3 Hot glass

The calorific imagination of practice in glassblowing[1]

Erin O'Connor

Imagination and reverie are often thought to be repose from practice, that everyday corporeal engagement with the world. In a similar vein, symbols have been regarded as floating above practices, as storehouse of meaning, expressive, but not constitutive of practice. Imagination, however, does not float above practice. It is deeply rooted in practice – in the relations of embodiment that structure our everyday social worlds, simultaneously salient to the generation and persistence of those practices – it is the organ of reciprocity of material and practice. Through understanding imagination as a generative force of practice, we can reconsider the role it has been scripted in theories of culture. Practice is not that *through which* we imagine; the cockfight is not a theatre of expression and display of what the Balinese men might imagine themselves to be, as Clifford Geertz argues. Imagination is an imperative of practice itself. The more deeply you imagine, the more deeply you practice – and, conversely, the deeper the practice, the deeper the imagination. Practical imagination, material imagination, the imaginative substance of practice complete with all in which the practice itself is engaged, embedded, intertwined, as a constituent element of practice, is itself constitutive, not expressive, of culture – the lungs of culture.

Drawing from two years of *in situ* ethnographic fieldwork in a New York City glassblowing studio, as a student and teaching assistant, and from an apprenticeship with a glass artist, I will explore the imaginative modes of glassblowing, from my own experience and that of others, elucidating the relations of imagination and practice across varying stages of proficiency: the dialectic of formal image and practice, one of light and technique; the recession of meaningful practice and practical imagination in fascination, one of heat and embodiment; and the emergent reciprocity of imagination and practice. I will examine this reciprocity, first and foremost, in the embodiment of glassblowing tools, and, secondly, in the intimacy thereby constituted with the material, a relation of heat and incorporation – a journey from the light to the heat. In this venture, we will see how embodied imagination, tied to practice, allows for the ascension of an "art," be that glassblowing, poetics, physics, or politics – a practice refined by the subtleties

of its field. Without this embodied, material imagination, practice lacks depth, like a shadow, or souvenir removed from original meaning.

The seduction of glass

I had already been an admirer of glass for some time, finding myself reminiscing about my grandmother's crystal figurine collection – the frogs, the clowns, the swans – holding them to the window light, admiring their many facets, repositioning them at the center of a mirror-coaster. My childlike fascination similarly riveted me before a Bergdorf Goodman holiday window on Fifth Avenue in 2002 – a winter reverie of sheer sparkling splendor: countless strands of crystal beads chaotically strung above mounds of blue-tinged glass shards, catching the light of a grand chandelier; crystal chalices, bowls, and carafes adorned a deep mahogany serving table, themselves wrapped in strands of cut glass cascading to the floor – a mirror reflected the luxurious delight, these remnants of decadence. I loved glass – loved to drink from it, look at it, hold it, press it to my cheek – to see through it, to the optics of the stem below, to the person opposite me – to see what it brought to the window light.

Many beginning students of glassblowing had exposure to, and were enthralled by, not only the objects of glass, cool and formal, but the practice itself in some manner. They cited these experiences as motivation for enrolling in the course:

> Matt, a student in his late thirties, explained that he was given the beginner's glassblowing weekend workshop as a birthday present: "We collect glass window ornaments and so my wife got me this class for my birthday. We've also been to Murano."[2] Similarly, Kathie had enrolled in the workshop after seeing Dale Chihuly[3] blow glass at a garden exposition in Atlanta, Georgia, while Ruthie, a dedicated collector of paperweights, including those of renowned Paul Stankard,[4] wanted to make some of her own.
>
> (Field notes, April 23, 2005)

In another case, a man, also in his late thirties, had wanted to learn glassblowing since he first saw it at a "crafts village" when he was nine years old (Field notes, June 6, 2005). Though the specifics of their stories differ, it is not uncommon that at least some beginners, including myself, enter the glassblowing studio having been seduced by glass in some *form*, whether the objects of consumption or collection, or the choreography of the bodily art itself. It is often those cool and formal images of glass that the beginner envisions as the object of her practice. To a great extent, the novice's knowledge of glass in one of light – cool hard forms, refracting, reflecting, and capturing the light. Blowing glass, however, is a practice informed not by cool reflective light but by engaging heat. However, it is the imagination of

light that the novice first brings to her practice of glassblowing – with it she envisions both the chimera and the caricature.

Images of glass: the chimera

In a beginning glassblowing class in February 2004, my instructor, Rob,[5] asked us to start bringing a notebook to class in which to take notes during the demonstration. He added that he would also like us to bring sketches of objects that we would like to make, which he would demonstrate for the class. A few weeks later, when Rob asked if anyone had brought a sketch, I showed him mine:

> "This is actually relatively simple. The only thing that might be different is getting that off the center like you have sketched," he said, looking at the sketch with a puzzled expression, and continued, "What exactly are you trying to accomplish?" "A pen holder/desk thing," I responded. It sounded so boring. "A pen holder/desk thing?" Rob asked, jokingly skeptical. "Yeah, a friend of mine just got a teaching position, so I want to make him a pen holder," I explained. I watched with curiosity as he made the piece and wondered, as it increasingly didn't look like what I had intended, how he was going to finish it . . . He finished – it wasn't anything remotely close to what I had envisioned. "Is that it?" he asked. I looked at him, half-smiling. "That face says 'no,'" he continued, answering himself. "You don't want to save it?" "Well, it's ok, it just looks like a miniature Christmas tree stand," I said. "A miniature Christmas tree stand, she says, folks! Christmas tree stand," he exclaimed. His assistant's gaze punished me as an ungrateful child.
>
> (Field notes, March 18, 2004)

I had seen an array of pen stands in my life, although generally of the veneered wood variety, and had a vague idea that a pen holder was connected to prestige and success. These rather embarrassing impressions were fodder to the sketch (Figure 3.1) – essentially a reproduction of an image I already possessed. Though I knew that openings in the piece could be formed from the bubble, which is always on-center, I had not brought this knowledge to bear on the sketch, placing the pen well off-center. I sketched without thinking of the techniques I had learned in my fledgling four months of glassblowing, nor how the glass itself might be expressed in a form known through wood veneer. I had not thought to take the time to translate the form into glass terms. When asked to "envision" an object, I lacked the ability to "see," to "envision" with the glass, an act necessarily rooted in the corporeal memory of the interaction with the material in practice itself. I could only imagine from my hitherto established practical sense of glass – the cool hard reflective form. Moreover, I imagined only a general hard form, given that the fabrication of a penholder from wood veneer was equally alien to me.

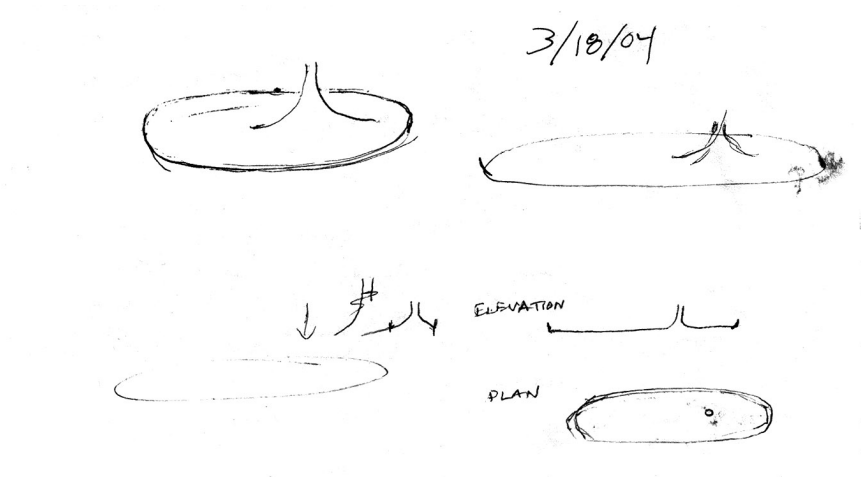


Figure 3.1 Sketch of penholder for a friend, Ernesto

My imagination for forms lacked any material depth gained through practice – the penholder was a chimera insofar as it had nothing to do with either the practice or the material of practice.

However, even the sketches brought by beginning students, who have thought through their objects in "glass terms," do not seem to "get at" what captures the imagination of the proficient glassblower. During a course in the fall of 2005, in which I was a teaching assistant, a second-time student, Gretchen, handed her sketch to Adam the instructor.[6] He responded:

> "Ah . . . a pitcher." My ears, as did the other teaching assistants', heard the resonating drone of monotony in his voice, and we looked at each other with a grin. "Great, yup, we can do this," he continued, the drone undetected by the students. He looked at the sketch again, "It's actually like the Kool-Aid man," he offered. We all laughed. He chalked the form on the cement floor, complete with eyes and smile.
>
> (Field notes, November 10, 2005)

While a pitcher is a completely legitimate form, blown across all levels of proficiency, its rendering, such as where the handle is placed, how the lip is flared open, or the proportions she has given to the fuller lower body versus the girded pouring neck – that is, *how* she has imagined the pitcher – falls short of capturing the depth and potential of the material. The subtleties of the form did not get at the complexities of the material. What is the source of the glassblowing imagination such that subtleties of form and complexities of material are wedded?

Touching the glass: towards the warmth

Warmth characterizes the first contact of the novice with the glass – warmth in the eyes from the luminosity of molten glass, orange and soft with heat – warmth upon the skin from the flames of the roaring glory holes and furnaces – warmth deep behind the nose, odors of burning wood and newspaper, sweat – and of course warmth in her own limbs, the graceful movements and gestures stirring her, without explicitly asking, to motion. The novice is poised towards her immanent engagement with the glass, open, already experiencing the material. The warmth itself invites the dream of shaping, an undulating dialectic of resistance and reception. This anticipated corporeal dialectic turns the novice towards "consciousness of inner heat which always takes precedence over a purely visual knowledge of light" and perhaps the novice, like Novalis,[7] senses that "[l]ight plays upon and laughs over the surface of things, but only heat *penetrates*" (Bachelard 1964: 40).

The immersion in warmth, simply by virtue of being in the studio, alights the novice's imagination from her body. In the actual encounter with the heat, in her first *gather* of glass, this invitation to engage the warmth is quickly overtaken by practical demands of the heat, yet corporeally incorporated and thus yet a figurative component in her imagination. While the novice may have aspirations for penholders, window ornaments, vases and intricate paperweights, the practice, even if encouraged by the anticipatory sensations of warmth, cannot yet realize those images. Rather, the novice's encounter with the heat awakens schemata with which to manage the situation. The adaptation, which structures this management, disposes the novice's body such that she begins to know and understand the material. Through learning and incorporating these dispositions, and thus coming to the material, the novice is able to begin to understand the heat.

To gather the glass, one must (1) warm the end of a gathering rod, a steel pipe approximately three feet long and up to two inches in diameter, (2) take the warmed pipe to the furnace, where the molten glass is kept, (3) open the small front door of the furnace and dip the warmed tip of the pipe into the glass while rotating, and (4) withdraw the pipe from the glass while still rotating with the "gathered" orb of glass on the end.

> Following Deb's[8] demonstration of gathering from the furnace, we said, "Ok, everyone grab a punty." The students had only been in the studio for about 30 minutes. Deb and I tried to coax them out from their timidity as they stood before the furnace's scorching heat, blinded by its glare, only pensively moving towards extending the punty into the furnace. We adjusted their hands, their position before the furnace, and tried to protect them from the heat, as they dipped the tip of the pipe into the glass, peering for the effect through the small opening in the furnace door.
>
> (Field notes, February 19, 2005)

The results of the gathers varied widely: some hardly nudged their pipes through the opening, gathering little or no glass, while others gathered a foot and a half up the pipe. The deftness of the gather, however, was irrelevant to the purpose of the exercise: namely, exposing the student to the experience of that invariable first step of glassblowing, the gather and everything that goes into it – the advance of the glass, the blinding glare, the singeing heat on the hands, wrists, forearms, cheeks, and its viscous grip on the pipe. The exercise effectively required her to adopt a disposition, a schema with which to handle the situation. Characterized by a consciousness of the heat, even overwhelmed by the heat, her management of the situation is not yet imaginative practice, but utilitarian, using or adapting the means available to accomplish a certain end. For example, gathering involves the sensation of heat and the motion of retrieval, common to experiences such as working a campfire or fishing respectively. Past experiences, the individual's own history of practice, translate the experience of first reaching towards a vat of molten glass so that a schema with which to manage the task of gathering, keeping adequate proximity from the heat and "retrieving" the glass without catastrophe, is engendered. This is a corporeal translation of new experiences through adaptation. Thus, in practice, the glassblowing *habitus*, that system of "structured, structuring dispositions," begins to take shape (Bourdieu 1990: 52): "[W]e are *disposed* because we are *exposed*. It is because the body is (to unequal degrees) exposed and endangered in the world . . . that it is able to acquire dispositions that are themselves an openness to the world, that is, to the very structures of the social world of which they are the incorporated form" (Bourdieu 2000: 141). Through learning the dispositions necessary to get to know the glass, the novice's body is immersed in this adaptive process of translation. The meaning with which she reads the practice is imported, as it is not yet in the practice's own terms.

Anchored in the body, perception is able to envision that which is corporeally incorporated. Thus the images of glass noted above, the penholders, window ornaments, vases and intricate paperweights, could not be "seen" even while sketching or describing their forms. With untrained bodies, we lacked the dispositions and the consequent habitus with which to "see" these images, given that "sight" is anticipation engendered by the corporeal incorporation of the practice:

> Social psychology is mistaken when it locates the dialectic of incorporation at the level of *representations* . . . This is firstly because of all schemes of perception and appreciation in which a group deposits its fundamental structures, and the schemes of expression through which it provides them with the beginnings of objectification and therefore of reinforcement, intervene between the individual and his/her body.
>
> (Bourdieu 1990: 72–73)

Gathering is the first step of the incorporation of the dispositions of the practice and that which instigates the development of corporeal sight.

Once the novice has gathered, she begins to attend to the glass with hand tools. With this, the horizon of her corporeal sight becomes more expansive. To feel through tools is to extend ourselves into and embody those tools.[9] Embodiment, or extension of our corporeal bodies through things, permeates our everyday experience – the grade of the pavement through our bicycle's tires, the shaking limb of a tree while swinging, the lake beneath a sailboat's hull – our lived body is much more than our own flesh and blood; our body reaches out and inhabits a phenomenological domain. In *Personal Knowledge*, Michael Polanyi discusses this process through which instruments recede from consciousness and become extensions of the body: "[T]ools . . . can never lie in the field of . . . operations; they remain necessarily on our side of it, forming part of ourselves, the operating persons. We pour ourselves out into them and assimilate them as parts of our own existence. We accept them existentially by dwelling in them" (Polanyi 1962: 59). Through attending, the novice begins work with and against the heat of the glass, shaping while it's hot, heating when it becomes cold.

Thus, the first collaboration with the heat, beyond managing it, takes place in the course of *shaping*. The use of the hand tools in *shaping* the glass provides an opportunity for the individual to consciously explore, direct, and guide her knowledge of the material – here, she becomes aware of material idiosyncrasies, a spectrum informed by heat, and thus it is in shaping that she begins to return to the warmth that enticed her upon her arrival in the studio.

The first instance of shaping is scoring lines in the gather with a tong-like bladed tool, called the "jacks," a technique called "jacking." Deb demonstrated how to make a line with the jacks in the glass, a shape referred to as a "caterpillar": rotating the gather on the punty along the arms of the workbench, you slowly bring the tips of the jack blades, while still rotating the punty, onto the glass and gently squeeze, scoring a line around the glass. While this sounds relatively simple (and appears as such in the sketch, Figure 3.2), it is quite difficult, given that the novice lacks the corporeal anticipation for the material idiosyncrasies encountered:

> The student lingered with the jacks above the glass, looking for a way to come onto the piece, which I helped him to keep rotating, much like one looks for the right moment to jump into the already skipping ropes of double-dutch. Part of the problem was that his hand wasn't right: "Put your hand on the outside of the jacks, hold them straight up and down to the glass, that's right, now just lower and . . ." Before I could get the word "gently" out, I saw the jacks lynch the rounded glass and immediately heard the clunking that comes from the jacks riding over cold squared glass.
>
> (Field notes, February 19, 2005)

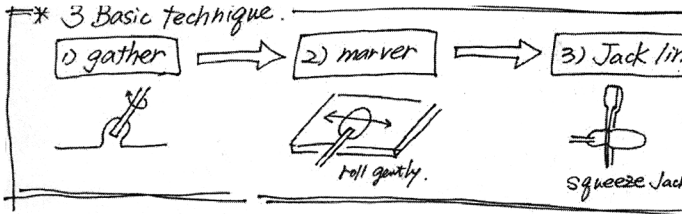


Figure 3.2 Steps towards and of jacking

Figure 3.3 Instructor, Bill, jacking a caterpillar proficiently

Removed from the affronting furnace, sitting at the workbench, guided by a very tangible image of a caterpillar, the novice begins to read, explore, and linger in reflection upon the glass. Though the exercise of shaping is about "scoring jack lines" and, more broadly, using the jacks to shape the glass, and not about "making caterpillars," the novice often measures the relative success or failure of the jack lines in terms of the resemblance of the produced shape to a caterpillar. A pedagogical device, the caricatured image of the caterpillar, a row of balls, guides the novice's exploration of the material and instigates a reflective practice. That is, the novice seeks to "see" the caterpillar. Embodying the jacks, she extends herself through them to the glass under hand, towards this caricature, reheating the small gather many times, trying to jack in more than one line.[10] Striving to achieve the caterpillar, she begins to understand the importance of heat and the limitations of cold glass.

> Dikla attempted to put a jack line into the glass following a heat but corkscrewed it. The jack line needed to be tightened up following another heat. "Ok, let's do that one more time, tighten that jack line up a bit," I said to her. But she remained seated, continuing to hold the jacks on the glass, rotating the piece a little forward, a little backward, the jack blades following the corkscrew, staring at the ever-chilling piece. "Heat, Dikla, heat," I said.
>
> (Field notes, May 16, 2005)

Within the blades of her jacks, she began to make judgments in relation to this caricature. "It doesn't really look like a caterpillar," she would say, "Can I heat it up and try again?" Though she subjected the glass to her gaze, she could not yet interrogate the glass, as did the painter for Merleau-Ponty in asking the mountain how it makes "us see the visible" through "[l]ight, lighting, shadows, reflections, color" (Merleau-Ponty 1964: 166). While Merleau-Ponty's painter, implicated in the visible, knows the import of light in the constitution of the visible mountain, the novice, aiming towards the visible caricature, attuned to the heat only in terms of achieving the visible, imagines heat as light in the cold and hardened caterpillar. Though exploring heat in shaping, she is not yet able to bring heat to her interrogation. In the initial stages of gathering and shaping the glass, the heat, for the novice, must be overcome and tamed into light, into hardened form. What she imagines is thus still tethered to a cold and static form. It is not yet properly informed: the imagination of the novice glassblower is not yet hot. Caught in the relation of caricature to practice, the novice only hesitantly acts – form is not a powerful generator of bodily action – allowing the glass to cool, to take form. Often she simply stares at it. Detached from the dynamism of glass and the heat, both the image and the shaping hands remain stiff, timid and pursed – unexpressive of the force of glassblowing, the heat, that swelling and softness. Thus, she yields only crass forms.

Losing touch: going for the heat

Lacking the corporeal competence to bring the force of heat to her practice – the structured and structuring dispositions – but simultaneously having a sense of the significance of heat, the novice may have "the desire for a warm, soft, enveloping, protective substance, by the need of a matter that surrounds the entire being and permeates it" (Bachelard 1971: 63). Though she may not be able to engage the heat meaningfully, she is definitely not unaware of it. Blowing glass is hot – beads of sweat roll off the forehead, hair becomes wet, rivets on jeans singe the skin atop the pelvic bone, and moistness sheathes the entire body. An exposed inner arm, unaccustomed to the heat of the piece, becomes bruise-ish red. An unfortunate brush against a tool, fresh off the hot glass, can burn, leaving a scar that begins to fade only after a year. Attracted to and surrounded by this heat, she may succumb amidst practice to visual reverie, contemplation of the heat. Unlike one sitting at the hearth, dreaming into fire, the glassblower's visual reverie is accompanied by an embodiment of the heat – the movement of the hot glass at the end of her tool.

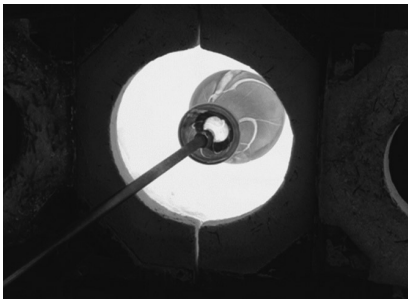
Such was the case the first time I tried to blow a goblet. I had tried, for the first time, to attach the stem of the goblet. Never having "taken a stem" before, my attempt to do so was marked not with the ease of incorporated practice but rather with the fumbling body, the bare punty, the blowpipe and the glass. Each was distinct and seemingly unrelated:

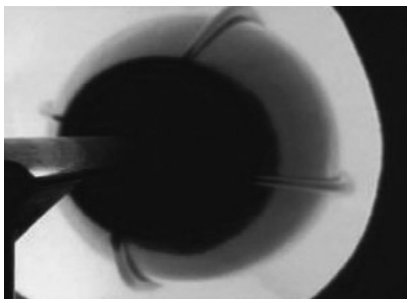
> My body was both numb and abuzz in the agitation of the unknown, hands shaking, heart racing. I drew the punty away from the bubble with the diamond shears so that the bit elongated into a semblance of a stem. They continued, "It's going cold! Cut it! Don't wait to cut it!" Not seeing the cold of which they spoke, but knowing that I had to act immediately, I hurriedly took the shears with my right hand, clumsily positioned them on my fingertips for leverage and clamped down onto the glass: quartz-like veins of opacity broke through its clarity, as I exerted as much brute pressure as I could muster; the glass moaning under the bandying shears like paper-thin ice of a frosted sidewalk puddle underfoot on a February morning.
>
> (Field notes, April 8, 2004)

Seeking relief from the anxiety of the arrhythmic cadence, I took the piece to the glory hole to heat. Immensely relieved, my body fell into the familiar mode, my fingers automatically twirling the pipe to a long-established rhythm, my eyes looking nowhere into the glory hole, slowly becoming caught up in the flickering texture of heat – its white, orange and grey hues running around the furnace's walls, framing the rotating glass – I became mesmerized and I day-dreamed:

> During the process of reheating the bit three times in order to "shorten" it, I had amazing visions at the glory hole. Not amazing visions, but I constantly see phallic or sexual images in the forms the glass takes. The glass started to move, the heat of the glory hole awakening its fluidity, its rounded end making gentle revolutions. I could not act on it; it was too charming, too intimate: I wanted to follow it, to see where it was going, where it could take me. I just stared at these still timid revolutions, pleased that it answered within a moment my own gestures. I kept the bubble, the goblet's bowl, and the bit, the goblet's stem, rotating. My body faded away – into the rotating blowpipe, my eyes becoming increasingly captivated by the movements of the softening glass. My bubble became testicles, flaming orange, and the bit, the stem, on the end became a searching penis, swirling around as it softened with the heat. Though attached to my pipe it seemed to swim outwards, bounded within the coarse white-peach-tangerine walls of the glory hole – the breathing red embers below, the roar of the bathing gas flame – was it nice in there? Why did I seem to be cutting through the lake? Moving ever outwards within the brilliant fiery red of the glory hole, the bit shortened and the penis reformed to a sperm, swimming towards me, the short tail struggling to propel the head up my blowpipe. I withdrew the blowpipe slightly, leaving only the bit under the flame: it sauntered and swayed round and round, directing the piece towards me. The sauntering amused me – I didn't mind. I wanted to keep the glass in the glory hole: I was relieved to become a spectator, to become captivated. The stem recklessly overheated, sauntered and swayed round and round – an enraged white sperm swimming towards me.
>
> (Field notes, April 8, 2004)

At the time, this visual fantasia seemed brilliant, inspiring like a muse, but when I inquired of the proficient glassblowers whether it was part of their practice, they spoke against such reverie: "You have to keep your focus on the glass. When you lose it, you lose the piece. I can't think about anything but what I'm supposed to be doing" (Paul Roberts, glassblower, April 13,





Figures 3.4 and 3.5 Glass vessels in the glory hole

2004). This reverie at the glory hole, the place where I could let the glass saunter and sway, where I could risk being a bit reckless, allowed me to experience that which I could not sustain in the more intimate contact of shaping of the glass with the hand tools – heat. Paul, able to work the hot glass, offered practical and reasonable advice – the safe way of making the piece. This was "formal" advice, short-term, the path to be taken not to "lose the piece." However, it did not touch on the more long-term necessity of understanding heat. Kanik Chung[11] touched on this necessity in coming to understand glass: "Intimacy is direct experience with the medium. It's not steps, it's not making a cup. It's dribbling on the floor, getting things too hot, getting things not hot enough – it's understanding the medium" (February 20, 2005). Similarly, while discussing approaches to glassblowing, the glass artist with whom I apprentice, Josiah McElheny,[12] explained to me that a good punty is just a bit of glass of the end of the punty rod, balled up, with a hot tip – that that punty would work for any piece; on the other hand, techniques to shape a punty that go against the basic idea of a small gather with a hot tip are limited (Field notes, March 7, 2006). The properties of glass, of hot glass, heat, need to be understood.

At the glory hole, I had abandoned that oneiric relation to work and allowed the eye to gain ascendancy: I was "seduce[d] . . . in the direction of forms and colors, of varieties and metamorphoses, of the probable shapes of future surfaces . . . desert[ing] depth, intimacy with substance, volume" (Bachelard 1971: 11). I had lost the dynamic engagement with the material and allowed it to become an utterly decontextualized, detemporalized imaginative meandering.[13] But, this imaginative meandering was a "reverie of will," which though irrelevant to the proficiency of the practice at that moment, allowed for a glimpse of the force of the practice, the heat.

While the reverie at the glory hole may have been born of sublimation – "Indeed, it is not only in art that the Libido is sublimated. It is the source of all the works of *homo faber*" (Bachelard 1964: 30) – into it must be incorporated *techne*, which both Dikla and I, eschewing our Promethean inclinations, had forsaken. It is in the sense, of both techne and material reverie that Heidegger's cabinetmaker attends to the wood:

> The learning [of a cabinetmaker's apprentice] is not mere practice, to gain facility in the use of tools. Nor does he merely gather knowledge about the customary forms of things he is to build. If he is to become a true cabinetmaker, he makes himself answer and respond above all to the different kinds of wood and to the shapes slumbering within wood – to wood as it enters into man's dwelling with all the hidden riches of its nature. In fact, this relatedness to wood is what maintains the whole craft. Without that relatedness, the craft will never be anything but empty busywork, any occupation with it will be determined exclusively by business concerns.
>
> (Heidegger 1954: 14)

In reverie, one discovers the force of the material, but it is this force in techne that is meaningful for practice. As the formal images had slipped away in the first encounter(s) of the novice with the glass, so too did the reverie, the indulgence of heat at the glory hole, quickly faded upon getting back to the task at hand. Thus, though I eagerly worked toward the goblet following this occasion of visual reverie, sincerely evoking my skills to the best of my ability, confident that I could carry what had been a difficult piece into something great and significant. I centered the stem, smoothed the bowl, attached a foot with eagerness and finally put the piece away in the annealer to cool. When riding the Manhattan-bound 3 train home, I was enflamed by the idea of a goblet, pondering its technical difficulty, considering that perhaps goblets were the only pieces of glass worth blowing, and enthusiastically sketched goblets fit for Venetians in my notebook. The actual piece, however, bore neither a remnant of my imaginative meandering nor a resemblance to the goblet I had seen taking shape under hand. It hardly looked like a wine glass. Yes, it had the same components as a wine glass: foot, stem, and balloon; but it was more of a gesture towards a wine glass. My goblet, my instructor joked, had turned "globlet": it was lopsided and stout with a bowl like an inverted pyramid – the curvature of which

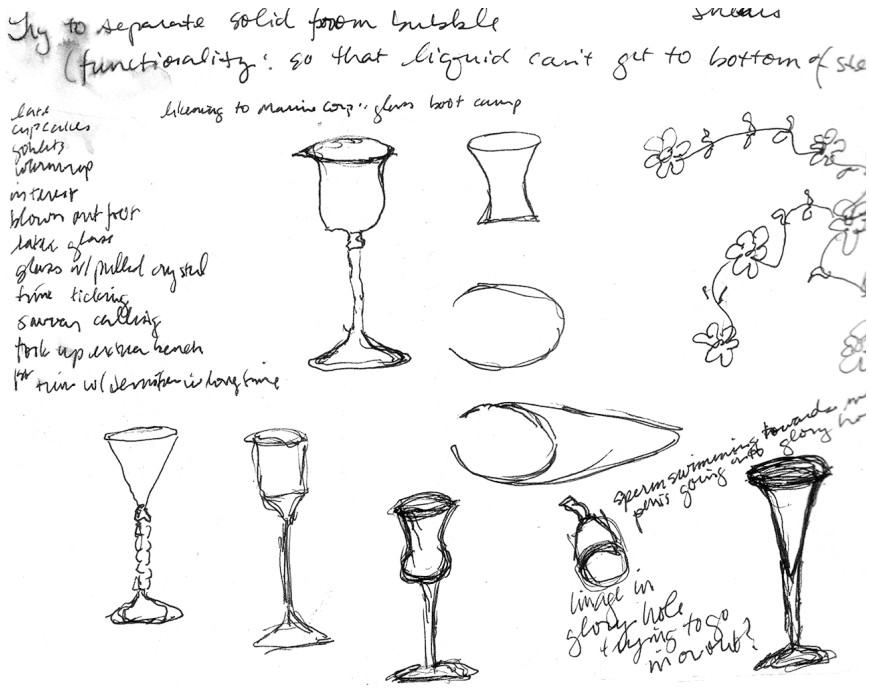


Figure 3.6 Subway sketches of goblets after blowing a goblet for the first time, April 2004. (Under my pen, they seemed, at the time, fit for Venetians)

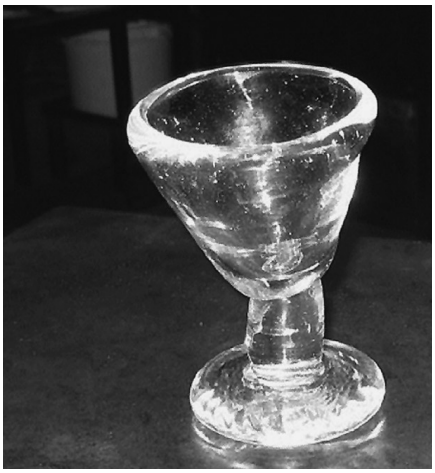


Figure 3.7 The "globlet"

could never accommodate my hope to gracefully aerate a kept Barolo – a stem as curved as a piece of ginger, and a foot that resembled a homestyle silver dollar American flapjack.

Though I had evoked my most sincere and well-executed technique towards a vision so tangible that I could see the Barolo swirling in the goblet under hand, that vision was doomed to failure, given that it was not coherent – split between visual reverie and faith in technique alone to achieve the form envisioned. However, reverie at the glory hole – a reverie of heat, of penetrating to the interior, which neither eye nor hand can access – opened that dialectic of warmth that the novice had sensed when entering the studio and in her first instance of shaping the glass: "Imagination needs a dialectical animism" (Bachelard 1971: 68). Subjecting it to an aesthetic gaze, I did not employ the initiative of a worker, knowledgeable of heat and its relation to the movement of glass, rooted in a dialectical animism. "The eye – that inspector – prevents us from working" (Bachelard 1971: 82). In blowing the goblet, there was no reciprocity between the work and the material, given that my imagination was informed by material depth as visual reverie, or by the light of form through technique towards the caricature. Material imagination, which intimacy with the heat fosters, forging a dialogical relation between work and material, a frame of reciprocity, had not yet emerged: "Imagination that is material and dynamic enables us to experience a provoked adversity" (Bachelard 1971: 68). The novice, unlike Heidegger's cabinetmaker, is not yet able to do this.

To the *anima* – the swelling, undulating glass which commanded my eye and dreams, the daydream – I needed to bring *animus*, the girding discretion of definite action:

> Matter, to which one speaks according to the rules when he is working it, swells under the hand of the workman. This *anima* accepts the

> flatteries of the *animus* which makes it emerge from its torpor. The hands dream . . . A reverie of intimacy – of an intimacy which is always human – opens up for the man who enters into the mysteries of matter.
>
> (Bachelard 1969: 72)[14]

In the visual reverie, I had experienced the movement which heat gives the glass, albeit in sexualized "forms." To make this intimacy with the heat meaningful for practice, the dialectic of warmth, an undulation of resistance and reception, needed to be engaged, worked, guided through the tools and the accompanying corporeal dispositions. It is at this juncture, wherein the worker develops an oneiric relation with the material, that the touch of the hand becomes the caress. And in the caress, material imagination takes flight.

Towards the caress: returning to the glass

The glassblower, in the course of shaping with the hand tools, begins to respond through the tool to the material. The glass says to the jacks, "Come on gently, lest I foil your intentions" – and therefore, both negate in part the instrumentality, the grabbing, which defined the novice's first contact with the glass in the gather and beckons the dreamer back to the task at hand. It is here that the depth of the material imagination opens, that imagination fueled by the force of the material, by the heat and incorporated habituated technique.

Learning to listen and respond to the material develops in tandem with the glassblowing *habitus*. While I had been jacking in necklines since my first day of glassblowing, it was in a Venetian glassblowing class that I began to understand some of the subtleties of using the jacks. I had used the jacks repeatedly to accomplish two tasks: (1) jacking in the neckline and (2), at a more advanced level, holding the jacks horizontally along the bubble, called "riding the bubble with the jacks" while blowing it out. I was "ready to learn," had developed a "practical sense" for glassblowing, a corpus of dispositions from which I could make decisions and take action in the field.[15] As a progressing beginner, the jacks had become an extension of my hand and in this sense, an object of subsidiary awareness, through which I attended to the object of focal awareness, the glass:

> This lapse into unconsciousness is accompanied by a newly acquired consciousness of the experiences in question, on the operational plane. It is misleading, therefore, to describe this as the mere result of repetition; it is a structural change achieved by a repeated mental effort aiming at the instrumentalization of certain things and actions in the service of some purpose.
>
> (Polanyi 1962: 61–62)

I was able to attend to the distal term, the object of focus, through the proximal term, the tool that has been incorporated, with some ease of incorporated skill (Polanyi 1967: 10). Though I was able to attend to the glass through the jacks to the extent that the jacks were no longer a conscious term of my action, I lacked the understanding of how the tool is held in the hand and how it is moved along the glass rotating underneath:

> Adam explained this step to me in a really clear way – he said he thought of it as "catching the curve," as in "catching the wave," so that you caught the curve of the bubble depending on the direction you were going in. When rolling the bubble forward and jacking, you ride the front side of the bubble by pushing back, and vice versa; when rolling backward, you lift the jacks off of the piece for a moment and then come on with the jacks pushing forward. He took hold of my hand with the jacks and guided it through the process of which he spoke . . . I had been riding the bubble with the jacks parallel to, or on top of, the bubble, and Adam said that this wasn't the most effective way to handle the glass – wasn't the most efficient – didn't really shape the glass.
>
> (Field notes, February 4, 2005)

In Figure 3.8, the glassblower is likely rotating the glass towards him, riding the front of the bubble at the bubble's set angle with the jacks by tilting his wrist out and downwards, so that he pulls the glass towards him as he rotates. These subtle wrist movements both taper and cool the bottom of the bubble. The glass that is not being tapered and cooled remains hot and will expand when someone blows through the pipe, creating the "shoulders" of the piece. Subtle bodily adjustments must occur while riding the bubble with the jacks to accommodate the heat and the shape of the glass. To shape well the maker must listen to the material, must let the material guide the practice. The body, through the tool, must be in dialogue with the glass, such that the glass informs the practice. As such, the novice shapes with heat. She begins to work towards her practice not according to form, but rather according to the formative properties of the material. The novice begins to think, to imagine, not in terms of the light of glass forms, but in terms of hot glass.

To this, however, I had to add my own program of visual rigor through which I could constantly evaluate the formative properties of heat: assisting beginning glassblowers. I became a teaching assistant in the winter of 2005, after becoming attuned to the complexities of the practice during months in the Venetian class. At this point I was able to actively watch, making judgments and suggestions. From May through July 2005, I assisted two to four nights a week, three hours each night for both a beginner's glassblowing class and an intermediate glassblowing class. In September, I continued my work as a teaching assistant, two nights a week, three hours a night for the full twelve-week semester and continue even now one night a week. At

Figure 3.8
Kanik riding the bubble with the jacks

each of these classes, I assist the instructor in his or her demonstration and then assist the students as they practice – it is three hours of evaluation, of constantly fixing the students' pieces, or helping them to think through how to make the piece that was demonstrated – a process of deforming the image: "Imagination is always considered to be the faculty of *forming* images. But it is rather the faculty of *deforming* the images offered by perception, of freeing ourselves from the immediate images; it is especially the faculty of *changing* images" (Bachelard 1971: 19). While the novice clings to the "form" – wanting to make the vase, the bowl, the cup, or whatever object it may be, the instructors have to teach not formation, but deformation – how to see the piece as various heats and shaping. In this vein, Adam recommended that his advanced beginning students not focus too much upon reproducing the steps to achieve the object, but try to understand what each heat and each use of the tool accomplishes:

> What I'm teaching you guys, the heats and how to use the tools – you should be able to use these for anything. You know, we're making a plate tonight, but you can make anything out of what I'm showing you. It's how you arrange the steps.
>
> (Field notes, November 10, 2005)

Through breaking the form down into particularities and then refiguring those particularities towards new and different wholes, in terms of the heat, I was able to bring the *animus* to the *anima*.

Imagining with glass

Through instructively watching, having experienced the material depth towards which my incorporated techniques tended, subtleties came to the fore. That October, I was able to bring them to my practice, albeit humbly, to command them of myself. Images were no longer theoretical, but practical possibilities, the content of which was not an imitation of some form previously perceived, but an image put forth based on, even relatively determined by, matterly engagement, matterly intimacy: "Take away your dreams and you stultify the worker. Leave out the oneiric forces of work and you diminish, you annihilate the artisan. Each labor has its oneirism, each material worked on contributes its inner reveries" (Bachelard 1971: 80). I was able to at least glimpse this oneirism.

> The litany of what became intimate possibilities: Drawing back out of the furnace when gathering so the glass is off the end of the pipe; angling the block down as I roll the gather outwards, bringing it up as I roll the gather towards me and then cupping the end of the gather in the block, rounding down, so as to round out the end of the gather; seeing the evenness of the heat in the glass; patiently waiting for the glass to cool to blow out a sturdy starter bubble; marvering with great breadth and calm to cool the sides so that the shoulders would blow out; jacking to and fro as I rolled the pipe on the bench, cooling the bottom enough so that the shoulders blew out well; a tight jack line; tapering my heats so that the glass would drop out from the right points; getting in and out of the bench with at least some felt grace, swinging the pipe with glass overhead and directly into the glory hole; heating up the dropped blown foot so that it didn't pull out into a flat oval . . .
>
> (Field notes, September 30, 2005)

I did not experience these subtleties and then reflect upon my new ability to blow glass with some greater degree of intention. I felt the power to do so and then set about doing it:

> The imagination will see only if it has 'visions' and will have visions only if reveries educate it before experiences do, and if experiences follow as token of reveries. As d'Annunzio has said: 'The richest experiences happen long before the soul takes notice. And when we begin to open our eyes to the visible, we have already been supporters of the invisible for a long time'.
>
> (Bachelard 1983: 16)

Six months before I was able to effectively experience and guide the heat while riding the bubble, I had searched out that heat in the visual reverie at the glory hole. Some time later, I was able to start envisioning, imagining

through and with the glass – I knew how heat would carry it, how my body would relate to the heat. I wanted the heat, heated the glass for the heat, needed the heat, because having the heat meant that I could blow glass – the heat in practice was my envisioned piece in form.

The first "artistic vision" I had – and I specifically felt it to be the first artistic vision, somehow different from any other "plan" I had had, prior to blowing the piece – was of a simple vase with blown out shoulders and a flared lip. While ever-refined technique and sensitivity to bodily engagement had opened a dialogical relation with the glass, my reveries had taught me to dream. With some competence I was finally able to "envision," to "imagine." Making this piece was accompanied by sheer pleasure and an unmistakable sense of empowerment. While the final piece is not a perfect resemblance of the sketch, I was nonetheless pleased – the way I had imagined the piece had been different: "The way we imagine is often more instructive than what we imagine" (Bachelard 1964: 28). I had imagined from within, rather than from without. At all times of day, at any place, I would sketch pieces to blow and for the first time, looking at *Glass* magazine made sense – I perused the articles with a discriminating eye, looking at the work of the artists featured, analyzing it, and mentally noting whatever aspects I might try to experiment with or incorporate into my own work. This changed how I began to think through the glassblowing process.

To imagine something like glassblowing, that dialectic of warmth, one has to imagine it muscularly – to imagine how the material resists, relents. Though Figure 3.11 is composed of static images, arranged in terms of steps, techniques and tool positions, their meaning is the bodily comportment in

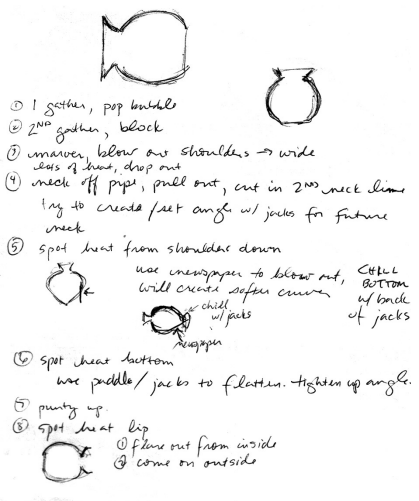


Figure 3.9 Sketch for glass vase with lip

Figure 3.10 Vase with lip

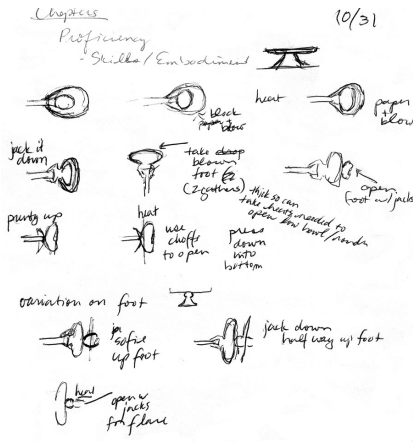


Figure 3.11 Sketch for footed low bowl

Figure 3.12 Footed low bowl

relation to the heat which they demand, beckon, call for. It is here, at the inner heat, that the glassblower imagines and works – in relation to the heat is the work, the imagining, albeit its end in the final form.[16] Thus, D'Annunzio's glassblower laments when thinking of how the blown pieces, still bathed in heat, are destined for some chilly bourgeois dinner table.[17] Thus, in my still nascent apprenticeship with Josiah, it was and is the *heat* of which I write and speak:

> I have never seen anyone work this hot. There seems to be some imperceptible moment when the piece actually becomes the form – until then, that orange luminous glow is never lost, is steadily maintained.
>
> (Field notes, February 21, 2006)

Moreover, the sketch that Josiah attaches with the magnet to the heat shield near the glory hole is a one-line drawn form on graph paper – no steps, no alternatives, no notes, just a simple one-line form. His imagination is much deeper than my own. Imagination "enfolds" the glassblower and the glass (Merleau-Ponty 1968: 139).

The journey towards the material imagination, rooted in the formative properties of glassblowing, is one from the light to the heat. Imagination has both informed and been shaped by practice – in fact, has facilitated the reciprocity of material and practice. We have seen two distinct modes of imagination: formal and material. In the former, the practitioner reproduces an image, which is grounded in neither an understanding of technique (rules and regulations or schemata) nor a developed sensibility for the material.

This imaginative mode, while creating a plethora of theoretical, envisioned, or visual possibilities, is without the tools for realization – the image remains formal, and unrealized. In material imagination, the practitioner is able to bring forth an image from knowledge of both technique and a developed sensibility for the formative properties of the material, in the case of glass, heat. Material imagination reinvigorates, expresses these engagements: "[T]here are – as I shall show – images of matter, *direct* images of *matter*. Vision names them, but the hand knows them. A dynamic joy touches them, kneads them, makes them lighter. One dreams these images of matter substantially, intimately, rejecting forms – perishable forms – and vain images, and the becoming of surfaces. They have weight, they are a heart" (Bachelard 1971: 11). Yes, they are girded by the possibilities of matter, but the imagination is allowed to take flight through the deformation of form.

Conclusion

This transition, however, is wrought with ambiguity. There is excitement in the initial sensation of entering a dialogical engagement with the material, which, though a ground upon which material imagination can take flight, creates the possibility of being fascinated, like Empedocles[18] before throwing himself into Mount Etna, with the molten material itself. In this vein, I remember a conversation at an East Village wine bar in July 2005 with my good blowpartner, Susie, in which I waxed poetic about drawing the glass out into a form, of envisioning the whole under hand: "When you're riding the bubble with the jacks to blow out the shoulders, can't you just see the whole piece before your eyes, right there under your hands?" Susie's face broke into a wide smile, "No," she began with a bit of a chuckle, "I just see hot glass and think about cooling the bottom with the jacks so that the shoulders blow out." "Imagine that?" I laughed, recognizing the practical wisdom of her statement, "You see, that's why you're the better glassblower."

While we both looked to the glass, Susie did so in a meaningful way. She imagined within the glass, not at or upon it. There is reciprocity between material imagination and practice – within the material is contained the means through which we imagine. "Contemplated nature aids contemplation, [in] that it already contains some means of contemplation" (Bachelard 1971: 77). While bodies and bodily practices have been documented in cultural analyses, the body as such has been poised as a canvas upon which social forces could be read. We have seen here, however, that the body in practice is engagement: "Our bodily experience of movement is not a particular case of knowledge; it provides us with a way of access to the world and the object, with a 'praktognosia,' which has to be recognized as original and perhaps as primary. My body has its world, or understands its world, without having to make use of my 'symbolic' or 'objectifying function'" (Merleau-Ponty 1962: 140–141); "It may be that the 'symbolic function' or

the 'representative function' underlies our movements, but it is not a final term for analysis. It too rests on certain groundwork" (Merleau-Ponty 1962: 124). The phenomenal body is this groundwork. Understanding its embeddedness in and modes of relatedness to material helps us to better understand practice and the life-giving force of practice to culture. Moreover, understanding the relations of the phenomenal body, as structured, not only by the field of practice but also by the formative properties of the material it engages, demands an understanding of how those formative properties are known and how they generate different modes of practice. While the heat in glassblowing can be known in visual reverie, we have seen that it becomes formative to practice when the glassblower begins to imagine, or envisions her practice in terms of heat (and by default, cold). Imagination thus constituted, material imagination, becomes constitutive of practice as an organ of reciprocity of material and practice. The *way*, not the *what* of imagination lends to subtle distinctions in practice. To understand practice as the theatre of expression of what we imagine ourselves to be falls short of recognizing our embeddedness in a material.

Culture is embedded and shaped by a material world. It is embodied practice. *In situ* ethnographic research, a practice itself of embodiment, opens up the possibility for understanding how the material world "penetrates" the actor. Here, we have not only practice at the center of our analysis, but have emphasized the material dimension of practice, the dialogical relation of the actor with the material world and the imaginative modes through which he comes into relation with the material. The actor has united "the poetics of reverie with the prosaism of life" (Bachelard 1969: 58). With deep imagination, there is deep practice, and so in glassblowing, one "art" – an "art" of culture – arises.

Notes

1 I would like to thank everyone at New York Glass for their continued support, particularly Deborah Adler, Adam Holzinger, Bill Couig, James McLeod, and Laurie Coutu-Korowitz. Special thanks to Kanik Chung and Susie Peck for their willingness to talk through the imaginative process, as well as for their steadfast care. I would also like to thank Josiah McElheny and Anders Rystedt. Working and talking with them has provided numerous insights into the art. In addition, thanks to Craig Calhoun, Richard Sennett, and Terry Williams for their encouragement, enthusiasm, and constructive comments. I am especially indebted to the living memory of my great-grandfather, Fred Papsdorf (1887–1978), American modern primitive painter – his simple story and passion for his craft continue to inspire me.

2 Murano is a small island off of the coast of Venice, Italy, renowned for its glassblowing. In 1291, the Venetian Republic ordered glassmakers to move their foundries to Murano owing to the fire danger they represented to Venice, a city of wooden buildings. The art of glassblowing became highly coveted, particularly with the perfection of mirror-making. By the fourteenth century, glassblowers and their families, courted by the French monarchy and the aristocracies of Europe, were forbidden to leave the island at the risk of assassination. Murano

continues to be an active glass center and is revered as the "home" of glassblowing.

3 Dale Chihuly is attributed with giving birth to the American studio glass movement. In 1967 he received a Masters of Science in Glassblowing from the University of Wisconsin. In 1968 he received a Masters of Fine Arts in Sculpture at the Rhode Island School of Design. Awarded a Fulbright Fellowship, Chihuly was the first American glassblower to work in the prestigious Venini Fabrica on the island of Murano. Along with several other glass artists, Chihuly founded Pilchuck Glass School in 1971 in Stanwood, Washington. It remains the "mecca" for many young glassblowers and is known as the "home" of American glassblowing. He currently works out of his studio, Manifesto, in Seattle, Washington.

4 Paul Stankard has specialized for more than thirty years in the art of making glass paperweights. Stankard flameworks miniature wild flowers of vibrant and distinct colors with extraordinary accuracy and delicacy, which are then encased in clear glass orbs. He is the most renowned American paperweight artist, his paperweights selling for up to $10,000.

5 Robert Panepinto was a beginning and intermediate glassblowing instructor at New York Glass until January 2005. With a B.F.A. in painting from Pratt University, he continues to work as a glassblowing assistant, while focusing on painting.

6 Adam Holtzinger is an upcoming glass artist, his works featured in the 2006 SOFA exhibition. Graduating with a B.F.A. from the Cleveland Institute of Art in 2003, he teaches beginning to advanced glassblowing, produces his own art, and works in production for a New York design house.

7 Novalis (1772–1801) was the writing pseudonym of Baron Friedrich von Hardenberg, a German lyric poet. The French philosopher Gaston Bachelard (1884–1962) regarded Novalis as a poet of substances, of depth, a poet who touches the untouchable – a primitive sensual substance – rather than seeing the invisible. He is a poet who disdains forms: "Consequently, for one whose dreams are marked by warmth, the imagination is purely a *material imagination*. It is of matter that he dreams, its warmth that he needs" (Bachelard 1971: 63–64).

8 Deborah Faye Adler is a glass artist and beginning glassblowing instructor at New York Glass. She graduated with a B.F.A. from the University of Massachusetts in 2000 and has worked in a production studio and as an assistant to a glass artist in Connecticut.

9 The French phenomenologist Maurice Merleau-Ponty (1908–1961) famously discusses this shift of an object in hand to an extension of the phenomenal body in regard to the blind man's walking stick: "The blind man's stick has ceased to be an object for him, and is no longer perceived for itself; its point has become an area of sensitivity, extending the scope and active radius of touch, and providing a parallel to sight. In the exploration of things, the length of the stick does not enter expressly as a middle term: the blind man is rather aware of it through the position of objects than of the position of objects through it . . . To get used to a hat, a car or a stick is to be transplanted into them, or conversely, to incorporate them into the bulk of our own body" (Merleau-Ponty 1962: 143).

10 It is often the case that the beginner can jack only one or two jack lines in the glass. In order not to discourage the students, it is sometimes suggested that they make a "snowman," requiring only two lines, rather than a "caterpillar," which requires at least three.

11 Kanik Chung is a sculptor and accomplished glassblower. Earning his M.F.A. at Ohio State University in 1999, he currently teaches glassblowing at beginning and advanced levels, blows production glass for a New York designer, and dedicates his remaining time to both glass and non-glass sculpture.

12 Josiah McElheny (born 1966) is a noted American glass artist. Graduating from Rhode Island School of Design in 1989, he has been a recipient of a Louis Comfort Tiffany Foundation Award (1995) and the 15th Rakow Commission from the Corning Museum of Glass. His work has been exhibited at many national and international galleries and museums, including the Isabella Stewart Gardner Museum (Boston), Yerba Buena Center for the Arts (San Francisco), Centro Galego de Arte Contemporánea (Santiago de Compostela), and the Whitney Biennial (2000). His work is included in the permanent collection of the Museum of Modern Art, New York and is currently on display.

13 Bachelard referred reverie in the depths of matter as feminine, as *anima*, versus the masculine *animus*: "Here we receive the teachings of the *natural calm* and an entreaty to become conscious of the calm of our own nature, of the substantial calm of our *anima*. The *anima*, the principle of our repose, is that nature within us which is sufficient unto itself; it is the tranquil feminine" (Bachelard 1969: 69–70).

14 The *anima* is the personification of all feminine psychological tendencies. The *animus* is the personification of all masculine psychological tendencies.

15 In *The Logic of Practice*, Bourdieu writes: "Practical sense is a quasi-bodily involvement in the world which presupposes no representation either of the body or of the world, still less of their relationship. It is an immanence in the world through which the world imposes its imminence, things to be done or said, which directly govern speech and action. It orients 'choices' which, though not deliberate, are no less systematic, and which, without being ordered and organized in relation to an end, are none the less charged with a kind of retrospective finality. A particularly clear example of practical sense as a proleptic adjustment to the demands of a field is what is called in the language of sport, a 'feel for the game.' . . . Produced by experience of the game, and therefore of the objective structures within which it is played out, the 'feel for the game' is what gives the game a subjective sense – a meaning and a *raison d'être*, but also a direction, a orientation, an impending outcome, for those who take part and therefore acknowledge what is at stake" (Bourdieu 1990: 66).

16 "This need to *penetrate*, to go to the *interior* of things, to the *interior* of beings, is one of attraction of the intuition of inner heat. Where the eye cannot go, where the hand does not enter, there heat insinuates itself" (Bachelard 1964: 40).

17 "[W]e should no longer be surprised that works dealing with fire should be so easily sexualized. D'Annunzio portrays Stelio who, in the glass works, is contemplating, in the annealing oven, the extension of the smelting oven, the shining vases, still slaves of the fire, still under its power . . . Later, the beautiful frail creatures would abandon their father, would detach themselves from him forever; they would grow cold, become cold gems, would lead their new life in the world, enter the service of pleasure-seeking men, encounter dangers, follow the variations in light, receive the cut flower or the intoxicating drink" (quoted in Bachelard 1964: 56).

18 Empedocles (490–430 BCE) was a Greek pre-Socratic philosopher. He maintained that matter was composed of the four elements: water, air, fire, and earth. He threw himself into the volcano, Mount Etna, so that it would be thought that he had vaporized into an immortal god. Bachelard writes of the Empedoclean lure of the glassblower's furnace.

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