

# Glassblowing Tools: Extending the Body Towards Practical Knowledge and Informing a Social World

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**Abstract** Understanding tools in the development of practical knowledge and in the formation of social worlds is critical for the sociology of culture insofar as they reveal how matter, or material, informs practice and discourse. This article is an ethnographic exploration of the variations of the maker-tool-material relation in glassblowing, informed by Bourdieu's logic of practice as well as phenomenological considerations of the body's dispositions towards and interactions with the material world. These relations form the backbone of the glassblowing studio, and more importantly provide the subject matter of 'tool talk,' studio talk about tools, which forges feelings of empathy and consequently contributes to the formation of the glassblowing social world. Through this exploration, we come to understand how material, the subject of much studio discourse, is a structuring force of a lifeworld, the glassblowing studio.

**Keywords** Practical knowledge · Tools · Glassblowing · Bourdieu · Body · Lifeworld · Culture

Tools are one of many resources necessary for artistic creativity. Analyses of the resource dependency of the art world, for production of culture theorists, have elucidated the networks upon which artists depend in order to demonstrate that "artistic creativity is not so much an act of individual genius as it is the product of the cooperative effort of a number of people" (Peterson, 2004). While the production of culture analyses were telling of how culture emerged from networks and organizations independent of macro-social forces (White & White, 1965), a focus on practice can bear more than the conclusion that culture does not necessarily mirror social structure. Beyond mapping production, distribution and reception, a focus on practice lends itself to a consideration of phenomenological embodiment. At a micro-level, drawing from over a year and a half of *in situ* ethnographic research in a New York City glassblowing studio, I will return to a phenomenological analysis of the actor in order to explore the role of the tool in a practice with the intent of revealing its broader

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import for theories of culture. Tools not only expand the actor's phenomenological body, but also dispose actors towards matter to be worked upon: such *matterly* dispositions, we will see, inform culture and consequently, we can come to understand edifices of culture, such as forms of knowledge and discourse, as substantiated with matter.

A look at the dialogical nature of practice through tools joins the broader shift in focus within the sociology of culture (Bourdieu, 1977; Swidler, 1986) to “the ways the material and social environment directly penetrate actors to shape their habits and skills” (Swidler, 2001, p. 6). This shift is more encompassing than asking how culture is incorporated or used by its possessors. It asks how actors are disposed towards material, how those matterly dispositions provide a backbone upon which a cultural milieu can form, and thus reveals the manner in which embodiment underlies and makes possible an actor's contribution to and participation within a certain culture, be that as small as a glassblowing lifeworld. This article configures the dialogue of practice as that of maker and material, expanding the notion of *habitus*, that system of dispositions, introduced into sociological literature by Marcel Mauss and made theoretically salient by Pierre Bourdieu, to include the deep metabolism of material conditions that inform its formation and simultaneously support the abiding culture.

I begin by detailing the initial phenomenal embodiment and incorporation of the tool, drawing from Michael Polanyi, including a documentation of the explanations, or meanings, which accompany the novice's introduction to the tools of glassblowing. While this will initially entail examining the tool as an instrument of technique, and a consideration of its contribution to the development of practical knowledge as such, I will provide an account for how the glassblower outgrows this relation to the tool, considering in stride how matter, or glass, comes to be the defining factor over technique of the practice. Specifically, I will detail how glass is engaged across the novice to proficient spectrum, including accounts of the varying understandings of the tool and material relation. Finally, I will investigate how talk about tools in the studio, ‘tool talk,’ expresses the embodied dialogue of maker-material-tool, both novice and proficient, and argue that this serves as a forum for the expression of an otherwise unarticulated embodied relation. We will see that this forum allows for the disclosure of the individual glassblower in the Arendtian sense and fosters empathetic relatedness among glassblowers, consequently contributing to the formation and solidification of the glassblowing social world.

## Introducing the tools

My first pair of shears, ordered from Jim Moore, a popular American glassblowing toolmaker, arrived in the mail in March 2005. I remember taking them into my hand, opening and closing them, feeling their well-suited weight and handle design. I remember the first time the shears, as a tool, were brought to my attention. It was my eighth session of class in Beginning Glassblowing in the fall of 2003. We were placing handles on cylinders, which involved cutting handle-length pieces from rolled molten glass with the shears, a scissor-like tool. Having taken the tool, let alone its quality for granted, I was surprised when Evan, my instructor, having just watched my partner cut the glass for the handle, lifted the shears and examined, proclaiming:

“‘These shears suck.’ ‘Why?’ I asked. ‘They’re just shit. . . . I don’t know what happened to all of the good ones,’ he responded absentmindedly as he adjusted the shitty shears with the tips of the blades of a better pair, like one might tighten an eyeglass screw with the tip of a butter knife. I looked at the shears and tried to understand—the ‘good’ pair were definitely stouter, which would give one much more leverage than the other pair, which had thinner and longer strips separating the handles from the blades” (Fieldnotes, November 16, 2003).

It was the first time I had looked at a tool in the studio as good, or otherwise. I had no framework for comparison, knew no other shears, than the ones I had been introduced to in my class. I struggled to understand what Evan was seeing and though the attempt to understand perhaps was unsuccessful, it had, if nothing else, effectively drawn tools and my relation to them within my glassblowing practice into my awareness, had made me aware that they were significant.

Tools, in fact are the first things introduced in the studio, following a general declarative introduction: “This (*broad sweeping wave of the hand*) is the studio.” Though Evan had surely started the first day of class with an introduction of the tools, I was too overwhelmed by the studio, the roaring fires, the luminosity, the heat, to notice. It was really only in the first day of my Intensive Beginning Glassblowing class with Rob, a twelve-week course that met twice a week into the spring of 2004, that I began to be able to reckon with tools. I had entered the studio as Rob was beginning his demonstration:

“‘Now, you see you want to take the punty out of the warmer and warm up only the tip in the glory hole, like this,’ he said, as he removed the metal rod from the rack with small gas flames at its end and rotated its end tip in the opening of the small cylindrical furnace. ‘So, you put it in that thing?’ a student asked, pointing from the pipe in Rob’s hand to the glory hole. ‘That thing is called a *glory hole*.’ Rob responded, ‘Yes, you put the tip of this thing,’ he continued jiggling the metal rod, ‘which is called the *punty* into that thing’, pointing with his right hand, ‘which is called the *glory hole*.’ After warming the pipe, he took the punty to the furnace, and gathered glass through the open door, coming out with a molten orange egg at the tip of the pipe. He carried the punty to the workbench, set the tip with the glass on the right arm of the bench, swung it outwards a bit, stepped behind, seated himself, and closed himself in by resting the far end of the punty on the left arm of the workbench” (Fieldnotes, January 29, 2004).

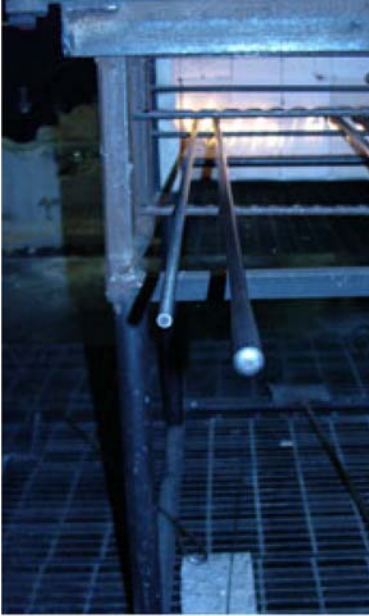
Through pipes, the glassblower has the first contact with glass. Foremost, pipes are used to remove glass, kept at 2050 degrees Fahrenheit, from the furnace, a technique called *gathering*. The glassblower rests the pipe on the small ledge of an opening in the furnace wall, and keeping one end of the pipe in hand, lowers the other end into the glass, and rotates—a movement similar to using a honey-spoon to gather honey from the pot at the breakfast table. A *punty* is a solid steel pipe used for making solid pieces of glass, for example a beer stein handle. A *blowpipe* is a steel pipe with a hollowed center used to blow out glass, for example the cup of the beer stein.

Rob continued: “‘Now these are the tools that we’ll be using.’ One by one he picked them up, calling out their names, ‘The jacks, (large tweezer-like objects), the tweezers (smaller tweezer-like objects about a hand and a half in length), the shears (extra-large scissors), and the diamond shears (scissors with blades shaped as if a diamond could pass through the middle when they’re opened), oh, and sorry, the newspaper (a sopping wet folded square from five sheets of the New York Times).’” (Fieldnotes, January 29, 2004).

The novice’s relation to tools is characterized initially by a sense of them as spatially discrete things, needing to be *pointed out* by the instructor as ‘this thing here’ and ‘that thing there’. An absolute spatial relation to the tools, however, is negated by directing the novice to take the tool into hand, as Deb and I had a group of beginners do during a weekend workshop:

“Following Deb’s demonstration of gathering from the furnace, we said, ‘Ok, everyone grab a punty’. They had only been in the studio for about 30min. 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” (Fieldnotes, February 19, 2005).

Taking the punty into hand is markedly different than the first encounter with the tools, that pointing to and calling out of names: it is the first step of incorporation. At the moment



*Punty (left) and Blowpipe (right) in the warming rack*



*Susie standing with blowpipe at workbench*



*Tools on top of the workbench (right to left): jacks, tweezers, (extra set of specialized trim shears), shears, and diamond shears with folded wet newspaper behind.*

of taking the punty into hand, the novice is already drawn into a relation with the glass, as she anticipates the end, the touchdown upon and gather of the glass, which has been explained and demonstrated.<sup>1</sup> Through the touchdown of the punty, the novice experiences her first tactile contact with glass—its both buoyant and gripping density.

<sup>1</sup> For a fuller discussion of this shift from explanation and demonstration to practice, please see O'Connor, Erin. "Embodied Knowledge: The Experience of Meaning and the Struggle Towards Proficiency in Glassblowing," *Ethnography*, Vol 6(2) (June 2005).



*Susie gathering glass on a blowpipe at the furnace*



*Susie with a gather of glass out of the furnace.*

While this moment is the first moment of actual experience with the glass, of contact and interaction with the material, the tool is used in its most instrumental sense, a means to an end, a groping hand upon a body without the knowledge coming from intimacy. The move beyond “being upon” the glass takes place during the course of *shaping*.

The first instance of shaping is scoring lines in the gather with the jacks. Deb demonstrated how to make a line with the jacks in the glass: rotating 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, at the tip of the punty off the right arm of the workbench and gently squeeze, scoring a line around the glass. In this first instance of *shaping* the glass, that the novice encounters the material idiosyncrasies of the glass:

“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 squared glass” (Fieldnotes, February 19, 2005).

The punty at this very beginning stage is still “dumb”—it simply grabs the glass. In the struggle to keep the glass at the end of the pipe, the novice begins to learn to respond to the material. The first conscious exploration of and engagement with the material, however, is with the handtools, in shaping. The maker must respond through the tool to the material—the glass says to the jacks, come on gently, lest I foil your intentions—negates, in part, the instrumentality, the grabbing, which defined the novice’s first contact with the glass—the grope into the caress much as an attentive lover’s hand adjusts in response to the movements and gestures of his or her lover’s body under hand.



*Jacking the glass*

### Embodying and incorporating the tools

To feel through tools is to extend ourselves into and embody those tools. Embodiment, or extension of our corporeal bodies through things, permeates our everyday experience—through a pen, the texture of paper, through shoes' soles, the give of ground underneath, through our backpacks, a fellow rider on a Brooklyn-bound A train—our lived body is much more than our own flesh and blood: our body reaches out and inhabits a phenomenological domain. This lived phenomenological character of our corporeal experience allows the novice foremost to come into contact with the glass through an extension of herself through the tools, a relation without which the practical knowledge of glassblowing cannot develop. Kanik Chung, glassblower and teacher, actively encourages his students to develop of such a relation to the glass:

“Its just like a relationship. You can't really know that person unless you spend time with the relationship. I was talking to my students about getting intimate with the glass like a relationship. . . . Once you start figuring it out and experiencing the medium itself, and knowing what it can do, you can do more things. The reason why some people are really, really good at it and some people aren't, is because some people really, really understand the medium and some people don't. Intimacy is direct experience with the medium. Its not steps, its not making a cup. Its dribbling on the floor, getting things too hot, getting things not hot enough—its understanding the medium.” (Interview, Kanik Chung, February 20, 2005).

Embodiment is significant beyond enabling the development of the novice's “relationship” to the glass through the punty and jacks: it is also the experiential window within which tools are incorporated skillfully into the body. While we easily can touch and feel and thus make temporal almost anything spatially discrete from our bodies, to do so skillfully, however, is a matter of incorporating techniques defined by the vocation through dedicated practice. Having defined the modes through which embodied tools engage the glass—from the “being upon” to the “caress” of shaping—which draw the novice into relation with the material, I would now like to explore these modes in relation to the development of proficiency of practice.





*Tweezing the lip of the cylinder out with the tweezers*



*Starting to trim the tweeze and trimming the tweeze off of the cylinder*

### **Incorporating the shears**

The shears, mentioned at the opening of the article, used largely for more advanced techniques, remain somewhat peripheral and enigmatic for the novice. When the shears are finally used by the novice, she has some, though limited, sense of the material underhand and is thus able to shift her attention beyond simply keeping the glass under manageable control, to technique.

Shears are large handled steel scissors, with blades ranging from an inch to eight inches long. One of the primary uses of shears is trimming “tweezed out” glass. To thin the walls of a cylinder the glassblower has to “tweeze” the glass, then “trim” it. “Tweezing” involves gripping onto the lip of the piece with a set of large steel tweezers, ranging from 6 to 10 inches long, and pulling the glass outwards, parallel to the piece. This stretches out the glass and creates a crimped edge. The shears are then used to trim off the crimped excess glass, leaving a clean lip and thinner walls.

Though Evan had once demonstrated how to tweeze and trim with the shears, he had quickly suggested that we probably were not ready for that technique: “You can try that if

you really want, but I don't think you're really for it yet. Just stick to opening the cylinder like we've been doing" (Fieldnotes, November 16, 2003). Consequently, our use of the shears during that first semester of glassblowing was limited to cutting much like using household scissors, as we cut through the solid glass to create a handle in the first example. It is not surprising, therefore, that I felt affronted during the second session of the beginner's course with Rob the next semester, when my partner, who had had previous glassblowing experience far beyond mine, tweezed and trimmed her piece:

I suggested that she go first since she missed class the last time. She began by arranging herself, then the tools and finally by heating the ends of the jack blades up. I had only ever seen an assistant do this for the gaffer to wax the tips of the jacks before necking a piece and I wondered what she was doing. . . . I asked her if she was going to blow, as a way of asking her what she was doing and why she was wasting my time. 'Yes, I'm just preparing the tools,' she responded curtly. 'Oh,' I said without emotion. She finished up, grabbed a blowpipe, and rolled it up and down the arms of the bench, was somehow dissatisfied, put it back in the pipe warmer and chose another. She rolled it on the arms as well—it passed whatever test she was giving and she took it to the glory hole to heat, making a lot of drama, blowing into the pipe, looking at its tip, etc. She suddenly stopped en route, turned and walked to the pipe-cooling barrel with the pipe, placing it inside. Again, she went to the warming rack, grabbed another, and brought it back to the glory hole to heat. 'Blocked?' I asked. 'No there was just a lot of extra glass on the tip.' 'Oh . . .,' I exhaled heavily. She heated the tip of her pipe, and headed towards the furnace. I followed her, opening the furnace door for her to gather. It opened a little bit too far and as I was going to close it she sharply said to me, 'Don't open it so far! It will burn the arm of the person who is collecting glass!' . . . Back at the bench, as my partner opened the glass, she did some other theatrics, which included using the scissors [sic] to cut off the top of the cylinder once she had opened it. I have seen others do this, but have never known myself what the purpose is' (Fieldnotes, February 10, 2004).<sup>2</sup>

I began to understand the purpose of the shears (above, incorrectly referred to as the scissors in my fieldnotes, which is telling of my practical orientation to them at the time) a few weeks following my partner's "theatrics" when during a demonstration Rob explained, after blowing out the bubble, that we would need to tweeze and trim the piece:

. . . Rob pulled the neck of the bubble out, like a long neck bottle, heated only the tip and "tweezed" it. He had talked as he worked: 'Now heat the tip so that its really, really hot, and . . . Jane, what would you call this?' he asked as he crimped and pulled out the heated tip of the neck with the tweezers. 'Ahh . . . heat and tweeze?' she responded. 'Yes, heat and tweeze, that's it,' he said, laughing somewhat at the terms, 'Heat and tweeze. You've got to heat and tweeze the piece.' 'Rob?' I began to ask. "I still don't understand what that is for.' 'Heat and tweeze?' Ron responded. 'Yeah, heat and tweeze' I clarified. 'Well, when you're doing this you can thin out the area, like when you're making a cup, or you can elongate the piece, like for bottles. Once we've tweezed the piece out, we have to heat it, and then cut into the tweeze with the shears, and just cut, turn, cut, turn, like Pac-Man" (Fieldnotes, March 18, 2004).

We begin by coming into relation to the glass through the tool, albeit dumb groping and naïve shaping. Explanation informs our shaping of the material within traditional norms of practice. Rob's explanation, in the context of purposeful technique, brought the shears into relation with the material through explaining their role in the process of thinning out the cylinder, by bringing vocational precedents set by traditional norms for tool use to the shears. Shaping which expands the meaning of tools beyond means to be upon the material, to reciprocal engagement, can only be significant for the development of proficiency in practice, if informed by the field's paradigms of technique: "We can assimilate an object as a tool if we believe it to be actually useful to our purposes and the same holds for the relation of meaning to what is meant and the relation of the parts to a whole" (Polanyi, 1962,

<sup>2</sup> For the record, I'd like to note that this person became one of my regular blowing partners, and a friend that semester, and the attitude I have here scripted her with was due to my ignorance of the purpose of her actions.



p. 63). This pedagogical commitment to explanation speaks to the active role of the *field*, that objectified history, in communicating practical knowledge, as it provides an understanding of the use of the tool as *technique*—the practice of a specialized knowledge. Taking the shears into hand cannot itself yield effective, or proper, technique. Explanation brought to practice bears technique—a process through which the novice adapts previously established corporeal habits, like cutting, according to new paradigms of purpose defined by vocational precedents, and thus develops new dispositions and practices, like trimming.

With an understanding of this technique, by the winter of 2004, especially following my partner Susie’s purchase of an excellent pair of shears, and constant practice of “trimming the tweeze” there seemed to be a surge in my skill at trimming. I was focused on the technique, rotating the pipe, cutting into the tweeze at the 6 o’clock position, turn, cut, turn, cut, turn, cut. I had taken on the shears as an extension of my hand, my grip melded to the handles: I no longer struggled to take them in hand as I had before: “We may regard this as the transformation of the tool . . . into a sentient extension of our body. . . . In this sense we can say that when we make a thing function as the proximal term of tacit knowing, we incorporate it in our body—or extend our body to include it—so that we come to dwell in it” (Polanyi, 1966, p. 16). Effectively, I had made the tool an object of subsidiary awareness, that through which I attend 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, pp. 61–62). I was able to act through the shears upon the glass.

Thus, when the opportunity came to tweeze and trim my piece during the second session of my winter 2005 course, Venetian Glassblowing, I welcomed it. The class had a number of students with skills advanced well beyond mine, causing me much unnecessary, but persistently present, ‘performance anxiety.’ In the second session of class we were blowing cylinders. Though a cylinder is the first shape the novice learns, blowing them Venetian-style involves new techniques in bubble set-up and in blowing out the bubble. Thus, when the moment to ‘tweeze and trim’ the lip of the cylinder came, I felt I had reached some sunny windowsill of rest and repose from the otherwise new and challenging techniques:

“Recently, I have tweezed and trimmed well—I welcomed the opportunity. But, it didn’t turn out to be at all the case. I tweezed the lip unevenly. I wasn’t working with Susie that night and my group was using the student set of tools—I got nervous thinking about having to use the student shears. ‘Warren,’ I called out to my partner, ‘Can you ask Susie if I can use her shears?’ He went to ask as I heated the piece. I called out thank you to Susie. I abhorred the idea of using the student shears. The nice shears didn’t matter though: I cut into the tweezed out glass and twisted the piece as I trimmed. My instructor, Bennett, offered more assistance: ‘Now remember, where did I tell you to cut? Back here,’ he continued answering himself, pointing to the back part of the blades, where they come together, ‘you’re cutting up here,’ he continued, pointing to the tips of the shears. I tried to tweeze and cut again, bidding his advice, but again twisted the piece” (Fieldnotes, February 11, 2005).

My moment of repose quickly became an accentuated occasion of anxiety—the technique that I had looked to count upon, had not been there; though I struggled and searched, I could not find it. The teaching assistant in the Venetian glassblowing class, Adam, noted my frustration with failing to trim the tweezed part of the cylinder well and came up to offer advice:

‘Now, remember, pull back when you cut into the glass. That way your cutting actually feeds the glass into the next cut.’ I decided to tweeze and trim again, just so that I could try to understand and feel what Adam had explained. I did and tried to cut far enough back so that the cuts actually fed the glass to the shears. I paid attention. What Adam had pointed to made sense. When I cut further back on the

shears, I could feel it drawing the glass in for the next cut. It involved attending the glass, drawing the glass into the proper place, more than acting upon it. ‘Yes, I see,’ I said to him, as I cut and the trim fell to the floor. ‘I understood what you’re talking about,’ I continued, looking up at him, ‘I could feel it.’” (Fieldnotes, February 11, 2005).

I did not really understand precisely at the moment what had changed about trimming that time, but I knew that it had been different and sensed the improvement. Adam and Bennett’s advice had been nearly the same, but thinking back on Adam’s advice, I saw that he directed my attention, through the technique to the glass. Adam, in pushing my focus towards the glass, also pushed the recession of the shears into my hand and demanded the accession of my sensitivity for the glass. In the development of tacit knowledge, for the shift in operational understanding to lead to proficiency, the tool cannot appear amidst the performance of the glass—in this sense the “tools seem to disappear”, indeed must, in the hands of the glassblower. Though I had developed some skill at trimming, I had continued to ‘get caught’ on the tool as an object of focal awareness, not only in technique, but also as a fetish-object, evidenced in my dread of using the student tools and plea for Susie’s shears to be brought for my use.

More proficient glassblowers will say that ‘the tool shouldn’t matter.’ Kanik, who enrolled in a weeklong class with Dante Marioni, had watched Dante blow goblets for one week, using goblet jacks designed by Jim Moore after those of Lino Tagliapietra.<sup>3</sup> Frustrated with the difficulty of mastering a technique Dante had demonstrated, Kanik laid aside his old cup jacks, larger and less specialized than Dante’s, deeming them unfit for the task at hand, and walked into the school’s store and bought the same pair of jacks as Dante’s for \$300. Despite the new jacks, however, he continued to struggle with the technique. Seeing this, Dante came over to assist, took the piece, sat in the bench and, without looking, picked up the larger old jacks, and executed the technique perfectly (Interview, Kanik Chung, February 20, 2005). Similarly, earlier in the evening of that same Venetian class, when I had struggled to use the student diamond shears, which have larger handles than the small-handled diamond shears that I had become accustomed to using with Susie, Bennett reminded me that the tool should not matter: “You have to figure out a way to use those shears. I’ve seen a lot of people with small hands figure out a way to use them” (Fieldnotes, February 11, 2005). I believe that this is what Ezra pointed to as well after questioning him how it would be to use tools which were not his own:

“As far as making my best piece with my tools or somebody else’s tools, I think that is an arbitrary issue at this point. Its knowing how to use the tools correctly and make the right move at the right time. Say I took somebody else’s jacks that had a weak spring. I would obviously, as that person handed them to me, naturally play with them, give them a quick test. . . . Its through learning how to blow glass and manipulate it—well, when you first start out you tend to squeeze the jacks real hard and you square or corkscrew the glass—but, through practice, you know that you have to come on with a gentle feel. The tools kind of become secondary and its process and technique first and the tools are just . . . if you watch somebody blow glass who has been doing it awhile, a lot of times they don’t really look at the tool bench they just have their set up, and they grab what they need, come up and do their thing, and they’re just watching the glass, and they’re keeping their eye on that and just reaching for what they need. So, I guess the tools do become secondary and an extension because you can’t touch the glass with your hands. You have to learn to have it be an extension” (Interview, Ezra Wiley, glassblower and studio technician, January 28, 2005).

While the incorporation of tools may begin with a focus on technique, wherein the tool may emerge as an object of focal awareness, as merely an object-in-use, for incorporation to

<sup>3</sup> Dante Marioni, glass artist, was born in Seattle in 1963 and is the son of Paul Marioni, noted glass artist. Lino Tagliapietra was born in Murano in 1934, began apprenticing at age 11, and became a *maestro* at age 21. He currently works out of Seattle and is one of the world’s most esteemed glassblowers.

be complete, the tools must become synonymous with the body, so that the glass becomes foregrounded in the practice. This is not to say that the glassblower did not previously attend, or respond, to the glass—she did, but it was only in the very beginning to its Empedoclean allure and then later, insofar as the glass somehow prohibited the execution of the technique, that is only when it became too cold for my shears to effectively trim. Adam’s advice urged me away from an instrumental relation to the glass through my tool, urged me to open myself to the glass.

The tool becoming the hand of the glassblower means more than embodiment and effective incorporation of technique. Accompanying the synonymousness of tool and hand, is the absence of the authoritative structure of maker acting upon material, wherein the material emerges as a defining force, the opening of a dialogical relation. Martin Heidegger, discussing the cabinetmaker’s craft, writes: “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, p. 14). The tool cannot be fully characterized as instrumental insofar as it shapes the maker into a listener: through it, in it, the maker is able to listen to the material, and therefore serves as more than a means to the specified end.

Glass, over technique, emerges as a refined and significant informant of tool use. Fred Metz, glassblowing tool designer and fabricator, came to understand this subtle dialogue between maker, tool, and material. In 1994 Fred was working as a studio technician for Josiah McElheny<sup>4</sup> at Rhode Island School of Design (RISD), where Lino Tagliapietra, one of the world’s most esteemed living glass artists was working. At RISD, Fred became interested in making glassblowing tools, while Lino, a *maestro* since age 21, needed tools. Fortuitously, a working relationship was struck in which Fred began to make tools for Lino, who then through using the tools, instructed Fred on both their shortcomings and their worth. I would like to quote at length the story told by Fred of this emergent relationship between he and Lino as a way of demonstrating that tools are ‘good’ when they answer, meet and respond to, the readings by the maker of the material.

“Lino made his tools look as if the tools did the work . . . made you wonder what it was that enabled him make things so easily, and so out of his hands, it just seemed to flow out of him. It appeared that the tools were part of the reason. We can talk about a hand-tool connection. Really good glassblowers make it seem as if . . . well, the tools can disappear in their hands. When they’re really good with their tools, its never awkward for them. We were interested in finding out what the right material and shape was for a punty. Initially we put together some puntys out of some readily available material, the closest we could come to 10mm was 7/16” which is about 25 thousandths of an inch larger than 10 mm. And we could also get 3/8” which is about 25 thousandths of an inch smaller than 10 mm. . . . In a blind test, Lino could immediately pick out the 10 mm. We discovered that within 10 thousandths of an inch, he could tell the difference of a tool. Usually an imperceptible amount would make a difference in how it felt. That was a break-through piece of information. . . . So, I made a few tools for Lino. He would get them and say, ‘Oh, why did you do it this way? It needs to bit a little bit longer, or a little bit wider here.’ So, Lino really helped define what the shape of certain things was suppose to be.

<sup>4</sup> Josiah McElheny, born in America in 1966, is a graduate of the Rhode Island School Design and a noted glass artist.

... We made a cup punty and the cup punty was suppose to be .625 inches in diameter. And that was it. Its gotta be .625 inches. And we understood that this was like a cardinal law. Lino and Dante had both told us that if it isn't this diameter, its not going to work. Essentially, this is the perfect diameter for making cups on. Well, they've gotta be right. I ordered the material and I put these pipes together and never really even paid any attention that it was .675 inches: .675, we're looking at 50 thousandths of an inch, about a sixteenth of an inch larger then what it was suppose to be. We made these and I sent them to Josiah at RISD. He called me back and said, 'These are too big, these are all too large. They are useless, completely useless.' I had another dozen of them sitting in my rack. I should have known, .675, .625. ... Anyway, they sat there for six months and I started getting calls from students at RISD saying, 'We liked that one cup pipe, could you send us another one?' ... It became immediately obvious that ... the glassblower would say that its got to be exactly this size, that this is the perfect thing, but in reality if they tried something else and learned to make something with it, that thing becomes the perfect thing. ... It had to do with what you learned to use.

... There is this one size, .813, that we just couldn't replicate. We never could find the material. Its was impossible, we couldn't get it in metric. ... We finally realized that if we were going to make anything close, it'd be this other size. For probably eight years, Lino made all his work at Manifesto on two of these pipes.<sup>5</sup> It was this in between size that he would never have endorsed right off the bat, but it turned out to ... well, whether he liked it or not, several million dollars worth of work was made on this one awkward size. We just recently remade them for him. We made it to that size. And they think they are the greatest pipes—that they're the perfect size. So in a way, the tools become an extension of the people, to the point that they are expecting this weight and this size and they can tell within a fraction of an inch" (Interview, Fred Metz, February 1, 2005).

Forged by limits of American steel industry supplies and the ability of *maestro* glassblowers, like Lino, to adapt to the new designs, Fred discovered that good tool design was not in perfectly replicating the Italian tools, but in providing a tool which could be adapted to and used by the glassblower. There is a certain surmountability of tools. From this, however, we cannot conclude that any tool will do. 'Good design' answers 'good needs'; good needs arise from skilled practice embedded in an understanding of the material. Though Lino could adapt to an extent to Fred's tools, Fred's tools also had to allow for Lino's reading, sensing, listening of the glass. The toolmaker's relation can be dialogical, and in fact, must be for proficient practice.

Thus, Fred says he has to chuckle when receiving some of his orders: "I've got an order right now for a pipe that is two inches in diameter, seven feet long, with a jumbo head. You know that person is without any skill. They're just making up for what they're missing because they can't handle the weight, so their solution is to get a bigger tool—they're huge, just monstrous" (Interview, Fred Metz, February 1, 2005). In other words, such a tool would impair the ability of the glassblower to answer and respond to the glass and speaks to a lack of material understanding. Good tool design is rooted in the needs of the good glassblower, which is in turn rooted in the glassblower's understanding and sensibility for the glass, dialogically informed—this is the defining dialogue of Fred and Lino's relationship. In academia, we know this as 'asking the right question'; that research design will never compensate for a poor question. That 'right question' in glassblowing is informed by a deep understanding of the material: this carries tool use beyond the unidirectional calisthenics of technique to the touch of material necessity—"To act *not for* an object, but *from* necessity"—which is known through listening and responding in accord to the material (Weil, 1999, p. 45). Some herald this 'art over craft'; some poeticize it as 'following the glass.'

<sup>5</sup> Manifesto is Tagliapietra's studio in Seattle, Washington.

## Knowing why and how good tools are good

I did not understand tools in the beginning, as seen in my complete misunderstanding of my partner's preparation of her tools and use of the shears, as well as in my evaluation of the shears' quality following Evan's critique, mentioned at the beginning of the article: I had assessed their quality according to some hackneyed formula of stoutness and leverage points created by some dubious relation of strips—completely unintelligible. Ezra unsurprisingly did not use these categories when speaking about what to look for in shears:

“With the straight shears, you don't want to have the nuts be too loose, which can happen if they're threaded. In terms of sharpness, the blades don't have to be razor sharp, you can feel that these have gotten pretty dull. That sharpness helps, but it's the heat that makes the glass able to be cut. I can cut with these with no problem as long as the glass is hot. If they were sharper it would help a little bit, but its kind of arbitrary. I wouldn't want to have them totally rounded out because they will never cut. The tips are really the most important part because that is where you get that final snip. What really matters is the heat of the glass. As long as the glass is hot, they work fine” (Interview, Ezra Wiley, January 28, 2005).

Ezra evaluated the shears in relation to the glass, as had Adam advised in regard to my trimming technique. In the practice of a *maestro*, the tool, serves the *maestro* the glass in a materially-informed, not a static technique-informed manner. There is a reciprocal engagement of maker and material in tool use, rather than a unilateral determination, for which knowledge of the material is mandatory.

Thus, we can begin to understand why tools are without character for the novice. The novice executes techniques with tools; she is not open to using the tool in a materially-informed manner and therefore lacks an ability to evaluate the worth of a tool. Though I was far from standing in relation to tools in a materially-informed manner, I had by December 2004, become sensitive to the issue of tools through the my own practice and the buzz of 'tool talk' in the studio.

'Tool talk' is comprised of discussions of whether and how tools are good—a judgment that can only be informed by the relatedness of material and maker. The sense of a tool's 'goodness,' however, we know is informed by the relation between the glassblower and the glass, confirmed in Ezra's discussion of how to select a good pair of jacks: “I think its best to try them out because every person makes their tools a little different. And their materials are going to be different; different steels are going to react differently. That's what great about Corning. You can go there and just try out all the tools and see, which feel the best in your hand” (Interview, Ezra Wiley, January 28, 2005). Though Ezra pointed to the importance of making the tools secondary in practice, he also stated the importance of giving attention to the tool prior to use, that quick moment wherein he would squeeze the jacks to test their spring, namely a *practical query* into the limitations of the tool.

In order, however, to be able to read the spring of the jacks effectively, the glassblower would already need to understand how she wants to come onto the glass, that is her needs in a pair of jacks, which entails having an understanding of the material: for the tool to be competently taken into hand is openness to and understanding for mandates of the material.<sup>6</sup>

<sup>6</sup> It is for this reason that Willie, the blacksmith protagonist of Douglas Harper's *Working Knowledge*, esteems blacksmith welds done at the forge over those done with gas: “Willie learned about metal in his father's blacksmith shop. At the forge a person comes to understand a metal in a fine and detailed way, through heavy handwork, altering metal with heat and then reforming it with the hammer and the cold of water or ice. Willie explains: ‘. . . you had to know your temperatures and you had to know your metals to do a blacksmith's weld. You've got to know the same things for gas welding—which metals will weld together and which ones won't. . .’ Learning about metal through blacksmith's techniques became, for the first generation

In talking about tools, one expresses this understanding. ‘Tool talk’ is thus an expression of one’s relation to the medium and furthermore serves a broader purpose of creating empathetic relatedness and solidarity within the group.

### **Tools: Informing a social world**

The appropriation of tools is celebrated therefore, even if in light-hearted ceremonies, as the commitment to the craft of which it is indicative anticipates the possibility of a development of a deep materially-informed relation with the glass:

“I emerged from the elevator into the reception area of the glassblowing studio, a bubble-wrapped 4-foot long blowpipe in hand, and crossed into the small reception area. Deborah was at the front desk—the object within the bubble-wrap was recognizable: ‘Ohhh . . . what’s that?’ she said smiling in her always very friendly manner. ‘Blowpipe,’ I responded, smiling back. I could feel my excitement rising. As I was laying the package onto the counter to sign-in, Rob and Ezra walked through the foyer to take the elevator, casually glancing into the reception area to wave hello. Their waves were self-interrupted as their eyes fell upon the package I still partially held in hand. The elevator came and went as they walked towards me. ‘What do you have there?’ Rob asked knowingly. ‘A blowpipe,’ I answered, beaming. I set it on the glass countertop, gently tearing through the three rings of masking tape, and unrolled the pipe from the bubble wrap. ‘Woah,’ both Rob and Ezra uttered in admiration. The rough luster of the soft steel was inviting. Rob picked it up. ‘It’s a large cup blowpipe—carbon—Spiral Arts,’ I dropped the words like diamonds. Resting it horizontally across his palms, he tossed it lightly, measuring its weight, its balance. ‘Very nice,’ he said gingerly, ‘This will be great for you’. He swung the tip for gathering glass before my face, and pausing for a moment, touched the tip down on my left shoulder and then my right. I had been crossed, been blessed by my blowpipe. We all laughed, but at the same time I took it seriously. The blowpipe belonged to me and I to the blowpipe. My excitement was evident in the shaky signature I managed on the sign-in sheet. Ezra stayed, while Rob went downstairs, to talk about tools, show me his tools, and give advice on how best to maintain them” (Fieldnotes, January 14, 2005).

What was poignant about entering the studio that day with my own blowpipe was the mutuality I experienced with Rob and Ezra around the blowpipe. I could look at Rob, who, as my previous instructor, knew my skill as a glassblower, as he felt the weight of the pipe in his hands and understand through his nods and even throws that he felt the pipe was good for me. We three could look at the head of the pipe and discuss how it was a good size, knowing that it would be used for the smaller pieces I would be blowing in the upcoming February Venetian glassblowing class. We each read the blowpipe through our own experience and thus our evaluation of the pipe articulated an otherwise unarticulated experience of embodied engagement with the material. Tool talk inadvertently is a forum through which glassblowers express their relation to the glass—a forum for revealing and disclosing the experience of the glassblower. This differs from other discourses, such as the “talk of love” discussed by Ann Swidler, insofar as it reveals an embodied experience of matter, rather than an internalized system of values (Swidler, 2001).

It is through this discourse that the glassblower bridges the relations of embodiment and the social world, and therefore experiences the significance of her actions in relation

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of welders, the basis for gas welding. These welders, like Willie, could understand welding because they understood metal in a deeper and more fundamental way than welders who learn first with the torch. The progress at the forge was slow, the changes in the metal relatively gradual, all controlled by the hand. The blacksmith’s weld is an extension of forming, bending, and adapting metal. Gas welding, which evolved from the blacksmith’s techniques, is a more efficient method of cutting and binding metal that, for basic work, need know only the basics of how to use the tool. On the other hand, a modern welder who learned his or her trade as a blacksmith summons a detailed and many-sided knowledge that refines the use of the technique” (Harper, 1987, p. 31–33).



not to the externalized object alone, but as one glassblower among others: “Without the accompaniment of speech, at any rate, action would not only lose its revelatory character, but, and by the same token, it would lose its subject, as it were . . . The action he begins is humanly disclosed by the word, and though his deed can be perceived in its brute physical appearance without verbal accompaniment, it becomes relevant only through the spoken word in which he identifies himself as the actor, announcing what he does, has done, and intends to do” (Arendt, 1998, p. 178). ‘Tool talk’ discloses the individual in the Arendtian sense: “In acting and speaking, men show who they are, reveal actively their unique personal identities and thus make their appearance in the human world” (Arendt, 1998, p. 179).

Disclosure, or unconcealment, through tools, in this sense, is not the expression of human essence, as discussed by Karl Marx. For Marx, the worker ideally objectified herself in her work, that is externalized her *species being*: “It is just in the working-up of the objective world, therefore, that man first really proves himself to be a *species being*. This production is his active species life. Through and because of this production, nature appears as *his work* and his reality. The object of labour is, therefore, the *objectification of man’s species life*: for he duplicates himself not only, as in consciousness, intellectually, but also actively, in reality, and therefore he contemplates himself in a world that he has created” (Marx, 1844, 1978, p. 76). The disclosure of tool-talk is not of the individual’s essence, but of her involvement in the world, her embeddedness, what Drew Leder calls the “dialectical world-body relation” and what Simone Weil refers to as “the perpetual exchange of matter by which the human being bathes in the world” (Leder, 1990, p. 34; Weil, 1997, p. 142). In the studio, this expression is of a particular engagement with the world—of glassblowing—the participants must be involved in this world in order to both meaningfully speak and listen. Given the extent we were becoming and had become glassblowers, Rob, Ezra and I “understood” each other as we spoke of the blowpipe, tossing it in our hands. Similarly, it is also for this reason that Ishmael failed to understand Queequeg’s relation with his harpoon in the first chapters of Melville’s *Moby Dick*—he had not yet become a whaler.

‘Tool talk’ expresses the glassblower’s distinct embodied relation with the material and, significantly contributes to the solidification of the group in the glassblowing studio, not only in its disclosure of the individual, but also in its disclosure of the embodied empathy among glassblowers as regards their maker-material relation. This need not imply consensus, for while—again, thinking of *Moby Dick*—the harpoon brings both Queequeg and Captain Ahab into whaling, their relation to whaling is altogether different. Moreover, regard or reverence for words spoken within this forum is based upon differences, those speaking with greater proficiency and experience—ultimately wisdom and sensitivity for the practice—being heeded the most, those without being avoided or ignored. In this sense, ‘tool talk’ additionally contributes to the construction of stratification within the group, according to a system of status based upon proficiency.

It is with a developed understanding of the material that the glassblower is able to speak of tools meaningfully, while the tools simultaneously enable the development of that understanding. The glassblower uses the tools, as a novice, without an understanding of their role in making her into a glassblower and buttressing the world in which she seeks to belong. She appropriates tools as her understanding progresses and if she has made wise choices, this is celebrated in small ceremonies, like the conversation with Rob and Ezra above, or more elaborate baptisms like the one following our conversation:

“I walked into the studio. Susie was there, chatting, holding her new blowpipe in hand. I walked up to the group with my pipe, still beaming. She had the stainless steel small cup pipe. I had the carbon large cup pipe. We compared the heads. ‘So, you guys have never used these before?’ Moshe, a glassblower in the studio, asked. “Nope,” we both answered. ‘Well, do you know what you have to

do?’ he continued. ‘Nope,’ we responded in sync again. ‘You see,’ Moshe said, taking Susie’s pipe into his hands, resting the blowing tip on the top of his shoe. ‘You see, first you have to kiss it and then give it just a little bit a tongue, just like this,’ he continued, pretending to curtly stick his tongue into the tip of Susie’s blowpipe. I looked at him skeptically, but obediently did as he instructed, ‘I need a little privacy for this,’ I said: turned my back, kissed the tip of my blowpipe, and shoved my tongue in the hole and turned back. ‘Now next,’ he continued, ‘you have to get the perfect gather. If you get the perfect gather on your first try, its good luck for the rest of the time using the blowpipe.’ Moshe cupped his hands in the perfect little avocado-shape of a first gather, whetting my imagination and hope—yes, I could do it I thought. I could get that perfect gather, so that from here on out my blowpipe would carry my work like magic. But, I, of course, failed. It was effectively impossible—you cannot gather on baby smooth cold pipes. . . . I had abandoned what I knew in the effervescence of getting it right, of making the pipe my own, of imbuing it with every morsel of good will and good fortune I could muster” (Fieldnotes, January 14, 2005).

The baptism, though a bit of a hazing joke, is nonetheless telling. Just as Captain Ahab tempered the harpoon, forged by himself and the blacksmith, Perth, for the final hunt of Moby Dick, with the blood of Queequeg and the other two cannibals aboard, so too must the glassblower temper the tool with the material for which it is intended—a confirmation of the reality of which it is already a part. Not one, the glassblower, tool, or glass—the whaler, harpoon, or whale—can be without the other, and indeed glassblowing and whaling are constructed in this like manner through relations of action. The deep metabolism of conditions which are in place for the practice are anchored in a specific matter.

## Conclusion

When Chandra Mukerji asked, “How do people construct social meanings and group lives with hands as well as tongues?” she was asking a compelling question, which this article has addressed (Crane, 1994, p. 159). She critiqued the dominant paradigm which assumed “that the material dimension gain[ed] its authority through its relationships to language categories” and indicated the importance of giving a separate existence to the forms of practice that can mobilize language categories in this way (Crane, 1994, p. 160). In our exploration of the role of tools in glassblowing, we have seen that through embodied tool use the glassblower comes to know and potentially master the medium. However, we have also seen that it is not masterly use of the tools, or precision execution of technique in lieu of material considerations, which propels the ascent towards proficiency. Rather, it is only when the glassblower comes to understand and respond to the glass, an understanding made possible through tools that practices of technique become meaningful and moreover, that glassblowing discourses become substantiated. In this analysis, the material dimension has revealed itself to be a force lending authority to, rather than gaining authority from, language, precisely through tools, and by embodied extension, through hands. We have explored in this case how people construct social meanings and group lives with hands as well as tongues through coming to know and understanding a material.

*In situ* ethnographic research, a practice itself of embodiment, methodologically opens the possibility within the sociology of culture for understanding how the material world “penetrates” the actor. We have seen that through tool use, material trumps technique as the defining factor of proficient practice, and also emerges as a structuring force in the formation of a social world. Mukerji (1994) praised the work of Thomas Kuhn (1970) for giving practice “its due as the center of social coordination.” Here, we have not only practice at the center of our analysis, but have emphasized the material dimension of practice through the dialogical relation the actor has with the material world. This has brought the *matter* of

culture to light as constitutive not only of individual practices and meanings thereby gained, but also as a foundation upon which social worlds are formed.

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