emphasis on sight-generated, sight-centered, sight-conditioned interpretations of knowledge, truth, and reality produces effects that prove insidious and concealed. Defining reality primarily by sight excludes information from other sensory systems. We fail to value what we know through them so they become weak and undeveloped. A cycle emerges in which the less-used senses contribute less, become less valued, and then less cultivated. The essential unity of the senses is disrupted. We miss the overlapping, mutually enriching resonances of the full sensory orchestra. We limit ourselves to a narrower range of physical movement and sensory stimulus. We lose touch with our bodies. The combination of narrowed reality, sensory imbalance and somatic dullness can contribute to a flattening of experience. It can lead to perceptual poverty.

The problem lies not in sight itself but in the way we see. The *disembodied observer* has become the ideal paradigm, upheld by science, academia, medicine and law. This model has seeped into the individual and collective self-image. It defines the way we think, act, convey information, and relate to each other and the world. The effortless, disengaged qualities of sight reinforce the illusion that we can minimize the conditions of the body and the environment. We have neglected the body as a source of knowledge. We believe we can act without considering the consequences for ourselves, others or the planet.

We treat our bodies, and allow our bodies to be treated, as machines, computer information, or chemistry experiments rather than living, sensing beings. We think of our bodies as mechanistic and technical; we seek experts to fix them if they cause trouble. The somatic body (the body we experience from the inside) drifts farther and farther from ordinary ken. We fail to trust our native authority, the ability to know how we are feeling and how to respond to challenges and opportunities. We run the danger of neither believing in nor cultivating the body's profound abilities to understand, explore and communicate. We remain stranded without ground to stand upon. The more we lack moorings in the body, the more desperately we need the body's native abilities to generate deeper connections and truly felt meaning. Addiction and deadening of the senses



literally cuts us off from the environment within and without. Such numbing may lead to escalating the level of sensory stimulation in order to feel anything at all. Overeating, high-speed driving or violent movies may express sensory need in a body that cannot feel.

Individually and collectively we long for meaningful contact, genuine relationships, and deep connections. We hunger for the real. A fundamental dimension of this appetite can be appeased only by sensuous contact. The somatic senses, which link us with others, with the environment around us, and with our internal environments, serve a profoundly important role in knowing where, who and how we are—and even why. Cultivation of the somatic senses redefines body, health, pain and pleasure. It provides a richer, subtler, more articulate self-image. A greater feeling of control and autonomy. A stronger grasp of ecological connections.

The power of interpersonal touch to create connections, promote healing, and assuage pain is now acknowledged in the fields of medicine and health care, evidenced in the rise of therapeutic massage, more benign treatment of premature babies, and touching of the elderly. Sadly, we have had to *learn* how to return to basic human contact.

Less is known about the effects of touching the *non-human*—the hammer we swing, the vegetables we chop, the dog we stroke, the streets we walk, the plants whose air we breathe, the clothes that protect our bodies, the chairs that support our weight, the water in which we bathe, the sun, wind, warmth and cold that embrace us—all of which convey information about our environs, nourish our need for sensuous contact, provide feedback about our own nature, and deepen our sense of being embedded in the world. This constant, unconscious intercourse between our bodies and the things around us remains critical to our sense of reality and vitality. Yet like the life-giving air we breathe, we take for granted this haptic sea in which we swim.

We acknowledge our ability to manipulate and shape things through activities such as planting and pruning, sawing and hammering, cutting and sewing, sculpting and carving, chopping and stirring. All these actions have a critical but hidden dimension: the sensory. Sensory touch seamlessly, ceaselessly interweaves with manipulative touch. If you have ever watched a potter at work on a wheel, you know how magically the pot seems to emerge from the clay turning between her hands. It grows from the skillful

discourse between sensing and doing, between feeling and making. The potter holds the shapeless lump of clay turning within her hands, assessing its softness, the degree of moisture, the speed of turning. One hand presses downward and outward to open the interior, the other presses in from the outside as they determine the shape of the pot. Both hands feel how much resistance the clay offers and how much pressure to exert. They sense each other's movements. They feel the thickness of the wall between them. They press into being the curves of the pot. The potter's manipulative abilities fuse with her sensory abilities, allowing her to lift, turn, mold, press, carve, squeeze, scrape, and shape as she desires. Her hands have learned through years of practice how to feel and respond to the clay, to sensory impressions and to her impulses. In a seamless feedback loop, her touch generates motions that lead to new sensing which leads to new motions. Her eyes have learned to coordinate perfectly with her hands, making moves and decisions collaboratively, guiding each other in turn. The potter has learned how to encompass in her haptic awareness the nature of the clay, the turning of the wheel, the shape of the pot, the effects of firing, how it will be held, what it will hold, and even its breaking. She has learned how to think, solve problems, respond, adapt, and create with her hands and body—with sensory intelligence. An unbroken continuum runs through sensory touch, aesthetic touch, manipulative touch and creative touch.

The number of activities that depend on developing such a finely tuned intelligence of sensing hand and body are countless and wide-ranging. Fly-fishing and acupuncture seem very different, yet both need a delicate, responsive, inquiring touch, a touch that includes the whole field in its awareness. The fly-fisher must sense the wind, water, temperature, fish, insects, rod, line, fly, and arc of cast so he may meet the fish on its terms, The acupuncturist must sense the client's demeanor, skin texture, heat, vitality, responsiveness, and pulses to meet his needs.

We utterly depend on these abilities, yet somatic intelligence remains uncultivated in our society. We believe intelligence lies in the province of the brain, and that knowledge is the accumulation of information rather than doing and making. We cut our moorings to the body and nature, casting ourselves adrift in a world of exteriority, vicariousness and abstraction. We live once removed from sensuous reality even though it lies at our fingertips. Lacking feeling for the real, we drive ourselves to extremes of

sensory stimulation. We fail to cultivate the body's brilliance as a source of knowing and creativity.

The antidote to these ills must take many forms, but I offer one here: an approach to art that acknowledges and uses the innate knowledge of the body—its intelligence, memory and sensory systems, especially the somatic senses. Every work of art is made by a body and perceived by a body. We tend to forget this fundamental fact, which infuses and informs virtually every experience of art. Aesthetic touch restores the body to both maker and perceiver, infusing the aesthetic experience with deeper, felt meaning.

I introduce this approach by describing in detail what happens when people touch a work of art. This unusual application of touch yields three things. First, it reveals the possibilities for a new use of touch—*aesthetic touch*—for expressing or discovering meaning, whether in making or experiencing art. Second, it expands our understanding of touch and its role in our lives. Third, it allows us to grasp the tactile, haptic dimensions of *visual* perception. This phenomenological, experiential approach to touch grounds our understanding in experiential, empirical reports, an approach which has been missing from much writing about touch. And because the context is the aesthetic experience, the nature of haptic perception emerges in the service of *meaning*. The somatic senses are not limited to their usual unconscious, perfunctory functions, but are allowed their expressive, emotive possibilities. Touch gains aesthetic dimensions and redefines itself.

This portrait of aesthetic touch draws from my work as an artist trying to fathom materials and forms while exploring perceptual processes. It emerges from my questions about touch, the body, and their role in making sculpture. It comes from my observations of people both sighted and blind as they touched my sculptures, and from their responses.

When I first had the idea of making tactile art in 1991, I could find nothing written on the subject so I spent a year visiting art museums in the company of Deidre Muccio, a woman who had trained as a visual artist before losing her sight to an inherited retinal disorder. She explored selected sculptures, articulating her discoveries as she touched and afterward in her writing. When I first began to make and exhibit tactile sculptures, Jeff Hayward of People, Places and Design helped me conduct qualitative, evaluative research; we interviewed visitors in two exhibitions and analyzed the data.

During these early exhibitions, as an experiment we offered sighted people blindfolds so they could touch without the usual habits of sight. We were stunned by the effects. People reported remarkable perceptions and insights. Coming to know the artworks entirely through the sense of touch before seeing them produced surprisingly different images and experiences than those gained by looking. Whether blindfolded or blind, this special condition—touch without sight—reveals the nature of haptic perception as nothing else could. It unmask the haptic processes that lie below the seductions of sight. People’s reports of their discoveries while touching my sculptures without sight (whether blind or blindfolded) form the basis of my understanding and the ability to generalize beyond my personal experience. Many of these succinct, insightful comments appear italicized throughout the book.

When I began exploring the sense of touch, I saw myself as part of the emerging multi-disciplinary movement to re-humanize our senses, our bodies, our minds, and the world we live in. Since then neuroscientists have begun documenting the plastic, integrative nature of brain, body and senses. Psychologists are exploring the senses in specific manifestations, not just typical generalizations, and in interaction rather than isolation. Anthropologists are recognizing the cultural dimensions of the senses and the need to study the sensory systems of cultures. Philosophers are developing a model of consciousness that is embodied, embedded, extended and enactive to counter the Cartesian paradigm of a disembodied, idealized, separate mind. Engineers are developing applications for touch that extend our tactile, haptic abilities. Architects and designers are designing more haptically intelligent, sensorily humane environments. Educators are using more interactive, embodied, contextual ways of learning. People with disabilities and differences are enriching our understanding of perception and self by articulating their distinctive experiences.

And artists are making interactive, multi-sensory, multidisciplinary, immersive artworks, installations and environments. In this context, we need a fine-grained understanding of how the somatic senses function in art. We need to develop and refine the somatic depths of our experience, whether as makers or perceivers. By exploring the sense of touch I have discovered dimensions of art I would never have otherwise known.

This book is about the nature of touch but also about the nature of art as revealed through touch.

From all these sources I have generated a composite narrative, a first-person, moment-by-moment account of what happens when someone touches a sculpture, detailing the responses that reveal the main elements of haptic cognition. The chapters in Part One each begin with a portion of this narrative and then expand on the principles of touch conveyed in the narrative: the intelligence of hands; the central role of motion and emotion; the sense of time and the use of memory; how we create mental imagery; and the profound differences between sight and touch. Part Two explores the implications of aesthetic touch for making and experiencing art. The nature of touch turns out to be remarkably congruent with the nature of art; both art and touch reveal and connect the worlds around us and the worlds within us. I consider the implications of cultivating touch for artists and educators, and the possibilities for integrating both aesthetic touch and implicit touch within art museums. As the premier sense of connection, we need the capacity of touch to connect us to each other, to the environment and to our inner lives.

## Chapter 2: Movement: the Light of Touch

*If you are trying to decide which is more important—the experience of the eye or the experience of the body—always trust the body, because touch is an older sense than sight and its experience is more fundamental. Apart from that, in our contemporary audiovisual civilisation, the eye is rather tired and ‘spoilt’. The experience of the body is more authentic, uninhabited by aestheticisation.*

*Jan Svankmajer, artist and filmmaker*

*I continue exploring the sculpture, now moving both hands down around the outside of it. This surface feels grittier, rougher than the wood.*

***I especially like touching a different texture with each hand and then reversing to see how my sense of smooth and rough shifts.***

*I reach around the sides with both arms and encompass the whole sculpture. It’s rectangular, like a house. The image of a building is taking shape in my mind.*

*The walls are not flat, as expected, but step inward. Suddenly my hand slips through an opening in the wall. A surprise. This is like a doorway.*

***How much expectations live in my fingers, especially about where things will begin and end. At first when I enter a hole, I assume there is nothing beyond. It’s scary to reach further.***

*I move inside the opening, feeling the insides of the walls. They’re softer than the outside, yielding slightly when I press. Outside and inside feel utterly different.*

***I find the soft interior so comforting. The outside is tough, satisfying.***

*As I reach further inside, I find the ceiling has the same soft texture. I discover an opening in another wall (this time from the inside), which leads out again. This place is very mysterious.*

***The openings lead inward, lead outward, lead inward.***

*My hands, one outside and one inside, sense each other through the wall, measuring its thickness. I discover that where the wall is recessed on the outside it pushes into the interior on the inside: they're two sides of the same shape. Inside and outside are no longer separate realities but two aspects of the same form. My working hypothesis about the sculpture is changing, becoming at once both more complex and more transparent. I'm constructing an image, but it keeps changing with each new discovery.*

*My hand slides along the floor and suddenly drops into another recess, a cavity in the floor. I thought the floor defined the bottom of the piece, but it too yields unexpected dimensions.*

Surprise is a strong element in tactile perception, especially without sight. When I cannot see the whole or know where I am going, I am more likely to be surprised, frightened or delighted by the unexpected. Flat surfaces make the encounter with a curve unexpectedly refreshing. A sharp edge makes me proceed with caution. Some people, wanting no surprises, make a swift survey of the whole before committing to a more detailed, prolonged exploration. Even with sight, the tactile encounter generates an impact that enhances the visual experience.

Another way to approach a sculpture is to pay attention to the sensations rather than attempting to create an image—sensing rather than mapping. Sensing may serve as a welcome respite from efforts to decipher or map the sculpture.

*At some point it changed from wanting a picture of the whole to just being with it.* A woman went through an exhibition of sculptures blindfolded, feeling her sensations rather than creating visual images. When she opened her eyes to look, she realized she had entirely ignored the forms. She went back and, with eyes closed, explored each sculpture again to read the forms. She was delighted to discover she could learn to grasp the forms at the same time as enjoy the sensations. She was able to hold both impressions simultaneously.

Intention, crucial to the nature of any touch, is a function of the mind. The simple reach of a hand can be menacing, cautious, creative or aggressive. The intention determines the physical characteristics of the movement—slow, fast, strong, gentle, firm or light—as well as the emotional or qualitative characteristics—inquiring, probing, open, brutal or sympathetic. Intention is fundamental to our movements and to their effects on the world. We always touch with some kind of intention, even the most unconscious gesture. One’s intentions can change in the course of touching a sculpture, from disinterested grazing to curious exploration to engaged imagination. Motion is embodied intention. Jacques Lusseyran, French philosopher who lost his sight as a young boy, writes about the profound gifts of blindness in his book *And There Was Light*. He speaks about movement as intention, informed by his haptic way of knowing:

I believe that seeing is responsible for the prevalent conviction that we shall understand and completely recognize the world when we progress from one form to the next, from one phenomenon to the other. We forget that the motion itself, which leads from object to object, cannot take place in our eyes. It necessarily *precedes* and *directs* their movement. Seeing is not the work of the eyes alone.

Exploring the sculpture is a process, a journey around forms and through spaces. Movement is the medium for this journey. Felt movement of the body distinguishes touch from the rest of the sensory continuum. Touch involves a feedback loop of sensation: as we touch, we move, feeling new sensations that lead to new movements and new sensations. As light is the medium for seeing, and sound the medium for hearing, movement is the medium for touching. Just as light is essential for us to see, movement is essential for sensing through touch.

Movement not only deciphers form; it generates meaning. Here a woman plumbs the expressive potential of the simplest movement:

*I moved my hand all the way across the wooden surface; it felt as if it went on forever, as far as I could reach my arm.*

Her hand and arm cross a space only two feet across but it feels immense since she cannot see where her hand is going. Every unknown inch is tracked by her moving body



rather than instantly mapped by seeing the whole. Meeting no barrier, the movement of her hand seems unlimited. By moving she develops a spatial sense of the sculpture's dimensions. She knows the measure, shape and gesture of the piece from the inside—from inside herself—which in turn makes her feel as if she is inside the sculpture. Motion multiplies the power of art to move us, mobilize us, or bring us to a standstill. A dancer observes:

*It becomes a dance because I have to move to touch. I knew this already, but I'm very surprised to feel it so strongly, the partnering of these two, sculpture and movement.* Touching a sculpture translates form into motion. Our motions translate it back into form. The motions of touch also generate a nuanced sense of self for the person who is doing the touching. Movement conveys the location, speed and quality of one's motions; I know *who* and *how* I am through my motions. Bodyworker Dean Juhan writes in his book, *Job's Body*, "Movement is the unifying bond between the mind and the body, and sensations the substance of that bond."

Neurologist Oliver Sacks, in *A Leg to Stand On*, calls the process by which the body knows and confirms itself the "sixth sense." This constant, subtle flow of information on which we base our sense of presence and reality is largely a function of motion. He describes how we learn a sense of self through movement:

The infant immediately starts exploring the world, looking, feeling, touching, smelling, as all higher animals do, from the moment of birth. Sensation alone is not enough; it must be combined with movement, with emotion, with action. Movement and sensation together become the antecedent of meaning...it is movement that makes possible all perceptual categorization.

Sacks learned firsthand about this "sixth sense" when he injured his leg in a hiking accident that severed the major nerve enervating his leg. Following surgery he was left with no feeling or movement in his injured leg. Worse, he had no sense of connection with his limb. It remained a horrifyingly inert object somehow attached to him. I had a mercifully brief experience of this feeling following surgery on my hand. In post-operative recovery, the anesthetic I had been given in my left shoulder was still in effect;

when my arm, heavy in its new cast, slipped off the bed, I was unaware of its errancy until I looked over and saw it dangling below. I had to haul it back up with the other arm. Having no sensation of life or motion, it seemed a thing that had nothing to do with me. The lack of neuronal connection prevented not only the ability to move but also the proprioceptive feedback provided by motion and sensation.

Kinesthesia and sensations within our bodies usually remain unconscious, but we can train ourselves to feel our movements to a remarkable degree. Because kinesthesia produces sensations deep within the body, movement has the potential to draw our attention to the inner dimensions of being.

*I could feel sensations deep inside my body as I touched.*

When we bring motion and touch into conscious awareness, and beyond that into the realm of aesthetics and meaning—as we do in touching sculpture—we join lower and higher functions of the brain, generating a more integrative, holistic experience.

The sensory systems operate in complex, dynamic feedback and feedforward systems with each other, with all the other body systems, and with our surroundings. The whole body works seamlessly to give multivalent, multisensory impressions of the world. Rooted in survival skills, the sensory systems evolved to provide as much corroborating, overlapping information as possible. The hunter does not simply look for deer or signs of deer. He listens for small animals moving, leaves rustling, twigs snapping. Smells the scat and the wind. Touches the matted grass where a deer lay to feel the degree of warmth. Memorizes its routes and habits. Dances the deer in ceremony.

The sensory systems consist of nerve centers at various levels in the body up to and including the brain. They work as systems rather than channels. They are interrelated rather than mutually exclusive. They are active rather than passive. The haptic system is a multi-layered, multivalent network extending from the surface of the skin deep into the interior of the body, spanning many functions: contact with the surroundings; movements of muscle and bone; balance in gravity; temperature; the self-generated sensations of emotions like the shiver of fear or the knot of anger; the flow of chemical neurotransmitters linking the system to all other systems; and pain and pleasure. These *somatic* senses provide the most information about the nature, status and ongoing life of our bodies and our selves. Sandra and Matthew Blakeslee assert in *The Body Has a Mind*

*of Its Own* that the somatic senses are “the mind’s true foundation. All your other senses are merely added on conveniences in comparison.” They describe vision as “a hanger-on, a humble symbiote” within the more fundamental body sense.

Built into the nervous system is the ability to know where a sensation occurs in the body. There are many maps or representations of the body in the brain; a map of the body lies in the somatosensory cortex, a strip an inch or so wide behind the center of the brain. Body sensation appears there, including proprioception, pain and temperature. The sensory nerves on and within the skin have spatial relationships with each other that are transferred to the cortex. The same parallel fiber arrangement holds for the motor nerves, which are projected onto the motor cortex just in front of the sensory cortex. These miniature maps of the body are linked to each other so that parallel circuits link my actual hand to my sensory hand to my motor hand in point to point correspondences. The maps in the cortex do not correspond to the one we see in the mirror. The varied densities and sensitivities of the nerves produce remarkably different maps of the body, with proportionately large areas of the brain devoted to the sensory input of the hands and mouth. Hands possess greater sensitivity and produce more subtle and complex sensations that capture more of our attention than other areas of the body. These maps are malleable and can change according to use. We are continually re-drawing maps of the self on our skin, in our bodies and in our brains.

Body maps can expand and contract. We even map the area within arm’s reach, called *peripersonal* space, which encompasses things we are touching or even that we could potentially touch. Our body maps enlarge to include this surrounding space and our potential to act in that space. This kind of mapping becomes most vivid for a person with visual limitations who is walking with a cane or a guide dog; one’s body seems to extend to the tip of the dog’s nose. When I approach a sculpture so that it lies within arm’s reach—so that I could touch it—the sculpture temporarily becomes part of my body map, *part of me*. When I actually touch the sculpture, it also becomes part of my body map in addition to the other tactile effects.

Neurologists have discovered mirror neurons, neurons in the brain that fire for motion when one is simply watching someone else in motion. These firings occur in patterns that mime the movement being watched, but we perform the action only

neurologically, not muscularly. We also have the capacity to feel sensations we see someone else undergoing and to feel the emotions visible in others. We can even read intention in motions. One of the discoverers of mirror neurons, Dr. Giacomo Rizzolatti, says, “Mirror neurons allow us to grasp the minds of others not through conceptual reasoning but through direct simulation. By feeling, not by thinking.” We do not yet know how these neural systems work in the experience of visual art, but common sense tells us we have the ability to feel-into and to empathize in profound ways.

Movement shapes the maps, the mapping process, and the sensory systems’ ability to decipher incoming information. The Blakeslees write, “If an animal is exposed to high-quality information but only as a passive observer, its brain will never learn what any of that visual information is supposed to mean.” Movement gives meaning to what we see, feel, hear and smell.

Cognitive psychologist Jerome Bruner describes three ways of knowing: iconic, symbolic and enactive. Iconic knowledge consists of visual images, diagrams and illustrations; symbolic knowledge consists of languages, words and mathematical symbols; and enactive knowledge comes through action, motor skills and the perception-action loop—knowledge acquired by doing, moving, and acting. This kind of knowing is multimodal and interactive, and touch is central to it. The principles of enaction are currently applied primarily to the human-computer interface, but they have implications for human development. Enaction raises bodily, sensory ways of knowing to a status equal to that of the more accepted symbolic and iconic ways. Enaction confirms the natural integration of the body into the experience of life and of art.

Perceptual psychologist Rudolf Arnheim proposes in his book, *Visual Thinking*, that even *thinking* is kinesthetic. When we think, he says, mental visual images of varying degrees of abstraction are part of the thinking process. The mental images we use in thinking are not mimetic, detailed representations of things but vague, imprecise hints and flashes, usually below awareness. Mental imagery tends to reduce things or situations to their essential features, emphasizing only what matters. This economy allows the mind to think swiftly in terms of patterns and forces. These abstract, non-mimetic shapes may be difficult to track in the mind. To make them more visible, Arnheim points to the gestures people make in conversation. Gestures are a form of thinking in action. Usually

highly abstract, gestures emphasize only one or two qualities or dimensions, like size, force or direction. One can indicate how fast and which way someone went with a sweep of the arm. The properties of physical objects and actions are effortlessly applied to non-physical ones: the degree of surprise is expressed with the same gesture as the size of a fish; the clash of opinions is expressed as the collision of objects. This spontaneous use of metaphor demonstrates that people are

...naturally aware of the structural resemblance uniting physical and non-physical objects and events: one must go further and assert that the perceptual qualities of shape and motion are present in the very act of thinking depicted by the gestures and are in fact the medium in which thinking takes place. These perceptual qualities are not necessarily visual or only visual. In gestures the kinesthetic experiences of pushing, pulling, advancing, obstructing, are likely to play an important part.

We can portray a movement quality through our hand gestures—zoom, creep, stomp—without any representation of *what* is moving. This gestural, embodied language is part of our natural way of thinking. We are used to expressing our thoughts in highly abstract, kinetic terms through gesture, through simple sketches on a blackboard or, as Arnheim suggests, through the making of art.

This aesthetic element is present in all visual accounts attempted by human beings: such necessary qualities as order, clarity, correspondence of meaning and form, dynamic expression of forces... The meaning...of form patterns in art resides entirely in the perceptual forces they convey...these forces cannot be represented directly by pictures or other physical objects; they can only be evoked by them...*perceptual forces come about in the nervous system*, not in the picture as an object of the outer world. (my emphasis)

Art is an extension and elaboration of our natural use of these elements of order, clarity, meaning in form, and expression of forces in our thinking processes. *Art is a way*

*of thinking.* This suggests that abstract art is not a departure from reality as we know it but an extension of what we are already doing all the time.

In any cognitive act, we arrive at understanding through a process that is dynamic, fluid and constantly in motion. In Arnheim's words, we experience:

...the challenge, the productive confusion, the promising leads, the partial solutions, the disturbing contradictions, the flash appearance of a stable solution whose adequacy is self-evident, the structural changes brought about by the pressure of changing total situations, the resemblance discovered among different patterns...

His description of the dynamic quality of perception holds true for any of the senses. But haptic perception is so much more accessible to our awareness that we can actually track these processes; people touching my sculpture report encountering such challenges, productive confusions, promising leads, partial solutions, contradictions, sudden resolutions, and changing conditions. Haptic perception *consists* of this dynamic evolution.

Haptic investigation of art exploits the kinetic dimensions of our gestural vocabulary and our thinking process. Coming to know a sculpture through touch is embodied thinking. We are asking questions of the object and finding answers. The question, "How big is it?" we answer with the reach of arms or hands. "What shape is it?" we know through the lift and movement of arms, the motion, formation and reformation of hands. "What textures does it have?" is answered by sensations in fingers, hands and the speed or ease of their motion. "What does this mean?" we discover by trying different movement patterns.

*I thought the suede parts were snaky and squiggly, but it was my fingers that went back and forth, making me think what I was touching was snaky.*

Recall watching a basketball game or dance performance and remember how you could feel yourself assisting a shot for the basket or the lift of a dancer, even though you were sitting still. Neck and back contract while watching a weightlifter strain; bodies tense on seeing a circus performer walk the high wire. The body responds by slightly

miming the movement we watch. Such subliminal muscular activities are concentrated, reduced versions of the larger movements that occur at the level of normal body motions; haptic memory tells us how to replay these motions. At an even more subtle level, mirror neurons are firing in the patterns of motions we are watching; we move neurologically if not muscularly.

Hans and Shulamith Kreitler in *Psychology of Art* note that these mimetic, empathic responses can occur in response to situations without actual movement, such as in a painting or a sculpture. If people are asked why they like a certain form or line in a work of art, they often describe the quality of movement it suggests to them. A Kenneth Noland bull's-eye may evoke endless stillness. The bold slashes of a Franz Kline painting are exciting or disturbing in their sudden change of direction. Sinuous curves like those in Miro's surreal landscapes feel calm and slow, a fat, fuzzy line slower than a thin, wiry one. This empathic animation of art is called *dynamization*: we project or feel at a subliminal level the kinesthetic sensations associated with the shape, direction or quality of forms that are only depicting movement. Human animation is shared with the so-called inanimate. A dynamized form is felt to be more alive, more active. Dynamization increases sensitivity to the tensions and resolutions in an artwork. It focuses attention on the emotional and personal meanings of a work of art. Dynamization is central to the experience of art.

Evidence shows that the visual fields and the world conceptions of children and indigenous peoples are filled with dynamism, far more than those of normal adults in Western cultures. The Kreitlers note:

The object-naming, free talk, play and artistic activities of children reveal that their orientation is primarily motion-directed. A dog is to them a barking-thing or a biting-thing, a bed is conceived as the lying-down place, and, in general, everything is moving, just about to move, has moved, or is at rest after a movement. For primitive people too, the things they see are far from being static and passive objects, but rather represent foci of dynamic powers or mutable things-of-action forever in a flow of change.

William Fagg writes in *In Search of Meaning in African Art*, that tribal cultures conceive objects as four-dimensional, the fourth dimension being the life force: "...matter is only the vehicle, or the outward and visible expression, of energy or life force. Thus it is energy and not matter, dynamics and not static being, which is the true nature of things."

In our culture we live far from this energetic, animate sense of things. Yet we maintain the potential for it in the unconscious practice of dynamization. Touching an artwork and knowing it through movement may give people access to a more dynamic, energized sense of art and, by extension, of the world. As one woman wrote after touching my sculptures:

*"Inanimate" objects—HA!*

Haptic perception builds on and contributes to a dynamized relationship with things. When we look at a sculpture—usually moving around it, looking above and below—we feel the qualities of movement suggested by the sculpture. In turn, our sense of motion is projected onto the sculpture; as we move, it gains more dimensions, both visually and kinesthetically. When we actually move our hands around a sculpture to touch it—bending, turning, reaching—dynamization becomes embodied and magnified. The motions become more conscious and more accessible. Works of art are constellations of forces and vectors; we feel these forces and vectors more vividly through the direction, quality and force of our motions.

As we move our hands, we can imagine the hands' gestures represent the whole body moving. We can project the whole from a part. When my hand moves down descending levels in a sculpture, I have the impression my entire being descends, accompanied by all the sensations, associations, emotions, and memories attending that motion.

*It was like swimming in a lake, not knowing what was on the bottom. I wanted to jump in the water again and again.*

*Stumbling on unexpected openings, I imagined my whole body moving through them.*

When a woman's hand entered a deep hole it was her whole body that fell:

*My hand went in and I was falling, falling, and I wondered, can I stay with this?*



Some people feel and imagine their hands as creatures, equating the intelligence, autonomy and liveliness of hands to those of animals:

*When my hands accidentally hit each other, it's like two animals meeting in surprise.*

Inspired by the reptilian motion of her hand, a woman assumed the role of a snake:

*First I thought it was a labyrinth. Then I was a snake in completely dark, underground, earthen tunnels. Then I found another opening and I was two snakes. My whole body was going through it in snake motion.*

People's hands or bodies may even become transformed into non-human, non-animal elements, such as wind or water.

*I imagined water had poured over the surface a long time and my hands became water.*

Notice the shift from observing to being in this last comment. The first image is that of feeling the surface as if shaped by moving water; in the second image, she has become the water. The Kreitlers define identification in the art experience as the way we temporarily resonate with the artwork. We feel as if its dynamics, forms and contents occur inside us, but do not lose self-identity. We can identify with a whole work of art, parts of it, qualities within it, or images triggered by it. In a sandstone figure of a Cambodian goddess, the simplified forms of the goddess' body offer unbroken surfaces soothing to the hand, eye, and mind. We assume the calming qualities of clarity and balance. Given the nature of the sculpture, identification with these qualities is exactly the point. The message of ease and centeredness communicated by the figure is directed to the mind and imagination, but also to the body. Identification is closely related to dynamization in its assumption of forces and qualities. These complex responses of body and mind are nothing less than empathy. And empathy is both the seed and the fruit of art.

We more easily identify with what resembles ourselves—sculpture that represents the human figure or has shapes and surfaces with biomorphic qualities. But we can also identify with things not human. What Henry Moore says about shapes could be applied to any shapes and volumes: “he [the sculptor] identifies himself with its center of gravity, its mass, its weight...” One of my sculptures contains a thick, flesh-like square of suede

leather suspended horizontally from ropes at all four corners, like a splayed body. Just above the leather hangs a large, flat, horizontal stone in rope slings. For some people the heavy stone suspended above the leather feels dangerous, since they identify with the leather and feel threatened by the stone slab above.

Identification and dynamization can take place at several scales, both physically and imaginatively, animating ourselves as well as the sculptural forms. At the most subtle level, dynamization occurs as neurons firing in empathetic, imagined motion. At another level, it takes the form of unconscious or subliminal muscular responses. At the level of active touch, our movements can feel as if they are resonating with forces or qualities in the sculpture. At another scale, we can feel as if our hands moving represent the whole body moving through or around it. At yet another scale, our motions may suggest larger forces such as wind or water. At each scale, the same equation applies; we relate our movements at one scale to movements at another. As Arnheim reminds us, the kinetic forms and patterns are what matter, not the exact size or shape of those forces.

In identifying with something, whether human or non-human, we can take on new or unfamiliar qualities. By engaging empathically, we may temporarily assume those qualities, finding them pleasurable, useful, disturbing or challenging. We can try on—indeed we are *called* to try on—unfamiliar qualities, images or roles in the safety and privacy of the liminal context that art provides.

Long before I began to explore the differences between sight and touch in my artwork, I became curious about the different feelings generated by horizontal and vertical elements. The two orientations have different qualities and produce different feelings. Working in handmade paper at the time, I tacked a thick, eight-foot-long sheet of handmade paper on the wall, then laid another long sheet of paper on the floor. I wanted to see how the pair would read. The sheet on the wall, no matter how visually empty, acted as a window, as a visual space. The one on the floor looked like an object, a tangible thing more than a visual event. I was fascinated by these perceptual differences.

Suspecting that they were rooted in the body-mind, I led a workshop to look further. People drew full-body self-portraits, first drawing the upper half of their bodies on paper taped to the wall. Then they lay down to observe closely how their bodies felt in

the horizontal position. They then drew the lower half of their bodies on the paper on the floor. When everyone put their drawings up, the differences between the two halves of the bodies were striking. The drawings of the upper half of the body were more precise, structured, and linear. The drawings of the lower half were more colorful, emotive, amorphous, and flowing. I ascribed these differences to the states of mind evoked by the drawers being vertical and horizontal.

Standing, I feel gravity run through my bones, which counteract its pull. I am aware of my structure. I feel all the endless, tiny adjustments required to remain vertical. I can move in any direction. I can defend or extend myself. My eyes can scan the surroundings. Being vertical is distinctly human. Lying down, gravity pulls everywhere equally. I can relax into the floor. Motions occur around a horizontal axis. I cannot see much. I am more vulnerable. I am closer to sleep, dream, the unconscious. I am closer to the animal, to the earth. The mind of verticality seems to include structure, orientation, clarity and extension into space—qualities that relate to visuality. Horizontal consciousness seems more inward, intimate, unstructured, emotional—qualities related to hapticity. When we look at art, every horizontal and vertical element draws on this fundamental somatic knowing, imbuing them with qualities we know in our bodies, however unconsciously.

Movements we make while exploring a sculpture connect with these basic somatic directions or orientations: horizontal-vertical, up-down, forward-back, left-right, within-without, surface-depth, diagonal, each evoking specific qualities and feelings. Movement of the hands close to the vertical axis gives one a more centered, restrained feeling than the expansive gesture of arms moving a wide horizontal motion. We sense directional movement of hands, arms and head in relation to the center of our bodies. If our arms rise or descend, we recognize the meaning of *upward*. If we reach under something, we recognize *below*. A sculpture can include several of these spatial patterns, can emphasize one, or can create contrast or tension between patterns. These directional motions can carry metaphoric, psychological, even spiritual meaning. The artist can, to varying degrees, choreograph people's motions to evoke these qualities and feelings.

Philosopher Mark Johnson proposes that these somatic patterns underlie our very thought processes and language. Patterns of sensory-motor experience play a crucial role in what we can think and how we think.

Emotions are a kind of motion within the body that reveal and express the conditions of the body-mind. They are muscular, hormonal, visceral responses that have evolutionarily evolved to produce specific swift, automatic reactions to situations and to convey to others what we are feeling. *Emotion* has “motion” at its root and means “to move out.” Emotions are called “feelings” because we actually feel them in our bodies. We know them through proprioception, the internal sense of touch; we feel the clench of jaw, quickening of breath or tightening of gut.

Sometimes touching an artwork (or anything else) induces muscular, neural, hormonal and mental changes that resemble emotion or turn into emotion. So swiftly do these changes occur that touching and emotion may seem to arise simultaneously. Haptic and emotional sensations are so entwined that haptic sensation itself is often experienced as emotion. This is one of the reasons touching can be so compelling.

*And gravity! My stomach and guts got involved. When I touched the cloth wrapping something vertical, I felt nausea.*

Yet the emotions triggered by artworks have a special status. We are not expected to act on those emotions but only to feel their effects. An aesthetic experience provides a safe, contemplative place to explore such feelings.

*I went through an exhibit on the Holocaust and felt very disturbed. Then I went into the exhibit of tactile sculptures. I pressed my breastbone against the vertical box and it was very calming.*

The encounter with art provides an opportunity to notice and explore emotions in an aesthetic context. Actually touching artworks can ground emotions in sensation, giving them an immediacy and reality that renders them more accessible: a steel passage feels cold, making me fearful; a wooden area feels warm so I relax; a leather hammock is reassuring; a tight fit generates panic; a sharp edge worries me.

The dynamics of emotion can be revealed in sculpture, especially figurative sculpture: bodies caught in motion and emotion, often in a position conveying the past

and pregnant with the future, such as Bernini's *Apollo and Daphne*; Daphne, in terrified flight from Apollo, turns into a tree in mid-stride; we see and feel her emotion and the stages of her transformation. The Kreitlers note the paradox of hard, immobile materials representing the dynamism of life, as in Bernini's sculpture. This strange combination of life and lifelessness is unique to art and fraught with creative tensions: "The organic and the inorganic, the warmth, sensitivity, vibration of life and the petrified, stiff bluntness of death, the moving and the motionless, the changing and the lasting—all these produce a matrix of dilemmas, conflicts, and contrasts." The paradox of motion in stillness highlights our aliveness and mobility at the same time that it reminds us of mortality and death.

Knowing a sculpture through touch provides an embodied experience of the changing, mobile nature of reality itself. Not only do I myself move and change as I explore an artwork, but my experience and concept of the artwork change as I move. There is no summative moment of completion.

*I wanted to know the sculpture's dimensions. At first I expected it to be small, but when I reached across it, my arm kept going on and on and it seemed huge. Then I walked around it and it seemed smaller.*

Michael Brenson, art curator and critic, describes this process in his essay, *Memory of the Hand*:

The life inside the mass has the thrust of endless movement. Even in the most immobile pharaonic figures, the same animation within the stone that reinforces the authority of the kingly presence also suggests the inevitability of change...a sense of movement within that image that argues for the inevitability of transformation. To touch sculpture that welcomes the hand can be to feel one is touching what was, what is and what will be. It can be like touching growth.

Like touching growth *and* decay. The forces that drive life forward into expansion and growth are accompanied by those that press life into contraction and dissolution. To feel the pulse of vitality is to know the inevitability of mortal stillness. Sculpture, as a strange hybrid of animation and stasis, carries that message to our searching hands. Knowing

through touch imbues artworks with motion and transformation, which become integral to the process of knowing, to the object, and to the self. Each time we see or touch a sculpture we have met before, it is transformed by memory, the flow of our lives, and the current moment. This perception of mutability in things reflects the underlying truth of reality, which consists of impermanent, ever-changing processes rather than immutable forms. Touching brings us closer to this truth.

### Chapter Three: Time and Memory

*Time is a blind guide.*

*Anne Michaels, writer*

*Without the global gestalt of seeing to guide my progress, I'm surprised by each new bump, ridge or opening as I nose my way along. There is a strange immediacy to this experience, a complete focus on the world at my fingertips, a world that reveals itself only as my hands move. This gradual discovery of the sculpture is more like listening to a piece of music, or watching a dance performance or movie. It unfolds in time, and cannot be hurried or slid over. My body moves at its own pace. I relax into a more contemplative sense of time and a more aesthetic frame of mind.*

*I realize I am taking a lot of time with the piece, more time than I spend with the average work of art. Not only that, but the piece takes on certain characteristics: depth, a sense of vastness, and as the unknown becomes known, I feel a sense of oneness with the piece.*

Aesthetic touch takes time—time to trace contours, discern textures, decipher forms, and absorb meanings. Touching in a thoughtful way may even take us out of time. Brenson describes this dimension of aesthetic touch:

...the kind of touch that is only possible when the hand is unpressured; when it is free to move about and settle where it wants; when the authority of clock time stops and time as it is lived by body and matter take over. When the sculptural mass speaks to the hand and the hand listens to the mass, the current of communication between hand and sculpture can establish a connection so basic that it lives in that hand forever.

Consider the time you spend looking at painting. Usually we encompass the whole in a swift glance, often in passing. The degree of engagement depends on our interest and knowledge and on our ability to enter its world. But time plays a larger role in haptic perception of art (especially touching without sight) by *necessity*. Muscular motion sets the pace. Time becomes palpable as one explores a sculpture, traveling the

surfaces, tracing the contours, discovering its nuances and secrets. Time is needed to decipher, identify, explore and make sense of it all. First impressions yield to deeper probing. Reactions follow one another. Forces resolve. Questions are answered. An understanding of the whole arises.

It takes time to organize and integrate haptic information and discern its meanings. Since perceptions are gathered successively, comprehension of the whole is built slowly, cumulatively. Most of us are not facile with touch as a means to know something as complex as a work of art; we need time for this way of perceiving. Yet taking time can bear fruit and allow integration. The amount of time required for this gradual unfolding of image and meaning calls for patience and persistence.

The movement of hands and body around an object renders the equation of time and space concrete. Movement through space-time creates an experience that has depth and length. Touching expands both time and space. As someone said after touching without sight:

*I never realized that one function of vision is to condense time and space.*

Time is notation of change. Before people invented clocks, they noted the movement of stars, moon and sun, the passage of the seasons, the evolution of a day. Paying close attention to change expands time. A fine-grained attention notices minute changes, expanding and deepening what we take in. The more closely I watch a child's growth, the more my sense of time feels continuous, inhabited. When I see a child rarely, and he is suddenly much taller; I wonder where the time has gone. I missed the slow subtle changes. Tactile perception of artwork can provide a fine-grained attention to details, textures and changes in form. Sight can work in the same gradual, cumulative way if and when I take the time. The question is whether I do.

Many people live in time and space as defined by computers, telephones, fax machines and airplanes, all of which compress space and time. The advantages of such time-and-space-savers are considerable, but the costs remain high and hidden. Moving swiftly usually means ignoring sensory richness and internal responses. Cramming ever more tasks into ever-smaller units of time, we miss the whole passing show on the way to the airport. As the media, schools, business and technology pressure us to move at a faster pace, our sense of time is further compromised by a shrinking attention span. We



are trained to glean information from ever-shorter visual flashes. Ironically, as speed increases, we feel we have less time.

By slowing down, time expands, yielding a more spacious experience. Time opens rather than constricts. Touching my sculpture without sight, people perceive more slowly by virtue of the time needed to explore it. Touching calls for a kind of attention that is often more meticulous and careful than that of looking. Touching can be absorbing in its intensity, complexity and novelty, altering perception not only of the sculpture, but also of time.

*I liked the gradual unfolding of each piece through touch; even after fifteen minutes I was still discovering new things.*

A slower pace can be refreshing for people, especially in contrast to their normal speed.

*Very meditative and soothing.*

*I found my mind to be very quiet, not thinking or interpreting what I felt.*

*Feeling this work helps the busy-ness drop away.*

*Time opens.*

Perception of art has always been a function of time. Music, theater, dance, film and story unfold in a precise structuring of time. Visual artworks can be appreciated in a time of one's own making. Yet the quality and nature of the aesthetic experience is often closely related to the length of time spent with the artwork. The more time I spend, the more rewards I reap.

Time is often experienced as possessing a different quality by people who live with disabilities. It can take so much more time to accomplish things that time itself seems different, not just in quantity but in nature. John Hull tracks the profound changes he undergoes in becoming completely blind in *On Sight and Insight*. He describes his new experience of time:

Sighted people can bend time. You force time to your will... For me, as a blind person, time is simply the medium of my activities...I am simply unable to hurry...perhaps all severe disabilities lead to a decrease in space and an increase in time...Time against which you have previously fought, becomes simply the stream of consciousness within which you act. Modern technology seeks to expand

human space and compress human time...The disabled person finds that space is contracted and time is expanded. It is because of the space-time coordinates within which the blind person lives that his life becomes gradually different from the lives of sighted people, particularly in a time of high technology.

The notion of time as a medium is useful. Like any medium, it can lead us toward something. Like any medium, its nature shapes our experience of its content. We usually assume the importance of any activity lies in its content, but the quality of time it takes deeply influences the meaning. Compare a quick bath to a lengthy one. The ability to alter the sense of time is a function of our state of mind.

Yet the Western tradition of art aims for an abstraction of time, for timelessness. Caroline Jones writes of this aspect of Western art:

Like the Christian icon that lies behind so much of Western aesthetics, the oil painting was intended to be an eternal object whose perfected, crystallized composition would never be disturbed by the vicissitudes of time. Time would even be phenomenologically banished from the pictorial realm—it would never be acknowledged as itself part of a viewing regime. Pictures in the Western tradition would be composed to convey a single event, the “pregnant moment” praised by Enlightenment...as the highest form of art.

One way to disrupt this timeless, static ideal is to restore the banished phenomenology of time in the viewing process itself: through the extended, embedded, time-rich experience of touch. Touch is somatic and erotic, conveying by its very nature an experience of change, transmutation and growth, along with the accompanying shadows of decay and death, which have been exorcised from the timeless “viewing regime.”

Our bodies respond naturally to rhythm, the music of time. We live within the self-generated rhythms of walking, running, dancing, speech cadence, chewing, breathing, heart beat, cranio-sacral pulse, peristalsis, brain waves and many more. The body's rhythms seep into the experience of touch. Some people move their hands or

bodies rhythmically when touching sculpture. Different parts of the sculptures call for different haptic rhythms. People's movements often use repetition, alternation and pattern, the elements of rhythm.

*I never thought about rhythm in art. I got a sense of rhythm, moving my hands in time.*

In the body, time is marked by the rhythms of tension and ease, excitation and relaxation. Tension and relief is a deep biological pattern: heartbeat, breathing, muscle contraction and release, activity and rest. The Kreitlers suggest that works of art activate tension and relief; people approach a work of art carrying their own internal tensions, whether specific or diffuse. The tensions in the artwork—in the composition, content and materials—trigger one's residual tensions, then absorb and combine with them. As the tensions in the artwork are resolved within the artwork, relief can also occur for one's diffuse, pre-existing tensions. Much of the power of art lies in the resolution of forces and tensions we carry within us, whether conscious or unconscious, temporary or enduring. The Kreitlers describe this dynamic in a charming way:

...imagine that the diffuse tensions are like many children playing, each separately, in a playground under the window of your study, making a lot of noise. Of course, they can hardly comply with your requests for silence, and to persuade every child separately would demand more patience than you have. But if you can bring in some other kids marching in a row with drums and trumpets, there is a good chance that most of the playing children will join them and march away from your study window, leaving you in comfortable silence...

Artworks are complex enough to evoke and accommodate tensions in many people. In fact, this is one of the criteria for effective art. If the tensions are too narrow, simple or little, the experience is less engaging. Curiously, people's pleasure may be enhanced by delay between tension and resolution. The more complex and demanding the artwork, the more time is needed to resolve its tensions, and the more rewarding the eventual relief of resolution.

Tensions in an artwork may affect us physically as well as psychologically. In the haptic experience of art, tension and relief are felt and expressed in the body, not only through empathy with the tensions in the artwork, but also through kinesthetic sensations. The movement of hands on a surface may be conceived as tension, and the simultaneous sensation as relief. Tension is transformed into relief when my hands move into the unknown and find something interesting. When I probe into space and happen upon a familiar place. When I travel along a seemingly endless passage and come to an end. When I can't decipher a shape and finally make sense of it. When a series of random elements suddenly connect with each other. The process of understanding a sculpture through touch produces a considerably delayed resolution because it takes time to create a unified sense of the whole. If we look while we touch, or look after touching, tension lies in the differences between what we see and what we feel. Relief or resolution occurs when we integrate the haptic sensations and the visual image, when we come to terms with the differences between them and resolve or transcend the conflict.

The element of time is integral to another dimension of art: the process of making. A work of art is the result of an artist's intense interaction with materials, other works of art, history, culture and ideas, and with personal images, feelings, memories, sensations and intuitions. The unruly, often extended process of making becomes compressed into a singular, completed artwork. An artwork is a time capsule, embodying and reflecting the time absorbed by its making. It contains everything that took place during that time, visible or not. While artworks seem timeless once complete, we also know, as writer Adam Gopnik says, that they are “a permanent experience of a particular moment.”

Just as it takes time for an artist to create an artwork, the perceiver needs time to unravel and integrate its complexities and ambiguities in another act of creation. The time-dependent haptic experience echoes, however faintly or abbreviated, the lengthy process the artist underwent. People who touch sculpture often comment that they feel like the artist as they slowly recreate the sculpture for themselves.

*This is like being the artist.*

Some artists intentionally play with the element of time, referring to its passage in the very nature or content of their work. By making artworks that have a clearly finite

life, that change with time, or that play out a narrative in time, artists explore notions of mortality, change, time and memory. From Tingley's early experiments with mechanized sculptures that self-destruct, to Duchamps' pleasure with the accidentally broken glass of his *Bride Stripped Bare by Bachelors*, to sculptures that incorporate melting ice, growing grass or decaying meat, many artists have intentionally played with such fast or slow changes in the artwork itself. Some changes mean the demise of the sculpture. Some changes, like a garden, lead to the fruition of the artist's vision. Some changes, like the rusting of a steel sculpture, reveal the passage of time and its effects.

Haptic art raises questions about art's permanence and inviolability. When making art to be touched by many hands, the artist must be willing to embrace the element of change—the face of time. The normal effects wrought by years of light, humidity, chemistry, and handling are speeded up and amplified in haptic art. The touch of hands erodes surfaces, deposits oils, and corrodes materials. These changes may actually be intentional and welcome, projected and planned. A photographer made images of Cambodian women's faces intentionally pale and faint, wanting the touch of people's hands to darken them over time, bringing them into being. Materials may be chosen which make visible the impress of hands and the effects of touch, such as clay, wax, or plaster. The patina that develops from wear and the passage of time can be pleasing in this day of indestructible, impermeable surfaces and throwaway things. Intimations of vulnerability and mortality lurk in the lineaments of wear. The Japanese have a deep cultural appreciation for things that have aged visibly and beautifully, an appreciation embedded in the complex aesthetic and philosophical concept of impermanence and imperfection called *wabi-sabi*. The closest parallel in the West would be the legacy of romanticism, which finds beauty in ruins, fragments and the processes of nature. The sense of time passing, of decay and its intimations of mortality, are evoked by aged, eroded, worn and softened surfaces. Many artworks made today play with notions of age and time passing in the way they use materials: traces of paint that suggest the effects of wear, aged or weathered wood, corroded metals. Outdoor sculptures often reveal the effects of season and weather.

*It would be fun to experience the work after years on exhibit, worn like medieval cathedral steps So I thought of time and aging as I touched these sculptures.*

If this effect is deliberately sought, the results of prolonged touching and wear must be considered in terms of the overall meaning of the artwork. A marble river god residing in a state capitol building reclines with his legs sprawled before him toward the passersby. Many people in passing have affectionately touched the foot extended in their direction, polishing the surface until it glows. The rest of the statue loses its intended impact in the shadow of this prominent polished foot, a case of tactile effects contradicting the artist's intention.

Another solution to the changes wrought by extensive touching is to make parts that can be replaced when worn or damaged. We now take replaceability for granted; after all, even many human body parts are replaceable. To subvert the preciousness of art, Duchamps played with the notion of replaceability, which has since become another means at an artist's disposal. Multiples, copies, and appropriations are common. Assemblages, which include items made for other purposes, have a century-long tradition. Replacement of parts as an aesthetic strategy has possibilities and implications yet to be explored. What happens when parts of clearly different ages co-exist within a piece? What about replacing a part not with an exact copy of the first, but a different version? What would it mean for a piece to evolve in this way?

Wear and tear on objects has had a primarily negative connotation in the Western art world. The whole industry of art conservation has developed to minimize, reduce, or reverse as much as possible the effects of time. Museums are dedicated to the preservation and conservation of objects and seek to remove them from the flux and contingencies of life as well as to exhibit them without jeopardizing their condition. Temperature, light and humidity controlled environments keep surrounding conditions as stable and unintrusive as possible. The museum mandate to conserve artworks has created notions of the artwork itself as inviolate, untouchable—purely visual. Perhaps the allusions to wear and the passage of time evident in many artworks today is in part a reaction to this inviolability. So is haptic art.

The sense of time is intimately entwined with memory. Memory creates a unified flow of experience as each moment is related to the previous moment and to past experiences. Memories of past experiences form a foundation for the way we perceive,

think and analyze. According to memory researcher Daniel Schacter in *Searching for Memory*, memories are not fixed patterns but a creative process. A stored memory is a pattern of brain activity that may be activated by a cue in the present experience that resembles a pattern from the past. Information from the present is combined with patterns stored from the past, and the resulting mixture of the two is what we remember. Each time we remember something, like a favorite painting, it becomes colored by the cue and by the circumstances of recall, so the next time we remember that painting, it appears slightly different. Its remembering may be cued by many things, such as an object, another painting, a color, pattern or shape, a feeling, sensation or movement, a smell, sound or taste. The remembered painting has now been subtly affected by the cue. It is also affected by the conditions in which we remember—whether in a museum, on a beach, in a restaurant, dreaming in bed. When we see the actual painting again, we have unconsciously altered it in memory since the last time we saw it. Each act of memory is a creative act, an ongoing transformation of the past. Arnheim notes, “Memory is a much more fluid medium than perception because it is further removed from the checks of reality.”

A work of art elicits several kinds of memories: specific episodes, incidents or images from the past; past experiences that have become unconscious or implicit; and conceptual, factual knowledge. Memories of specific episodes usually include many kinds of information—visual, auditory, spatial, verbal, and tactile—stored in convergence zones in the brain that bind together the fragments of perceptual experience. A sensory perception from present experience, such as smelling metal or touching a wood carving, could be the cue that triggers the memory of an event in personal history. Past experiences, now unconscious, may be elicited by a cue in an artwork without one even realizing a memory has been retrieved; it may seem an intrinsic part of the artwork. The experience is one of "knowing" without being aware of the source of knowing.

Another kind of memory, procedural memory, is used for skills and habits, such as riding a bicycle or cooking. This kind of memory is more likely to be called into play by physical exploration of a sculpture than by visual exploration. The motions of touching a sculpture may resemble certain familiar movement patterns or physical habits. The movement memory may be unconscious or become conscious. Some people

associate their experience of my sculptures with playing musical instruments, or of intimate physical touching. People who have touched my sculptures speak of moving in ways that remind them of their impatience, or their ability to concentrate, or their pleasure in being lost in exploration, or their fear of the unknown.

If memories remain dormant until the right cues come along to trigger them, then the more cues provided, the more likely memories will emerge. Haptic art has the advantage of providing more cues—and sometimes more vivid cues—than a strictly visual art form. The rich combination of tactile, auditory, olfactory, kinesthetic and visual cues encountered in the experience of a haptic sculpture offers an abundance of stimuli to unlock memories of past experiences and associations. Proust makes a distinction between “conscious memory,” a deliberate act of recalling the past, and the retrieval of past reality that flows unexpectedly from “sensation revived.” In the well-known eruption of his childhood memories of life in Combray, triggered by the taste of madeleines, he provides an electrifying example of the kind of spontaneous emergence of memory from a sensation in the present reviving a sensation in the past.

Arnheim notes two different perceptual forces acting on memory. First is the tendency toward simplification—to arrive at the simplest structure, symmetry, or regularity in order to reduce the tension of complexity. Second is the countertendency to sharpen distinctive features, even to exaggerate them: things are remembered as larger, faster, uglier than they actually were. Both tendencies can be operating at the same time in varying degrees and ratios. The two tendencies work together to clarify, intensify, streamline, and characterize. These two tendencies are central to the making of art: to simplify and to exaggerate; together they intensify, clarify and transform life into art.

Memory is essential for piecing together an image of the whole when using touch. The necessity for a span of time and the conscious efforts of memory become more pronounced in haptic perception.

*This work focuses memory and experience.*

Many people have difficulty remembering haptic impressions as they explore without sight or when they try to recall the sculpture after touching without sight.

*I learned that my touch memory isn't that developed.*



Most of us are unused to deciphering something through touch, and few of us have deliberately developed our capacity for haptic memory. Yet some people feel more confident in memories acquired through touch, because of the intimacy of the contact, the concreteness of the encounter, the involvement of the body, and the time it takes.

*I realized I could know a work of art better through touch, that it would be easier to memorize a work of art.*

For some people, feeling and remembering textures proves easier than detecting and recalling spatial relationships. For others, spatial memories come more easily. Some people naturally incline to a kinesthetic intelligence and are comfortable exploring through physical movement and touch.

Brenson speaks for the memory of the hand as carrying peculiar power. He describes such a memory as one that continues to ring through his being. I quote it here in its entirety because of its eloquence:

What I am asking for here, most of all, is respect for the memory of the hand. A sculpture that has been a resting place for the hand is remembered differently than a work that has only been seen and analyzed. The first time I fully grasped the power of sculpture was in the chapter room in the Cathedral of Autun, in which Romanesque reliefs are still available for observation and touch. I moved my hands over the seated figure of Joseph and the pie-crust blanket of the three sleeping magi, in whose dream they are actually touched by the hand of the angel of God. For several minutes, I cupped my hand over the small female head enmeshed in foliage, whose terror-struck eyes and mouth seem to have caught the devil at work. Although their original placement on columns indicates they were made for the eye, Romanesque spirituality is immensely, inescapably physical, and these reliefs seemed to me, by their size, articulation and emotional directness, to ask to be touched. Touching them seemed taboo yet natural. Their memory is in my hands still. Because of this, my recollection of them is always more than that of an image or sensation. Since the recollection is in my hands as well as my eyes and mind, years are compressed whenever I recall them. Past and present merge with shocking suddenness. This never occurs when I remember a

painting, even when the encounter with it is also a landmark in my life. Whenever I recall those stones, I feel them in my hands, and I am in that room again for the first time, in July 1964. I am there and I am here. When the seat of memory is in my hands, I inhabit the moment in which the encounter took place. Through touch, sculpture makes accessible not only its own abiding presence but also my own.

Artists also draw on memories as sources for their work. Polish sculptor Magdalena Abakanowicz describes the memory of a moment in her childhood that had a profound impact on her developing sensibility:

I was a small child, crouching over a swampy pond, watching tadpoles. Enormous, soon to become frogs, they swarmed around the bank. Through the thin membrane covering their distended bellies, the tangle of intestines was clearly visible. Heavy with the process of transformation, sluggish, they provoked one to reach for them. Pulled out onto shore with a stick, touched carelessly, the swollen bellies burst. The contents leaked out in a confusion of knots. Soon they were beset by flies. I sat there, my heart beating fast, shaken by what had happened. The destruction of soft life and the boundless mystery of the content of softness...The never fully explored mystery of the interior, soft and perishable. Many years later, that which was soft with a complex tissue became the material of my work. It gives me a feeling of closeness to and affinity with the world that I do not wish to explore other than by touching, feeling, and connecting with that part of myself which lies deepest.

We approach an artwork through our histories, memories and associations, which unconsciously shape our perceptions of the artwork. We see according to the past that lives within us. Such associations can take the form of images that merge and blend with the images we are observing. A poet wrote about the sculpture *Memory* in this way:

*I loved that it has a hinge, can be pivoted. In mythology, memory (Mnemosyne) is the mother of the muses, a mother of creation. You really get at some of the power of memory, that it can shift, surprise, and occupy a kind of hinge in us. Memory is not static.*

We accumulate images and experiences which form and inform new images, building a structure of meaning that grows ever more complex, enriching each new encounter. Memory and time are essential to the development of aesthetic pleasure and appreciation. In Abigail Housen's stage theory of aesthetic development, accruing the skills and experience to look at art deeply and thoughtfully takes time measured in years. She describes someone in the last stage of this four-stage developmental process as having a long personal history of viewing and reflecting on art. For the long-time viewer, a familiar painting is like an old friend known intimately but still surprising and still in need of attention. As in all friendships, time is a critical ingredient, involving the history of the work and our own history with it. Memory infuses the artwork with traces of our selves. As we change, grow, age, develop sensory and intellectual acumen, undergo the vicissitudes and joys of life, we return to a particular artwork a different person each time. Memory is the hinge on which the doors of perception swing open.

The Greek goddess of memory, Mnemosyne, is mother of the Muses, of the arts. Art serves as the collective memory of a people, as a way to preserve and carry memory forward. In our communal lives, art provides shared memory, creating bonds that join us together, that make sense of the past and that provide new possibilities for the future. This function of art holds within individuals as well. It makes sense of what we know, integrating it into our experience, transforming it, and carrying it forward into the rest of our lives.

#### Chapter Four: The Intelligent Hand

*The hand heals the fissure the eye creates.*

*Michael Brenson, art critic*

*I'm sitting in front of a sculpture that's completely unknown to me. I'm going to explore it entirely through touch—blindfolded—which seems difficult if not impossible. Seeing allows me to assess a situation so I know how and where to meet it and what stance to take—defensive, receptive, open or reserved. I can't do that without sight; in these conditions I can't anticipate what lies ahead. Before I even touch whatever's in front of me, I've discovered an important part of touch: I must initiate the contact. I must reach out. There's risk in the gesture and control in the choice.*

***Touching is such a risk-taking experience.***

***I'm so excited. Anything could be out there.***

*My fingertips touch a hard, flat surface. I feel the slight shock of meeting something different than what I had imagined.*

***Two feelings come to me when my hands touch the surfaces: one of disappointment and the other of pure joy. Disappointment in the fact that I was expecting something dramatic, maybe even gross. And the joy was that this is not dramatic, it is calm and soothing.***

*I also feel the shock of breaking the taboo against touching art.*

***I feel really guilty touching these sculptures, like some large hand is just waiting to swat. That really intensifies my sense of touch. First comes the strange fear and thrill of breaking the hovering taboo of "Don't touch the art." And once broken, a whole new world comes to life.***

***I slowly slide my hand over the surface, feeling the mingled sensations of cool and smooth. It never occurred to me before that an artwork could have temperature.***

*I reach further, following the lead of my fingers. I only know what lies under my hands. I come to an edge, then down to another edge, and another: they're steps! My fingers slide down the steps the way I used to slide down stairs as a child..*

*I wonder what material I'm touching. I make a light fist and knock my knuckle gently on the surface. I hear the resonant tone of wood, suggesting warm chestnut colors and a handmade quality. It feels silky under my fingers.*

***Somebody spent a lot of time working these surfaces to make them so smooth.***

*For some reason I suddenly remember my other hand, which has not moved from its perch on the ledge above. Only one hand has been moving.*

***I rest my left hand on the sculpture and move my right. One is home base, the other the explorer.***

*My hands measure the space between them, creating a palpable sense of the sculpture's size and shape.*

Touching art is a novel role for touch and for the hand. So much of our hand use is functional and unconscious—manipulating things and wielding tools. But in exploring artworks, hands are liberated from their usual workaday functions to become receptive and exploratory. They become conscious and aware. Hands' intelligence, range and resourcefulness emerge.

The hand is so central to touch that David Katz, pioneer researcher into haptic perception, designates the hand as the organ of touch rather than the skin. Sometimes the organ of touch, he suggests, is both hands together, like binocular sight; two hands are able to read the shapes and spaces between them. Katz calls the hand, or hands, the tactile sense organ for several reasons: the hand's versatility, which enables it to make many kinds of grasping movements and take many shapes; the hand's equivalence to the other discrete, unitary sense organs (eyes, ears, tongue and nose); the close connection between tactile activity and mental activity; the way the hand, in spite of gaps between the fingers, integrates stimuli so a surface is read as continuous and unified; and the way we form memory images so rich and specific that we could then tactually recognize the object with other parts of the body that are much less sensitive. Finally, he notes that a tactile memory image can be more potent than a visual one.

The hands' sensitivity, structure and movement range make them the most versatile and articulate of instruments for expression, manipulation, communication, creation, and sensing. Hands contain infinite possibilities for haptic exploration with their extraordinary mobility and subtlety of articulation. Ordinarily fingers work together as a single touch organ, yet each finger can operate somewhat independently of the others in moving, pressing, lifting, touching. The length of the fingers produces a range of sensation: running fingertips over stone gives one kind of impression; a different

impression occurs with the fingers' length upon the surface, and different again when pressing down so fingers and palm meet the stone as a whole.

The first two fingers of the hand are used for fine manipulation, direction, flexibility, guiding, searching. They connect through the wrist bones to the radius, the bone on the inner side of the forearm. The two smaller fingers function for strength and support and connect to the ulna, the outer bone of the forearm. When the hand rotates, the radius rotates around the ulna, so that hand motion includes arm motion. The fingers themselves actually contain no muscles, which would render them too bulky and unwieldy. Their astonishing strength, speed and agility are directed by muscles in the palm and the forearm. Complex lacings of tendons connect fingers and their distant muscles like marionettes on strings.

The hands are global in structure and function, everything curving as if to hold a sphere; to flatten the hand requires effort by muscles on the back. This natural spherical shape makes the hands spatially keen. The many small joints provide a range of mobility, allowing the hand to conform itself to an object to a remarkable degree. The hand can swivel in a full hemisphere at the wrist. Add hinged movement at the elbow, three-dimensional rotation at the shoulder, a floating shoulder blade, flexible spine, and we have an extraordinarily versatile organism for gathering information and engaging with the world..

The complementary use of hands described at the beginning of the chapter—one resting and one active—is related to handedness, the strong preference for the use of the same hand in a variety of tasks. Handedness is a uniquely human trait. The French psychologist Yves Guiard conceived of the two hands as a working partnership in a division of labor. Regardless of which hand is dominant, the two hands interact or complement each other's action. They partner in a dance of cooperation, one tending to finer manipulative skills and the other to larger supportive motions. The dominant hand usually uses smaller, faster movements than the other hand, which moves more slowly in a larger range. In chopping carrots, one hand works the knife in a small range of swift motions while the other feeds the carrot into the blade. In writing, the non-dominant hand continuously positions the paper in anticipation of the moving pen. In sewing, the non-dominant hand positions and orients the fabric for the active hand. In throwing, the other

hand and arm counterbalance the active hand and arm. The non-dominant hand usually frames the movement of the dominant hand, adapting to situations and determining the spatial context in which the skilled movement occurs, even before the action of the other hand.

Left and right sides each have their own mind and qualities. My left side has always felt more sensitive and creative, while my right feels more active and down-to-earth. As a left-hander, I identify more with the qualities of the left. When I was learning left from right as a child, I would imagine myself facing an intersection of two roads near my home. If I turned right I could see my house, representing predictability, safety and familiarity. If I turned left, the road opened into fields and woods, which were wild, limitless and mysterious. I was drawn to the left but needed the support of the right, a complementarity that carries through into the actual use of my left and right hands. I draw, write, and do fine work with my left while I carry buckets, wood and groceries with my right. My left hand is the diamond-cutter, the hand with finer, more precise manipulative abilities. My right hand is the workhorse, stronger and less refined. The sculptor Barbara Hepworth, who worked largely in stone, spoke of her hands in a similar division of labor:

My left hand is my thinking hand. The right is only a motor hand. This holds the hammer. The left hand, the thinking hand, must be relaxed, sensitive. The rhythms of thought pass through the fingers and grip of this hand into the stone. It is also a listening hand. It listens for the basic weaknesses or flaws in the stone, for the possibility or immanence of fractures.

How hands came to be as they are clarifies their special abilities, according to Frank Wilson, a neurologist who has worked with the hands of writers, musicians and athletes. His book *The Hand* examines the evolution and role of the hand in shaping the brain, language and culture. The relationship between hand and brain, Wilson says, is a two-way evolutionary exchange. He finds it unfortunate that current theories of cognition and behavior find little value in the powers of the hand, whether in the evolution of our

species or in the lives of individuals. He laments that the highly trained, creative hand remains almost entirely ignored in neurology.

The hand is so widely represented in the brain, the hand's neurological and biomechanical elements are so prone to spontaneous interaction and reorganization, and the motivations and efforts which give rise to individual use of the hand are so deeply and widely rooted, that we must admit we are trying to explain a basic imperative of human life.

He aims to inject into theories of brain, mind, language and human behavior the grounding, driving reality of action by the hand. The oversight of the hand's contribution to intelligence is dependent upon a wider ignorance of the body and its intelligence.

In addition to the story of human evolution, Wilson recounts the life stories of individuals who live by the hand, such as jeweler, juggler, surgeon, chef, auto mechanic and crane operator. He traces each person's development and the role of manual, tactile, kinesthetic dexterity in shaping their careers and their passions. He finds their stories reveal associations between the use of one's hands and an emotional connection with one's inner life. He finds that developing motor skills stimulates development of cognitive skills. He believes we have hard-wired instinctual strategies for tactile skills but it takes years to finely tune these abilities.

In the wake of publishing his book on the hand, Wilson heard about odd disabilities showing up in young people now entering the work force. Although bright and well-educated, strange gaps are appearing in their perceptual abilities. Engineers who cannot visualize spatial problems. Surgeons who lack dexterity. Doctors missing the knack for palpating. Auto mechanics cannot find young men who tinker with cars. He speculates that the children of this generation have spent much of their time stationed at computers and televisions; they have grown up without the intense education children have always gained by collecting stones or bugs, taking things apart, making puppets, building forts, painting and carving. Their toys are now fully designed, their pastimes visual, their lives scheduled, their environs indoors.



Many artists do exactly what Wilson describes; they refine their haptic abilities over the course of many years; such skills are learned in the doing, not in the abstract. Artists cultivate fluid connections between the use of their hands and their inner lives. They learn to trust and to follow the intelligence of their hands wherever they lead. If Wilson is correct that there are links between hand and brain, between hand use and cognition, between hand skills and a relationship with one's inner life, artists are among those who carry the wisdom we need if we are to recover our haptic abilities. Art making of all kinds for all ages is more necessary than ever to teach the intelligence of the hand, which stimulates the intelligence of mind and heart.

This artist came to learn about the hand through an accident. Rafting on the Colorado River in Grand Canyon, my boat plunged into a huge wave in one of the rapids. The wave broke over the raft, wrenching my hand from a rope, severely dislocating the third finger of my left hand. Once home, surgery restored torn tendons, ligaments and joint. When cast and pin were removed, every finger had its own recovery to effect. The scarring and swelling that immobilized my hand prevented movement and blocked sensation. The numb, scar-bound finger hungered for feeling of any kind, even pain.

I learned how important proprioceptive sensation is for a sense of aliveness and ownership, let alone action. I learned the unique role played by each finger, contributing to the functioning of the whole hand. I learned how precise, swift and powerful the movements of the fingers are. I learned that the hand works as a unit, depending upon the cooperative synergy of its many parts, and that an injury to a part is an injury to the whole. The stiff, unyielding finger rendered my hand awkward, unable to do many of the simplest things: dishwashing, opening a jar, hammering. My finger's woodenness curtailed my ability to feel objects or to use them, compromising both motor and sensory abilities. I learned firsthand the seamless unity of sensing and action.

I was amazed that an injury to such a minor finger in the pantheon of the hand could have such a profound effect. But I had lost ulnar opposition, the ability of the ulnar fingers and side of the hand to wrap around things and bed them in the palm. Though less celebrated than the opposable thumb, ulnar opposition proves to be crucial for integrating tools into the hand and allowing them to become extensions of the arm and body.

Since I am left-handed, I was forced to use my right hand for unfamiliar actions. A dialogue ensued between my two hands, the left teaching the right how to perform new functions and the right teaching the left how to recover old ones. My nervous system had to forge new connections to direct the right hand in fine motor tasks.

I learned how subtle yet global in effect hand movements could be, both for physical mobility and for mental agility. Since my thinking hand had been injured, my thinking was impaired. My whole body image was disrupted. I ran my hand into doorframes, my feet mis-stepped. My sense of self was wounded. I felt disoriented and depressed. As my hand recovered its lost abilities, I also recovered my sense of definition. When I regained even the tiny ability to bend the outermost joint of the injured finger I felt more articulate in my movements and even in my self-image.

As I slowly regained motion and sensation, I discovered the expressive, qualitative character of the hand and its parts. The hand is like a dance company, each member offering different possibilities for choreography. The joints are not so much mechanical hinges as the nexus for subtle forces moving in several directions. The delicate end of the finger is like an antenna, the base of the finger like the root of a plant. The palm provides wholeness, integrating the multiplicity of fingers. The hand can envelop, embrace and surround. It can be receptive like a bowl or a nest. Hands can ward off, push and strike. They can come together in the abdication of will called prayer. The hand can be the tail of an action made by the arm or it can initiate and lead a gesture. All these minds and qualities, and many more, operate in the simple touch and movement of a hand. French philosopher Michael Serres describes this poetic capacity of the hand:

The hand is no longer a hand when it has taken hold of the hammer, it is the hammer itself, it is no longer a hammer, it flies transparent between the hammer and the nail, it disappears and dissolves, my own hand has long since taken flight in writing...Our hand...can make itself into a pincer, it can be a fist and hammer, cupped palm and goblet, tentacle and suction cup, claw and soft touch. So what is a hand? It is not an organ, it is a faculty, a capacity for doing, for becoming claw or paw, weapon or compendium. It is a naked faculty.

Rilke describes the complexity of the hand in writing about the sculptured hands of Rodin:

...hands are a complicated organism, a delta in which much life from distant sources flows together and is poured into the great stream of action. Hands have a history of their own, they have indeed, their own civilization, their special beauty; we grant them the right to have their own development, their own wishes, feelings, moods and occupations.

The irony of a haptic sculptor suffering a hand injury was not lost on me. I had always believed that my impulse to make tactile art was a personal effort to forge a stronger connection between my inner life and the world around me. An inveterate introvert, I sensed that this injury provided an opportunity to create a more open passageway between me and the world. I felt like a hermit crab being coaxed to come out of my shell.

In the beginning, the therapist worked gently with my finger to restore ease of motion. One day he moved my whole hand and arm in an exploratory way. As my arm rose and fell, I was suddenly back in the boat on the river, re-experiencing the moment of injury. This small motion altered the entire project. I could see there was more to rehabilitation than mere physical repair and more to it than the hand. For many months after that I spent time moving, exploring the sensations, images and blank places in the rest of my body.

I discovered to my complete surprise that my task was not to move *outward*, as I had thought, but rather to move deeper *into* my body, to inhabit it more fully. I first grasped this sense of inhabitation while exploring my visual perception. By letting my vision sink back into my eyes rather than reaching out toward what I see, I realized that I usually extend my consciousness out to the world through my sight, whether in empathy, identification, appreciation or curiosity. This excursion can leave me feeling stranded, out on a limb, without a sense of home. My perceptual habit has been to operate as a disembodied eye. Shifting to a more embodied way of looking, I find myself occupying a solid place in the world rather than floating through it. Everything becomes more

palpable and three-dimensional. Perception is specific and detailed rather than generalized and abstract. Space becomes tangible, a substance rather than a void, a linkage rather than a gap. Patterns and connections emerge spontaneously. By more fully inhabiting and sensing the interior of my body, I gain greater access to the proprioceptive awareness of the spatial location of my body and all its parts. This unconscious spatial acuity is then projected onto the world around me, generating a fuller, more spatial reading of things and the environment.

When I extended this insight into my kinesthetic, proprioceptive perception, I found that I focus my awareness in my hands, which serve, like my eyes, as antennae, preceding, initiating and directing my actions. I use my hands like my eyes, as if disembodied. This disconnection makes me vulnerable to being buffeted by forces such as the wave that broke my finger. Operating in my periphery rather than in my core distances me from my emotions and from the intuitive wisdom of gut and heart.

From my new, inhabited core, my hand turns out not to be peripheral. My hands are not the outer reaches of my body. They are channels through which my body sees and acts, a medium that participates in both body and world. Hands form a joint with the world. When I touch something or grasp a tool, I temporarily become joined or hinged to that which I touch in a relationship of mutual leverage. The incredible range and ingenuity of the hand allows me to adapt to things, interact with them and use them in complicated, subtle ways. Like joints, hands are sites of interaction and creativity. They can also be sites of vulnerability and disconnection. By experiencing disconnection through injury, I was able to grasp the hand's affordance for connection.

*Vision reveals what touch already knows.  
We could think of the sense of touch as the  
unconscious of vision.*

*Juhani Pallasmaa, architect*

*When I see, it's as if the richness of the tactile experience has disappeared. I need to approach everything altogether differently. I don't want to interfere with what just happened.*

*I feel sad. I feel the loss of that experience.*

*If I had looked first, I would have thought of landscapes and ruins. But looking after touching, they seem so much harder. They conjure technology and machines as I look, but to my hands, a whole other world. Touching them, they were biomorphic. My hands were like creatures, like rodents nosing around, whiskers and all.*

*There was such a sense of freedom: no barriers, no age, no survival, just bliss. Permission! Being a kid! Atavistic. A return to childhood.*

*I feel taken over by my eyes. It's like the eyes dominate and muffle. The shock, the upset, the emotion! It's like leaving your childhood, like growing up!*

*My eyes are so attached to my mind. I wonder if I could form a partnership between my hands and my eyes. I wonder if I could touch and see so my hands would dominate and my eyes would follow my hands. What about letting my eyes be like my fingers? That's where the joining, the fusing, the healing might come in.*

*I keep thinking of the loss, that I lose my touch when my eyes are open. I'm separate from the pieces. When I was touching they were the whole world. I was inside the experience. My eyes are from the outside. Maybe it's like Janus: turn the eye over to find the finger, turn the finger over, there's the eye. They're one organism. Then they can deepen each other.*

The differences—even conflicts—that people discover between sight and touch prove more striking than they could have imagined; the ensuing tension often drives them to an overarching awareness of perception itself:

*Contradiction between geometrical, formal, visual awareness and unlabelable sensual awareness.*

*Comparing what I saw with what I felt, the different kinds of information were impressive.*

Exploring the sculptures blindfolded allows hand and body to generate a different reality than what we see. When we do so we realize the degree to which the eye-mind dominates our notion of reality. The price of this division and dominion, as the person quoted above realized, is intimacy with nature, the freedom of childhood, and the possibility of empathic union with the world around us.

There is more to the tension between seeing and touching than merely their perceptual role. Sight and touch are metaphors for ways of knowing. We say *I see* to mean *I understand*. We say we are *touched* to mean *I am emotionally affected*. We link sight to comprehension and touch to emotion. Sight to brain, touch to heart. Why do these two sensory modes relate to such different aspects of the body-mind? How do they and the dimensions they reveal relate to each other? How do they conflict? What do the experiential differences between sight and touch have to do with the lines we draw between reason and emotion, mind and body?

*These sculptures make me think about the difference and similarity and overlap of the senses—the way one touches with eyes and looks with fingertips.*

More is implicated in these differences than meets the eye or hand. Sight and touch are not simply means of gathering sensory information. Each embodies a different way of knowing. Each creates a different version of reality. Our concept of reality determines how and what we perceive; what we perceive further shapes that sense of reality in a cycle of continuing construction. This constructed reality shapes our bodies, identities, behaviors, world-views, arts, laws, religions, cultures, and wars. Which sensory systems we cultivate has profound, far-reaching implications.

Most people remain unaware of the qualities and effects unique to the sense of touch. When people touch my sculptures blindfolded, they are often surprised, accustomed as they are to visual ways of knowing.

*I remember the sculptures kinesthetically but not so much visually, and I usually have strong visual memory. I remember a deep hole in one, and going down that hole, but it didn't look that deep. What I remember is the way it felt, not the way it looked.*

*When I looked it felt cold, it felt warm when I touched.*

*You can't tell how it feels by looking at it.*

The visual system is concerned with salience, orientation, arousal, attention and identification of things. The haptic system attends to safety, motion, spatial orientation and self-definition. Yet visual and haptic perceptions usually occur in tandem, fusing to create a unified impression, which we assume to be visual in nature. When impressions from sight and touch conflict, one or the other can dominate or at least modify the other, depending on the situation. We remain unaware of the exact mix of seen and felt.

The seemingly objective quality of sight and the importance we bestow on sight make it the measure of reality. We tend to assume what we see is true, real, the whole story.

*We take in so much visually and then think we know it.*

Most of us believe that looking is simply a matter of visual recording. The popular notion of the eye as a camera suggests that seeing imprints images on the retina, like light on film, faithfully recording everything within the field of vision. Yet sight is highly selective in what it chooses to see and how it responds to those choices. Like all perception, seeing is driven by desires and interests, both conscious and unconscious. We select what we see depending on what is relevant or important to us. In fact, we see very little. We usually focus only on what matters at that moment, what is striking or what is familiar. How we interpret and assess what we see is shaped by our personal histories. While we assume that other people are seeing things the same way we do, the person next to us is seeing quite differently—selecting different things, seeing them in different ways, and giving them different meanings. Yet seeing seems to provide an objective picture.

Seeing is a distance sense. We have the ability to see far and globally. We effortlessly traverse an enormous range of visual spaces, from remote to close, spanning the interval between faraway mountains and the glass at hand within a single glance. We can focus on a particular tree while also taking in the surrounding forest with peripheral sight. To look at some things in their entirety, especially large ones, we must actually

maintain a certain distance. If too close, we see only part, or see it with distortions. Works of art are usually meant to be seen as a whole and therefore at some distance. Much of the power of Richard Serra's huge steel sculptures that wrap around or cut through space lies in our *inability* to see them all at once, especially indoors; we come to know them in motion over time, with our bodies as much as with our sight.

Given the ability and sometimes the necessity for distance, sight removes us from what we see. We may not be touched in the same way we are by touching. Arnheim describes the power of sight to remove us from engagement:

To be able to go beyond the immediate effect of what acts upon the perceiver and of his own doings enables him to probe the behavior of existing things more objectively. It makes him concerned with what is, rather than merely what is done to him and what he is doing. Vision...is the prototype and perhaps the origin of *teoria*, meaning detached beholding, contemplation.

While sight gives us the ability to observe without entanglement, this distance proves a double-edged sword. We think of ourselves as separate from what we see. The seen object remains aloof, independent, beyond us. This physical and psychological distance can breed a feeling of disconnection. That which is seen can more easily be objectified.

*Feeling with my eyes open was more distant. My brain was working. The sensory fell away and was less intense.*

*I realize how much I rely on my eyes to define and objectify my world. Sight can actually be a handicap and can distance me from truly experiencing something on a deeper level. In that way sight is similar to language. Words can distance me from an object or an experience in a peculiar way.*

As a child grows, the distance from the mother, who is central to the child's sense of reality and safety, is carefully, experientially measured. At first the distance is as close as possible, skin to skin. As the child learns to move independently, he maintains visual or auditory contact with the mother, making repeated returns to the mother's body for tactile assurance. The child closely measures the gradually lengthening distance from his



mother, learning the spatial, distance senses through the fluctuations of space and distance in this highly charged, fundamental relationship. Sight as a distance sense remains colored by this basic movement away from the tactile refuge of the mother. Touch remains colored by the assurance and comfort afforded by the embrace and nourishment of the mother.

*There are so many emotions attached to the closeness and innocence of touch.*

Seeing seems one-sided, not reciprocal or mutual. Seeing can even give us a sense of power or dominance, as if remaining unaffected by what we see allows us to control it. Sight confers a degree of invincibility, potentially isolating us in the chamber of our thoughts and fantasies.

Gabriel Josipovici, professor of literature at Yale, wrote a meditation called *Touch*, in which he describes our habitual way of seeing:

[seeing is]...our way of establishing our connection with the world: through viewing, or having views of it. Our condition has become one in which our natural mode of perception is to view, feeling unseen. We do not so much look at the world as look out at it, from behind the self.

The words *viewer* and *spectator* are commonly used to describe someone looking at art. As Josipovici notes, these words connote sight, distance and point of view. Because those are the very qualities transformed into intimacy, proximity, and mobility by touching, I avoid using such terms to describe the people who touch my sculptures. Even for people who perceive artwork visually, haptic perception is subliminally present; words like *viewer* fail to acknowledge the tactile dimension of the aesthetic experience.

Touch by definition brings us into intimate contact with the world. We meet the world and let it in. Sight reinforces the hermetic privacy of separate selves, while touch confirms the palpable existence of a world pressing on and permeating us. The boundary between bodies and world, self and other, melts.

*Touch is so immediate and personal. I hear things and smell things that I do not when I only look.*

Touching calls for a stronger level of commitment than looking. Josipovici again:

Sight is free and sight is irresponsible. I can cast my eye to the far horizon and then back to the fingers I hold up before my face, all in a fraction of a second and with no effort at all...On the other hand, were I to walk to that point on the horizon it would take time and effort...To look cost me nothing but to go involves both a choice and a cost.

The investment made by the walker costs more but also yields more, as he takes in the whole landscape along the route, knows his body moving, and feels the textures of the ground as he walks and the changing contours of the land as he climbs and descends. Such actions, although very different in scale and effort, resemble touching an artwork—the physical resonance with the contours, the way it evolves over time, and the unfolding narrative. Touch engages one in an embodied journey rather than viewing from a distance.

While the space encompassed by sight can be vast, the space accessible to touch is limited to what we can reach; haptic perception remains bound to the sphere of the body. The space we can know through sight is less physically determined. Ironically, the ease of eye movement generates a less defined, less felt sense of space than that known through touch. Spatial knowing through haptic exploration, though more limited in range, is more vivid. It registers in the body.

*When you look it's an object. When you touch, it's a journey.*

The spatial limitation, the commitment, and the vividness of touch encourages concentration, focus, a deepening of perception.

*There's no distance; looking at abstract art can be distancing.*

Touching may even amplify visual qualities.

*I had visually explored the sculptures a month ago, and knew what the forms were. Yet going through the exhibition without sight, the forms seem much larger, deeper and wider.*

The distance of sight makes for a more global grasp, but usually of lower intensity. Tactile proximity offers an experience that may be higher in intensity and

intimacy but lower in comprehension. The Kreitlers suggest that "...vision affords an acquaintance without complete encounter, while tactility provides for an encounter without complete acquaintance."

Sight and touch pick up different qualities in things. Katz notes that touch takes us inside the object, revealing properties intrinsic to it, whereas sight remains on the outer surface. Fingers and hands obtain information about the innards of objects: we feel the mass, weight, substance, materials, temperature. Touch gives us a concrete, sensible version of things, playing a larger role than sight in grounding us in the reality of the world. He writes:

We must give precedence to touch over all the other senses because its perceptions have the most compelling character of reality. Touch plays a far greater role than do the other senses in the development of belief in the reality of the external world. Nothing convinces us as much of the world's existence, as well as the reality of our own body, as the (often painful) collisions that occur between the body and its environment. What has been touched is the true reality that leads to perception; no reality pertains to the mirrored image, the mirage that applies itself to the eye.

Josipovici recognizes touch as a more intimate, concrete way of knowing. He even considers touch as a metaphor for the process he uses in writing his book:

...the notion of feeling one's way forward, of groping in the dark or semi-darkness, implies a testing of the way with the whole body. And although this method may be painfully slow, it is much less likely to lead me astray than if I relied on sight alone and had open country to cross and a bright sun to go by. In this way I will experience every inch of the way rather than suddenly finding that I have reached my goal with very little sense of the terrain I have passed through. If I can simply walk across the space that lies between me and my goal I may arrive there quickly, but then I will be left wondering whether I have really arrived or only dreamed or imagined it.

Bodily sensations are the very matter of tactile experience. We cannot separate our tactile understanding of an object and the means of acquiring that understanding. My grasp of a sculpture's roundness and the sensations I feel as I grasp remain fused. Sensations occur not only on the surface of the skin, but also within the skin, felt as pressure, temperature and vibration. Sensations of the body's movements are felt in muscles, joints and ligaments. The effects of touch ramify into the body's depths.

The effects of touch also ramify into the depths of our consciousness. Touch remains the primary sense in physical and perceptual development. From early dependence on tactile stimuli, we gradually learn to discern forms and spaces through sight, drawing connections between the two sensory systems. Over time we internalize haptic perception to the degree that we no longer need to touch everything. Nevertheless, tactile memories form the basis for visual impressions and remain embedded in them for the rest of our lives. We are so deeply affected by pre-verbal contacts that touching in later life resonates unconsciously with these early formative experiences. The ease and frequency of touching and being touched that occurs in childhood diminishes as we mature; conscious, sensuous touch eventually becomes limited to sexual encounters, and so closely tied to sexuality that touching anything with intention can easily call up such associations:

*I never considered touching in another atmosphere than the intimate.*

Touch, sex and pleasure have become linked in a trio that excludes other kinds of tactile exchange or sensuous pleasure. This narrowing of tactility and pleasure to the sexual realm can reduce sensitivity and openness to other tactile experiences. Fear of sexualizing other contacts, and the confusion of any touch with sexuality, can lead to rigidity and limits around tactile exploration or communication.

*Sight is safe, touch is erotic.*

The mutuality of sexuality remains useful for understanding the nature of touch. however. When we touch, we are intimately engaged with whatever we touch. We are touched as well as touching. We cannot remain aloof. Mutuality and reciprocity underlies the psychological dimension of touch.

*It's all about relationship. When I touch, I enter into a relationship with what I'm touching. I can't remain with my superficial ideas of what something is. I'm invited to go deeper.*

In addition to pleasure, touch can cause pain. We can be hurt. Engagement of the body entails risk. Vulnerability underlies the experience of touch. In making physical contact, we open ourselves to the possibility of negative feelings as well as pleasure. In my exhibitions I often heard people with visual impairments or people wearing a blindfold worry about danger in touching a sculpture.

*Does it have any sharp places? Will it bite?*

*It took trust. I had to trust there wouldn't be anything sharp.*

We are also psychologically vulnerable. We open ourselves to being emotionally affected, which may include such feelings as fear or confusion. The depth of the haptic experience stems in part from the intimacy and the vulnerability:

*Deeply touched and touching. So much to take in, so much experience we miss in the dailiness, so much that lives embodied that I don't want to verbalize.*

Sight can register a situation instantly and immediately. Andy Potok, a painter who lost his sight at mid-life, complains that what he misses most is the “all-at-onceness” of sight, the ability to take in a large visual field, like a Franz Kline painting or a Rothko, in a gestalt far swifter than the slow, cumulative process of touching.

Sight easily encompasses shifting points of view, changes of size, overlapping and perspectival connections while maintaining a conceptual grasp of what we are seeing. With sight we tend to take in the whole scene first, and then focus on particulars.

When we explore something with touch, we usually begin with parts and details, moving gradually from the particular to the whole, stringing together successive sense impressions to construct a complete image.

*Touching gives more a feeling of the parts than the whole gestalt of seeing.*

*Touching cannot capture the whole form in the mind the way sight does.*

Hull describes with great precision his adaptation to the successive nature of touch after he became fully blind:

The tangible world sets up only as many points of reality as can be touched by my body, and this seems to be restricted to one problem at a time. I can explore the splinters on the park bench with the tip of my finger, but I cannot, at the same time, concentrate upon exploring the pebbles with my big toe. I can use all ten fingers when I am exploring the shape of something, but it is quite difficult to explore two objects simultaneously one with each hand.

Sight also constructs the whole from a series of stimuli; in seeing the eyes move in swift, darting movements called *saccades*, leaping from one feature to another, stitching the whole picture together from a series of pictures. Through these saccades we find, relate, compare, contrast and connect parts, building a whole from successive perceptions. However, the time and effort are so minimal that most of us are not usually aware of either.

When touching without sight, hands move over a sculpture in a continuous way to make connections and construct a sense of the whole. We may return to particular details or areas, but we cannot leap from part to part as we do with sight or we would lose the mapping connections. If we touch while looking, we use touch more the way we use sight, leaping from one part to another. Haptic researcher Charlotte Magnuson tracked someone who is visually impaired exploring a person's face with both hands and juxtaposed this haptic map to the tracks of someone visually scanning a face. The haptic version shows continuous, curving lines flowing over most of the face; the visual version shows short, straight, disconnected lines jumping from highlight to highlight (representing the saccades). The two versions graphically display the different qualities of haptic and visual experience: continuous and discontinuous; sensuous tracing and abstract connections; democratic discovery and hierarchical selection.

Haptic perception unfolds in time as well as in space. The motion of touching takes time. It cannot be hurried. Moving faster only blurs perception and we miss things.

*Touch is slow. The speed of hands determines the rate of perception.*  
Unlike the incredibly swift accumulations of sight, touching provides a slower, more sequential accumulation of information. Touch is tortoise to the hare of sight.

*It takes time to touch things. I had to slow down and pay attention.*

The haptic experience has duration. However randomly or methodically we proceed when we touch without sight, we go over and back over parts, map and measure, discover relationships, establish known territory, strike out into the unknown, find, lose, and find again. We remember, forget, reinforce memories, reinterpret, revisit, revise.

*You don't know where you began. You go out from there and discover, not knowing if you come back to it.*

*I created a base and moved away from it and back again over and over.*

The inch-by-inchness of touching requires more time, but also creates a time that feels inhabited, not glossed.

*You really get to know a piece; you know every little nuance and detail, whereas if you looked, you'd see it overall.*

People enter an altered sense of time, slower and more expanded than normal time.

*This was contemplative time, so refreshing from my normal hectic pace.*

We try to live in visual time rather than haptic time. We believe events could and should occur with the swiftness of sight rather than the deliberate motion of bodies. The more we invest in technological economies of time and space, the more we hope to reduce and even collapse time; we resent the time it takes for a light to change, a computer to boot up. Ironically, in this quest for speed we inhabit our experience less fully.

Haptic time takes us into the realm of lived, felt experience. We slow down, take in, savor, appreciate. The slow, successive, cumulative process of touching creates a very different impression than the swift compass of sight.

*I liked the gradual unfolding of each piece through touch.*

*The speed was very different on different textures: the suede was slow, with my whole hand; the metal was faster, just the tip of my finger.*

Haptic perception proceeds as an unfolding, often generating a story, a narrative.

Touching it, an artwork *grows* in the imagination.

*The first side is like being in a factory; the second side seems more like an old house—completely different. The theme seems to be that which is human, that which is not.*

*When the sculpture wasn't defined by visual experience, I found I could imagine much more. I made up stories about it.*

When we look at an artwork in a way that resembles the way we touch--cumulatively, slowly, over time—we deepen our relationship to it.

*It was really nice to actually experience the art rather than just observe it.*

The objectifying nature of sight creates the illusion that we know something, but this knowledge is often conceptual and symbolic rather than specific and nuanced. Sight separates, distinguishes, and categorizes, creating hierarchies of significance. It tends to remain at the categorical, even stereotypical level.

Categories arrived at by touch remain more mobile, mutable. Touching spawns a more investigative, open-ended approach. People reporting their tactile experience often convey a narrative filled with ambiguity, discovery and contradiction; they allow perceptions and even objects to change, evolve and unfold. They have less need or ability to identify, categorize, summarize or conceptualize—to *fix* the object. In touching there is more ease with the shifting, evolving nature of perception itself. It produces a fluid, open-ended sense of an artwork.

*I didn't conceptualize when I touched; the reality felt more immediate. It's like the Zen master hitting you to break conceptualization.*

Touching also generates a more malleable self-image; as the size of a sculpture changes in the course of touching, so does one's own scale. With sight we know where we are and what size we are. When touching without sight, the imagination can assign different sizes and scales to a sculpture—and to ourselves—when we cannot see it.

*The scale is fixed with sight. In the imagination it can be very big or very small.*

*I was surprised to find such pleasure in hard edges, square corners. It emphasized the organicness of my body. I felt huge in relation to their scale, not human.*

Haptic knowing is fluid, non-hierarchical and democratic. In these qualities it reflects more closely the transient nature of reality and the multivalent nature of art.

We often divide visual artworks into figure and ground, major and minor elements, positive and negative spaces, creating hierarchies of salience and meaning. When exploring through touch, especially without sight, we take what comes as we find it. The usual draw toward the figure in visual figure-ground relationships is transformed



into a more even-handed exploration of every part. Through touch we explore major and minor elements and details with equal interest. This can shape our experience in interesting ways, making us more attentive to details and relationships.

*Felt completely enclosed, cave-like on the inside. Didn't realize for a long time that openings in the upper surface went through to the inside until I felt the ceiling. Another shift occurred when I felt underneath and realized it wasn't solid either.* And if we are looking as we touch, elements that were visually subsumed in the whole, perhaps even overlooked, can become more prominent through touch.

Because of the sequential nature of haptic perception, figure and ground also have temporal meaning. *Figure* means whatever lies within the present moment of attention, and *ground* refers to the areas previously explored or yet to be explored. Whatever I am touching is figure to my inquiring hand; everything I have already touched becomes ground. What is figure and what is ground become interchangeable, mobile, transient. The usual hierarchies of perception are considerably delayed or do not occur.

The visual categories of positive and negative are also confounded by touch. Positive object and negative space are not quite so distinct. While artists usually see space as fully as they see objects, this is a learned skill. James Lord recounts a moment in his biography of Giacometti when the French sculptor perceived space as palpable. Lord writes of Giacometti:

He began to paint once more, but after a few minutes he turned round to where the bust had been, as though to re-examine it, and exclaimed, 'Oh, it's gone! I thought it was still there, but it's gone!' Although I reminded him that Diego had taken it away, he said, 'Yes, but I thought it was there. I looked and suddenly I saw emptiness. I *saw* emptiness. It's the first time in my life that that's happened to me.'

The vividness of Giacometti's perception came from his expectation. Space was charged with the unexpected absence of an expected presence. The spaces in and around Giacometti's sculptures and paintings are charged with such presence. Space often seems to be active, sentient, pressing upon his figures as if devouring them.

*When touching, space is felt as presence.*

*What you find with your hands are the spaces, while your eyes find the objects.*

Moving consciously through space, we sense space itself—its shape, dimensions, qualities and emotional resonances. Without the overview of sight, bodies remain intensely alert for object and form to ground their wandering, constantly expecting something. As they move, they become keenly aware of absence as they search for presence. Space becomes charged rather than empty.

*The air, the space that my hand had to travel from touch to touch became very palpable.*

More importantly, the moving hand or body experiences itself moving, generating kinesthetic sensations even if there is no tactile contact with anything. When space is experienced haptically, the object and the spaces around and within the object become continuous; solid and space are equally known through movement. Both are suffused with kinesthetic sensation.

*Information taken in through the fingers was tactile and spatial, but it was a sense of space I have never experienced before, because it was not made finite and given limits by visual measurement. I sensed in a way I have only toyed with before. It was like taking LSD.*

As we come to know space through movement, it no longer seems empty; space is inhabited by the moving, sensing body.

*I had to give up my ideas of how we order space; this is totally different.*

The moving, sensing body is the medium for haptic perception. Movement is needed to feel textures, discern forms, know spaces and discover relationships, not only by passing the skin over surfaces, but also by gathering information from the speed, position and shape of the moving body.

The eyes work differently. They move from place to place in saccades to acquire visual information and form a sense of the whole, but the moments of actual perception occur only during *stillness*, when the eyes are at rest, however fleetingly. When the eyes are moving between the moments of focus, the brain suppresses sight so the scene will appear to be still despite the smearing of the moving image on the retina. If the retinal

image remains still too long, the sensory nerves adapt and sensory impressions disappear, so the eyes have to keep moving to make sense of a visual scene. In this sense it resembles touch. At the level of percept, however, sight occurs in stillness.

Because haptic perception occurs in time and motion, memory serves a crucial role in haptic cognition. Touch is linear and successive; we need to remember what we have already felt as we explore new parts in order to integrate them into a developing sense of the whole. We cannot return as easily to previously observed parts to compare and connect as we can with visual scanning. We have to repeatedly return to parts previously explored to make sense of the whole.

When seeing, we look ahead and around, constantly sizing up the situation. When touching without sight, our perceptions extend as far as the tips of our fingers. We have to inhabit the here and now. Each tactile event is unanticipated. We are committed, without knowing to what. Surprise is common, stemming from the inability to anticipate as well as from the unexpected qualities produced by touching.

*Every new thing, every little bump, was a surprise.*

This way of approaching things is so different than seeing that it produces a range of reactions, including excitement and fear.

*I couldn't quite let go of thinking I needed to be careful.*

*I feel so bombarded on a sensation level. It's overwhelming to stay with all the changes. I want to go on one surface forever. To be present with the changes I have to be really slow. When I move to a new surface the contrast is so intense I get a little nauseous. With vision I take in the whole picture and can control how much I take in, whereas with touching (without seeing) I have to deal with all the information I'm getting. I can also handle it more easily when I make a visual image in my mind; when I just feel it, it's much more intense.*

Sight is singular and centralized. The eyes, in the front of the head, confer a *point of view*. Artists and architects of the Renaissance, observing how the eyes see the world from a point of view, developed the artistic convention of perspective. Perspective structures artworks so that the visible scene arrays from an individual consciousness. Everything is aligned relative to that point of view: lines that define space, such as tables,

walls and windows, ray outward from that point; bodies are seen from one side; things farther away are smaller; hills in the distance are softened by the intervening atmosphere. The ubiquitous use of perspective in our imagery conditions how we see, how we organize space and how we place ourselves within that space. We need only look at imagery from earlier or indigenous cultures to realize there are other ways of organizing the world: bodies may be represented frontally and symbolically rather than realistically, things are arrayed according to their affective (rather than spatial) relationships, and size is determined by importance. This way of representing the perceived world has nothing to do with perspectival sight. It reveals a consciousness that is more communal, affective, and haptic.

*The Renaissance was the time of the invention of visual perspective. This work offers a new kind of perspective.*

Within the eyes themselves, small adjustments of acuity and focus are critical to sight. The fovea, the area of the retina that can focus sharply, is actually the size of a pin. Acuity falls off precipitously beyond the focal area. We have to move our eyes to bring this minuscule span of focus to more than one small spot in the field of sight. Yet the minimal kinesthetic feedback from sight contributes to the disembodied quality that accompanies seeing. We maintain focus within a small visual field at a fixed distance for long periods of time while looking at books, television, movies and computer screens. This sustained visual focus can be extremely tiring without awareness of its cause.

*The body kind of disappears.*

We now know from neuroscience that there is no coherent self running the body-mind, but rather a multiplicity of processes. Sight, with its fixed locus, perspectival potential and singular focus contributes to the illusion of the singular self. We extrapolate from the sense of sight to the sense of self.

Touch provides a much broader, more diffuse system for sensory exploration. Hands are incredibly complex organisms that can explore in endless ways, with different parts, and change their shape to a remarkable degree. Hands are part of our arms' reach, independent of each other, with a wide range of motion. The hands' "view" is mobile, changing, and adaptive.

Beyond the hands, the entire body is receptive to touch, with a vast number of sensory receptors spread across many square feet and at different levels, providing different degrees and qualities of sensitivity.

The skin is a boundary but a permeable one, allowing the passage in (and out) of fluids, salves, heat, nutrition, and pheromones. In the words of the sculptor Kiki Smith, who makes work representing the body, “After all, skin is really a lacy surface, it’s porous, like a big net, even though we perceive it as solid.” This permeability integrates us into the flow of air, sunlight and moisture, infusing and fusing our bodies with our surroundings.

The skin has a remarkable capability: elastic enough to deform and reform, it can stretch to adapt itself to whatever impinges on it, and then return to normal. The capacity to shape slightly to whatever one touches or is touched by is of subtle but critical importance to discerning shapes and textures, grasping without slipping, making tools an extension of touch, and activating deeper tactile receptors. Imagine your flesh taut as the skin of a banana; hands would bounce off surfaces rather than yield as they do. The body surface takes things into its embrace, creating more sensation as well as subtly merging with things.

The movement of haptic perception draws still more of the body into the perceptual act. Moving hands and bodies have changing, multiple perspectives with which to know a sculpture, including parts that cannot be seen. The locus of perception can be one hand, the other hand, both hands, a forearm, a back, or the whole body. We can pay attention to our internal sensations of motion or to the object being touched. Proprioception can range from the pinpoint of a finger to whole-body immersion. Hapticity spans the surface of the skin to the body’s core. This complexity yields a mobile, complex consciousness encompassing the full depth of our being.

Sight allows the illusion that we are separate, autonomous beings; we see things at a distance, as a picture, as if objectively apart from us. Sight makes distinctions. But lest you imagine you are autonomous, just feel the pull of gravity—your weight. Notice where you touch the ground, the floor, the chair. Notice the constant slight effort to remain in balance. Feel the air entering your lungs. The sense of touch reveals connection rather than separation.

*The more you engage through touch, the more the division between us and the environment dissolves.*

Although very different, sight and touch remain fused. People touching my sculptures often describe their haptic experience in terms of sight—as being different than seeing or better than seeing or as a kind of seeing. In daily perception, sight and touch work together in a dynamic interplay of figure and ground; the figure of sight is always supported and infused by the ground of touch. Haptic perceptions and haptic memories constantly feed information into our visual grasp of things. Whether we know it or not, sight is always grounded in the body. When we ignore or alienate the body, the connection between visual and haptic senses becomes attenuated. We lose depth and richness.

We spend much of our time using focused sight at a fixed distance with a single focal length. In our culture the narrow, focused qualities of sight are more valued than the broader, more diffuse, complex qualities of touch. Touch can be used in a focused, precise manner, such as a jeweler cutting a diamond or an acupuncturist feeling pulses. Sight can be used in a broad, unfocused way, as it is by a hunter in a forest or a teacher before a classroom. We can use either sense anywhere in the continuum between focused and field awareness. However, in our culture, where focused sight is so central to our activities, and where touch is relatively devalued, focused sight is the figure in our perceptual repertoire.

Finnish architect Juhani Pallasmaa has written a compelling manifesto for the individual and social need for haptic consciousness in *The Eyes of the Skin*. He suggests that peripheral sight is an important counterbalance to focused sight, allowing in more and different information. This would be especially true in architectural settings. In the same way, shifting from focused sight to touch can broaden perceptual perspective; touching can open sight to different ways of seeing. Such a dynamic interplay between sight and touch can mean new ways of conceiving both self and world. One gentleman found the differences between tactile and visual perception confirmed his notions of reality:

*There is no ultimate physical reality. The world is plastic and not concrete, on a psychic level but physically as well. On a tactile level, things exist completely differently than visually. By touching first, I have the opportunity to juxtapose those two realities, to feel them as equal in weight. There's no one-to-one correspondence between tactile and visual realities. And it's not as if they complement each other—they don't.*

Some people notice only minor divergences between their haptic and visual images, but still find the distinction worth noting. That such differences occur between the images we create through touching and those we create through seeing seems critical for understanding perception. Touch and sight provide considerable overlap in information, which is why touch can stand in for sight and why it may seem redundant to sight. Yet even when there is overlap, the *experiential* differences color the information. We may know the smooth ovoid shape of a marble Brancusi head by looking at it and imagining how it would feel to touch, but when we actually touch it, we know it in a different way. We feel coolness, smoothness, mass. It might suggest a child's head to sight, while feeling it may trigger memories of touching a river stone. As artist Magdalena Abakonowicz says:

I touch and find out the temperature. I learn about roughness and smoothness of things. Is the object dry or moist? Moist from warmth or from cold? Pulsating or still? Yielding to the finger or protected by its surface? What is it really like? Not having touched, I do not know.

The experiential differences between the two sensory modes have emotional, psychological and spiritual dimensions. Touch and sight provide us not only with different ways to perceive, but also different kinds of consciousness, different ways of being. Touch and sight carry implications for how we behave in the world, and how we conceive who we are.

Pallasmaa addresses the field of architecture but his diagnosis of social ills, which he sees as related to visual dominance, and his prescription of haptic, embodied knowledge, apply to the other visual arts and to the culture at large. The use of technologies, he writes, has collapsed time and space so that we live in a “perpetual

present, flattened by speed and simultaneity, and grasped by instantaneous perceptions of the eye. The only sense that is fast enough to keep pace with the astounding increase of speed in the technological world is sight.” The mass production of visual imagery and its proliferation into every corner of our lives tends to “alienate vision from emotional involvement and identification, turning imagery into a mesmerizing flow devoid of focus and participation.”

Pallasmaa laments how the magnification and alienation of sight has affected architecture, which has “housed the intellect and the eye, but...has left the body and the other senses, as well as our memories and dreams, homeless.” He could be speaking of currents in contemporary art when he says it is “often more engaged with the architectural discourse itself and mapping the possible marginal territories of the art, than responding to human existential questions.” He decries such architecture as marked by nihilism and narcissism: “The narcissistic eye views architecture solely as a means of self-expression, and as an intellectual-artistic game detached from essential mental and society connections...the nihilistic eye deliberately advances sensory and mental detachment and alienation.” The Czech filmmaker Jan Svankmajer concurs: “In modern life, hearing, seeing and taste have been perverted. Smell has been destroyed. The only pure, virginal sense that remains is touch. It’s also the only one that hasn’t been catered for by the arts. It hasn’t been aestheticized. I see it as an unexplored plain; I believe there is buried treasure there.”

We see so many images, which remain pictures rather than felt, fully sensuous experiences, that we have learned to view the world around us as if looking at pictures: flattened, framed, and detachable. We conceive even ourselves as images, as if seen through the lens of the media rather than felt from the inside. In discussing the differences between sight and touch among docents at an art museum, one of the women, who was in her sixties, said she was looking in a full-length mirror after a bath; turning to her husband, she asked him, “What could you possibly still like about this body?” to which he responded, “It feels good.” She had asked the question from the perspective of the visual image, which is subject to standards and stereotypes; he had responded from haptic consciousness, which is more internally driven. Sight tends to contribute to a feeling of exteriority, and touch to interiority.



Underlying these problems lies alienation from the body. The disembodied quality of sight renders us spectators, viewers and observers instead of being physical, sensory participants. From such a distant, detached point of view, the world we generate will also be distant and detached. When the body is the center of perception, sight is grounded within the full sensory continuum. The haptic sense roots us in the body, drawing us back from the potentially disembodied aspect of sight.

Deepening the relationship between sight and touch leads to more flexible, versatile ways of knowing. The two modes balance each other. The speed, range and acuity of sight work in tandem with the sensuousness, depth and connectedness of touch to enrich our perceptions, our world and our ways of being. The visual and haptic senses fuse to create a unified field with depth and extension. As Pallasmaa suggests: “The percept of the body and the image of the world turn into one single continuous existential experience...there is no body separate from its domicile in space, and there is no space unrelated to the unconscious image of the perceiving self.” The ethereal light by which we see uses the flesh and blood of touch.

The separation of the senses has served the purpose of discerning the differences among the sense and examining each as if in isolation, but now it is time to restore their unity. A tree would be a better metaphor for the way the sensory systems work in concert, each sensory nerve a root leading to the trunk of the spinal chord and flowering into the branches of the brain. But even that image does not convey the complexities of their interactions. And touch itself is useful, in its sprawling, multi-leveled, untidy richness, for reminding us that the senses are not discrete, separate functions.

