Gravity Wins

Mary Jane Hackett

maryjhackett@gmail.com
3 Opal Street
Preston
Victoria 3072
Australia

Abstract

This paper discusses a set of photographs that I have taken, *Gravity Wins*, and my discoveries and findings which relate to the view of the maker and the autonomy of the object. Although there are those who have discussed material interventions from the viewpoint of blacksmithing as subject, such as Keller and Keller (1996), there is a gap within the research on this form of making that fails to fully address the energy inherent within material practices.

Situated within the field of art this research is guided by new materiality theories, where relationships between things is an integral factor within the making process. Through these drawings, I search for forms that reflect the connection between maker and material, resulting in deeper understanding of the vitality within processes, material reactions and performance inherent within a quench.

KEYWORDS: quenching, steel, material, process, drawing, sculpture

Introduction

Within my own practice I search for the moment in between the maker's intention and the material's reaction by isolating and focusing on one process which is the cooling of steel in liquid. In other words, I look at the performative relationship established between myself and the material of my art practice - steel - and an action involved in its

transformation - quenching.

Situated within an arts practice, and the field of new materiality theories, this project interrogates material choice and practice. Drawing on the writings of Andrew Pickering, Jane Bennett, Elizabeth Grosz and Richard Serra it examines the experience of making and what it means to have a connection with substance. It exposes our sensual compulsions towards the physical qualities and distinctive characteristics of matter, how they dictate our behaviour towards it and therefore our exploitation of it.

I discuss the unique relationship that blacksmiths have with their material, how the manipulation of steel has been established over a period of time through peculiarities of material and history. I will then give an explanation of the objectives and manner of quenching. The sequence of my research to date is explained including describing the form of quenching through drawing, video and photography. I examine the force and effect the act of quenching plays through the material/human alliance exploited when blacksmithing.

Finally I reflect on the photographic drawing series, Gravity Wins, and seek clues of the very nature of my making practice to give shape to my investigations through sculptural assemblages. I search for forms that reflect the connection between maker and material, resulting in deeper understanding of the nature of making within an art practice.

Human/Material Agency

The energy that is found within quenching is the result of human and material agency. Andrew Pickering (1995) explains within *The Mangle of Practice* as effects produced through action. Pickering describes the performative practice that relates to science research, and the push and pull of 'resistance and accommodation' that provides results. I liken this to the effort that occurs in the quest for the harnessing of natural characteristics of iron for advancement of human kind. Actions of blacksmiths, alchemists and metallurgists, as knowledge of iron accumulates, and the responses from iron as it reveals its many characteristics, builds up a thinking through material. This deliberation

is expressed through what we can now do with materials and our medium choices when we make. Material thinking not only generates progress in our ways of living, but also a personal relationship with material. It could be argued that it is our sensorial experience of material, and the world around us, that we express when we make and that the **e**xperience of making is more important than the resulting object. As matter in itself does not have intention, does iron in an indirect, inadvertent way, draw us to it?

In *Vibrant Matter*, Jane Bennett (2010) explains that all matter has vitality. It moves and shifts on its own accord, forever changing, and in that, it has agency. And, indeed, we are made of the same substances. The minerals in us, as in all organic matter, have organised and made us over lifetimes to become who we are, and are still reorganising at this very moment. What is interesting is that the matter that has made us is now, through us, organising those same minerals in other ways and for our benefit.

This thought is elaborated by Elizabeth Grosz in *Chaos, Territory, Art: Deleuze and the Framing of the Earth* (2008), who explains that it is not so much that we make things for the purpose of use but as a way of sharpening experiences. I understand her to mean that there is a coming together of natural forces with those of living beings to create an experience. Grosz goes on later to clarify this point through a discussion on the colour of birds, as well as their songs, suggesting a relationship to sexuality, and therefore sensuality which is after all a magnification of senses.

In *Weight*, Richard Serra (1994) describes the launch of a ship that he remembers from his childhood. He recalls the sensations around him as the ship slips from the security of its scaffold and makes its way down into the sea. He describes the colour of the brand new ship and the sound of the crowd as they watch with expectation and celebration. The descriptions mark time - the time of year, his birthday; the time of his life and that of his father's, the time that it took for the ship to move down the chute, and then the length of time it took for the rocking of the ship's body to cease. He describes the movement of the ship as it 'swayed, tipped and bounced'; and then the weight of the ship as it sinks into the water.

He not only writes about his feelings of that moment as a boy but also as an adult. Within his adult thoughts he compares it to the labour carried out by Vulcan 'at the bottom of the smoking crater, hammering out raw material'. It causes me to think of the instant of quenching where time is narrowed to a point of intent and the rhythm in that moment where one second leads to another giving an expectation of the next. Where colour is highlighted as the smith waits for the orange glow of hot steel; and the rhythmic pounding of the hammer as it counts time; while people chatter is background noise. All that you hear is the pulsing of the hiss when the object is pushed into the water. There is the heat that is felt, dirty, salty sweat and in the back of the mind is a longing for the same fate as the steel - to be plunged into the water and body heat quenched. Most of all there is the understanding of the weight of the metal as it sinks, and gravity wins.

It is, to my mind, as if Richard Serra is describing childhood memories of the processes of a quenching - that is, Serra's connection with matter. It seems as if those memories are imprinted in his mind and he can do nothing more than repeat them in his work. Throwing Lead (1969) captures these memory intentions and connection with material physically as he uses his whole body to throw the molten lead. Also, the mask that he wears carrying out this action suggests other sensorial connections with matter.

What does it mean to have a sensorial connection to matter within blacksmithing?

CM Keller & JD Keller (1996) explain the manner that blacksmiths work with steel as 'thinking hot'. Every cause of action of a blacksmith's making process is determined by the tools and movements needed to complete a task undertaken while the steel is hot. Each task is thought through either before the work begins or while the piece being manipulated is in the fire. Moreover, blacksmiths have options in regard to the manner in which they make e.g., they are able to repeat certain actions either by using tools that can reproduce a form or by working freehand. The choices made either completes something which is 'cold' and 'dead' or full of 'warmth' and 'life'. Richard Sennett (2008) talks about the experienced maker 'thinking ahead' using hand gestures that have been repeated over time from when they began to learn the craft. We are not born knowing how to work in a particular way but through repetition, drive and need we add layers of

knowledge, physical as well as mental, to our repertoire of expertise.

Blacksmiths develop understanding of steel over generations of trial and error. They work with their material through all of their senses not just their hands. By looking at the colour they know when the steel is ready to forge. The sound of the hammer on metal as well as its colour indicates when it needs to be placed back into the fire to reheat. They are also able to tell through the smell of their clothing, apron and boots if there is danger from the heat. When the process of becoming blacksmiths begin, it is started tentatively by learning to build a fire in the forge. Understanding is then gained on placing steel into that fire, and when and how to hit and form it. They also learn to cool steel down quickly and work harden it.

As iron is a difficult material to bring to a workable state, the history of its making has to be marked with a strong desire to capture and create a usable material from it. Early man was unable to smelt iron as the temperature needed to do so was higher than that used for copper and other metals. Therefore, it took an interruption to the supply of tin, which was used in the amalgam of bronze, for smiths to reassess iron's capabilities. Robert Raymond, in Out of the Fiery Furnace (1986), suggests that the smelting of iron was discovered by accident while copper was being produced. The use of iron became more prevalent as bronze grew harder to produce, and was used to make, not only tools for living, but also swords for war. Those with the strongest swords won and even after tin availability resumed, iron became the metal of choice for war mongers due to smiths and alchemists exploiting the structure of iron.

Iron is a metal that easily absorbs other elements and by experimentation at the smelting and forging stage, as well as by the diligence of early alchemists, it was discovered that it would absorb carbon. This absorption changed the hardness of the metal creating a working material that is strong, yet malleable under the right circumstances. Furthermore it was discovered that steel depended on a process of capturing that state of hardness. Smiths learned to control the strength of iron through the act of quenching.

The reactions of steel within this process and others, has been exploited through the struggle and adjustment that occurs when humans make. This getting of, and advancing knowledge is again explained by Andrew Pickering as a performative exploration, a 'mangle of resistance and accommodation' that occurs through a scientific practice. The scientist's intention is to solve a problem and he uses materials that he believes will solve it. The scientist then waits to see what evolves from that process. The 'resistance' is the inability to achieve the required result through capturing the material's unique attributes, and the 'accommodation' is the revision of the intentions and material that relates to the problem. The understanding of these structural shifts occur through centuries of forging, quenching, and testing of the steel as it is utilised.

Quenching is a step in the sequence of working with steel. Sometimes it is a simple act, just a matter of dropping steel into water to cool it, and at other times it is a measured, calculated and, often, a ritualistic event causing the steel to harden in accordance with the desire of the maker. The quenching is done after the steel is fashioned into tools and boundaries of all kind.

To cool or to harden through quenching are different activities. Quenching to cool is something that happens after forging to allow the work to be handled. It does not harden the steel, as such, but brings it back to a solid state. Quenching to harden, however, happens after forging has been completed. The object is heated to yellow hot and plunged into a liquid depending on the carbon content and alloy of the steel. The sequence of quenching is integral to making and requires knowledge of material, involving anticipated reactions as it enters the quenchant, as well as the tempo required for the quench to be carried out.

For complicated quenching like tempering, these actions become more precise. Tempering is used to refine the hardening of tool steel to make implements for specialist work. Hard steel is fashioned into the required tool, heated to yellow and plunged into the quenching medium. Then the black oxidation on the new tool is cleaned away, making it bright, and is heated again. As the tool is heated the bright area is watched carefully for the colour of the metal to change, and then plunged into water. The change

in colour is important as each colour corresponds to the hardness a particular tool needs to be. I was taught to do this by a silversmith as a means of allowing me autonomy over tool making and repairs. The subtleties of colour change to bring about the required hardness using visual clues from the steel is a sensorial understanding. By this I mean that I use my sensory faculties to perceive changes in material as I make.

What is my intention when I work and how do I relate to my material?

Quenching for me is a process that I don't need to think about as it is embodied knowledge. It is a routine process that I use to change the state of my material - I work the piece until it cannot be worked any more and plunge it into the quenching bath beside the forge. As the object is dropped into the water it hisses and spits until the heat is extinguished. Sometimes, when I have quenched an object I have made from tube, the steam rises through the tube as it sinks into the water, burning my hand in the process.

Quenching is performative in that it requires repeated movements that have been learnt over a period of time. It is a muscle memory and is a result of constant practice. In *The Craftsman* (2008) there is a description of someone learning glassblowing in order to perfect a goblet and a moment of becoming one with material as she is urged to not take her 'eyes off the glass' as it swings at the end of the pipe. It implies that there is a forgetting of the self and to almost become one with the material as well as the tools used to accomplish the task. Juhani Pallasmaa explains it as a need for:

> *the craftsman to embody the tool or instrument, internalise the nature of the material, and eventually turn him/herself into his/her own product, either material or immaterial'.*

This is the human agency involved in the work, but there is something else that happens in order for the object to be complete. There is the response from the material itself.

Pickering says that there are periods of work and periods of waiting to see - time for the maker to make and then to watch to see what the material will do. This is what he explains is a combination of human and material agencies. Material agency is the

reaction that occurs as the steel hits the water. Jane Bennett explains this as 'thing-power' (2010, P2) which

happens as they connect - one hot, one cold. The human agency is the drop - my drop - of the steel as I release it from the tongs that have brought it from the forge to hold it hovering over the tank. My hand opens the tongs that hold the yellow hot steel ball and then releases it into the water. At other times and other quenches my arm moves forward towards the quenching bath and holds the object under the water, or oil, or brine, or ice, or whatever, like it is extinguishing the life of some creature which hisses and spits in protest at it's death throws. It is the intersection of that relationship, that material and human agency, which comes together to complete that orchestrated manoeuvre.

Quenching Video

Through my current research I focus on the connection point that happens within quenching. I observe, analyse and describe this task to find the space between the actions and reactions of material and maker. It is the time when the creator lets go of their practice trusting in the material to complete it. This does not mean that I am expecting iron to think, on the contrary. Iron, on its own does not think as it is inorganic, instead the maker exploits the accumulated knowledge of the characteristics of iron, and then allows chemistry and physics to get on with the task that it has been set.

To concentrate on the act of quenching I dropped yellow hot, hollow, steel balls into water while recording the effects on video. As they were hollow they quickly drop to the bottom of the tank and spring back up. This drama happens in the blink of an eye, and most of what a blacksmith generally witnesses is watched from above the water. All else is hidden.

Figure 1 shows a still from the video, *Quench*, 2013

So, for the purpose of the videos I used a glass water tank so that I could observe the whole action. From the videos I saw the drama that occurs in and around the ball. As it dropped into the water the yellow heat from the forging was extinguished so that by the time the ball bounced back up it was cool. In the process the water parted as the balls dropped and, as the ball rose again, it pushed the water before it causing a stem of that water to rise up from the surface. This experience was swift but the videos allowed a closer inspection by slowing the incident down, also allowing me repeated viewings of the event.

In addition, the videos showed that there were other things happening. While the ball was in the water, it was encased in a foam of bubbles. I have been told that in larger workshops using bigger pieces of steel there are machines that agitate the water as the large steel chunks are enveloped in boiling water, and the agitation helps to break up that encasement. Blacksmiths know of the boiling casing as they see it when they drop their objects into the water and understand that they need to agitate to cool. This led me to formulate the question: At what point does the maker relinquish the making process to the material?

I realised through the videos that there was a great deal of energy within the quenching process itself, and this does not take into account the metallurgical responses of quenching. The metal dropping causes movement in the water, and as it rises, it moves again. The heat from the metal results in the water boiling, delaying the quenching. This output of energy was, so far, the effects of the quench on just the water alone.

The real work, structural shifts within the metal, are not visible. Steel when heated and then quenched undergoes changes from austenite to martensite. Austenite is when steel is heated above 910º C. This allows carbon to be taken up into the steel. Quenching arrests this process and traps the carbon within the steel. The changes to the metal have been utilised over centuries but only recently been viewed under microscopes to verify. How were they understood especially as the visuals of quenching are hidden under the water and happen so quickly?

Drawings

I have made drawings from the video recordings, interpreting the actions of the quench on walls, paper, board; and then making in metal and turnip peelings. I began by drawing over video stills, considering the history of iron and its uses and other ways of experiencing a drop of hot metal such as meteorites dropping from the sky. These were followed by larger drawings proportional to the human body, which started as suggestions of my forged steel objects. They evolved into describing quenching, the hollowing out of the water as the steel sunk, sometimes the flash of colour of the hot ball, sometimes just

the form of the movement. What was interesting was with the readings from other people of the completed

Figure 2 shows a drawing, *Drop*, Charcoal, oil stick and conte on paper, 150 cm x 210 cm, 2013, photographer: Marc Morel

drawings, especially one, which reminded some of the human body and its functions.

I drew the process itself directly onto walls while watching the video. They were quick gesture drawings in charcoal, a direct method of analysing the drop after the ball had left

my hands. These drawings examine both the force of the steel as it plunges through the water and the power of the water as it accommodates and compensates for the steel, which was dropped through my action. These drawings described moments as they occurred, beginning with the impact on the water as the ball hit the surface. They presented the explosion, the wake, and then a peace; a tempest and then a calm; a force of energy. They also consider the position of and reveal the hand of the maker within the drawing. These drawings do inform my sculptural practice, however, I felt that I was only reflecting what I did know, or assumed that I knew.

Gravity Wins

Previously I had turned to the domestic realm to express the world around me by making things in steel that suggested every day objects. This time I chose to represent my processes using turnip peelings to examine my preconceived ideas of the quench. By using the camera as a means of framing the subject I took a series of photographs of the peelings as they sat in a framework of skewers or steel. I separated the photographs into groups and considered my thoughts and feelings at the time of photographing. By using repetition and reflection I encouraged the anomalies, and through the peculiarities I sought the meeting point of maker and material. The first images were tentative as, at that time, I was unsure how the turnip peelings would work. I coiled the turnip peel up and sat it on a framework of skewers in a dirty white space. I could smell the pungent ‘vegetableness' permeating my studio as it mingled with the odour of the glue gun. The outside of the turnip skin was hard and lumpy with tiny tendrils here and there. It was pale cream with areas of bruised pink while the inside of the peel was wet and cool and had a darker, creamy appearance. The coiled turnip was static - a rosebud on top of a clear vase. I hoped that the coil of turnip would unravel though it needed physical encouragement from me. As I touched the peel it unfurled straight away, creating an elegant swirl as the turnip touched the ground. It was now an open flower.

At a few points I used a reflective backdrop hoping that it would look more like water. The reflective paper revealed glimpses of myself taking the photographs, which annoyed me and I tried to erase my presence from the background. Why was I annoyed since these images were reminders of my presence? A reflection of the vortex created by the

hanging peel simulated energy while the form of the uncurled turnip peel was soft and gentle.

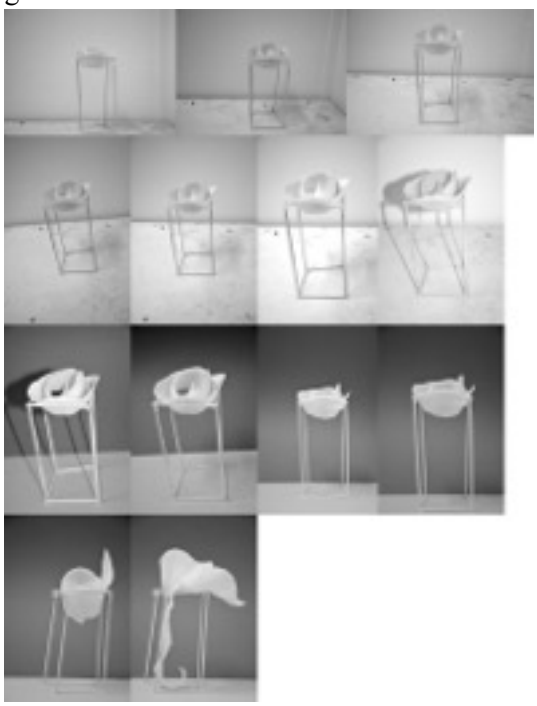

Figure 3 shows image 1-13 *Gravity Wins*, 2014

I tried to capture the movement of the peel before it slumped to the bottom of the frame but the camera was not quick enough. I become aware of similarities to the lemon peel in *Still Life with Chinese Bowl and Nautilus* (1662) by Willem Kalf, where the peel is on the edge of the table and on the brink of falling; a gentle fall, none of the drama visible in a quench. At another point, after setting up the reflective card again, the flash on the camera triggered, leaving areas of white in the background. Barbara Bolt's discussion on light in *Art Beyond Representation* (2004) came to mind. Bolt explains assumptions of light reflections revealing form of European settlers in Australia. What cannot be seen in the glare of the light within these images is still there, just not revealed. I am unable to know what is going on but I trust that it is still there. This reminds me of assumptions I have of a quench and those things that I don't see when I am quenching such as what transpires as the ball falls through the water, nor the transformations within the ball itself,

yet I know that these things are happening.

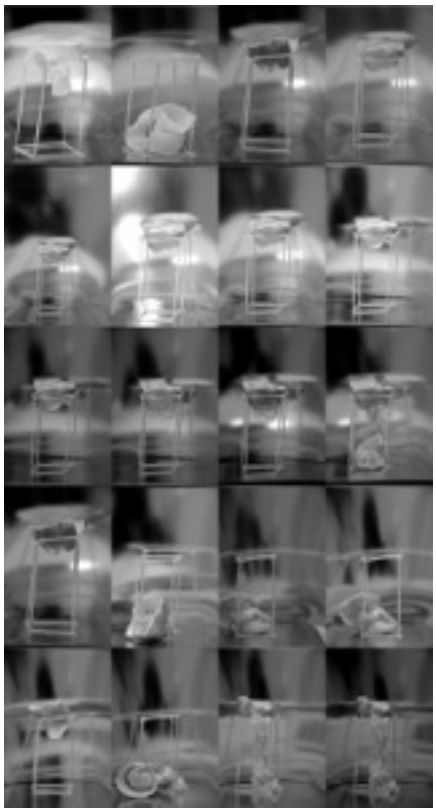

Figure 4 shows images 14 - 33, *Gravity Wins*, 2014

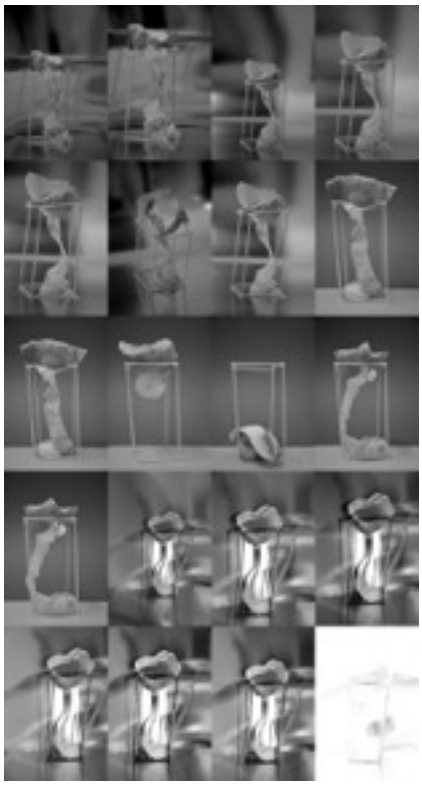

Figure 5 shows images 34 - 52, *Gravity Wins*, 2014

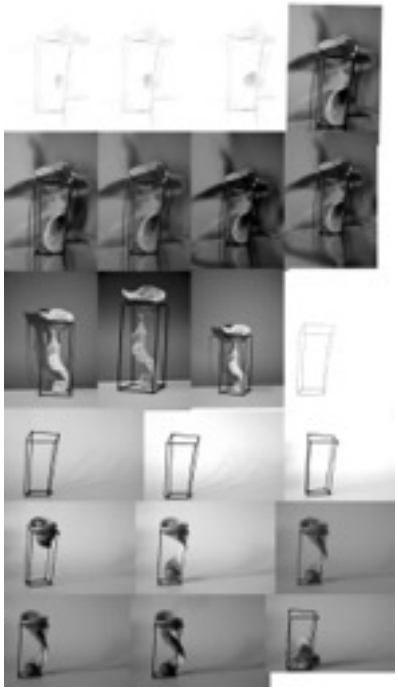

Figure 6 shows images 53 - 73, *Gravity Wins*, 2014

Figure 7 shows images 74 - 94, *Gravity Wins*, 2014

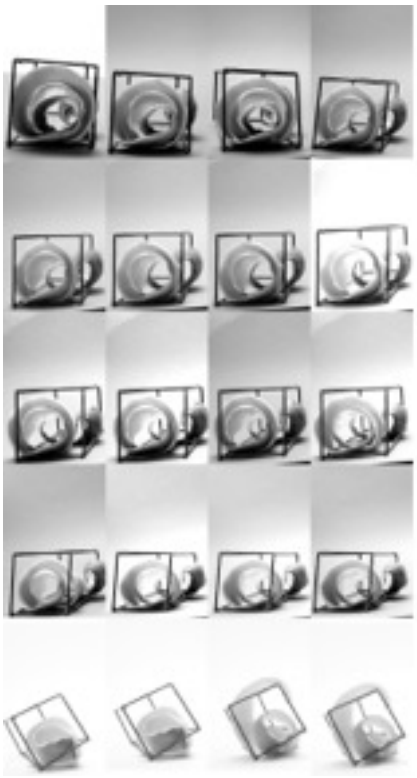

Figure 8 shows images 95 - 114, *Gravity Wins*, 2014

Materiality of the turnip verses that of the quench

When quenching it is customary to look down to watch as an object drops and cools in the water giving the visual outlook an aerial view. I set about photographing the turnip peelings front on. These images mimic the videos where I use a picturesque view of the ball dropping into the glass tank. The shift in view changes my perception of what is going on and wakens my awareness of all that occurs. I have subconsciously turned the viewpoint around in the photographs to accommodate the aerial view and to reflect a quench more closely. However the full consequence of the drop is not reflected in these depictions.

I believed that the form of the water would be reminiscent of a whirlwind, willy willy or tornado and I used the turnip peelings to describe that form, but in fact the water does not spiral, instead it forms a funnel for an instant. The spiral on the dropping turnip peel images lack the impact of a quench. What is not seen in the drop and force of the ball as it plunges into the water is important in these turnip photographs. The form of the water as the ball drops is a displacement, a parting of the water to accommodate the object. I wonder what else I could photograph to explore this movement?

Within all of the images I have used scaffolding to support the turnip peel. I believe that I used the scaffold for two reasons: to hold up the turnip peeling and to echo the glass tank that was supporting the water. By its very nature water needs containing and supporting and it has been useful to use this device for these images. However, like Richard Serra's ship, for the next I will take the scaffolding away from the turnip peelings to allow for a more autonomist form.

I have been granted a heightened awareness of gravity through the response of the turnip peeling as it falls from the scaffolding, as well as how the yellow hot ball reacts in the video as it hurtles through the water and falls to the bottom of the tank. Gravity is an important component within the dynamic of the quench. In numerous occasions photographing the turnip peelings I would allow one end of the peel to drop to the ground and the other end would follow before I could photograph the transition. The moment that I had anticipated had vanished within a blink of an eye and I could not capture it. This is the moment that I am trying to find and I feel that finding this moment will provide a form that expresses the sensuality involved in the process.

Conclusion

There are a series of actions and reactions that are brought together in the energy of a quench that I explore through drawing and sculpture. I look for forms that demonstrate the interrelatedness between the responses involved.

When a blacksmith steps up to the forge they have in mind what they want to make and the stages required. The tools are selected prior to beginning work, as well as the material stock that is needed. To learn the craft there is a repeated involvement of the manipulation of metal employing hammers. Knowledge of fire making, the demands of temperature regulation of the work, along with the subtleties of quenching are all gained through immersion. Moreover, the character of steel is transformed through the process of heating, forging and then quenching with the assistance of the maker.

There are also natural forces involved that are utilised by both the maker and material. As a consequence of photographing *Gravity Wins*, my awareness of the role that gravity plays within a quench has increased. Shifting my focus from looking down to a side view has resulted in the realisation of the unique perspective of the viewing point of the maker. In addition, looking at these images has afforded me an understanding of the force of the quench and the forms made by the object as it enters the water.

Figure 9 shows an image of *Keep the Ball Rolling*, from the upcoming Part B exhibition, *Sin-Titulo*, 2014

As a direct result of the turnip peel photographs, I now explore the funnel form of a quench and to do so without structural confinement that would suggest a container. This will result in the possibilities for the maker, or viewer, to occupy the same space as the work allowing further investigations into making practices.

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