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DRAWN TO DISCOVER: A COGNITIVE PERSPECTIVE

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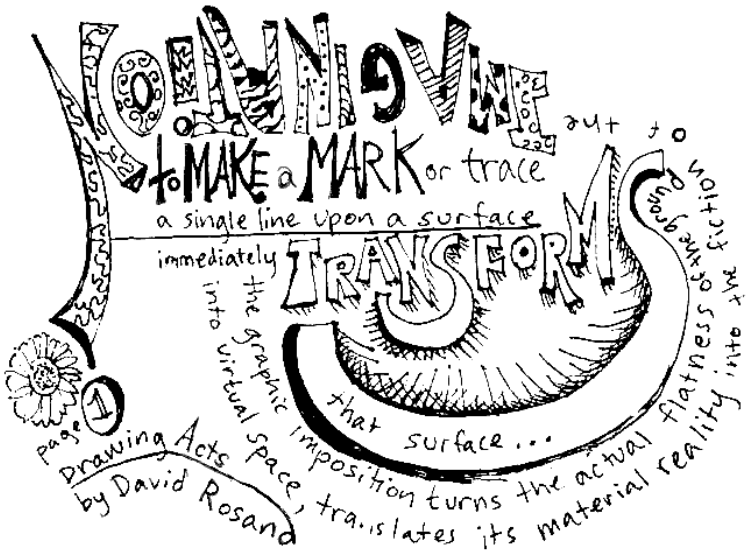
Contemporary artists often report that they draw to generate and explore new ideas and test established ones. An open-ended process often utilizes deliberate ambiguity to promote discovery. Indeterminacy allows the drawing to take on a life of its own, which is often experienced by the artist as separate and distinct from his or her conscious will. A kind of dialog between drawer and drawing ensues. Nurturing the relationship between drawing and drawer and allowing the drawing to find its own independent voice seems to be key in promoting discovery. The drawings that accompany this article, unless otherwise noted, are made by the author, and represent her own personal investigation into the drawing process.

INTRODUCTION:

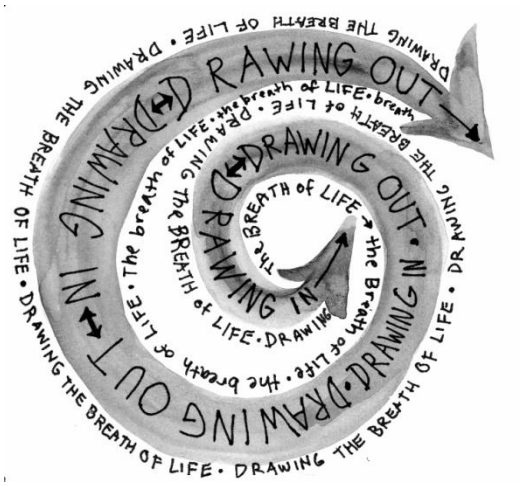


'To make a mark or trace a single line upon a surface immediately transforms that surface, energizes its neutrality; the graphic imposition turns the actual flatness of the ground into virtual space, translates its material reality into the fiction of imagination' (Rosand 2002, p.1).

How can the act of drawing help drawers think through ideas and experiences? What kinds of knowledge and understandings are cultivated through the drawing process? I made the informal drawing above to explore an important idea which opens Rosand's investigation of the drawing practices of Renaissance and Baroque artists. Through the act of drawing the opening lines of "Drawing Acts," I transformed a sheet of paper into an imagined space, and there was able to more fully understand and internalize the words I had read. This sketch is part of a series that have become a useful part of my own investigation of the drawing process. By giving external, visible form to ideas or perceptions that would otherwise be hidden inside the brain and body, drawing gives the drawer a chance to reexamine, revise and expand upon thoughts and feelings in the light of day.

Drawers of all sorts, ranging from artists to designers, architects and engineers, often report that they draw to generate and investigate new and established concepts and percepts. Artists may differ from others who draw as part of their professional practice, because the process of discovery can be an end in itself, rather than simply the means of solving a pre-defined problem. What is it that allows skilled artists to continually find something new in the process of mark-making? From from a review of the literature, countless discussions with a wide variety of contemporary artists, and from my personal experience as a practicing artist, I have identified common cognitive processes that underlie very different kinds of work.

The simplicity and accessibility of materials needed, and the way drawing can be a very direct externalization and exploration of thought, makes drawing a particularly valuable arena for developing the human imagination and capacity for invention. For artists, drawing is often experienced as a journey without a known destination. Drawing, in this case, can be a process of what has been called problem construction or formulation (Csikszentmihalyi & Getzels, 1989, Simon, 1984). As marks accumulate on the drawing surface, the drawer begins to respond, not only to what is in his head, but also to what is happening on the page. A kind of dialogue emerges, as the artist interacts with the material traces his own hand has inscribed on the drawing surface.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Donald Schon, in his influential book, 'The Reflective Practitioner,' contrasts 'knowing-in-action,' the kind of procedural knowledge, or enactive cognition, in daily use as we drive to the grocery store, change a diaper, or mow the lawn, with reflection-in action, which is metacognitive. We begin to reflect on what we know when something comes up that is surprising, unexpected or problematic. At those moments, we may need to sort through alternatives, to feel our way through those 'troublesome "divergent" situations of practice (p. 62). The more 'know-how' we accumulate, the easier it may get to cease to question, and just go about our daily chores in the expected manner. Artists and designers often introduce uncertainty deliberately into their sketches, to afford opportunities for discovery. Experts can find new meanings through alternative associations, or frames of reference. Openness and fluency of analogical thought seems to be gained through experience. (Goldschmidt, 1994)

Fish and Scrivner write, in Amplifying the mind's eye, 'Sketches contain deliberate or accidental indeterminacies that are important to their function. Amongst the indeterminacies commonly found are blank spaces where the drawing fades away, multiple alternative contour lines (penitmenti) missing contour lines, wobbly lines....one reason for such indeterminacies is the need to preserve alternatives.' (1990, p. 120). They recount Leonardo's report of gaining inspiration from cracks in the wall and clouds in the sky, indeterminate images that were able to spark thought. This is a strategy that Fish and Scrivner detect in a wide variety of sketches of both artists and designers, from observation, memory and invention. Indeterminacy, they write, 'can provoke innate, unconscious recognition mechanisms to generate a stream of imagery' (p. 140). The more problematic an image is, they suggest, the more effective it may be in stimulating new ideas.

Gabriela Goldschmidt details the 'oscillation of arguments which brings about gradual transformation of images' (1991). Using a talk aloud protocol analysis method, Goldschmidt investigated the 'ping-pong' pattern of interactions, 'moves' and 'arguments' that architects had with their design sketches. She recorded the quick systematic alternation of 'seeing as,' and 'seeing that,' in other words, interpreting (and re-interpreting) the gestalt of the figural elements in the sketch and imagining how they might be transformed. The intentional ambiguity of the sketcher's first thoughts allow for this consideration of alternatives. Goldschmidt proposes that the 'continuous production of displays pregnant with clues' in order to generate new ideas is unique to the drawing process, and does not occur in other kinds of visual production (p. 140).[1] In her essay, 'What do sketches say about thinking?' Barbara Tversky writes, 'Sketchers make sketches

1 Kevin Henry, an associate professor of industrial design at Columbia College of Art, noticed that as his students' drawing skills declined, due to their increasing dependence on digital 3-d modeling, their creativity also declined, and recently wrote a book, Drawing for Product Designers, (in press) to address what he sees as an urgent need for his students (personal communication).

with certain ideas and goals in mind, but fortuitously, may see new objects and configurations in their sketches. These encounters produced welcome but unintended discoveries, and may be a fruitful source of new design ideas.'

Vinod Goel, in Sketches of Thought, lays out a theory that sketches may provide a better model of important characteristics of human thought than a computer (1995). The dense, rich and ill-defined qualities of sketches make them such fertile territory for new ideas, Goel suggests, because they mirror the richly layered, complex and ill-defined characteristics of much of human thought. Goel borrows Nelson Goodman's distinction between 'repleteness' and 'attenuation' (Goodman, 1976, p.230) to describe what is unique about sketches. Computational models and drafting systems, like natural language and sketches, can denote and exemplify certain aspects of reality. Natural language and sketching, however, differ, in that they can also be ambiguous, undifferentiated and expressive. Sketching alone, according to Goel, is replete, and non-disjoint. As Goodman says, 'Any thickening or thinning of the line, its color, its contrast with the background, its size, even the qualities of the paper—none of these is ruled out, none can be ignored' (p.228). Because of 'repleteness,' this dense range of possible interpretations, sketches, like internal thoughts, can resist fixed meanings and generate new directions for further inquiry.

Tolerance for potential mistakes and willingness to revise are hallmarks of expert drawing skill. Research on sketching by expert designers and architects has shown that they are slower to "solve" the problem at hand, literally drawing out the process to give themselves time to think through the sketching process (Verstijnen et.al., 1998). The indeterminacies become openings for the unexpected. A kind of breathing room is created that allows for a kind of call and response between the drawer and his or her work. Artists often incorporate similar kinds of indeterminacies through sketching or even more deliberate courting of the accidental and incidental. This often extends beyond sketching. For example, Jane Fine , who I have interviewed as part of my research, is only one of many contemporary artists following in the footsteps of Jackson Pollock and others by dripping and pouring paint to provide a stimulus for response.

DETAIL FROM "WRETCHED REFUSE," BY J. FIBER (A COLLABORATION BETWEEN JANE FINE AND JAMES ESBER)

THE THINKING (SEEING) HAND

The practice of drawing for discovery can itself be traced back at least as far as the Italian Renaissance, when many of the representational techniques and drawing methods that dominated European and American drawing for the last 500 years were developed. Renaissance artists invented a whole new way of investigating the visible world by means of what art historian David Rosand calls, the 'seeing pen' (2002). They studied human anatomy, invented linear perspective and absorbed aerial perspective through their exposure to Chinese landscape painting (Cahill, 1985), in order a powerful sense of verisimilitude. The practice of 'pensieri,' or sketching, literally 'thoughts,' first came into usage during this time (Goldschmidt, 1991). Rosand explains how Leonardo da Vinci used drawing and sketching to investigate the natural world, and create new knowledge. He writes, 'Leonardo had come to discover a correspondence between the form of motion in nature and the motion of his own hand in drawing. A basic linear structure became his way of both seeing and recording, and it is hardly unique in the history of art that hand and eye so acknowledge their mutual dependence. With pen or chalk in hand Leonardo saw better. Through graphic gesture he could make visible those forces of nature that seemed to lie beyond the threshold of normal perception' (p. 97).

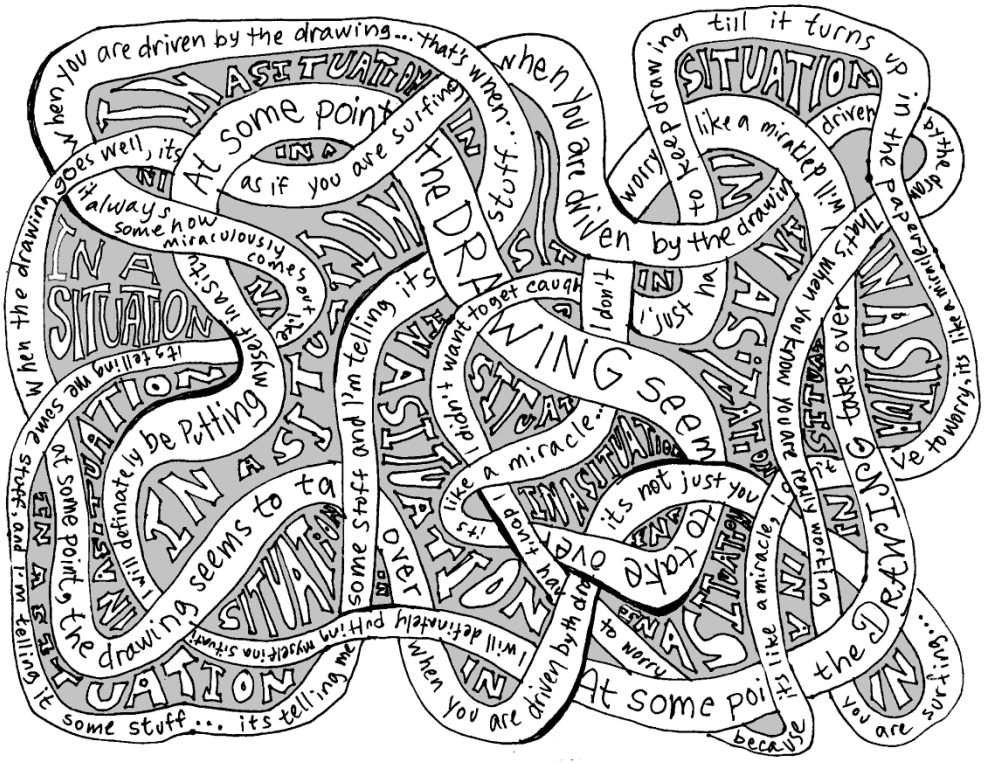
How is it that our hands can sometimes reach out and grab hold of that which is outside normal awareness? Metaphor becomes realized through marks on paper. This notion that drawing can capture what 'lies beyond the threshold of normal perception' is a common in drawing pedagogy. Kimon Nicolaides, an extremely influential drawing teacher at the Art Students' League of New York in the 1920's and 30's describes his students' experience of gesture drawing, as they learn to loosen up and express their 'first thoughts': 'Often students do them well and are quite surprised at the results, which are far beyond any knowledge they have. The reason is that by working quickly they accidentally find the gesture. The gesture is a feeler which reaches out and guides them to knowledge.' (1941/1969, p 14). More recently, results of Judith Burton's research study on figure drawing with 7th graders demonstrated a similar leap in their drawing skills, simply by learning to trust the dialectic process of seeing and doing. After seven weeks of playful exploration with a variety of materials, students were able to make a huge leap in their ability to draw the human figure. In the pre-test, drawings were stiff and constrained, less so when drawing from observation than from memory, but still limited in their expressive range. In the post-test, 'the drawings have a presence and… exhibit great confidence in their interpretation of what most observed to be the "livingness" of the human form' (n.d., p.13).

In order to determine common experiences that might underlie very different kinds of work, I have been videotaping and interviewing a variety of contemporary artists as they work. Tara Geer's abstract drawings are made from observation.

My drawing below is from observation of Tara's hands as she worked in her studio. What I noticed as I drew was how quickly and decisively her hands moved: they clearly knew what they were doing and seemed to possess a sense of agency all their own, apart from her conscious will.

Other artists I have videotaped each seem to have their own individual habits and routines which allow their hands to see and think for them: through deliberate and sustained practice they have developed specific manual skills which shape their journey as they feel their way forward. This seeming independence of their hands from their conscious will seems to be key in allowing them to be surprised by what they have made.

Artists often describe getting themselves "in a situation" where "the drawing seems to take over." The words in my drawing below are taken from numerous interviews with artists as they recount their drawing processes. At a certain point, a sense of autonomy is passed from the hands to the drawing itself. Artist Vicki Behm explained how she gives herself over to the experience, saying "It's like a miracle: I don't have to worry." This submission to the process is often described as a pleasurable feeling of letting go, letting "the drawing take over."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THE DIALOGUE

> *'When the intensity of looking reaches a certain degree, one becomes aware of an equally intense energy coming towards one, through the appearance of whatever it is one is scrutinizing....The encounter of these two energies, their dialogue, does not have the form of question and answer. It is a ferocious and inarticulated dialogue. To sustain it requires faith. It is like burrowing in the dark, a burrowing under the apparent. The great images occur when the two tunnels meet and join perfectly. Sometimes when the dialogue is swift, almost instantaneous, it is like something thrown and caught' (Berger, 2005, .p 77).*

The writer and artist John Berger has written extensively on the first person experience of drawing. His account is vivid and familiar to experienced drawers. Here Berger is referring to observational drawing, but from my own experience and with discussions and observations of artists who do not work from observation, the experience Berger describes is common across a great variety of drawing types. Many artists have refer to the 'intense' quality of the dialogue that they have with their work. The painter Phillip Guston, who did not work from observation, described his drawing practice as a form of combat, and referred to the 'instantaneous' dialogue that he had with his work. 'I draw constantly when I paint, I'll take a week off and do hundreds of drawings. It's a form of germination" Guston said. "What I always try to do is eliminate, as much as possible, the time span between thinking and doing. The ideal is to think and to do at the same second, the same split second' (Stiles & Selz, 1996, p. 154).

Paradoxically, the automaticity of expertise, the procedural knowledge which enables skilled artists to draw faster than they can think, facilitates the dialogue, enabling the drawing to speak back to the artist with a distinct and independent voice. The psychologist, Daniel Wegner, has written extensively on the sense of agency and free will. He explains, "Because automatic actions do not support inferences of agency during the action, it turns out that many of our most fluid, expert, and admirable actions are ones we do not experience consciously willing." (2002) In drawing, this is experienced as if the drawing , the work of one's own hands, develops a mind of its own. It is Galatea to the artist's Pygmallion, Pinocchio to Gepetto. Not incidentally, Pygmallion and Gepetto are masters of their craft: in these stories, the superior procedural knowledge of the artists, their expert skill allows their work to breathe on its own. And only then does the unexpected happen.

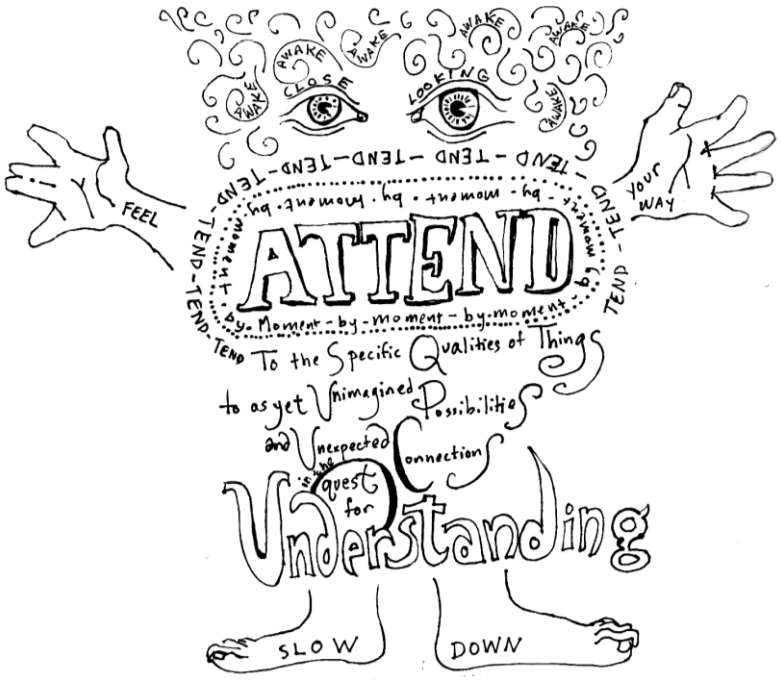
Yet the essence of the tale of Pinocchio, the process by which works of the imagination seem to come alive, is familiar. It harks back to the imaginary friends of childhood. Marjorie Taylor, in her book on imaginary friends, discusses the process by which these

invisible companions can take on a life of their own, despite the child's understanding that it is 'just pretend.' She tells the story of a mother's frustration when her daughter's imaginary pony failed to show up for the birthday party. There was nothing that could be done: the pony was just not in the mood for a party (1999, p.153). My thirteen year old daughter recalls the imaginary world she created as a young child, 'I would set up a situation and then just watch what happened.' As a child, I also constructed an imaginary world, with an extensive cast of characters, that I would visit often, but that I knew carried on quite well without me. This is very similar to the way adult artists and writers talk about their work. The difference may be that the adult artist has the skill and knowledge to give tangible form to the works of their imagination, which enables them to speak to others.

Taylor compares the experience of imaginary friends that take on a life of their own in childhood to adult authors' accounts of their relationships with the characters in their novels, and asks 'At what point does an author's loss of control occur and what does that mean?'(p151). Taylor cites Wegner's work on 'our sense of having consciously intended our voluntary actions in something of an illusion' and adds, 'The point here is that the possibility of experiencing an imagined being as acting independently is entirely consistent within the larger framework proposed by Wegner…it seems likely that this process takes some time to develop. In other words, I suspect that imagined entities become unruly only after the fantasies involving them are well established. This hunch fits with work by Hubert Dreyfus and Stuart Dreyfus showing that performance becomes automatized with increasing expertise' (p. 251). Phillip Guston corroborated Taylor's hunch. 'All I can say is that, when I leave the studio and get back to the house and think about what I did, then I like to think that I've left a world of people in the studio. A world of people. In fact they are more real than the world I see…It's a long, long preparation for a few moments of innocence' (Stiles & Selz, p. 250).

The graphic novelist Lynda Barry recounted her experience relationship with her characters at a roundtable discussion on *The Art of the Graphic Novel* in New York City. She said that the most important thing is to show up. 'My characters need to know I'm reliable. Then they'll do the rest' (Philoctetes Center, 12/12/10).[2] In her book on drawing, *Picture This,* Barry emphasis the importance of deliberate practice, of keeping the hand moving, in order to set the stage for the characters to appear. She writes, 'It is funny to think of the characters in my comics as being mine. I didn's plan their arrival. I didn't know they were coming…I don's know why I drew them again at first, but they quickly took over my comic strip. When I moved my brush across the paper wall, they were there. When I stopped my brush, I'd lose the signal, and I couldn't get it back by thinking' (2010, p.116

[2] The video of this roundtable is available on Youtube: http://www.youtube.com/watch?v=zvgZB-V_2_c



The artist William Kentridge makes animated films with charcoal on paper. What he records is the process of drawing itself. His film 'Tide Table,' is an elegy to his own childhood memories of people and animals on the beach near Capetown, South Africa . He felt his way through the images, as they emerged in the process of drawing. The diverse characters 'wandered onto the scene in quite a blind way, and the hope is there are meetings and recognitions once they are there.'[3]. Kentridge explains his process in a manner that echoes Barry and Guston's descriptions, 'I often find that if I start drawing, and find a certain formal clarity in that drawing, then the content, sometimes in the form of a story, will come along. Drawing, at least for me, is always about turning a corner, and I can's always see what's around that corner. In a sense you just keep drawing.' In a later annotation to his own words he continues, 'In the hope that it will turn a corner, and reveal something I cannot see at the beginning.' (Rosenthal, 2010, p. 238).

Allowing oneself to be surprised may be an important component of what it means to truly "know how" to draw. By drawing attention to that which is beyond our conscious control, we learn to attend to our moment to moment experience instead. What perceptions and inner awareness rise up when we dare to feel our way forward, noticing the specific qualities of things, which can be experienced so differently when words are left behind? Drawing requires us to slow down, and in the process we encounter new possibilities and unexpected points of contact. And in the "virtual space" created by marks on a flat surface, discovery happens.

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[3] *William Kentridge on the Making of 'Tide Table.'* (San Francisco, California: San Francisco Museum of Modern Art, 2009), Museum of Modern Art (MOMA) website, Flash, http://moma.org/interactives/exhibitions/2010/williamkentridge/flash/index.html#16 (accessed June 29, 2010).

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