

Trace and Time's Arrow

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Introduction

Trace can be thought of as a copy, a small amount of something, evidence, a remnant, vestige, residue or mark. Trace can also be considered more actively as a verb, meaning to follow, track or locate. The studio production that I am engaged with encompasses all of these meanings.

My MFA research project specifically investigates trace from rust. Rust, also referred to as iron oxide, is a by-product of the breakdown or oxidation¹ of iron, and it develops in the presence of oxygen, moisture and time. In my studio practice, I transfer rust onto various materials and it is the resultant vestigial marks, or 'traces', that are at the core of my MFA studio explorations.

This exploration is focused on a philosophical self-location within the greater context of our ever-changing physical world. I utilize rust to document a process of change that reflects my own physical narrative in the world – one of fragility and impermanence. This process of change is irreversible, and 'Time's Arrow' is a term commonly used by physicists to refer to the direction of the inexorable flow of time (Professor A. Taylor, 2016, personal communication, 18 February). 'Time's Arrow' is specifically linked to entropy,² which is the increase in disorder that accompanies the breakdown of matter, and rusting is a commonplace demonstration of the increase of entropy.

In my studio practice, rust traces emerge as stain, pigment, dust, burn and corrosion, which I use to mark canvas and other materials. Rust is generally considered a nuisance and a hazard and yet the physicochemical process and the resultant visual

¹ Oxidation is an oxygen-based process that involves the loss of electrons from an atom of one element to another. Iron is considered to be 'easily oxidized' as it loses electrons to oxygen more readily than other elements. In fact, as long as oxygen is present, iron will continue to lose electrons until it is completely transformed to rust dust ("Oxidation, *n.*", 2016).

² Entropy is a measure of disorder ("Entropy", 2016). The second law of thermodynamics states that entropy always increases (Professor A. Taylor, 2016, personal communication, 18 February).

effects of rusting hint at a natural³ magic or alchemy. As Sybille Kramer (cited in Geimer, 2007: 16) notes, “What makes it possible to leave traces and to read them is the material continuity, physicality and sensuousness of the world.” For me, rust-generated trace conveys a tenacious engagement that is intrinsic to natural materials and processes.

In many cases, traces of rust tell the story of something that is no longer needed, maintained or useful, giving voice to a narrative of material reality. They tell of the relentless power of natural forces, a “vision of nature beyond the human ego” (Ondaatje, 1996: viii), whereby phenomena governing our existence but beyond our control trend inevitably toward entropy. Rust speaks to change, transformation and impermanence: a fundamental reality for humankind. In this regard, I believe that the materiality of the rust enriches the content of my work, which deals with the artistic exploration of the passage of time and human transience.

Iron is inextricably linked to the human narrative, which encompasses elements of the macro, and the micro, universe. Beginning in the iron cores of supernovae and their subsequent involvement in the rise of life, continuing through to our need for iron in the body (or the more poetic concept of coming from ‘stardust’ and carrying its traces within our bodies to this day), iron has been significant in art and culture throughout human history. We equate its inherent qualities with strength but also with deterioration.

Most naturally occurring traces of rust happen spontaneously *in situ*, but my studio process incorporates elements of control: the collecting and editing of metal and the active encouragement of the formation of rust. Even so, rusting has unpredictable outcomes and I find that working with a process that cannot be completely controlled introduces unexpected possibilities and new insights into methods and materials of art-making. Rusting is a dusty, pervasive and ultimately destructive process. However, the visual characteristics of corroding metal can be complex and captivating to look at. I work primarily with the traces left by rusted found objects,

³ For the purposes of this paper, all references to ‘natural’ or ‘nature’ refer to the inherent controlling forces that act on all matter in the Universe.

body imprints (using a binder to hold soils and pigment on various substrates) and metal objects that I have produced myself.

The presentation of my studio work for examination references a grid in its organization and appearance. I am referencing the marking out of space in a Cartesian⁴ method of graphing to represent a human tendency to organize and track information for the purposes of study and the expansion of knowledge. This grid is closely followed on the floor of the gallery. As the works move away from the center and onto the walls, however, the structure of the grid becomes less rigid. The works on the walls are presented in a dense, visually immersive display. As the installation moves away from the floor and its ordered presentation the display structure becomes less stable and items break away, straying further into disorder and roughly emulating the increase of entropy that is a defining principle of the process of production.

In this document I will examine the unique physical properties of iron that allow me to use its oxidized residue to create trace. I will speak to the agency of matter and human constructs of influence and authority in nature. In addition, I will explore subtle material processes that evoke the passage of time and provide evidence of change.

⁴ A linear graph with (x,y) coordinates beginning at an intersection of (0,0), so named for René Descartes who introduced the concept (“Cartesian, *adj.*”, 2016).

Contextualizing My Practice

Why Iron Oxide?

As iron is the most common element, by mass, on Earth (Morgan and Anders, 1980: 6974), our interactions with it are extensive and the use of iron oxide in art-making is not new. We can see the results of rusting, or the oxidation of iron, in both our natural (Figure 1) and urban landscapes (Figure 2). In fact, the only way we encounter iron is in an oxidized form, because the moment the pure element comes into contact with air it begins to oxidize and change.

The conscious use of the transformative quality of rust in art dates to prehistoric times. Iron oxide is the source of the ochre pigments used in cave paintings across the globe.⁵ Scientists interpret these sites as providing evidence of the first signs of humans unchanged in their evolution as yet from us, modern humanity (Marchant, 2016).

The natural palette of iron oxide consists of reds, yellows and browns (the ochres, siennas and umbers of raw pigments and tubes of paint available today). Iron oxide clays and slips were used to create, and decorate, early human pottery⁶ and have been readily available for the purposes of art and decoration⁷ for the entire age of humanity.

⁵These sites include Storm Shelter and Didima Gorge in South Africa, Altamira Cave in Spain, Lascaux and Chauvet Caves in France, Maros in Indonesia, Gabammung in Australia and the rock shelters at Bhimbetka in India, to name a few.

⁶Pottery is thought to have been introduced with Neolithic settlements 10,000 – 8,000 years ago (Chalmin et. al, 2006).

⁷ The Paleolithic scholar Andre Leroi-Gourhan describes how the floors of Stone Age caves and rock shelters were commonly impregnated with a layer of reddish ochre up to eight inches deep. This led him to believe that these ancient peoples dyed their bodies, their animal skins and their spears, and that ochre was used for decorative purposes in every aspect of their domestic life (1968: 40).



Figure 1. Oxidized iron in sandstone, Citrusdal, South Africa. Photo credit to Janis Milligan 2016.



Figure 2. Rusted handrail Cape Town, South Africa. Photo credit to Janis Milligan 2014.

Iron oxide is most recognizably visible in our natural landscapes as reddish soil and rock and can be used to stain other materials. Manufactured objects that are comprised of iron have these same qualities and lend themselves well to the process of mark-making. It intrigues me to think of artists who have used these pigments in various forms throughout human history. Forty thousand years after some of the earliest chemically-dated examples of cave painting (Leroi-Gourhan, 1968: ix), I see myself as part of this long continuum of artists using materials at hand to document something of meaning about my existence in this time and place.

Iron has underscored many achievements or moments of significant change in the ways that human cultures have developed. The discovery of smelting, or extracting ore, launched the iron age of making weapons and tools from alloyed iron and enabled the establishment of more permanent settlements and the further domestication of crops. Even before the smelting of iron, Ancient Egyptians recovered meteoritic iron and used it in jewellery and weapons⁸. As these items were found in the funerary chambers of royalty, it is thought that they may have had special religious status (Johnson, 2016).

The strength of iron is increased by its combination with other metals in various alloys. Many different kinds of steel are manufactured for as many different purposes: railway tracks will differ from reinforcing steel, which differs from a sprinkler head, which differs from a soda can. These differences are created by iron content, heating of the alloyed materials and the addition of chemicals to give the alloy the required properties for its function. International companies make billions

⁸ Nine ancient Egyptian beads excavated from a grave site in 1911 have been determined to be over 5000 years old and made of meteoritic iron (Rehren, et al.,2013). A dagger found amongst the artifacts recovered from Tutankhamen's tomb has also been identified as meteoritic in material origin. As these items were found in the funerary chambers of royalty, it is thought that they may have held special status. "If ancient Egyptians knew that iron could be found in meteorites that came from the sky – the place of the gods – it may have been symbolically important to them. As a result, they could have seen all iron as a divine material that wasn't appropriate to work into a practical, everyday form and that should be reserved only for high-status people" (Johnson, 2016).

of dollars annually from tinkering with combinations to get the product just right for the desired purpose (Waldman, 2015: 120).

The skyscrapers, bridges, ships, railways and drilling platforms that are commonplace today exist because of an infrastructure of iron. Iron remains the cheapest means of building high and large and strong, but iron also has a physical narrative of impermanence. It is not uncommon to see rust on a daily basis almost everywhere one looks in both an urban and rural environment.

Rust produced from manufactured, iron-containing metal alloys such as steel is what we observe within manmade environments. The rusting of iron is unusual among metals, and makes our perceptions and uses of steel seem paradoxical. Most metals oxidize in a way that creates a cover or patina that is cohesive and protects the underlying metal from the air and further deterioration. By comparison, rusting iron swells and forms scales and flakes off such that air continues to permeate the metal and each subsequent rusted layer falls away from the metal allowing further corrosion, until the iron structure is completely eaten through. Rusted reinforcing bar will crack concrete and eventually cause it to crumble.

In terms of working with rust, I find it interesting to contemplate that anything that is built using iron is already deteriorating from the moment it is installed or used. The current monetary value given to the global cost of corrosion, or rusting, is estimated to be US\$2.5 trillion (ZAR 34.8 trillion), which is equivalent to 3.4% of the global gross domestic product (GDP) (Jacobson, 2016: 2). Twenty-five percent of the iron consumed by the United States annually is used to replace corroding infrastructure.

There is, however, a narrative of iron that precedes humanity and even the 'life' of our planet, which is critical to the context of my research. Scientists have determined, through observation and study that iron is the first stable element to be fused in the nuclear furnaces that are at the core of supernovae, ultimately responsible for the subsequent explosion and consequent rise of life as we know it

in the universe (Arnett, 1996: 26). From the high-energy discharge of new matter⁹ dispersed into the fabric of space for millions of miles after a supernova event, to the remnants of that celestial dust so integral in its turn to essential biological functions in our bodies, iron is intimately and irrevocably connected to the experience of what it means to be alive as a human being.

Renowned scientist and pop culture icon Carl Sagan coined the expression “We are all star stuff” (1973: 57). For me, the contemplation of our existence within this context is inspiring. It fuels my sense of wonderment with regard to the remarkable phenomena of natural processes as they relate to and represent the change that has occurred in the Universe to bring us to this very moment ... and the next and the next. Given that humanity is a relative latecomer to the history of our universe, I find it possible to begin to imagine the significance of iron far beyond the context of my life. I am able to think of iron as an agent of change and, even though it is classed as inorganic, I can think of it as a wholly vibrant and vital material that is connected to humanity in complex and interesting ways.

Jane Bennett is a professor of Political Theory¹⁰ at John Hopkins University in Baltimore, USA. In her book, *Vibrant Matter: A Political Ecology of Things*, she asks her audience to consider the influence of non-human, and even non-organic, entities that are critically interconnected with human activities and that are inseparable from our experience of life. In her introduction to the book, she clearly states that she wants “to highlight what is typically cast in the shadow: the material agency¹¹ or effectivity of nonhuman or not-quite-human things” (Bennett, 2010: ix).

⁹ Prior to a supernova explosion, there are 7 elements present in the star. The power of the supernova explosion creates enough energy for fusion to occur and the remainder of the Table of Elements to form (Arnett, 1996: 26).

¹⁰Political theory analyzes and interprets the foundations of political life and evaluates its principles, concept and institutions. The history of political thought and analytic and philosophical investigation are its two traditional perspectives (“Political Theory, n.”, 2016).

¹¹ Agency is defined as the capacity, condition, or state of acting or of exerting power (“Agency, n.”, 2016)

Bennett suggests that to engage meaningfully with ideas concerning the agency of matter requires a suspension of anthropocentric and biocentric thinking. She goes on to say that the general idea of matter as “passive stuff, as raw, brute or inert” encourages us to “ignore the vitality of matter and the lively powers of material formations” (Bennett, 2010: vi), and thereby separate ourselves from much of our natural environment. Bennett argues further that we limit ourselves and the possibilities open to us in many arenas of thought and experience by thinking that “the only source of vitality in matter is a soul or spirit”; that “where subjectivity begins and ends is too often bound up with fantasies of a human uniqueness in the eyes of God, of escape from materiality, or of mastery of nature....” (2010: ix). For me, this is not about religion. It is about an attitude of mastery of, or separation from, nature that allows human beings to think of matter as being fixed and expendable and, therefore, to disengage from ideas of the complexity of interconnectedness and the significance of the agency of matter in the way that we interact with it. Bennett encourages us to shift our thinking from our experience of the world to the actual materials that make up that world, including the components of our own bodies.

In a chapter entitled “A Life of Metal”, Bennett brings attention to the way in which iron is perceived. We see it as solid, dense, and immutable, but matter is not as fixed and homogeneous as it may at first appear. Bennett refers to common tropes of fixity, such as iron will, but also points out that a human perspective is limited by the time scales under which change occurs in different materials (2010: 58).

Nature is a complex and awe-inspiring system within which humanity is a small part, and the physical changes that take place in us are not dissimilar to the changes that take place in all of nature. Our bodies are made up of the same basic chemicals as many other forms of life and matter. Over time, human civilizations have created a sense of controlling the environment but natural forces are ever present in our lives and affect every aspect of our reality. For the most part, living in large cities, we become oblivious and somewhat immune to the wonder of the natural world. We push it aside, so to speak, by creating ‘city limits’ that infer a differentiation between urban and rural or more natural areas. However, it is a thin veneer that separates the two. Most city dwellers have witnessed the persistent seedling growing between

the slabs of a concrete walkway, clinging tenuously to earth that has settled there, have seen cracked and heaving asphalt that gets in the way of growing tree roots, or have seen the corrosive influence of rust. Nature is relentless and, essentially, indifferent to humanity's interventions.

Art Historical Context

In this section, I will examine the work of a number of artists – historical and contemporary – whose concepts and art processes have elements of alignment with my own studio production.

The use of materials in a non-traditional way and awareness of the agency of materials to produce trace and reference time are key concepts for me. In "Materializing Pedagogies", Barbara Bolt discusses a studio-based artistic practice whereby "the materials are not just passive objects to be used instrumentally by the artist, but rather the materials and processes of production have their own intelligence that come into play in interaction with the artist's creative intelligence (2006:1)", bringing hand, eye and mind to the creative process. She refers to Paul Carter's use of the term 'material thinking' to suggest an artist's responsiveness to the materials and processes with which they are working. "Material thinking", she says, "is the magic of handling (Bolt, 2006:1)".

South African contemporary artist Paul Edmunds uses everyday materials to create objects that are a complete reinvention of those materials, often referencing natural forms. Edmunds expresses an interest in the history of materials, beyond their modern incarnations, in addition to their natural qualities. "Edmunds describes a concern with process in his work, referring at once to the process by which the work is made, and to a recognition of natural processes of which both he and the materials that he manipulates are a part" (Murinik, 2001). He speaks to the 'cyclical origins' of the plastic he uses, and references the constant state of material change through which one can trace a path backward from plastic originating from fossil fuels, which originate in turn from geological layers of plant materials (Murinik, 2001). For example, *Sieve* (Figure 3) evokes an organic shape although constructed

from plastic and cable ties. On closer inspection (Figure 4), the way the material is aligned shows uniform layers of near identical form, like a beehive, visually suggesting the kind of order found in nature at a microscopic level.



Figure 3. Paul Edmunds, *Sieve*, 2003. Polypropylene mesh, cable ties, 120 x 100 x 100cm

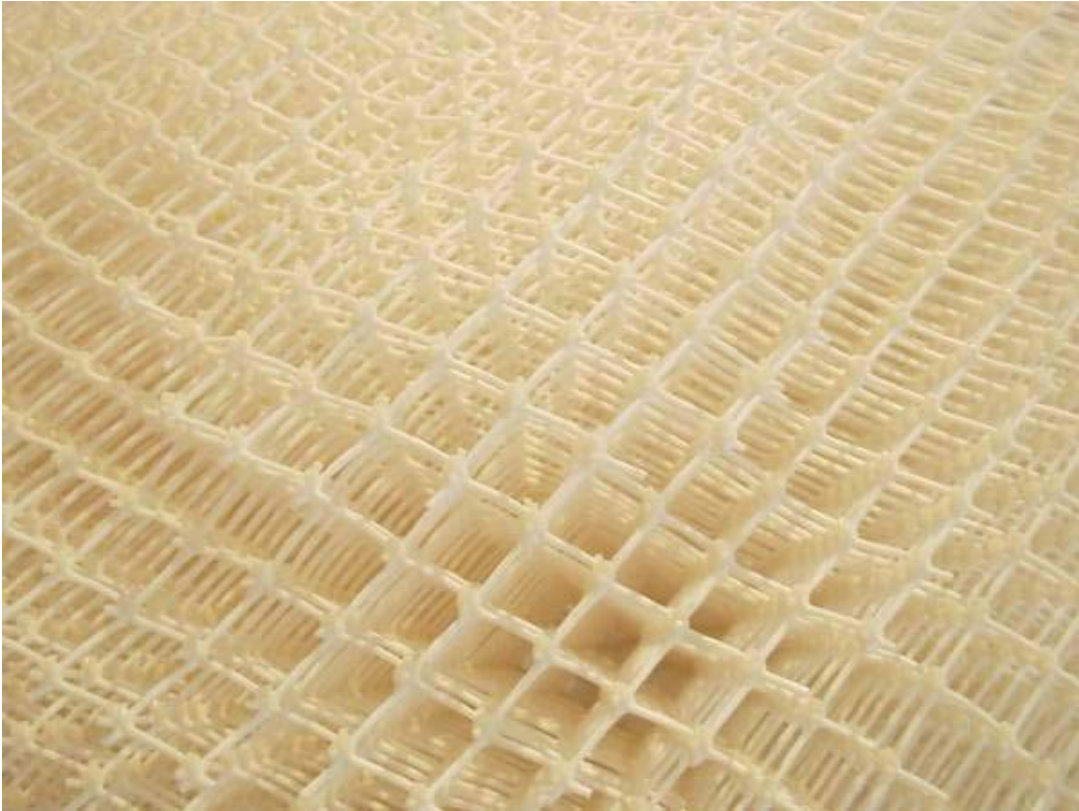


Fig. 4. *Sieve* (detail), 2003, Polypropylene mesh, cable ties, 120 x 100 x 100cm

Recognition of the agency of matter resonates with my conceptual concerns regarding the role of iron in the universe and points, again, to the relevance of Bolt's arguments regarding 'material thinking' and the potential for creative interaction of human and non-human matter.

Like Edmunds, American artist Tara Donovan uses multiples of common everyday items to completely transform our perceptions of them. She describes her work as

“playing with materials in the studio and then being very open to what the materials are doing” (cited in Harvey, 2015)”. Donovan chooses one material object and creates large-scale installations that consist of a sheer, repetitive volume. She claims to allow the materials to “do what they do” naturally as she piles or glues them together and says she is always fascinated by the way her sculptures mimic natural formations. “I think that’s because I’m completely relying on the physical properties of the material before me, kind of going where it naturally inherently wants me to go, so that things always wind up mimicking nature in a way” (Donovan cited in Weschler, 2008). Donovan is a good example of Bolt’s concept of the ‘magic of handling’, as she takes common objects that we know well and transforms our perception of them by creating installations of overwhelming accumulation. We look and wonder what we are looking at. “The mystery, and the potential for any material in her hands to capture it, prompts us to pay better attention to our surroundings, permitting the everyday to catch us up again” (Harvey, 2015).

Donovan’s 2001 installation of tarpaper, *Transplanted* (Figure 5) is a good example of this transformation of materials. What is normally used in a flat, slightly overlapping form to provide waterproofing for roofs in housing construction, becomes a heavily layered, topographical landscape resembling a lava flow or rock formations. Material that is relatively flimsy and flexible is transformed by Donovan into something that appears to be dense and solid.



Figure 5. Tara Donovan. *Transplanted*, 2001, Installation view (left) and detail (right), torn tarpaper, installation varies. Photo credit to Alexandre Masino.

Donovan cites the work of Eva Hesse as a strong influence but is careful to point out that there are differences in their practices. While both use ephemeral materials, Hesse's were handcrafted while Donovan uses mass produced items from consumer culture. She also notes that Hesse's 'hand' is evident in her work as "highly personal and delicate", while the work Donovan creates herself is more "mechanical" and can be reproduced by anyone with the proper instructions (Donovan cited in McCoy, 2010). But Donovan's reference to 'playing' with materials to see what they do links to the Process Art movement of the 1960s, with which Hesse was strongly associated.

When Eva Hesse wrote about her studio explorations, she spoke of the personal, organic, unexpected, irrational and absurd throughout her diary entries (Johnson, 1983) and about using extreme opposites in her art to achieve these effects: "Order versus chaos, stringy versus mass, huge versus small" (cited in Spector, 2016a). Hesse was a conscientious writer and her struggles with formal relationships in her artwork are well documented (Lippard, 1976: 41). She was curious, enjoying the

incidental character of the unusual materials used in her practice, such as resin molds and plastic sheeting (Fer, 2009: 87). As of 1964, Hesse expressed feelings of disenchantment with traditional painting and, in a diary entry, wrote, “For me painting has become that [anti-climactic] ‘Making Art’—‘painting a painting’. The Art, the history, the tradition, is too much there. I want to be surprised. To find something new” (cited in Johnson, 1983).

As a result of the intrinsic properties of the latex that she used, Hesse was able to make imprints and molds of objects with vestigial, trace-like appearance. *Expanded Expansion* (1969)(Figure 6) was produced with a formal mix of opposites that makes the ephemeral nature of the work very evident. She used fiberglass, which will last for a long time, as a support structure and draped it with cheesecloth saturated with latex. The flexible quality of the latex material allows it to sag with the force of gravity, from the stiff fiberglass rods supporting it, creating that contrast of ‘opposites’ that she sought to exploit. A strong element of entropy is very evident in many of Hesse’s later works and, although she doesn’t use the term, she does write about things breaking down and expresses a certain acceptance of that state of being (Johnson, 1983). In a conversation with Cindy Nemser, she is cited as saying “Life doesn’t last; art doesn’t last. It doesn’t matter” (2002). With time, the latex of *Expanded Expansion* (Figure 7) has yellowed and become very brittle and fragile, a natural ageing process of the material, so that the ephemeral quality of the work is creating difficulties for archivists at the Guggenheim, New York. Many of her latex works from that time have, in fact, crumbled into smaller parts and archivists are uncertain how best to continue to display them (Guggenheim, 2008).



Figure 6. Eva Hesse, *Expanded Expansion*, 1969, fiberglass, polyester, latex and cheesecloth 309.9 x 762 cm, photo credit to Guggenheim Museum, New York.



Figure 7. Eva Hesse, *Expanded Expansion*, 1968, as shown in 2006. Photo credit to Guggenheim Museum, New York.

In the 1980s, Cuban American artist Ana Mendieta explored physical and material transformations by using her body and wooden templates of her body to leave ephemeral traces in the natural landscape leaving the materials used to deteriorate and return to a natural state. Like Hesse, the work was highly personal and fragile. Mendieta was exiled when she was young from her homeland of Cuba and referred to her feelings of loss and disconnection from her heritage as being “cast out of the womb” (cited in Warchol, 2013). Mendieta visited Mexico often and felt an affinity with the indigenous artists, drawing from their symbolism and archetypal imagery. Between 1973 and 1980, she made a series of hundreds of *Siluetas* (Figure 8). “My art is the way I reestablish the bonds that tie me to the universe” (cited in Warchol, 2013).



Figure 8. Ana Mendieta, *Untitled (Siluetas Series)*, 1978, Body imprint (left), Wooden template (right) in mud

Megan Heuer, curator of the Whitney Museum of American Art, Brooklyn, relates the ephemeral qualities of Mendieta’s work to that of ‘land art’, using “natural materials in the landscape to create form without permanently changing the environment, but instead ‘fixing’ these delicate, ephemeral impressions by documenting them photographically” (2004). Mendieta’s work focuses on “the physical experience of

the world through natural elements” that explores her relationship to the landscape (Heuer, 2004). Mendieta employs the inherent transient and entropic tendencies of natural materials to explore physical and material transformations through body-based works that emphasize her own impermanence.

Robert Smithson¹² wrote extensively about his ideas regarding art and process, and he was fascinated by entropy later in his career. This reflects ideas of a narrative of impermanence and the agency of natural materials and processes. The *Spiral Jetty* (Figure 9) on the shores of the Great Salt Lake in Utah is one of his most famous constructions in a natural space, illustrating his interest in entropy in an ongoing way. The jetty, completed in 1970, is in a state of perpetual change and deterioration as a result of the very principles that Smithson explored. “For Smithson entropy was a natural law that has no conscience, no moral imperatives; it is a natural law that is completely indifferent to humanity – in other words, it just doesn’t care. As such it was the perfect tool for challenging our patterns of thought, our conventions, ideals, absolutes, or to use Smithson’s word, our ‘fictions’¹³...” (Crowther, 2012: 160).

Spiral Jetty was submerged for decades due to the water level in the area rising, but recent droughts made it visible (Figure 10). The Dia Art Foundation, which owns the artwork *Spiral Jetty*, has begun regular documentation of the work in an effort to monitor changes and make decisions about conservation interventions. In 1971 Smithson wrote, “I am for an art that takes into account the direct effect of the elements as they exist from day to day apart from representation” (cited in Holt, 1979: 132). For now, the Foundation plans to ensure documentation is continued on a regular basis but has not determined whether to conduct any restorations or let the jetty continue to deteriorate.

¹² Smithson is also connected to Abstract Expressionism and Land Art.

¹³ “Separate things, forms, objects, shapes, etc., with beginnings and endings are mere convenient fictions...” (Smithson, cited in Harrison and Wood, 2003: 880).



Figure 9. Robert Smithson, *Spiral Jetty*, 1970 Rozel Point, Great Salt Lake, Utah, mud, precipitated salt crystals, rocks, water coil, 1500' long and 15' wide



Figure 10. Robert Smithson, *Spiral Jetty* (in 2016), 1970, Rozel Point, Great Salt Lake, Utah April 1970 mud, precipitated salt crystals, rocks, water coil, 1500' long and 15' wide

The use of non-traditional art materials, conceptual ties to the natural world and natural processes and ideas surrounding the life cycles of matter are core concerns in my own studio research. In the work of artists such as Edmunds, Donovan, Hesse, Mendieta and Smithson, the 'agency' of material choices is critical to the ideas they strive to explore. Through the mark or trace of an engagement to which the viewer

would not otherwise have access, these artists have taken an ongoing process that exists in the studio and the world and reframed it as an aesthetic experience.

In terms of working specifically with iron, I am compelled to mention the practices of Richard Serra and Jan van der Merwe¹⁴. Serra is known for his large-scale steel sculptures, but his earlier work was more ephemeral. The importance of his body in his art-making process is evident when, in the late 1960s, he wrote a list of transitive verbs and used those 'actions' to direct his creative output (Spector, 2016b). Examples are 'to drop', 'to hurl', 'to roll' and 'to prop'. In 1968, he made a 3-minute video titled "Catching Lead" in which his hand opens and closes as he tries to catch pieces of small lead sheets that drop from the top of the frame (Figure 11) and, on another occasion, he hurled molten lead against the wall of an exhibition hall. These works were without an abiding object as end-product and the only record of their existence that remains is the documentation. Serra also rolled lead into dense, metal cylinders and then began manipulating lead sheets, cutting, stacking and leaning them in early experiments with gravity and balance. "Dispensing with carving and welding – conventional methods of delineating volume and securing mass – Serra created precarious sculptures that stand by virtue of equilibrium and gravity. Such pieces exist in a constant state of tension, ever revealing the process of their making, ever threatening to tilt off balance" (Spector, 2016). Experimentation with natural processes and forces including gravity and entropy was part of the means of production embraced by the Process Art movement. Artists became more involved with describing their work themselves, and valued process and production as the more important aspects of making art ("Process Art", 2015).

¹⁴ South African artist Jan van der Merwe uses rusted cans, which he solders together to form large pieces of 'fabric' allowing him to wrap various objects. He then arranges these objects in tableaux that are evocative of history, often referencing military life, and creates displays that highlight a patina of time that comes with neglect.



Figure 11. Richard Serra, *Catching Lead*, 1968, video stills

Serra continued his experiments with gravity and balance as he proceeded to focus on large steel works¹⁵.

¹⁵ Richard Serra used Cor-Ten steel for many of his sculptures. It is a rust-resistant, alloyed steel that is designed to form a patina like other metals but does not have wide application due to climate restrictions – it does not work in marine, rainy or otherwise humid environments.

Rust – My Process and Making

“The nature of art practice as research is that it is a creative and critical process that accepts that knowledge and understanding continually change, methods are flexible, and outcomes are often unanticipated, yet possibilities are opened up for revealing what we don’t know as a means to challenge what we do know” (Sullivan, 2010: 99).

I identify myself as a painter. I am technically using the same pigment as might be found in self-made or commercial paints, but applying it in a very different way. Within a fine art context paint is traditionally applied with a brush, pallet knife or a roller onto another surface. Modern variations in modes of application might be seen in splashing, dripping, spraying, stenciling, etc. or, as in my practice, a chemical process of transfer. I have experimented with iron oxide pigment in the form of rust scale, soil samples and rusted iron paint, as well as commercially produced iron oxide-based paints in the ochre, sienna and umber palette. I have created rust traces on paper, plastic, canvas and other fabrics. Sometimes the trace is identifiably indexical and at other times more abstracted.

Much of the material used in my practice is sourced through opportunistic encounters of derelict bits of rusting steel on sidewalks, beside roadways and on seemingly deserted beaches. I have borrowed bits of metal or metal tools from the gardens and homes of friends, as well as done some scrounging at metal scrap yards. I have collected samples of iron-rich soils during various road trips around South Africa, and never miss an opportunity to pick up the rusted bottle caps that proliferate on the ground everywhere I go. Finally, I have used both plasma and laser cutting machines to cut metal into specific shapes: some are geometric, some abstract and some are the outline of my own body from photographs.

The process by which I paint or mark my canvas involves sealing wet material and iron-based metal together in plastic and leaving it for a period of time, ranging from as little as one week to two months (Figure 12). In planning a rusting, time is spent considering composition in the placement of objects, layering of materials,

combinations of materials (ie. whether to rust multiple types of substrates at the same time), and whether to rust all elements of a composition for the same amount of time. Sometimes I weigh the material package down with heavy objects so that the surfaces of the metal and the canvas are pressed more firmly against each other. It is the chemical reaction that takes place between the metal and cloth, in the presence of oxygen and moisture, that creates the coloured mark and it is the physical configurations by which the metal and the canvas connect that creates variations in line and form. Creases and wrinkles in the canvas or the surrounding plastic are translated into the resulting images as moisture is forced to travel along a 'path of least resistance' within any given package of materials. The palette is closely linked to that of iron oxide-based paints: ochre, umber and sienna. The agency of physical processes, both chemical and mechanical, becomes a major part of the art production.



Figure 12. Janis Milligan, *Rusting in progress*, 2016

In my studio research, I am using rust to explore ideas and construct meaning around the interaction of human and non-human matter by engaging with materials in a process-based practice. Iron has a 'life' of its own and is highly reactive. I have experimented with this process for over five years and have worked with different rusted objects, material substrates and other sources of iron oxide pigment, developing some competence in their application. However, I cannot completely control the outcomes of individual rustings (Figure 13). I enjoy the unpredictability of the process and experience a sense of anticipation when opening a rusting to see the results. In figure 14, two sides of the same piece of lightweight canvas show quite different marks as the result of rusting. This canvas was placed between an iron template and a sheet of plastic. The image on the left faced the metal and the image on the right faced the surrounding plastic.

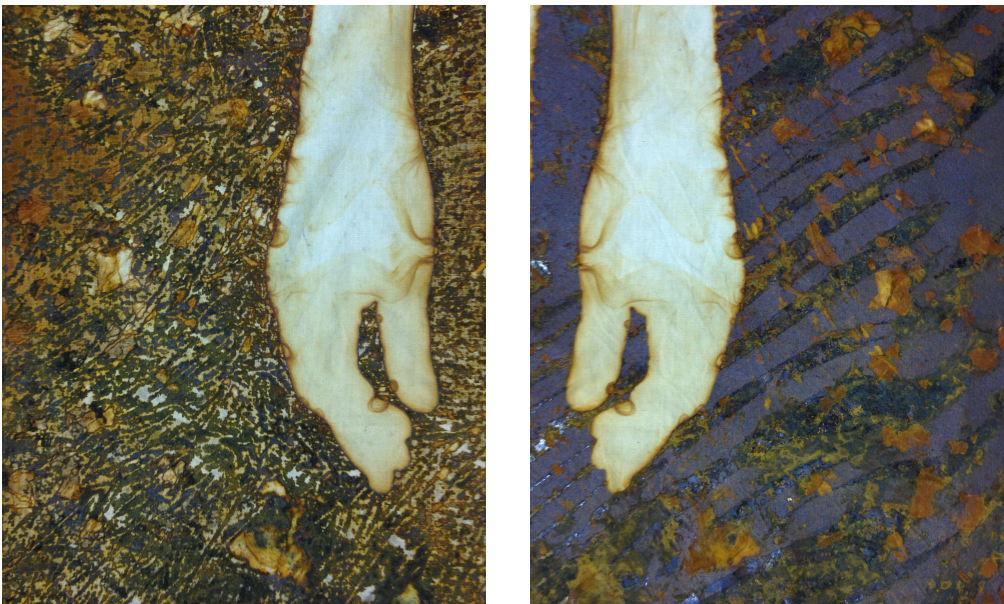


Figure 13. The flipped sides of an image on one piece of cloth, showing a contrast of outcomes in the results of rusting. Photo credit to Janis Milligan.

In his essay “A Sedimentation of the Mind: Earth Projects” (cited in Harrison and Wood, 2003: 877), Smithson discusses the physical shift from the artist being confined to a studio to the artist moving out into the world to seek new ways of working with new materials. He comments on technology and industry becoming an “ideology in the New York Art World”, as artists embraced working with industrial and machine-made products. In the essay, Smithson singles out steel as an ideal example of technological ideology, being a machine-manufactured product. He speaks about the toughness and strength of iron in alloy form as suggesting the “permanence of technological values”. However, he then takes this thinking further to consider the natural, material properties of the metal to reveal that “... the more I think about steel itself, devoid of the technological refinements, the more *rust* becomes the fundamental property of steel” (Smithson cited in Harrison and Wood, 2003: 879, author’s emphasis). He carries on to point out that, to the technological mind, rust evokes fear and as a result the perception of steel as more valuable than rust is a “technological value, not an artistic one” (Harrison and Wood: 879). Smithson speculates about the potential in art-making of entropic or ‘non-resistant’ processes that better reflect natural history, geology and time (Harrison and Wood: 879). He echoes Bolt’s ideas that the agencies of matter and of mind, working together, make it possible to access a potential creative consciousness that informs the artist’s process, saying that “the refuse between mind and matter is a mine of information” (Harrison and Wood: 879).

Bennett acknowledges the intimate connection that exists between an artist and their materials, and the tacit knowledge acquired. She points out that people who work daily with these materials know that there are,

variable intensive affects and incipient qualities of matter that external forms can only bring out and facilitate. Instead of a formative power detachable from matter, artisans encounter a creative materiality with incipient tendencies and propensities which are variably enacted depending on the other forces, affects, or bodies with which they come into close contact (Bennett, 2010: 56).

Through my art production, I use rust traces to evoke irrepressible forces of nature and the steady, ongoing change that occurs all around us. Similarities from the life of iron can be drawn to the human narrative– birth, life and death – which pose, from a certain perspective, a mutable passage through time. Jane Bennett speaks of “the habit of parsing the world into dull matter (it, things) and vibrant life (us, beings)” (2010: vi). And, although the animation that we associate with life is vastly different from that of the inorganic materials that we require to survive, there is a quality of ‘liveliness’ to the reactivity they bring to their involvement in our existence and survival.¹⁶

The way I work with rust requires a lot of space and physical activity although this is not necessarily evident in the finished product. As with Process Art, I consider the mechanics of production to form a significant part of any resultant creative output. I use metal objects and often work on a large scale. There is a great deal of bending and squatting and lifting of metal objects and heavy, wet material. Much of the rusting takes place on the floor, so I must prepare the space and keep it clear for the predetermined rusting period. While rusting is in process, I must work around that occupied floor space. When I open a rusting, pieces of wet, rusty metal, large sheets of wet canvas, and the surrounding plastic must be hung to dry and stacked against walls and they consume a lot of space within the studio environment. That space can become a place of sensory overload with the dust, smells, humidity and visual cacophony of materials. Some days, I am overwhelmed by rust: on the metal, on the cloth, on my hands and clothing and in the air. As the course of my academic research into iron and rust has progressed, I have also become aware of how pervasive a force this particular material and its derivatives exert on human existence, and I am overwhelmed by the significance. This has led to a desire to reconstruct that feeling in the gallery installation of the work, creating an immersive, almost claustrophobic sense of the ‘weight’ of iron, and therefore rust, acknowledging its presence and prevalence in the world that humans inhabit.

¹⁶ I am referring here to the presence of iron in my body and the essential roles it plays, ie., the transport of oxygen, and the involvement of iron in physical and chemical reactions involving many of the body’s vital functions.

My presentation references a grid and it is therefore my intention that it should be read as a whole, in the form of an installation. The grid represents a methodical approach to collection and categorization of information and materials and references the human desire to bring order and, ideally, understanding to a field of study and the greater world in which we live. Systems of organization, such as the Table of Elements or Taxonomy or Mineralogy, represent classification systems that humans use to identify and group materials and collections according to their commonalities and/or differences for the purpose of study or the compilation of knowledge. Collection and experimentation is relevant to my studio practice and, thus the work is presented in the tradition of cabinets of curiosities and scientific research.

Elements of my studio production are crowded together and interspersed in the gallery much as they co-existed within the studio space. On the floor, large boxes hold iron-rich soils and metal objects. The components of the grid are uneven, shifting up and down like a landscape, referencing the research process of exploration; digging and collecting and examining relationships on the journey of discovery. On the wall, objects made of rusting iron hang side by side with ephemeral rust traces on see-through mull cloth. Delicate cheesecloth that holds a very thin layer of rust scale is lightly draped over a heavily stained, rusted canvas. Large swathes of rusted cloth form the backdrop to the bust of a figure barely discernable within an immersive field of rust. Hard edges of industrially produced building materials butt up against soft, fragile bits of rusted cloth, demonstrating the range of material expression.

Some elements of the installation include canvas (183 x 549 cm) with the pattern of a rectangular grid creating a large visual field of rust (detail, Figure 14) along one side of the gallery. The grid is made using a technique of frottage so that the surface tension of the wet paint has resulted in raised areas where the liquid pooled while drying, creating a strong texture on the canvas. Iron paint has been applied to the surface and then rusted with a mild acid. The corrosion of this surface continues but will not rust through the gesso, or plastic coating, of the canvas. The grid speaks to the use of iron in human constructions such as cityscapes and industrial complexes, referencing the desire to categorize, organize and enforce structure.



Figure 14. Janis Milligan, macquette, 2016, rusted iron paint, 60 x 140 cm

As a result of the research conducted in the course of my studies, I have come to be more and more immersed in the story of rust, as it pertains to both my everyday life and the philosophical frame of reference for my art production. I see rust everywhere I look and have come to appreciate that, although I was aware of it before, now I am completely sensitized to it. I cannot see it without making connections to all that I have learned about the role it plays, on a very grand scale, in

my existence. As a result, in the past year I have incorporated laser-cut steel images – both positive and negative shapes – of my own body, in addition to found materials. I have used these templates to create abstracted images of myself dissolving into an overwhelming environment of rust (Figure 15). This is indicative of my sense of being a very small element in the story of iron, as opposed to the other way around.



Figure 15. Janis Milligan, Rusted positive template within negative template of steel, 2016, rust on canvas, 245 x 122 cm

Like Mendieta, by exploring ways to express my sense of belonging within the context of the greater physical environment in which I live, I have come to recognize that I am inseparable from it.

I was born in Canada and have lived most of my life in that country, but not in any one place. To date, I have lived in forty-three different domiciles and a number of those have also been in countries other than Canada. Therefore 'home' and 'belonging' are constructs that are not connected to any particular address or GPS coordinate, but rather something that moves with me as I engage the world. It is perhaps the lack of things, or familiar things, which prompts me to seek a belonging that does not root itself in ideas of a fixed home. Perhaps it is the constant adjustment to change that makes the topic of change and transience so prominent in my thinking and in my desire to express it in my creative endeavours.

At the same time as I experience an abstracted sense of home, many of the objects I use in my work are familiar objects and strongly connected to the material aspects of a home, such as a bed spring, tools, mechanical and hardware bits, a framed piece of corrugated iron that could once have been a wall or a roof and other debris/remnants of metal materials that have been utilized by humans. These objects are potentially indexical of home (and I continue to live in 'homes' of various kinds) but they also belong to a specific class of metal that is highly reactive, and intimately and historically linked to humanity. Within my art-making I am striving to make the connection between the distinctive materiality of iron and a human narrative. As I grow older, my corporeal reality and awareness of my own impermanence and ultimate mortality makes addressing my conceptual ideas by using natural chemical and physical processes more meaningful for me.

In a grouping of objects, a piece of metal plate is rusted on four separate occasions on the same lightweight canvas (Figure 16). The resultant 'bars' of rust are layered on top of each other, overlapping, and have the appearance of a cross-sectional sample of the earth that might connote geology or archaeology and discovery. Each layer is different and demonstrates something about the physical conditions under which it was formed.



Figure 16. Janis Milligan, 2014, rust on canvas, 92 x 152 cm.

The range of outcomes and changes at the interface of the two surfaces articulate an analogy for the transformational forces at work in nature that are intrinsic to all matter.

The way the rust bleeds into the ground of the canvas (detail, Figure 17), speaks to the edge of something perceived as solid and immutable on a macroscopic scale, while it is actively changing by losing mass or material and reacting to its environment on a microscopic scale. When Bennett examines ideas about perceived

boundaries, she again uses the example of iron when she explains the crystalline structure of its makeup and the ongoing, reactive surface of the material. “In this strange, *vital* materialism, there is no point of pure stillness, no indivisible atom that is not itself aquiver with virtual force” (Bennett, 2010: 57, author’s emphasis).

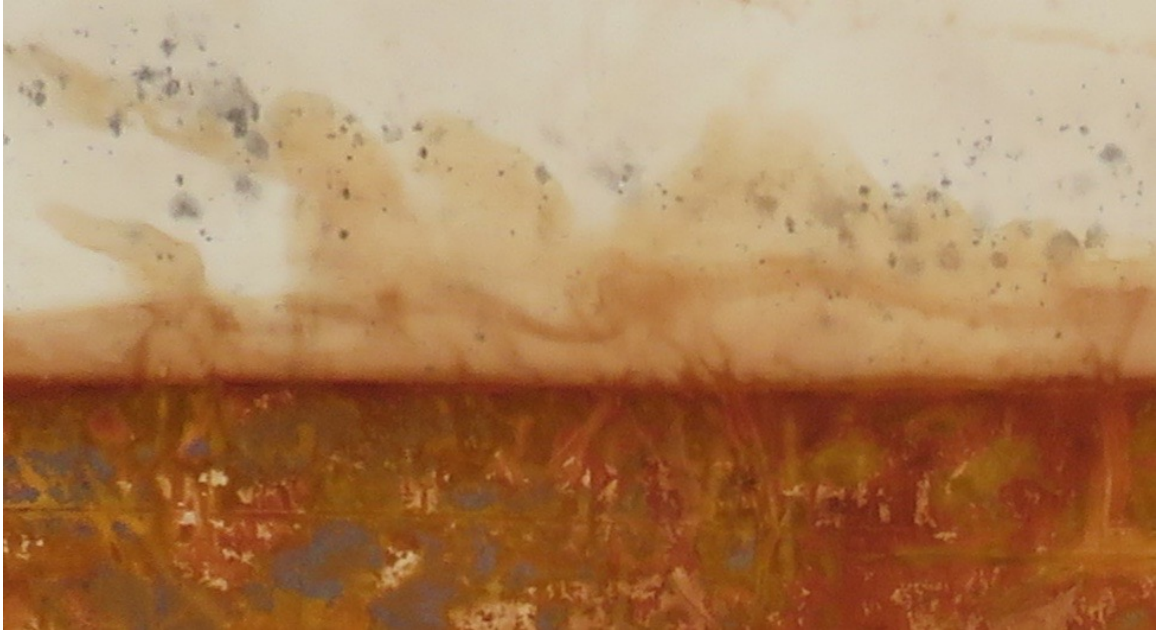


Figure 17. Janis Milligan, 2014, rust on canvas (detail)

Although the works exist on a radically different scale, there is a conceptual link to Robert Smithson’s *Spiral Jetty*, whereby the work of art is completely subject to the natural forces of its surrounding environment and entropy is the driving force of the end result. Smithson also notes that “... no materials are solid, they all contain caverns and fissures. Solids are particles built up around flux, they are objective illusions supporting grit” (cited in Harrison and Wood, 2003: 879).

In taking traces from a metal that is highly reactive to its environment, I am capturing a small increment of change – in fact, a liminal moment of change – in an effort to demonstrate an analogy to the transience of the human condition and my current reality. There is in that very moment the essence of my own narrative, the myriad changes that are ongoing within my physical being. I am examining that reality in the context of being a part of nature and not separating myself from the matter of which I am made, thereby making a connection to the changes within my physical state and that of another material. A very thin layer of material is deposited as a result of the specific process of rusting and leaves the remaining object altered from its original form, however slightly. The trace of material that is left on the canvas captures that threshold moment of change or transformation.

Rust trace, as I am using it, is an “emanation of the referent” (Geimer, 2007:16), an extension of presence involving touch and impression. Rosalind Krauss comments, in “Notes on the Index”, that photographs and photograms are indexical because they result from direct physical contact (1985: 205). Krauss thought that photograms, in particular, exhibit the “ghostly traces of departed objects” (Ibid, 203). As a result of this indexical quality, there is a sense of embodiment in the traces of rusted objects as substitutes for the real thing. There is an interconnectedness of materials across time and space and rust could therefore be thought of as a reminder of the narratives of human existence: between presence and absence, love and loss, beauty and death.

Rusting is a relentless process that, once begun, is unstoppable and irreversible. I am interrupting the process at various points, to document the ongoing transformation of the material. Rust is active in my art as symbolic of our lack of control over our destiny, like a modern day Vanitas¹⁷ or memento mori.¹⁸ The reality

¹⁷ Vanitas refers to 17th century still life paintings of Dutch masters, such as Pieter Claesz, which included human skulls and other objects as reminders to the viewer to appreciate life’s pleasures with a mind to their inevitable loss (Chilvers, 2009: 248). The reference originates in the Old Testament of the Bible: “Vanity of vanities, saith the preacher, vanity of vanities, all is vanity. What profit hath a man of all his labour which he taketh under the sun? One generation passeth away and another generation cometh: but the earth abideth forever” (Ecclesiastes 1: 2-4, *King James Version*).

of human transience is inescapable and it is therefore inevitable that it continues to be a fundamental theme of art-making and curatorial discourse.¹⁹

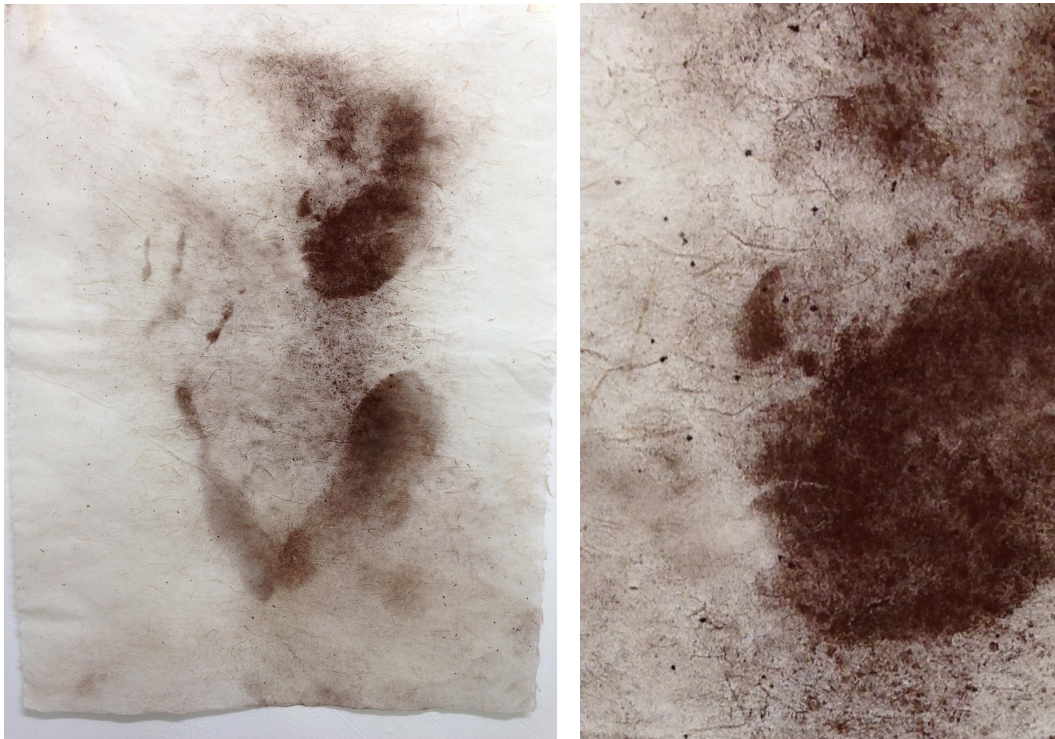


Figure 18. Janis Milligan, 2014, soil on rice paper (left), 60 x 100 cm
detail on right

¹⁸ Memento mori, a Latin phrase meaning 'Remember that you must die'. A warning or reminder of the inevitability of death, *esp.* a skull or other symbolic object. Later sometimes in weakened use: any grim, ominous, or sobering symbol. ("Memento mori", *Oxford English Dictionary Online*, 2001)

¹⁹ See *Vanitas: Meditations on Life and Death in Contemporary Art*, Virginia Museum of Fine Art, Virginia 2000; *Vanitas Contemporary Reflections*, MMOMA, Moscow 2012; *Vanitas: Contemporary Reflections on Love and Death from the Collection of Stéphane Janssen*, Marshall and Hendler Galleries, Phoenix 2014/15; *Contemporary Vanitas*, Lights of Soho, London 2016, etc.

Figure 18 shows an ephemeral, soil-on-paper imprint that is fragile and of poor archival quality. The soil used was collected near the Saldanha Iron Ore Terminal in the Western Cape and has accumulated on the ground in the area as a result of the continuous transport, in open railway cars, of iron ore to the shipping terminal over the course of forty years.²⁰ Within this work, I see the emergence or coalescence of a life out of the dust of our cosmic origins as well as the inevitable return to dust again after death. My motivation to produce work consisting of iron-rich soil references the role of iron in the rise of life and within my own tissues and bloodstream. The contrast of the strong, industrial materiality of iron to the seemingly insubstantial dust that represents a human form is meant to emphasize a precarious and ephemeral façade to our physical reality. Herman de Vries uses his fingers to spread soil on paper, leaving a temporal and tenuous human mark to remind us of what he calls our 'primary reality' (cited by Azzarello, 2015).

In the Dutch pavilion of the 2015 Venice Biennale, Herman de Vries presented a grouping of artworks that used natural materials such as stone, rose buds and soil. His *from earth: everywhere* was a wall-sized display of samples of earth that he had collected during his travels around the world (Figure 19). The samples appear to have been swiped onto the paper using his finger to form a roughly square shape in the centre of each sheet (Figure 20) and were individually framed to form a grid. There is an impressive range of colour and the work acts as documentation of the movement of his body through various spaces. When interviewed, de Vries (cited in Azzarello, 2015) said that his soil samples,

²⁰ There is a dedicated railroad track from the Sishen Mine in the Northern Cape of South Africa to the Saldanha Iron Ore Terminal. Although I am interested in the mining industry and have visited the Sishen Mine in Kathu and the Iron Ore Terminal at Saldanha, I keep returning in my work to a narrative that exists on a molecular scale. I attempt to draw attention to rusting iron as a signifier of a natural process, in turn reflecting a human reality that situates us within nature as a composite of natural materials or matter – matter that we often think of as passive.

...are turned into areas of colour, to show how many different colours the soil over which normally one walks without thinking, can have: mustard yellow, red, white or green... I wish to transmit an increased awareness what nature presents and what is our primary reality (sic).

During the course of my research, I have collected iron-rich soil samples from many locations in South Africa while on road trips, and use that soil to create traces but also to reference the diverse palette of iron-rich soils on the planet.

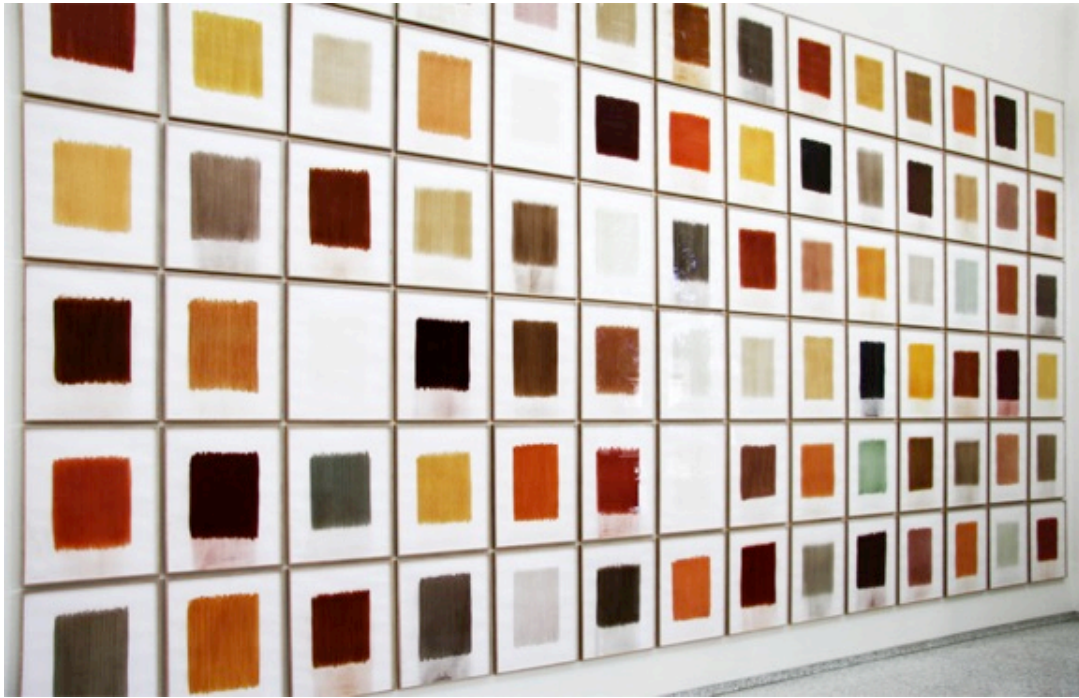


Figure 19. Herman de Vries, *from earth: everywhere*, 2015, soil on paper (framed) 84 of 8000 samples, dimensions vary photo credit to Judith Jockel



Figure 20. Herman de Vries, *from earth: everywhere* (detail), 2015, soil on paper (framed), photo credit to Judith Jockel

My use of ubiquitous and under valued objects and materials in art-making relates to the studio practices of many of the artists mentioned in the previous section of this paper. Where their works are primarily sculptural, my images are more photographic in character, but all bear evidence of a human engagement with trace using different substrates. An ‘incidental’, unintended result created in the process by which I rust onto canvas is the trace that forms on the surrounding plastic in which I wrap my materials to keep them damp during the transfer of rust. The plastic sheeting is an inexpensive material and readily available, and the images on it have an ephemeral quality of impermanence as they are non-archival. The plastic sheets are synthetic and will last for a long time but the rust trace sits on the surface of this material and will not adhere to it or be absorbed in a permanent way. Like Hesse’s crumbling latex and resin, the rust trace will dry out, turn to dust and flake off from the surface of the plastic. Although scale found on all rusted surfaces is

friable, rusting onto cloth or canvas is more permanent because the rust embeds itself within the woven fibers.

A final work I wish to discuss, Figure 21, consists of a painting support wrapped in tarlatan²¹ and printed on both sides with a laser-cut piece of rusted steel so that there is a visible double image of my body in a tucked position. This support is placed on top of five horizontal steel bars. The steel bars present a solid ground upon which the more ephemeral material appears to float. The grid in the texture of the layered tarlatan results in a moiré²² pattern, creating movement in the image and accentuating the layers. The combination of this visual effect and the small amount of rust that appears to float on the surface of the mesh makes it difficult to interpret the exact placement of the trace. The intention is to contrast the thin layers of rusted steel with the solid bars in an effort to highlight the illusion of permanence.

²¹ Tarlatan is a porous fabric used in print processes to remove excess ink and is also called mull cloth when used for book binding.

²² Moiré patterns are visual distortions created whenever one semitransparent object with a repetitive pattern is placed over another. The slight motion of one of the objects creates large-scale changes in the moiré pattern. These patterns can be used to demonstrate (light) wave interference (*Encyclopedia Britannica Online*).



Figure 21. Janis Milligan, 2014, rust on tarlatan, wood, iron

In her questioning of the ‘liveliness’ or vitality of inorganic matter and examining its relationship to humanity, Jane Bennett refers to Michel Foucault’s idea of a ‘simulacra’ – a thin, external layer of matter: “These filmy sheathes, and not the full object in the round, are the stimuli to human perception, for it is these mobile floaters that hit our sense apparatus to give notice of the presence of an outside” (2010: 57). Foucault (cited in Bennett, 2010:57) speaks of “a materiality that

dissipates the density of matter.” When I rust onto canvas, I am in the act of removing a very thin layer that exists on the surface of the denser material of iron and adhering it to canvas to express qualities inherent to that material. I am working at an interface of matter that investigates the ongoing dynamics of perceived boundaries as ethereal; less substantial than they may at first seem. Hard, dense metal is re-contextualized as a soft, supple and ephemeral material.

Conclusion

In Chaco Canyon, New Mexico, there is a pictograph drawn onto the rocks using iron oxide pigments (Figure 22). The image is one that is believed by some to document the supernova of 1054, a well-documented event elsewhere in the world (Greening, 1995). I find it extraordinarily poignant to contemplate that cycle of materiality: a human being using a rust pigment to document an event happening billions of kilometers away that is an original source of rust trace. I, too, am using rust trace to document something about my existence on this planet and evoke the irrepressible forces of nature.



Figure 22. Pictograph at Chaco Canyon, Penasco Blanca Trail, Chaco Canyon, New Mexico. Photo credit to Peter Faris, 1997.

The contextualization of rust for aesthetic purposes in my art practice has engendered in me a sense of wonder for the agency of materials and for the creative potential of process-based studio research. It has been a focus of my studio practice to bring attention to the presence of everyday phenomena, the complex and amazing results of natural physicochemical reactions that effect deterioration, metamorphosis, and the general state of constant change that represents the tangible physicality of our daily existence.

The expression “Change is the only constant” is credited to the Greek philosopher Heraclitus, around 500 BCE (Mark, 2010: 1). Change is certainly a defining characteristic of the human experience and it is ubiquitous and ongoing. When I began this exploration, I recognized aesthetic qualities in the visual presentation of rusting that I responded to as nostalgic references to discarded or old, neglected tools. It reminded me of discoloured blood or tea stains on time-worn household linens, and sepia photographs from the nineteenth century. Rust made me think of history and change and the steady march of time.

Rust is associated with entropy and the physical narrative of change in a much larger context than I had originally imagined. Time’s Arrow points in one direction, and I have found that working with a studio process that engages traces of oxidizing iron as evidence of irreversible change has poetic value with regard to explorations of impermanence and human transience in the natural world.

My research explores my sense of belonging within the greater context of the material universe, linking the transformation of matter to my personal narrative as a human being. Given that iron is the sixth most common element in the known²³ universe and represents only 0.002% of its mass, I am fascinated by the idea of my improbable existence. I am a trace element myself, within this greater context: a trace creating trace.

²³ A mere four percent of the Universe is considered as ‘known’. The remaining 96% consists of dark matter and energy about which very little is understood beyond evidence of its existence (A. Taylor, 2016, personal communication, 18 February). If we consider the entire universe, 0.002% would be reduced to 0.00008%.

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