the w[ ]rth of objects_
charles johnson_
2021_

This research focuses upon de-centering the notion of the 'human' from an ontological standpoint through the creative exploration and interrogation of found objects. Traditionally 'non-human' matter is viewed as passive and inert – this traditional humanist thinking has brought upon many of the global issues we face today.

This research entails the creative investigation of a variety of objects that have presented themselves throughout the research. Creating artworks from these objects through varied technological systems allows these objects to speak for themselves, transcribing their agencies to a frequency we as humans can listen to and understand. The technological processes to do such have been guided by the physicality and hidden narratives of the objects themselves. Engaging with tough questions about the objects in our lifeworld and the agencies they possess is a crucial task, as they have an undeniable, devastating and haunting effect on us when ignored or left to be 'passive and inert'.

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It is worth noting that this thesis contains the use of human and animal blood in a variety of artistic works involving printer scanners, photography and lithophanes. This exegesis is submitted before the final exhibition of works. There will be changes in the display of artworks that will occur between the submission of this exegesis and the final presentation of artworks such as artwork presentation mediums, code changes in response to space and/or other artist's works and chosen works to present.

I would first like to thank my supervisors Dr Clinton Watkins and Professor Frances Joseph for their ongoing, continuous advice, support and encouragement.

I would also like to thank Dr Donna Cleveland and the postgraduate materiality group at AUT for their support with my far-fetched ideas and the eagerness to see them come to fruition.

Finally; I would like to give thanks to my friends and family for their unwavering support, encouragement and understanding. You mean the world and all its constituent objects to me and I couldn't have completed this without each and every one of you.

"I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), not material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning."
– Charles Johnson. 02/06/21

"As philosophers, our job is to amplify the black noise of objects to make the resonant frequencies of the stuffs inside them hum in credibly satisfying ways. Our job is to write the speculative fictions of their processes, of their unit operations. Our job is to get our hands dirty with grease, juice, gunpowder and gypsum. Our job is to go where everyone has gone before, but where few have bothered to linger."

- Ian Bogost, 2012

"There are events. I never act; I am always slightly surprised by what I do. That which acts through me is also surprised by what I do, by the chance to mutate, to change, and to bifurcate."

- Bruno Latour, 1999

The notion of the 'human' has been a central focal point for thinking throughout history; viewing the world and its constituent objects as tools to use for our own human benefit. This traditional humanist thinking has created the world as we know it – however, this human-centered (anthropocentric) approach to the world is a 'double-edged sword' and has had dire consequences for the world we live in. What happens when we de-center the human from an ontological standpoint? What happens when we look at ourselves not as humans that exist separately to the world we inhabit and above the objects we use; but as objects ourselves that exist inside a vast, incomprehensible assemblage? What happens when we acknowledge the agencies that objects have?

Object-Oriented Ontology (OOO), Posthumanism and New Materialism are three current philosophical schools of thought that engage to tackle this task in a variety of ways. When used together in artistic research, we as a collective can begin to think about these questions of objects and agency more critically. This research focuses on a variety of artistic works and object interventions created from encountered objects over the past year (March 2020—May 2021) that engage with these three schools of thought.

These artistic works have risen from analyses of the things-in-themselves and study of the hidden narratives that may have existed in the object's past. The artistic methods used to fabricate the outcomes vary from project to project; crystallizing from the analyses taken, listed qualities and observations noted about the individual objects, taking them as they are – not as tools to use. This research also provides a discussion around digital materiality and how the digital objects we accrue and dispose of have agencies of their own and hold equal value to the physical objects we interact with daily. Since the world is becoming increasingly more digital, with the rise of cryptocurrencies, NFTs (Non-Fungible Tokens) and other Blockchain technologies; it is important to take the same ontological standpoint. This thesis is broken into three sections, first is the contextual research and methodological reasonings for the varied, crystalised approaches. The second section concerns the objects themselves and the work that's arisen from them, whether that be digital scans, physical installations or sound files. The second section also highlights personal reflections and thoughts gained from the varied processes, how they fueled the research and future experiments. The final section contains closing remarks, where a dialogue and discussion is opened around certain points or questions raised in or as a result of this research.

Rationale:

Initially, this research's primary objective and area of interest was hacking; the notion of changing something's meaning by contorting its physical and presented attributes so much so that it's no longer legible or recogniseable in its new form. A personal fascination with the mind and current new technologies led to an initial exploration into biohacking which is the process of surgically adding technology implants to aid aspects of your life. I started this research project with the objectives of "deconstructing myself in thought", "techno-artistic investigations of blood" and "to unpack what it means to be human as part of the lifeworld" as stated in this project's initial research form.

Exploring this concept led to a discussion on New Materialism and Object-Oriented Ontology (OOO). These discourses engage with some of the

questions initially explored but offered new insights and perspectives to questions and observations made. This research crystalised and evolved into what it is now. A new focus on 'non-human' objects instead of the 'posthuman' guided a deeper engagement with what it means to be a human and 'part of the lifeworld' as originally put. I give a definition of the 'posthuman' later in this exegesis as falling under Philosophical Posthumanism's definition. Figure 1.1 shows a timeline of works, when the objects were first encountered, the time spent analysing the objects, when certain interventions were, when blood donations occurred and when each manifestation of digital waste was created.

Finally, the title of this research itself "*The w[ ]rth of objects*" serves as an introduction to the ideas and themes of this thesis. As discussed later in the contextual research section on pages 10—14, there is an inherent withdrawal of objects, the fact that we can never truly see something's reality, only anthropomorphize it. The space between the square brackets represents this idea while the harshness of the brackets themselves illustrate the edges of the objects, the "event horizon" of the "black noise" they radiate — Ian Bogost (2012) says "Our job as philosophers is to amplify the black noise of objects". Additionally; square brackets are frequently used in coding languages and as this research opens a dialogue

about digital materiality as well as using code in artworks such as *sIren*, having an "o" instead of "[ ]" wouldn't communicate this integral facet of the research.

RESEARCH OUTCOMES:

This research engages with OOO, New Materialism and Philosophical Posthumanism through varied artistic practices, doing so to gain a deeper understanding of the objects that consist of the lifeworld, including one's self. The research opens a dialogue to the questions: What does it mean to be a human object in this rapidly evolving, assembled world of inherently withdrawn objects? When the agencies of objects are explored and taken seriously, how does the world around us change? As human objects with an unavoidable, anthropocentric view of reality, how can we expand our perceptions to include the realities of objects? When given the chance to speak for themselves and not as tools, what do found objects say?
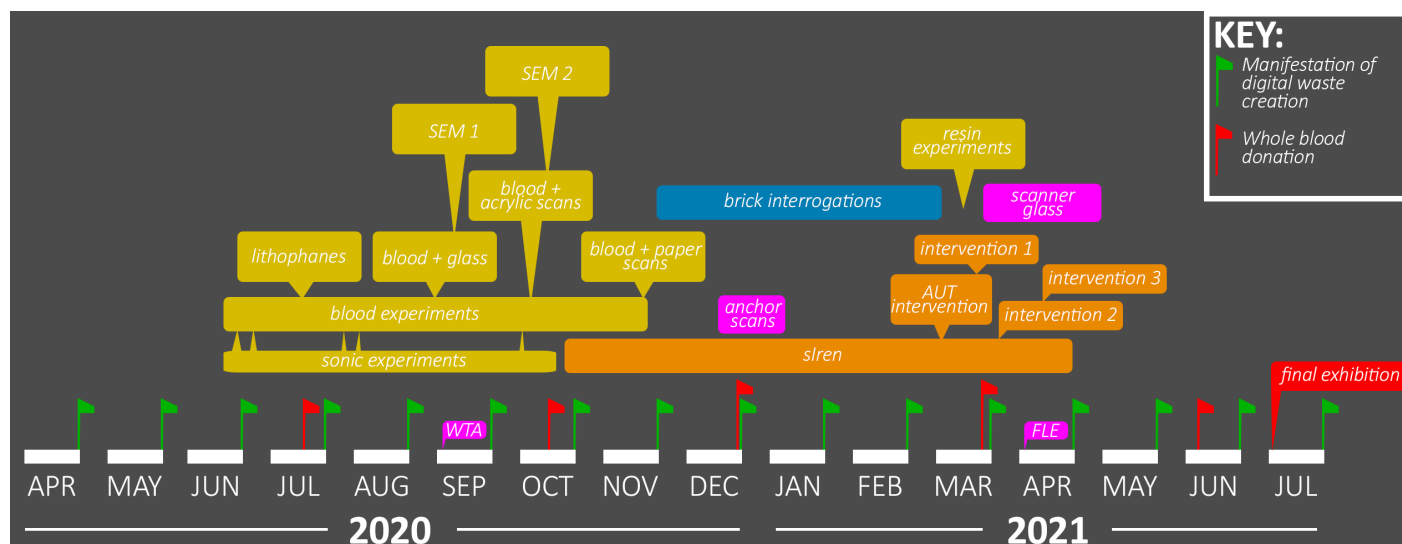

Figure 1.1. Johnson, C. (2021). Timeline of works

contextual framework_

Things. Things surround us, constantly shouting out at us to inform us of what they are and what they mean. Colour, texture and physical materiality tell us what an object looks, feels, sounds and smells like, but there are hidden aspects that all things possess – their perspectives, narratives and inner realities. These perspectives and realities are alien to us, we are never able to experience what they do or listen to their thoughts on other things (Bogost, 2012., Cole, 2013), because we ourselves are not those objects. We only ever experience the world in one human-centred (anthropocentric) viewpoint, to attempt any distortion and experience an alien's sense of being is an impossible task; some abstraction is needed.

We can think of reality as being qualitative – heterogeneous, temporal and nomadic (Bergson, 1910., Rubidge, 2006., Denzin & Lincoln, 2009); always changing and transforming. Everything is constantly in flux, the constituents of this world are not already thrown or cast, they are in the throwing and casting (Ingold, 2010). When we take a scan, a field note or a sound recording, we are taking a quantitative slice of that specific section of time, analysing it and storing it in that moment. However, as soon as we do so; that slice becomes dated, the material, the environment(s) and reality itself has shifted beyond that momentary slice. What we do get however is an anthropomorphised narrative, one that we as humans can analyse in a language that we understand – be that visual art, sound recordings, written stories, still photographs or video. By taking the thing in question's alien perspective and warping it to a language we as humans can understand, we can start to analyse and understand what it's like to be a thing. The practice of doing so is called 'Alien Phenomenology' (Bogost, 2012).

When thinking of reality in this way; we must also consider our own anthropocentric perspective both historically and presently to gather a complete perspective. There are three current philosophical movements that have informed this research and the final exhibitions of artifacts and artworks; New Materialism, Object-Oriented-Ontology (OOO) and Philosophical Posthumanism. Each in their own way aims at re-articulating 'human' centeredness in both our own thoughts and the wider political climate to move forward. Several related practices that involve things; Assemblage, Bricolage and Philosophical Carpentry are also considered in this review.

Before we consider an alien object's perspective and agencies, we must first analyse ourselves – the 'human', what it means to be one and the problems that come with being such an object. The 'human' here is defined as an open notion of ideas, instead of the biological systems that make up our physical bodies. Philosophical Posthumanism is a collection of three main approaches to the human as an open notion; Post-humanism, Post-Anthropocentrism and Post-Dualism (Ferrando, 2013, 2017, 2018, 2019). The first approach, Post-Humanism looks at the traditional marks of what makes a human, 'human'. When we look back in history we can see that not every human was considered such, master over slave, men over women and white over coloured. The greek term 'ánthrōpos' (ἄνθρωπος) translates to 'human' however, that did not include every human, to be considered "ἄνθρωπος" you needed to be:

A human animal

Not a God or Goddess

Not barbarian (Persian)

(Ferrando, 2017)

This is where we first see how these ancient, racist ideas were carried through the notion of the 'human' into modern thought. The term "racist" here is being defined as putting one's own race above another. The second approach of Philosophical Posthumanism asks us to look at the human-centeredness of traditional humanism. Post-Anthropocentrism looks at how historically the human was put above or labeled as more important than the non-human. 'Non-human' here is being defined as not "ἄνθρωπος", as is the case with traditional humanist thinking. Theodore Roosevelt's head of forestry once described forests as "manufacturing plants for wood" (Alaimo, 2012), with this quote we can see these anthropocentric ideas manifest; the human's desires are put above those of the forest's, animals living there and the environment.

We don't need to look far to see this thinking in modern society either; fossil fuels being used to fuel combustion engines leading to a polluted environment, animals being slaughtered en mass for human food and using massive amounts of ocean sand as a tool for concrete construction, leading to the destruction of the ecosystem (Torres et al, 2017). Finally; the third approach of Philosophical Posthumanism asks us to look at the dualistic nature of humanism and recognize the problems that come with using dualisms as tools to define issues. As we've seen; that which is considered more 'human' is always put above those that aren't. These dualisms are used as a technology to give reason to problematic social behaviours (Ferrando, 2017). Issues such as systemic racism, sexism and the dehumanisation of criminals through correctional brutality (Goff, Eberhardt, Williams & Jackson, 2008) can in part be attributed to the 'technology' of dualisms.

When we consider the issues with how the 'human' is defined in traditional humanism, we can analyse and adapt our personal behaviours, actions and thoughts. Philosophical Posthumanism argues that when we do this, we can become 'posthuman' in thought, as opposed to the Transhumanist belief that we can only become 'posthuman' when our physical bodies are no longer recognizable as 'human' (mind-uploading). The perspective of Philosophical Posthumanism's definition of the 'posthuman' is the one that I am adopting for the purpose of my search to become a 'posthuman'.

Having deconstructed the notion of the 'human', we can now look at the objects around us, how we fit in with them and what we can learn from them to move forward. Object-Oriented-Ontology (OOO) is the ontological practice of putting 'objects' at the centre of being (much like post-anthropocentrism), where nothing has a special status (Bogost, 2012). To be considered an 'object' in OOO, the 'thing' in question must be both irreducible down to its constituent parts but also be irreducible upwards to its effects. They must be more than what makes them up, but less than what they do.

To use Levi Bryant's (2011) example; a body cannot exist without its cells, but a body cannot be reduced to just its cells either. To take this example further; a singular human body cannot also be said to be the sole cause of Global Warming, although it is a contributor to it. OOO suggests that 'real objects' (that which exists whether or not it is currently affecting any other 'object') can only relate to one another indirectly through 'sensual objects' (that which exists only in relation to other 'real objects') (Harman, 2018). We can never truly see the table, cup of coffee or the siren, we can only ever interact with the sensual objects they communicate to us through.

There is always a sense of withdrawal and secrecy of objects (Morton, 2013., Harman, 2016, 2018, 2021). This is similar to how a blackhole can never truly be seen, only located and observed through the bending of

spacetime (event horizon) or by the hawking radiation it gives off (Bogost, 2012).

Thinking of objects in this way can be thought of as kind of a flat ontology (Bryant. 2012), where things, ideas and properties are put all on a one dimensional plane, with no hierarchy of being. However, a flat ontology implies that things are separate from one another, they exist in groupings on this philosophical 2D plane that are formed from an external observer. Ian Bogost (2012) asks "Who's to say that my mess is not the volcano's mess? Whose conception of reality gets to frame that of everything else's?". What he suggests is a 'tiny ontology' where everything exists in a singularity, interacting through sensual objects to everything else in some unknowable, alien way. When we consider these interactions between all other real objects and the sensual objects through which they interact with each other; we can look at what these things are saying to us about themselves. When we do that, we can look at the agencies that these objects have not just for themselves, but also the ideas that they impart onto us and other objects.

The agency of objects is a topic of much discussion in current New Materialist and OOO thinking – but what is agency?. Bennet (2010) describes agency as a type of vitalism that permeates objects; the capacity for a thing to not only impede or block human will, but to bring about their own trajectories and tendencies. It is important that the ideas of 'vitality' and 'agency' here are not defined as 'things' that can enter and leave an object akin to a soul, but rather characteristics inherent and intrinsic to objects.

Similarly, Barad (2003) describes 'agency' as the dynamism of the ongoing reconfigurations of the world: 'agency' isn't an attribute that an object has or doesn't. Rather, it is how the locally determinate structures that determine the properties, meanings and patterns of

bodies ebb and flow in the ongoing making of spacetime which emanates from the objects themselves (Harman, 2013). When an object captivates and brings a person out of their life for a moment, that object is expressing its vitality and thus giving rise to an agency of being. The agency of a thing is always dependent on the collaboration, cooperation and interactive interferences between many bodies, this is much like how real objects speak to others through sensual objects in OOO. Since 'we' (collective humanity) are real objects and other real objects can only speak to us through sensual objects, we can assume that this vitality and an object's agency is a collection of sensual objects. Sometimes these connections are stronger than others, the textual or aromatic sensual objects are stronger in some things than the auditory or visual sensual objects in others and visa versa. This aspect has been explored in this research through the use of Ontological Cataloging (explained later in the Methodology section, pages 15 —16). Since there is no way of comprehending these alien experiences; some abstraction and anthropomorphizing of the gathered data is required.

There is no way to completely separate 'the human' from this thesis, since it is written by a human, for a human in human language – there is an unavoidable anthropocentrism lying beneath the surface of my artifacts. Even if I and my audience consider ourselves as 'posthuman', Philisophical Posthumanism still implies that we needed to be 'human' in the first place.

When thinking of the agency of things in this way, we can take a closer look at these collaborations, co-operations and interferences. The idea of assemblage comes to mind; ad hoc groupings of diverse elements (Dezeuze, 2008., Bennet, 2010) and what agencies they can have or ideas they impart onto other real objects through the sensual objects they emit. Artists (Schwitters, 1921., Raushberg, 1955., Johns, 1962., Anatsui, 2009.,

Sze, 2009., Powers, 2013) have created assemblages across decades using the methodological practice of Bricolage; a method used to fabricate aggressive artifacts about taboo subjects using soiled, valueless and fragile materials (Kelly, 2008). Bricoleurs who create assemblages often look at the idea of emergence through their work; the idea that the whole is greater than the sum of its parts, that some other feature of meaning is exhibited only when these objects are assembled together. Harman (2018) describes this idea with how a 'city' is more than just the people that are there or the buildings it consists of. If we removed the people from the city and placed them all in an empty field, we wouldn't call this a city; nor would we call the collection of empty buildings in a specific geographical location that same city. It is only when these two real objects (group of people + city + cultural implications as well as a myriad of other, incalculable real & sensual objects) come together that the 'city' object emerges.

These notions of assemblage and bricolage sit comfortably within New Materialist thinking and within OOO. However, OOO's objects are not able to be reduced both upwards or downwards (Harman, 2018, 2021), meaning that while we can acknowledge that real objects are made up of a myriad of other real objects interacting through sensual objects within itself (elements, atoms, quarks, etc), we also acknowledge and embrace emergence. While some artists look at the idea of emergence through bricolage, others look at the downward reduction of objects and explore physical materiality itself. Artworks such as *Contingent* (Hesse, 1969), *River of Oblivion* (Yoshimoto, 2006), *White Coffin* (Yoshimoto, 2006), *Ra* (Morozov, 2016), *You're so 2000 & L8* (Tompart, 2010) and *Hemoglyphs* (Eagles, 2011) look at the physical materiality of the objects they work with. These artists work with a variety of material objects; everything from denim and bleach to blood and resin in order to unpack and analyse the material objects under further scrutiny.

However, these works primarily look at physical materiality, therefore ignoring or not touching upon the equally fascinating emerging field of digital material. As we talk about 'materiality', it is not uncommon to equate 'materiality' with physical matter (Leonardi, 2010) and only see what physically exists as 'material', but this is not the case. We must change the way that we look at the word 'materiality' in order to move into this fascinating new realm. Yoo (2012) comments that digital material is immaterial, both the digital data itself and the softwares required to represent it are stored as a series of bit strings and temporarily stored in "bearers". However, what of the HDD or SDD that these are stored upon? These bit strings move between RAM slots and components in the computer the same amount – if not more than physical material. Therefore, everytime a document on a computer is opened it is in a different form than when last observed, even though it might not seem so to the human observer. This idea of evolutionary digital material is something that is considered in this research and embraced with the project *Manifestations of Digital Waste* (Pages 26 — 28). The work looks past what's happening on the screen and concentrates on both the agencies and what happens beyond what we can see as humans (Reichert & Richterich, 2015).

While some artwork's materials exist beyond the initial exhibition such as *Contingent* (1969) and *Ra* (Morozov, 2011), assemblages are finite and thus each new time these artworks are presented or observed, they are different. The temporality and nomadicity of assemblages is important, as we know that reality is qualitative, so too are the objects and assemblages that constitute it. Assemblages are entropic, thus it is in their nature to break down (Markus & Saka, 2006). Some artists use this temporality to their advantage, making one-off installations to highlight the temporality of their specific chosen medium. Japanese floral artist Azuma Makoto in his work *Iced Flowers* (2015) froze bouquets and plant

cuttings inside obelisks of ice in an abandoned warehouse and left them to melt over the course of a day; the fresh whole plants frozen in place quickly wilted when exposed to air. By the end of the exhibition, the final artifact was a collection of wilted, damp plants on the wet ground. Similarly in 2016, Russian artist Demetri Morozov used his own blood to create batteries that are suspended from chandeliers. The current from the batteries fed into a microprocessor, synthesizing a soundscape based off the incoming AC current in his work *Until I Die*. The batteries used copper and aluminium bars with his chemically enhanced blood as the reagent to create this current. This reaction was only possible once and as such, when the six hour installation was complete and the batteries were expired, this installation was concluded and the artifact rendered inert and complete. Blood was the initial subject and starting point of this research and is a fascinating material to look at from a New Materialist perspective, not just because of the religious and social taboos that it has, but also as a material object in-itself.

Blood exists within our bodies as a nomadic, changing substance transporting oxygen from our lungs, through our heart and to the rest of the body. When oxygen is transported to our cells through diffusion, both the chemical structure of the red blood cell is changed as well as its function. Now, with the CO_2 waste product, the blood makes its way through veins back to the lungs, this cycle continues until the red blood cells die. When blood leaves the body, these functions no longer exist, its meaning is changed from a tool in our bodies to a plethora of meanings depending on environmental context (religion, medicine, etc) and as it dries, the cell structure changes too. Artists have tapped into the materiality of blood to showcase its structure (ABDM, 2012., Eagles, 2012 & 2018) while others have used blood as a medium to analyse its meaning in society (Eagles, 2014-2016) and themselves (Quinn, 1991-Present).

There is another type of object that has been discussed and theorized by Timothy Morton (2013) that of the 'Hyperobject', that which exists beyond human perception at a higher dimension that we can only see the small effects of in the current moment, but can see the effects of temporally when thinking of it in the past and conceptualizing itself in the future. This notion of existing beyond human perception is common in OOO: the idea that all objects are inherently withdrawn from others, even themselves (Harman, 2017, 2018, 2021) begins to make sense when you really scrutinize a 'thing'.

Under OOO and within a Philosophical Posthumanist framework, assemblages can be explored; the objects that make up them, their agencies, the temporality and nomadicity of such assemblages and the technology used to create such objects. This is the crux and focus of my thesis, exploring the vital objects that have called out to me in my nomadic, explorative practice and have used the systems available to me at the time to allow them to communicate their alien perspective and agencies to us in forms we can understand, images, sound and physical installation.

INTRODUCTION:

This research has involved both external and self reflexive exploration about my position in the lifeworld. Here, exploration has involved three domains; the physical, the material and the philosophical. The creative process was initiated while moving around the city and allowing the objects presented in this exegesis to arise through creative exploration. When these objects were encountered, I explored and worked with their particularities, doing so through an 'Alien Phenomenological' (Bogost, 2012) lens. Through this process and reflection on and in action, I've explored my own creative existence and the philosophical implications of my findings. The research has followed a crystalized, practice-led, autoethnographic approach. Having the outcomes driven by practice (Malins, Gray, Bunnell & Wheeler, 1995) to produce creative artifacts that provide a philosophical discussion (Markus & Saka, 2006., Bell, 2008) enabling the audience and myself as the artist to reflect (Ellis, Adams & Bochner, 2011) on their own materiality.

There is an unavoidable anthropocentrism (human-centeredness) to this project and any other project that looks to de-center the human from an ontological standpoint. At the end of the day, we are human animals (we may not be ánthrōpos, but we are some notion of the modern 'human') and the only perception we have or will ever have is that of our own self. Therefore, it's an impossible task to completely remove or decenter ourselves in thought. Materiality (physical and digital) is also an unavoidable topic in this exercise to decenter the human given that the 'other' (in this case all 'non-human' objects) is brought into the focus of ontology. Every object interacts with every other object in some unknowable way (Bogost, 2012) and we as human objects are not exempt to this. However, we can engage with questions that ask us to do these tasks as a philosophical exercise to look at where we stand in our lifeworld in relation to this 'other'.

PHILOSOPHICAL CARPENTRY AND LISTING:

The notion of Philosophical Carpentry has also informed the methodological approach to the creation of artworks. Alluded to by Ingold (2010) and described by Bogost (2012, 2015) as the act of creating artifacts that do philosophy by listening and following the force of the materials that the carpenter works with, allows the vitalities (Bennet, 2010) and sensual objects (Harman, 2018) to be enhanced to a level that we as humans can understand.

Artists make art that conveys their concept and philosophers write books about their perceptions, but in the end these outcomes all come back to the human behind the thing presented. The artist's concept is ontologically placed above the physical or digital material in question as is the philosopher's perception is placed above the physical or digital book. The wood, glue and paint objects used to create the artist's art are not taken into question, only what those objects represent. These objects are ontologically placed beneath the concept that has been imposed on them, as is the same with the ideas the text conveys within the pages of a philosophy book. Who is to say that the paint's or ink's realities aren't as valid as the concepts they have had imposed on them? By making objects that do philosophy, the focus of the outcomes is on the things themselves and what they say, not the human creator.

In this light, listing is a powerful rhetoric tool which breaks the normal conventions of narrative-based language (Harman, 2009., Spufford, 1989) to highlight the qualities of objects. Standard language relates qualities in relation to the overall thing that appears to the viewer or reader.

The narrative-based sentence "This coffee cup is brown" suggests that the subject (coffee cup) with brown qualities (cardboard) is presenting itself to the viewer (a human). Listing on the other hand abandons this human-centric stance and brings a focus to the thing-in-itself, consider the following list: "coffee-stained, cardboard, vessel, seam, plastic, ink, 01 4X 05BA, empty". Communicating the same information presented in this list in a traditional sentence structure would take far too many words and by the end of the sentence, the original meaning is lost or confused. However, when listing, a larger overall picture is revealed but with more mystery and encourages further curiosity and exploration. Bogost (2012) calls the practice of listing "Ontographical Cataloging", taking note of these objects and listing them with no sentence structure. Doing so, he explains: "... hones a virtue: the abandonment of anthropocentric narrative coherence in favor of worldly detail". This is how I've analysed my objects, listing the vibrant qualities that stood out about the objects.

Presenting the list at the beginning of each chapter, I invite you to analyse these objects closely and for what they are. This has included a dialogue about the technologies I should use to analyse and communicate the objects I have chosen to work with . These technological apparatuses not only allow the real objects presented in/through them to communicate their own agencies and narratives, but enable a reconfiguring of spacetime matter and thought as part of the ongoing dynamism of becoming (Barad, 2007., Hickey-Moody, 2020).

Elan Vital and Object-Oriented Ontology:

Because of the explorative nature of this thesis and the objects I've encountered, an iterative and emergent methodology was developed that allowed the methods to grow and crystalize as I responded to the objects encountered. 'Elan Vital' is a term which means "a drive without design" (Bergson, 1910., Bennet, 2010) and an overall ethos I have undertaken in my methodology – akin to how I have subscribed to OOO as my overarching ontology; Elan Vital has been my 'ontology' for my analysis methods, to state it colloquially. Through this exploration method, I've allowed the objects to present themselves to me 'naturally' as I come across them, as opposed to searching them out specifically. These presentation methods have been different depending on the object (both digitally and physically); but all objects have not been intentionally or directly sought out. When encountered, real objects emit sensual objects, the power of such objects and the relationship between other real objects around them (assemblages) are what creates their vitalities (Bennet, 2010) and agencies. As discussed, the objects presented in this exegesis have enchanted or persuaded me of their value; presenting themselves and their sensual objects to be analysed, listed and discussed.

A key aspect of OOO is discussing the "thing in itself" (Deleuze, 1988., Harman, 2009, 2016., Bogost, 2012) and the unique worlds or operations that take place within a thing. OOO is discussed in more detail earlier in the contextual framework (Pages 10—14), but to reiterate; OOO looks at the notion of bringing the non-human object into the focal point of ontology. In this research, this notion is carried forward by allowing the objects to speak for themselves, enacting their own agencies in a medium that we as humans can understand. Bogost (2012) answers the question of 'what it's like to be a thing' by saying that it is an impossible question to answer in the first place, we can imagine what it's like to be a thing,

but that imaginization is anthropomorphised since we only know what it's like to be a human. When a kettle asks the same question to a grape, the kettle is 'kettle-ising' the grape's existence, so on and so forth. Therefore; when we ask the thing in question to state its own existence to us (humans), we must apply some anthropomorphism to its answers so we can understand. The artistic works detailed later in this exegesis look at anthropomorphising the thing in question's responses to this question through various artistic outcomes such as digital scanned images, physical installations and sonic translations.

CRYSTALLIZATION AND NOMADIC ADAPTATION:

The emergent and albeit "improvisational tone" (Latour, 1999) of this research thesis was guided by a methodology of crystallization, whereby the specific methods of analysis grew, changed and altered, extending in different directions as the project developed (Richardson, 2003). This approach evolved and was adopted for a myriad of reasons, including; the nature of my study, the objects themselves requiring different analysis techniques and because of the impacts of the COVID-19 pandemic.

In between lockdowns and only being able to come onto campus sometimes, often a few days at a time, I had adopted a nomadic approach; using the technologies available to me at the time. I used the Textile Design Lab's (TDL) digital textile printers (*Manifestations of Digital Waste, Pages 26—29*), a Scanning Electron Microscope (SEM) (*Blood + Silk, Acrylic, Page 40*) as well as a printer scanner at home (*Blood, Pages 36—41., Brick, Pages 30—32., Anchor, Pages 33—35*), Zoom recorders and 3D printers (*sIren, Pages 20—25*). Access to these various technologies had been precarious, and availability was sporadically limited due to unforeseen circumstances throughout my thesis. In adapting to these circumstances I have had to take note and advice from the temporal,

nomadic nature of the objects I have chosen and that have chosen me. A dialogue between us was opened, accepted and developed over the project.

PRACTICE-LED RESEARCH, AUTOETHNOGRAPHY AND REFLECTIONS OF MATERIAL SELF:

This thesis asks questions about the nature of reality and recognising an object's agency. However, prior to recognising the agency of things in the world around me, I first needed to explore my own psyche and placement in the material world. How could I analyse that which is not 'me' before I analysed and defined what is 'me'? 'I' am not separate from the materials and objects with which I interact with/through (Hood & Kraehe, 2017). Therefore, I also adopted an autoethnographic approach to this research. This was done through a practice of exploring my own creative existence and my own materiality (through experiments and the ritualistic donation of my blood). Researchers (Suominen, 2004., Eldridge, 2012) have undertaken autoethnographic approaches (Ellis, Adams & Bochner, 2011) to produce collections of artifacts in the form of photography, creative writings and self-reflective collages. I have done the same, but produced the artworks that are detailed and discussed in the main body of this exegesis. Ultimately, these artifacts and self-reflexive works have created an assemblage – a bricolage of both form and methods (Denzin & Lincoln, 2009).

In an effort to reflect upon my material self, I have undergone a donation of my blood every three months through The NZ Blood Service. This process became an important ritual over the course of the research. There is a minimum wait time in between donations of three months; this is to allow your body enough time to replenish plasma, platelets and red blood cells according to Heathline NZ. Following these regulations, I have undergone three donations over the course of the project

with the first donation marking the beginning of my thesis year and the final one initially planed to mark the end of my master's journey on the hand-in date. While this process has a poetic dimension, in that it bookends this section of my life, the purpose of the ritualistic nature of these donations was to explore my own materiality and consciousness prior to exploring non-human/external objects.

Blood as a material has been an integral part of every facet of human society, used in religious ceremonies to appease gods (Joralemon, 1974., Kryda, 2018) and in western medicine as a material that can be contaminated and host diseases (Greenstone, 2010., Rando & Finkel, 2013., Miley & Christensen, 1947., Weber, Fußgänger-May & Wolf, 2007). However, the final two donations were unable to be actioned as I had an injury which meant that I could no longer give blood during the recovery. This injury is persistent and I'm unsure when I'll be able to donate blood again. There is a history of the use of blood in the fine arts (Quinn, 1991., Eagles, 2011, 2014—2016., Blue, et all, 2012., Morozov, 2016). Drawing from these diverse sources, I undertook this ritualistic reminder and sacrifice of my own materiality (Monogoven, 2003). Making this self-sacrifice resulted in the acquisition of a collection of objects, my bandages and the subsequent forms they took.

This research undergoes a practice-led approach, having the research question crystalize and arise from the process of the practice itself (Malins et al, 1995., Candy & Edmonds, 2018). The practice, artworks produced and process of the research itself grants a personal exploration into OOO, New Materialism and Philosophical Posthumanism as well as contributing to the wider community of practice within these fields by acting as conversation starting points. It could be argued that this research is practice-based as many of the questions have arisen from the act of adopting such a crystalised,

'nomadic' practice. However, the fact that these creative artifacts, the documentation and surrounding discussions are the basis and crux of the contribution to the wider field; this research is firmly practice-led (Candy, 2006., Candy & Edmonds, 2018).

Technologies and digital materiality:

The selection and use of technologies has been influenced by the works of artists that have worked with similar technology/materials before me. I have drawn from and adapted their practice/methods for my research. Artworks such as *The Blood Mirror Project* (Eagles, 2014—2016), *Until I Die* (Morozov, 2016), *Self* (Quinn, 1991—Present), *Hemoglyphs* (Eagles, 2011) and *The Automated Blood Drawing Machine* (Blue, et all, 2012) have looked at blood's physical materiality to create artistic works. I have been influenced by techniques present in these artworks (drying, chemical alterations, external material interactions and freezing) to create artefacts that use human or swine blood. Alongside these artistic influences with material, artworks such as *Ra* (Morozov, 2016), *Rippling Images* (Woywod, 2016), *binary* (Watkins, 2019), *60 Medical Infusion Sets, Water, Fire, Metal Sheets 20x20x4cm* (Zimoun, 2013), *Swamp Orchestra* (Petković, 2016) and *Divider* (Morozov, 2016) have influenced the technology I have used to explore my chosen objects. For example, I have used microprocessors, 3D printers and printer scanners which are all technologies used in these previous artistic research examples.

It is important to note that some of these artists listed above have created these projects as 'art' and not as academic research, but the techniques developed through their practice are relevant and have helped in my nomadic experiments. These artists have looked at materiality in a physical sense, however I have also had to take into account digital material which is equally as nomadic and

evolutionary. We're living in an age where our digital and physical selves are becoming evermore integrated with one another (Reichert & Richterich, 2015). Much of our lives are lived online or we rely on the digital materials that we have to get work done, remember key dates or communicate with each other. This digital space is being created by us and thus warrants equal (if not more) exploration of this unique new digital environment (Yoo, 2012).

Therefore, akin to the explorative practice of letting the objects come to me, I let the digital objects from my computer use accumulate 'organically' in my recycling bin each month when I delete them. At the end of each month, I randomly place them together in Adobe Photoshop creating a collage (akin to some prior expressions of autoethnographic study) of that month's experiences. In this ritual, it's important that I do not care how it looks aesthetically or where the objects end up as that would be enacting my own ideas and concepts onto the objects, taking away part of their agency. Just as the physical objects selected have their own agency, each digital artifact here is a 'last chance' to demonstrate its being and worth before obliteration by me, a final quantitative frame of a qualitative string of data. This is explained further on pages 26—29.

Moving through this exegesis:

In the following pages in this exegesis, each sub-chapter discusses a specific object or group of works I've analysed. These include sirens, digital waste, a brick, an anchor, scanner glass, swine blood and my own blood. The objects are discussed in the method of presentation to me, their sensual qualities in the form of listing, the chosen technologies used to analyse them and if relevant their interventions. Interventions in this context means any form of presentation or exhibition that has resulted in new knowledge about the thing in question. I've had

the opportunity to present some aspects of the various works in international online competitions, physical symposiums and guerrilla spontaneous installations.

Finally, each chapter concludes with a reflection about the thing-in-itself and what I've gathered from the analysis of these objects and the world around them. The order of these chapters don't follow a chronological sequence, instead, they follow the logic of how impactful each object or set of experiments was to my thinking. I am not saying that these objects appear in order of importance or relevance either, doing so would defy the 'flat' ontology of OOO. All the objects or sets of artworks presented in this exegesis are of equal importance and agency, but the thoughts gained from each have been different and the relevance of those thoughts in relation to the formation of this thesis is how these objects are presented.

While nomadically moving through this research, engaging the ideas of New Materialist philosophers and applying them to my assemblage of methods, I have created a bricolaged exhibition and with this, becoming a quilt-maker of concepts and artifacts, a posthuman and an object in my explorations.

dead_
red_
"fire"_
warning_
cracked_
silent_
rusted_
exposed_
"do not remove"_
varied_
damaged_
smooth_
speckled_
flaked_
fragile_
stripped_
retired_

_sIren

sIren is an installation that consists of 11 fire sirens attached at the top of a 2m galvanised steel pole. These sirens were first encountered through the Facebook Marketplace on the 10th of October. These sirens were ripped out of a construction site by a worker, although there is no record of which buildings these were and where they were located.

After listing the qualities and examining the things-in-themselves, I considered how to facilitate their agencies and highlight the hidden narratives without enforcing my own concepts or ideas. Object-Oriented-Ontology (OOO) suggests that since we can never fully understand or see an object, there is something always withdrawn (Bogost, 2012., Harman, 2016, 2018, 2021). Sound was an immediate withdrawn object from these sirens, without power or an input signal, this sound object could never be fully communicated to other objects. The orientation of the sirens was another hidden mystery; how were they previously set up? Was this particular stress mark caused from hanging upside down or after being clamped too tight? Was this "Do not remove" sticker exposed to the elements or left sheltered inside? I had plenty of questions for these sirens and there was no way to answer these questions as they exist outside of my physical and temporal perception. What I wished to do was to bring some possible answers to the field, to amplify their hidden narratives while allowing them to communicate their agencies.

The sound object was tackled with an Arduino Nano, two 1650 3.7v 2500mAh batteries and custom circuitry (Figure 2.1). Code was made in such a way to allow one siren to communicate for half a second every half second, 5 seconds or 15 minutes as each installation required a different timings (Appendix A).
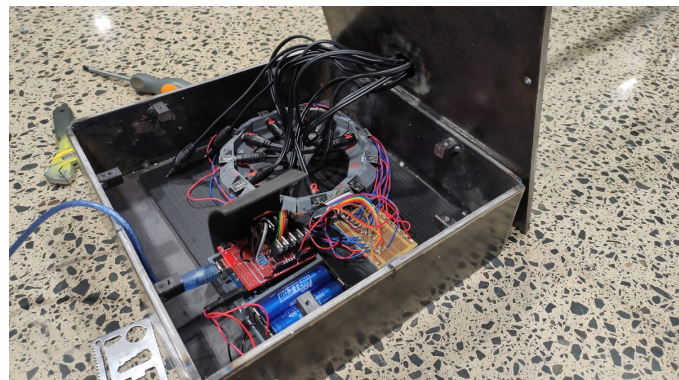

Figure 2.1. Johnson, C. (2020). sIren circuitry

Figure 2.2. Johnson, C. (2020). sIren close up final render

Figure 2.3. Johnson, C. (2020). sIren making process

As I was unsure which contexts this work would be exhibited in, I knew that making an installation and running cables in accordance to the space would not be feasible. A single, standalone installation was needed. Given the questions I had, it is impossible to rule out that these sirens didn't all come from the same building or that they might have existed in pairs, triplets, etc. Having them all together within a single artwork meant that I could recognize the potential pasts of these objects while also acknowledging how they now exist to me – together.

However, their previous orientations still remain a mystery and a secret to these real objects, so to best exemplify this uncertainty it felt appropriate to install these obejcts at differing physical angles. I settled on a mix of 0º, 20º and 45º orientations, rotated in either direction (Figures 2.2 & 2.4) in order to achieve this. I designed couplings to be 3D printed in Fusion 360 (Figures 2.3 & 2.4). I sourced a 32mm galvanized steel pipe and cut it to 2m. I chose this length as it rests just above head height but not too large to be cumbersome to take to various locations for its future interventions. These were produced as singular, double or triple connectors to showcase the mysteries of their past potential pairings (Figure 2.4). These fittings were pressure-fitted onto the pipe.

This artwork has had a series of installations over its life so far, ranging from local 1.88 second interventions at night to long-frame gallery installations (Figures 2.5—2.12). Each of these interventions have taught me something about the sirens themselves and about a OOO mindset. The reflections on each interventions are detailed later in this sub-chapter. The specific intervention locations were nomadic in nature. This artwork has moved between AUT workshops and my personal workshop many times and while travelling, I have taken the work to various locations I thought were rich in assembled vitality. Memories are objects in an OOO framework, so 'ordinary' places that have deep personal histories are equally as vital to international online symposiums with hundreds of viewers in a room with multiple other works.

Figure 2.4. Johnson, C. (2020). sIren couplings

Figure 2.5. Johnson, C. (2020). sIren exhibition 2

exhibitions of work_

10/03/21: 12:23pm 12 seconds

     sIren was set up for testing by a stairwell on level 4 of the Sir Paul Reeves building at AUT, near St Paul St. I met a colleague on his way home, who commented he was glad to see it completed. I asked if he wanted to hear what it sounded like and casually turned on the installation switch. As the sirens made their noises, people passing by began to stare in shock. I looked down and realised that the switch handle had broken off and the installation was stuck on, with the sirens blazing. I scurried to turn off the switch with a small tool I had in my pocket and thankfully, after 12 long seconds, managed to turn it off. The sirens demonstrated more agency than I thought, they decided to speak for longer and with their full voices, beyond the control of the switch I had installed to turn them on and off.

Figure 2.6. Johnson, C. (2020). sIren exhibition 1

10/03/21 9:19pm 1.88 seconds

     My partner and I wheeled *sIren* down the street on a skateboard to the park near our house. There's a footbridge that spans a small creek which we decided was a good spot to place it on. After taking a few photos of the piece, I switched it on for 1.88 seconds, enough for the initial sirens to fire and just enough time to hear the beginnings of the code start. When I switched it off, it was dead silent until I heard a dog a few blocks away give out a howl in response. I had not considered this previously, but it must've sounded like a dog howl for that short time from a distance away. I could never have predicted this interaction, and if it weren't for that dog calling back a response; I never would have thought of the extended scale of this assemblage; How far reaching and diverse this object is and how many realities it might permeate.

Figure 2.7. Johnson, C. (2020). sIren exhibition 3

Figure 2.8. Johnson, C. (2020). sIren exhibition 3.2

09/04/21

This work was exhibited as part of the ArcInTex symposium hosted at AUT titled "Future Living Environments". As this work was exhibited alongside other installations; the sirens would not be able to fire as often as they have previously been. Due to security protocols and respect for fellow artists, after some discussion, one siren firing every 10 minutes was decided as an appropriate timing. Due to external commitments, I was unable to attend the event itself; so I was not able to see this installation unfold, instead relying on reflections and accounts of the viewers. I'm unable to critique or unpack this intervention; but it doesn't make it any less relevant for the sirens themselves. My conception of reality doesn't frame that of the sirens or the viewers of the work. Me not seeing it in action doesn't mean that it never took place or had impact and agency, I was just not a witness to it. Though I can't reflect on this installation personally, maybe my sirens can or hold an account of it in some way.

Figure 2.9. Johnson, C. (2020). sIren exhibition 4

11/04/21

My partner and I picked *sIren* up from its previous exhibition space in WZ111 at AUT for the ArcInTex exhibition. I decided to change the code so that one siren operated every five seconds instead of the previous one siren every ten minutes. We loaded the artifact into the car and took it to a few remote spots on the North Shore: A water pump, a nature walkway

intersection, a make-shift dock on a mud beach, the top of a shipping container and a refurbished bomb shelter. These places were all places that I have been before and that have held some significance in my personal life. I have fond memories of these places growing up and wanted to see how this object interacted with the assemblages that mean a lot to me. Each space offered a different resonance due to the objects around us. Trees, streams and mud flats offered a softer, more absorbed sound, accepting the new sound objects into their assemblages. This was contrasted by the harsher man-made environments such as the bomb-shelter which bounced the sound around it and out the entrance – a refusal of the sound which drove us away faster and felt more alarming and unwelcoming. While we were on the mud beach, during the 1 minute and 30 second installation a spider had spun a web from the nearby tree to the sirens. A fast transition and acceptance of this object. The spider object's reality saw this not as an art piece or sirens speaking their voice but as a potential new home. It didn't care that it was loud and obnoxious, only that it was sheltered and nearby.

Figure 2.10. Johnson, C. (2020). sIren exhibition 5

Figure 2.11. Johnson, C. (2020). sIren exhibition 6

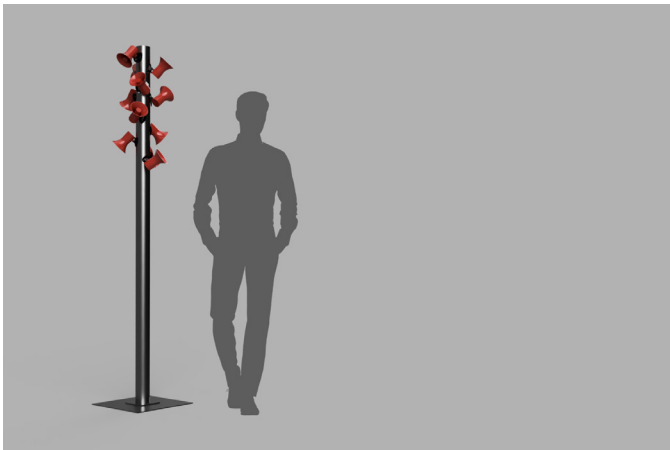Figure 2.12. Johnson, C. (2021). sIren exhibition 7

Figure 2.13. Johnson, C. (2021). sIren initial render
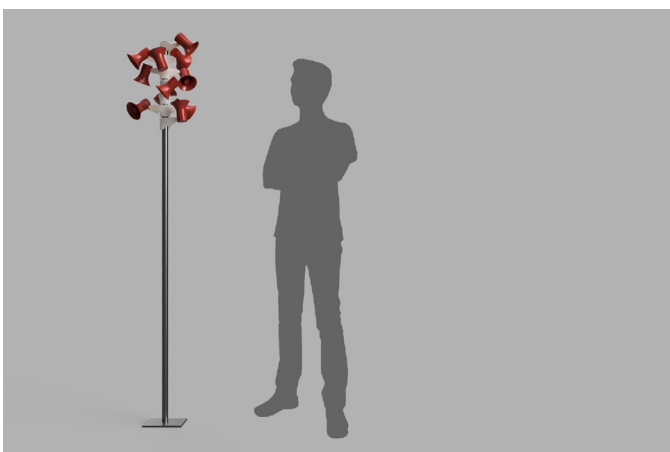
Figure 2.14. Johnson, C. (2021). sIren final render

These sirens had a strong sense of agency when first encountered. I was enchanted by these sirens and did some initial renders (Figure 2.13) for a potential future external art installation. However; I was not fully aware of the terms 'vitality' or 'agency' until I encountered the brick, which is detailed later in this exegesis on pages 30—32. After encountering the brick and making a shift to explore the non-human, I brought these sirens out from storage and explored them deeper. The sirens were so unlike the brick, the hidden narratives, physicality and pasts of these sirens were so different they couldn't be treated the same. After initial 3D printing of couplings, electrical circuitry prototypes and sounding tests, a final render (Figure 2.14) of the installation and couplings was completed. A creative process and documentation video is presented in Appendix A and Figure 2.3.

A variety of diverse skills have gone into making this artwork such as metal working, 3D printing, circuit bending and custom circuit building, all skills that I've had the chance to learn anew or compound upon from previous experience. I've gained critical knowledge about OOO and Philosophical Posthumanism from its various interventions (as detailed earlier in this chapter) as well as gained a new found appreciation for these sirens and other objects after the fact.

ephemeral_
enigmatic_
diverse_
digital_
condensed_
emotive_
personal_
silver_
glitched_
saturated_
evolutionary_
flux_
stitched_

_manifestations of digital waste

The level 4 COVID-19 NZ lockdown of April 2020 sparked the beginning of this practice. Originally made as an exemplar for an exercise for a class of undergraduates that I tutor (Figure 3.1), this practice utilises the deleted digital material on my personal computer. The data is gathered organically throughout the month and at the end are entropically layered in photoshop, where it collides, mixes and distorts the other digital objects in the piece. Doing so allows the deleted material a final chance to re-present themselves before final obliteration; a last breath of life to show their hidden narratives and enact their valid agencies. The objects in these pieces range from photos downloaded to show friends to pages of academic texts and in the case of October 2020 (Appendix B) – accidental artifacts created from the process itself.

I intentionally have not recorded or documented the exact process of creating these pieces to preserve the integrity of having these pieces be the final destination these now deleted digital objects reside in. If the process were to be recorded or the original files kept to show the process and how they existed before, the deleted objects would retain their previous meanings and narratives. Keeping record of how these objects existed before this process was done would mean that they would exist separately to the final pieces they are represented in. If this were to happen, the purpose and intention of this ritual practice would be defeated.

This creative practice, in keeping with my wider research practice, has evolved and crystalized into something that it was not intended to be. In the beginning, this practice was just an experiment using what I could do with what I had around me during the level 4 lockdown of March/ April 2020 using the deleted

Figure 3.1. Johnson, C. (2021). April 2020 waste

files of that month (Figure 3.1). After making the first piece, I recognised it as a single artifact and commented on the images and text that made up it. These reflections gradually became more in depth and personal as this process helped me articulate the month in a visual way. I've never been great at personal reflection, finding that writing or keeping journals don't work for me. However, I've found that having this visual aid helps me remember and contextualize the months gone by. I found myself delving deeper into the thoughts that I had throughout the month as the process went on, commenting less on the individual aspects of the images and more of how the piece as a whole reflected my emotional state. Below are two excerpts from the first month (April 2020) and a recent reflection (Feb 2021, Figure, 3.2):

April 2020:

"...in this month's trash there are three pieces that stand out to me: my brother's eye (centre), My D&D character sheet (Centre right), me dressed as Magenta from the *Rocky Horror Picture Show* (Upper centre)...I downloaded a picture of my brother to show my partner, my D&D character sheet was from a character that died while playing online and the photo of me as Magenta was taken during one of the performances I did in Feb."

February 2021:

"...This is both great and exhausting. I've got so much I want/need to do that finding not only the time, but also the brain space for it all is hard. I feel that this month's trash reflects this feeling pretty well. Some areas are so exposed and bright – filled with content, but it all overshadows each other and you're left with nothing but white noise. That white spot in the lower middle left of this month is how I feel – oversaturated and exposed."

These reflections had quite a tonal shift throughout this process, becoming deeper and contextualising the trash in relation to my feelings and

thoughts, rather than just commenting on the visual aspects.

In August of 2020, four of these pieces were submitted to the World Textile Art (WTA) pre-biennial competition and were selected to be finalist pieces. This particular exhibition was online,detailing the four pieces that were digitally printed on Charmeuse Silk (0.5m width x 1m length) in the TDL (Figures 3.3 & 3.4). When the manifestations were printed on silk, specific aspects of the deleted objects were easier to see than on the screen. The silk made them appear to shimmer and take on a new dimension that was different from when they manifest as digital image files seen on the computer.

Figure 3.2. Johnson, C. (2021). February 2021 waste

reflections/thoughts_

Through this ritual practice, each image created has been diverse and unique. Since these images are produced from the digital ephemera of the month, no piece is the same – each contains a unique narrative that is created from the digital files themselves. These pieces are unique from the other works detailed in this exegesis as these artifacts are created from the narratives that have arisen from the practice, not working to uncover, speculate or highlight the unknown. When taken into the physical realm through means of digital printing onto silk, there is a material shift which highlights different elements than the screen does. Blowing up the images to this size means that the audience can get closer to the artifacts themselves; bringing the digital to the physical allows this interaction which if left digital would be impossible.

Technically, this was the first artwork produced in this thesis, by the time my initial blood experiments started, two pieces had already been created (April, 2020., May, 2020). I was engaging with this digital material and unpacking its agencies before I knew what I was truly doing. Initially this project was under the guise of hacking and rearticulation, stripping these pieces of their meaning and obliterating any sense of worth they had. However, on reflection and after completing 14 of these pieces, I realise that's not what was happening. Instead, these deleted digital objects were given one last final chance to prove their worth, how they wanted to be remembered and eternalised. How they wanted to be brought into the physical world when printed on silk or remain in the digital space when observed from a screen. These pieces had as much control over themselves as they had control over me. During this process I would submit myself to the entropy of this ritual and allow the objects to fall where they wanted to and blend how they saw fit.
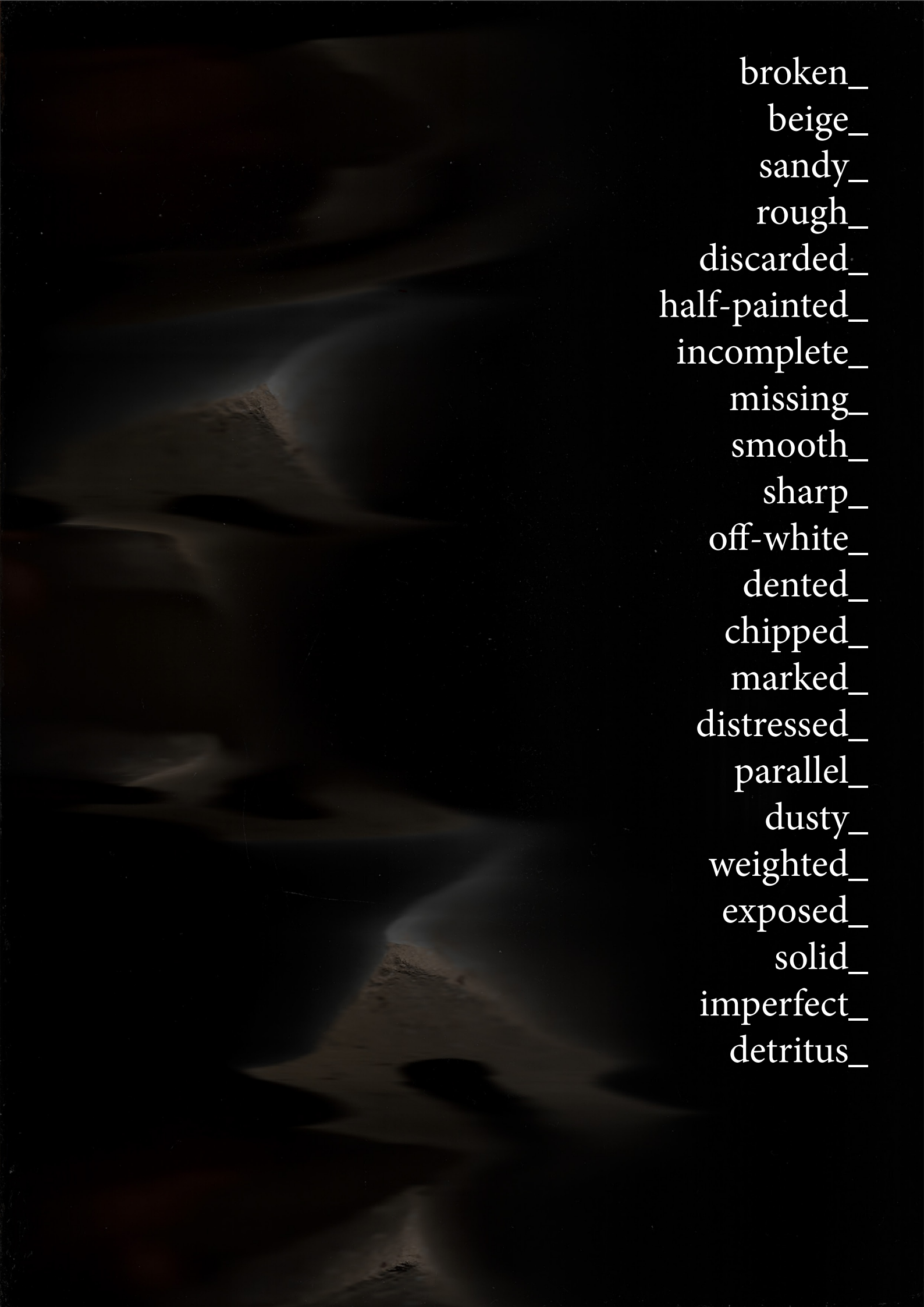
Like all the artworks detailed in this exegesis and as OOO suggests, there is an unavoidable anthropocentrism here: I, as a human object, still moved these digital objects around the screen, I, as a human object, still selected the blend modes. I, as a human object, have printed these on silk to be viewed and examined by other human objects. However; since this anthropocentrism is unavoidable, I have done all I can to minimise my personal bias and impact on these objects to allow them to speak for themselves.

Figure 3.3. Johnson, C. (2021). Digital waste printed on silk

Figure 3.4. Johnson, C. (2021). Digital waste printed on silk 2

broken_
beige_
sandy_
rough_
discarded_
half-painted_
incomplete_
missing_
smooth_
sharp_
off-white_
dented_
chipped_
marked_
distressed_
parallel_
dusty_
weighted_
exposed_
solid_
imperfect_
detritus_

_brick

This series of digital scans was developed working with a piece of broken brick found on the side of a road among debris (Figure 4.1) on the 29th of November 2020. Given the debris around about, it was clear that this brick was meant to be thrown away but missed the bin next to it, breaking on the road and finally resting where I found it. Something about this brick's vitality spoke to me; its sensual objects were louder to me than the surrounding objects. I wasn't initially sure why that was, but when I picked it up, I was struck by its intricate textures. The small holes, the angles at which it was broken, the half pipe alluding to the fact that there was more to it that is hidden and the paint on just one face. Why was this brick cast aside? Was it broken before or did it break when it hit the ground? Why was only one face painted?

These questions arose as I held the thing for the first time. Exploring the object only led to more questions. I scanned each face at 1200dpi (Figure 4.2, Appendix C) and after scanning all the faces as they were, I realised that this was only one aspect of the brick; the hidden sensual objects of its past needed to be told or explored in order to potentially get the full story. Moving the object while holding it at different angles and heights across the scanner bed, led to a 'ghosting' effect (Figures 4.3—4.6). The light from the scanner bounced off the brick at strange angles and back into the sensors onboard to give 'illusions' of an object that's never in focus. These images made it look as though the brick was floating or in motion, the images had certain trajectories to them. When trying to unpack the hidden narratives of this brick's past, it most likely was not placed where I encountered it on purpose, so the movement in these scans gives some potential insights to the action of the brick being thrown.

I experimented with this 'ghosting' and glitching over 175 scans and found that 1200dpi scans were too slow, although it gave fantastic detail, the scan bed itself was too slow and therefore didn't give the same record of moving shapes as the 300dpi and 600dpi scans gave. At these faster speeds I had less time to consciously think about the rotations and movements I imposed on the brick, instead tuning in to what the object itself was communicating, indicating to me which sides it wanted to be scanned. I was as surprised by these scans as the brick probably was to be scanned.

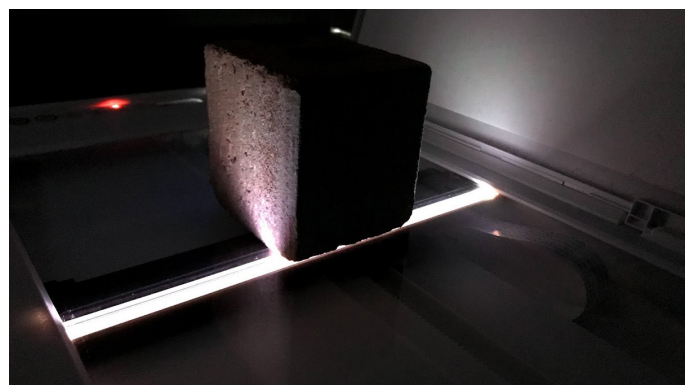Figure 4.1. Johnson, C. (2020). Brick Assemblage
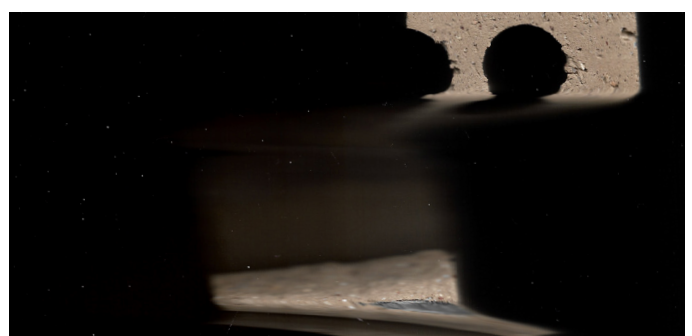

Figure 4.2. Johnson, C. (2020). Brick scanning

Figure 4.3. Johnson, C. (2020). Scan 118

The brick was the first found, non-blood artifact that I experimented with. Lying on the side of the road, part of the assemblage in which it was situated: brick, cone, cigarette butt, decaying leaf and broken wood (Figure 4.1). It brought me out of my world and for a moment, drawing me in to analyse and acknowledge their world for a time. This is what I would discover later to be the vitality of an assemblage (Bennet, 2010) and the powerful agencies that these objects exuded over me. A lot was gained from conducting these scans; how to convey movement in a static image, how to work with the materials at hand and how to use light & shadow in unconventional scanned images (Figures 4.4—4.6).

These techniques were brought forward into my future anchor scans (detailed in pages 33—35). The scratches and dust left behind on the scanner glass from these interrogations also added to the story of the glass object. But I didn't just learn new scanning techniques; I also came to understand more about the world around me and the power that detritus has. Lisa Doeland (2020) describes waste as "specters" and how objects become waste when they have lost their use to us, but that object has not lost its meaning to someone or something else. Doeland (2020) puts it plainly by saying "We are not the only beings doing the relating" as does Ian Bogost (2012) when he says "Whose conception of reality gets to frame that of everything else?". To an extent, we are blind as to what lies beyond our perception thus a common thought is that reality forms around us. However, who's to say that this detritus's perception of reality isn't as valid or legitimate as our own?

From the moment I saw the brick in its original state; I was seduced by its agency, this micro reality that was initially beyond my perception was invisible until it called out to me. After conducting these scans and looking at the traces of these hidden narratives/realities I started to reconsider other non-human objects in this way, I began adopting an OOO mindset.
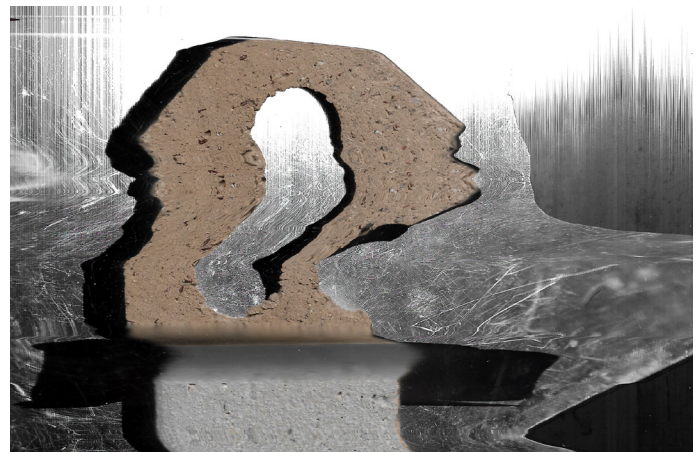

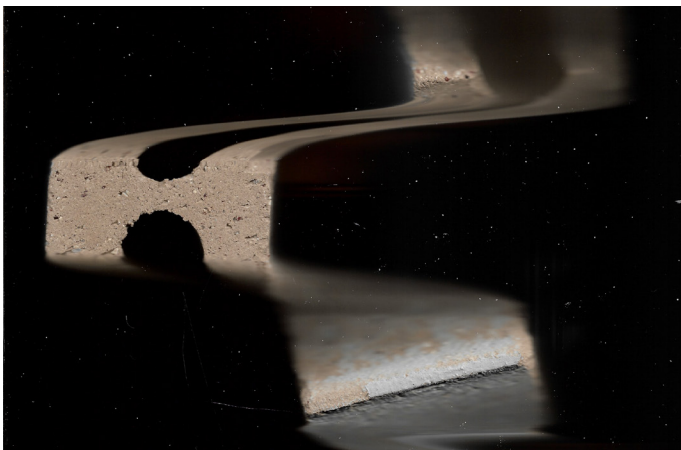Figure 4.5. Johnson, C. (2020). Scan 151
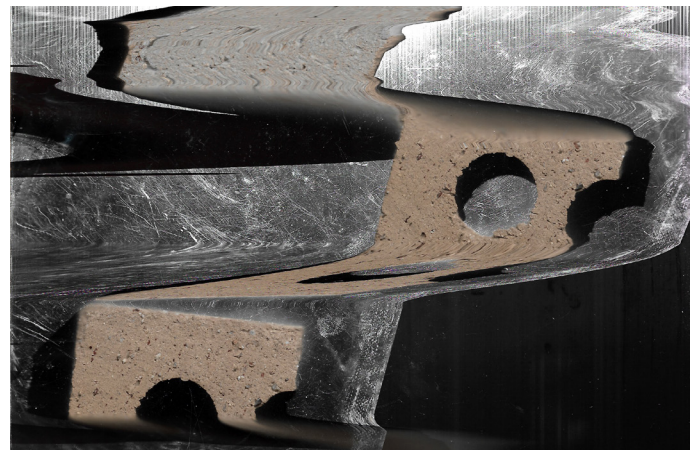

Figure 4.4. Johnson, C. (2020). Scan 142

Figure 4.6. Johnson, C. (2020). Scan 152

rusted_
fragile_
fatigued_
corse_
sharp_
dangerous_
heavy_
haunted_
detailed_
dented_
created_
unintentional_
scarred_
influenced_
chipped_
dried_
flaked_
scratched_
obscured_
bruised_

_anchor and scanner glass

The anchor appeared on the Facebook Marketplace for $10. Encountered on the 22nd of December, 2020, this object had a vitality to it, like the brick (pages 30—32). The anchor had clearly been used for a long time, but abandoned in recent years. It appeared to be hand-made and was heavily rusted. Using a similar technique to the brick scans and attempting to capture the movements of the chain, a series of 62 scans (Figures 5.1—5.4) were collected. While the techniques were similar to those uused in the brick scans (Detailed on pages 30—32), the objects themselves and resulting scans were starkly different. While the brick scans seemed to have trajectory and movement to them, the chain links seemed to meld into one homogenous piece, despite the movement of the chains. It was difficult to tell the differences between scans.

The scanner glass itself went unnoticed until the conclusion of these scans, over the course of the experiments metal, rust and dirt had embedded themselves underneath the glass and worked into the minor scratches on the surface (Figure 5.5). These qualities had risen from my direct actions in analysing other objects. Some of these scratches were a result from the brick, anchor or my earlier blood scans. It dawned on me that I had neglected to think of this scanner object as a 'thing' itself, I was treating it as a tool for me to use. I had put the anchor, brick and blood objects ontologically 'above' this glass object and not realised it. Because of these actions, the scanner glass was permanently changed, scratched, bruised. Every scan that I conducted changed this object in some way and now, the results of these processes were undeniable, I could no longer ignore the consequences of my actions.

The scanner glass is a unique object amongst my collection of non-human things. This object's vitality and agency has arisen from my human actions. Unline the other objects detailed in this exegesis, it is an object *of* this thesis, not *for* this thesis. Perhaps then, this is one of the most poignant objects in my collection. One that has arisen from my practice and one that exemplifies my transformation in thinking. Reflecting on it, it is both the first and last object I have interacted with. I started with my first blood scans and then ended with this object as as an object itself.

Figure 5.1. Johnson, C. (2021). Anchor scan 012

Figure 5.2. Johnson, C. (2021). Anchor scan 015

Figure 5.3. Johnson, C. (2021). Anchor scan 033

Figure 5.4. Johnson, C. (2021). Anchor scan 042
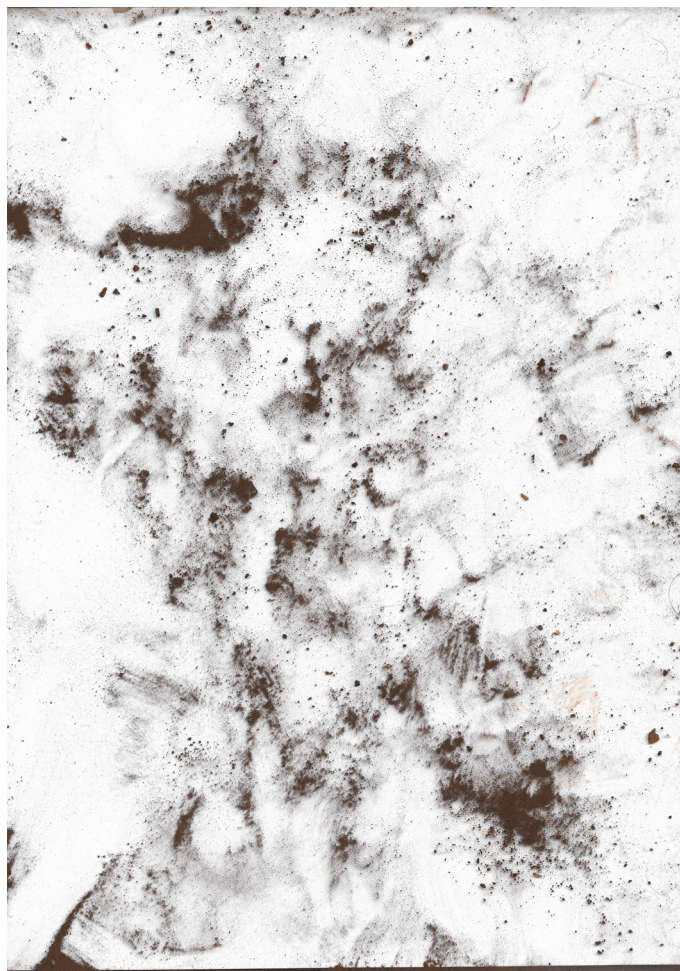
Figure 5.5. Johnson, C. (2021). Anchor scan 061

personal_
red_
changible_
textured_
small_
flux_
dried_
cracked_
patterned_
art_
plastic_
bandadge_
creased_
narrative_
ancestral_
ancient_
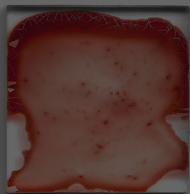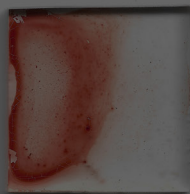
_blood

As blood was the initial material and original focus of this thesis, a series of varied and divergent experiments were done to explore the temporal and ephemeral material properties of blood. These experiments have been conducted using swine blood as well as my own. A series of initial experiments are not detailed in this exegesis, as my thinking has evolved beyond initial reflections and thoughts gained from these exercises. These experiments included defrosting, timelapses, lithophanes, scans and sonic translations.

The experiments detailed here involve: Blood & Acrylic scans; Blood, paper and silk; SEM explorations. The experiments detailed in this chapter were conducted over the course of the practice, each leading to a new discovery to move forward with, both using blood further as well as feeding into other practices with the other objects detailed earlier in this exegesis.

Blood & acrylic glitched scans:

I conducted these scans on the 19th of October 2020 and this was the first time I started to experiment with movement in scans. Previous scans (Figure 6.1) were static and textual. These acrylic slides were created from a scrap piece of acrylic I had from a previous project, the blood came from a puck of frozen swine blood purchased from a discount butcher and the scanner was free from the facebook marketplace. I had previously conducted some experiments by melting frozen blood, scanning frozen blood and drying blood on glass slides in the sun. Here I decided to explore deeper into the drying process, seeing what textures the substance could yield and how household chemicals (isopropyl alcohol and methylated spirits) would react with the blood as it dried.

Figure 6.1. Johnson, C. (2021). Blood scan 002
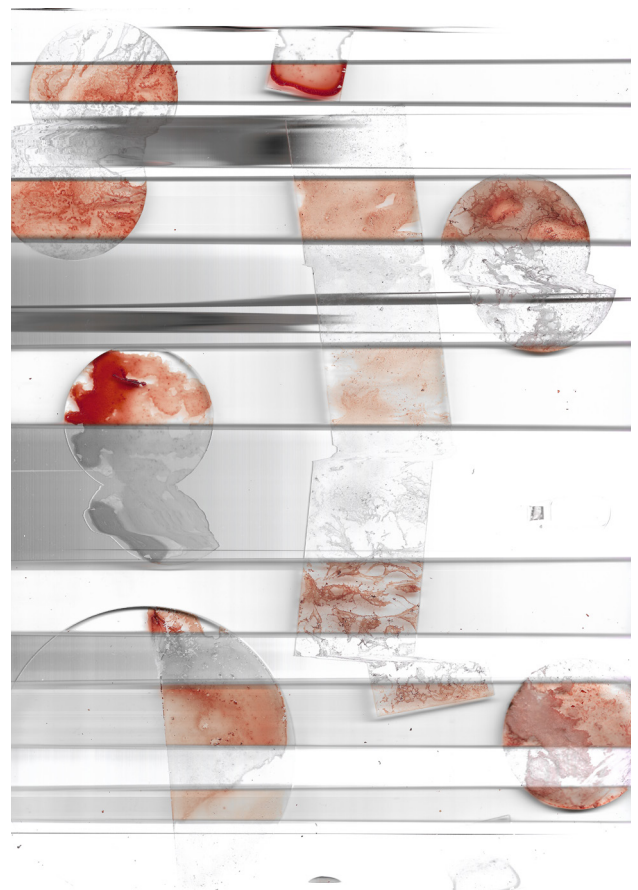
Figure 6.2. Johnson, C. (2021). Acrylic scan 024

The results were fascinating. I found that the isopropyl alcohol would thin the blood and make it dry faster, but thinner. Applying the alcohol before the blood and after the blood yielded different patterns, which was unexpected. Methylated spirits 'burnt' the blood for lack of a better word. When added, the blood would curdle and then turn a darker color and when the blood dried on the acrylic, it stayed in clumps, like it was clotted, not as spread-out or thin as the isopropyl alcohol. These slides revealed a great deal about blood's physical materiality, which I took into further experiments, especially more traditional fine art experiments with paper and silk. I had seen the work of Nathaneil Stern's Rippling Images (Woywod, 2016) and decided to attempt and adopt a similar methodology using the scanner – not by creating a new device as is the case with Stern, but by utilising the scanner to capture and show movement. By the end of these explorations, I learnt a great deal from these scans. The movement exerted on the pieces gave interesting results and when I lifted the scan bed cover a beautiful silver colour was created (Figure 6.2); something I had not previously known about or thought to do. This technique was adopted in later scans with the brick, but I took these techniques and exaggerated them, leading to more dynamic and lively scans.

Blood, paper and silk:

I conducted these experiments on the 30th of November 2020 when I took a puck of frozen swine blood, 33 pieces of A5 paper and various tools (syringes, brushes, small containers and trays) diverging from the primarily digital practice I had been following in my practice to that point. I had been using the printer scanner to analyse the materiality of dried blood and acrylic as well as experiment more with movement; but I made a conscious effort to adopt more 'traditional' fine art techniques and mediums such as sketch paper, brushes and sponges to get some variety and potentially

some insights into my practice. I noticed immediately that the blood acted differently on paper than acrylic, this is because of how porous paper is. I also noticed that when the blood dried, it crumpled and contorted the paper, something that had not occurred with either the silk, glass or acrylic experiments.

These experiments were conducted when I started to read about aggressive assemblages (Kelly, 2008), techniques such as splattering, dragging and throwing the frozen blood puck over the paper were used to create these 'aggressive' experiments (Figures 6.3—6.7). Ultimately, these paintings and subsequent scans encouraged a more experimental approach to movement and caused me to engage more with abstraction rather than literal material analysis.

Figure 6.3. Johnson, C. (2021). Paper 024

Figure 6.4. Johnson, C. (2021). Paper 011

Figure 6.5. Johnson, C. (2021). Paper 057

Figure 6.6. Johnson, C. (2021). Paper making process 1


Figure 6.7. Johnson, C. (2021). Paper making process 2

SEM explorations:

After experimenting with the blood and silk, I had the opportunity to use the Scanning Electron Microscope (SEM) at AUT. I had to prepare and decontaminate a sample of blood-soaked silk that was less than 3mm in any dimension. After soaking the sample in isopropyl alcohol, the sample was coated in platinum in order to be examined (Figure 6.9). Exploring the blood and silk at the micron level opened an entire world of caverns, craters, cracks and snapping microthreads (Figures 6.9 & 6.10). This was a literal exploration into the physical materiality of silk and blood, nonetheless this process allowed me to explore and examine these hidden worlds that were initially beyond my perception. However, just as the nature of reality is heterogeneous, temporal and nomadic, so too was this piece. Then it disappeared from my collection overnight – when a cleaner mistook the fallen object as rubbish and threw it away.

This act was interesting; while this physical artifact was of immense importance to me and had great impact on me, to someone else it was just a piece of garbage that was cluttering the otherwise pristine floor. The anonymous and unknown cleaner's reality was not affected by this object with agency, but their disregard for this object doesn't remove it from my equation. Its ephemeral self lives on in this paragraph and reflection, its physical self is still out there; enacting its agencies in ways that I will never be able to know. However, this doesn't make it any less important or impactful to the objects that exist beyond my perception.

Figure 6.8. Johnson, C. (2020). SEM preperation
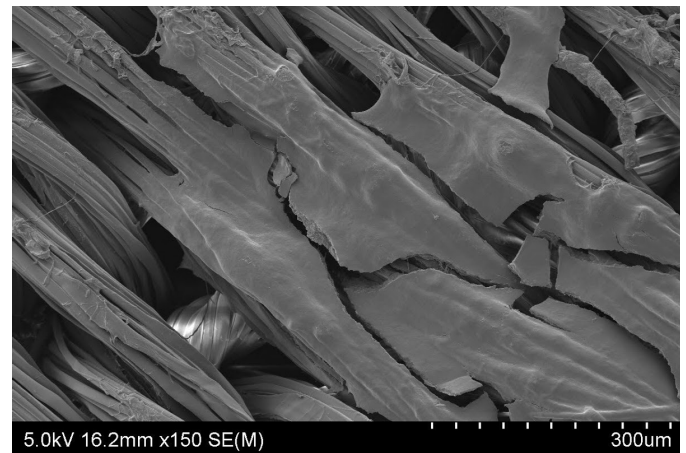
Figure 6.9. Johnson, C. (2020). SEM scan 003
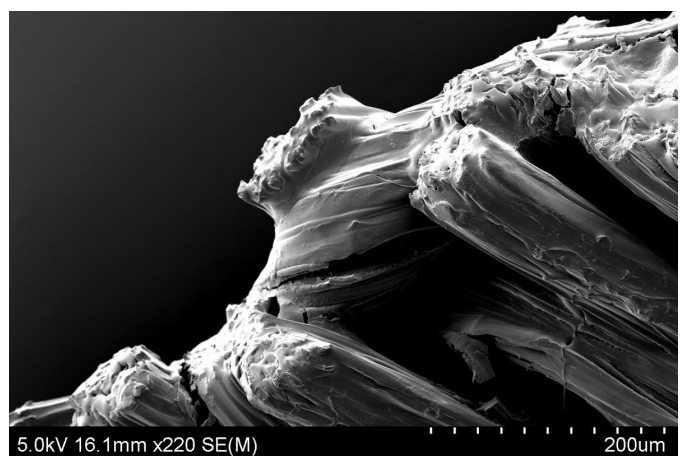
Figure 6.10. Johnson, C. (2020). SEM scan 006

Blood was the initial medium and material I began looking at in the start of this thesis. I wanted to explore the hidden narratives that existed in a material as ephemeral and personal as blood, as I argued that no other material could be scrutinized under a Philosophical Posthumanist framework. While to some extent I still believe in that, exploring other, non-human discarded objects has ironically taught me more about myself than analysing and donating my own blood. I think this is to do with the newer research I have been involved with – OOO.

Scans conducted on the dates of my blood donations (Figures 6.11 & 6.12) informed my future scans, leading to the artworks detailed previously in this chapter. The ritualistic donation of my blood initially served as a core aspect of my practice, having the act of doing so reflect how I was sacrificing my material to serve a higher 'power' - the term 'power' here was taken to mean my concept and artistic practice.

However, like everything detailed in this exegesis, this evolved and the act of the donations themselves became less and less important as core aspects of my practice, but rather points to reflect about my practice and where I was heading. As is the case with the *Manifestations of Digital Waste* reflections, these personal reflections became less about the obvious and material, but rather about the practice as a whole.

Before, I knew about posthumanism and New Materialism as schools of research, but as I broadened my research horizons, I found OOO - a school that encompassed everything I was thinking and more. By engaging with and researching the discarded objects (real & sensual) around me, I have learnt to analyse myself in

a more post-anthropocentric way than I could've with a purely Philosophical Posthumanist mindset. However, that being said, the initial experiments with blood (swine & my own) have pushed me along in my research and have played a critical and crucial role in my crystalized practice.
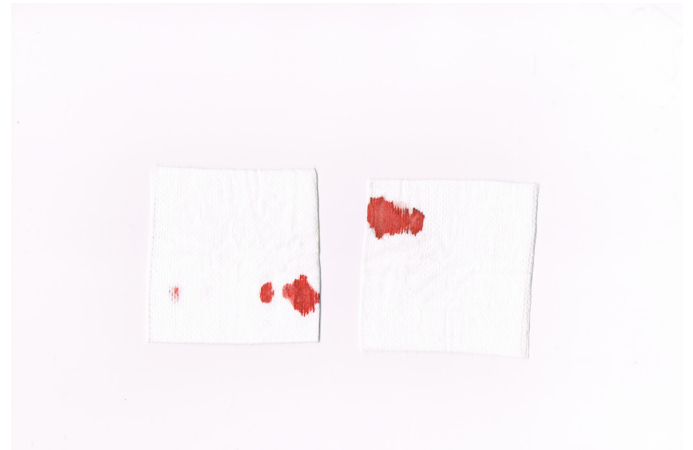
Figure 6.11. Johnson, C. (2020). Bandage scan
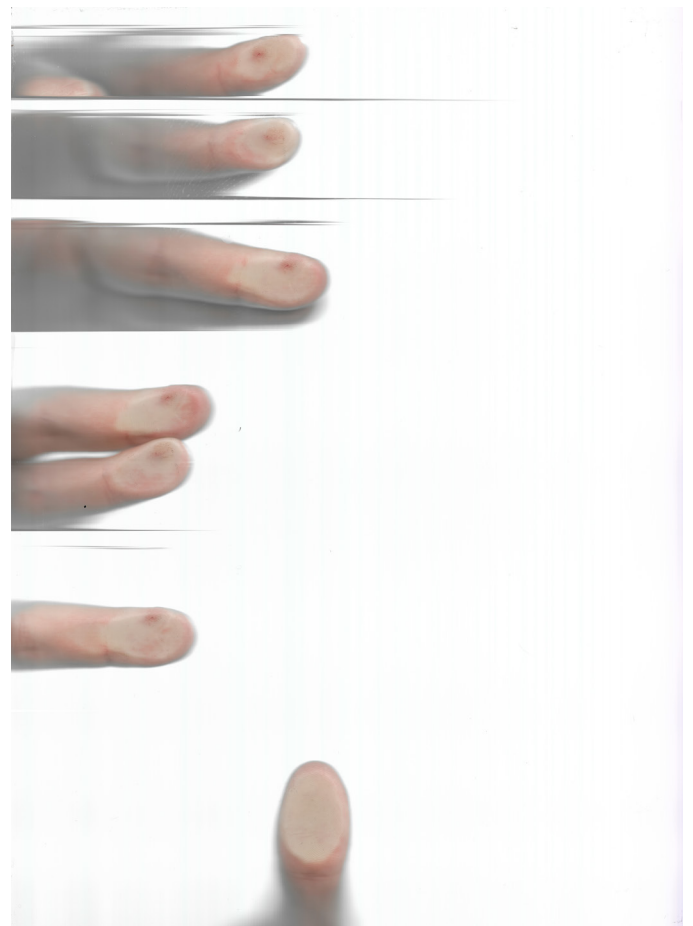
Figure 6.12. Johnson, C. (2020). Finger scan

closing thoughts_

Over the duration of this research project, I've learnt about the world around me and learned about myself. OOO, New Materialism and Philosophical Posthumanism have provided new lenses to view the world and its constituent objects through. A lens that offers a new found wonder, intrigue and curiosity that, for me, was lost in the transition from childhood to adult life. I had never considered the inherent withdrawal of objects or their worlds before this, how an object such as a coffee cup is a part of a complex system rather than just a beverage to consume in a vessel to be thrown away. Each object explored in this exegesis has suggested new perspectives on the world.

The sirens taught me more about electronics and custom circuitry, metaphorically bringing 'dead' objects back to 'life', its various interventions have taught how objects like these permeate the assemblages and micro-realities out of my current perception. Scanning the brick was my first exploration into non-human objects which gave rise to a method to use scanning to convey motion and multiple aspects of an object (rather than just a plain 2D scan). The *Manifestations of Digital Waste* have offered a new practice that I will undoubtedly take forward into my future artistic practice as well as a chance to reflect on the timeline of this project in a way that makes sense to me. Finally, the experiments with swine and my own blood have given me insights into the physical materiality of blood in an artistic context: How blood exists and its new connotations outside of the human body and above all, insights into my posthuman explorations.

This research project has crystallized and formed into something that is more than it intended to be. As stated in the introduction; this project's initial intention

was to explore biohacking in artistic installations as a form of philosophical carpentry (though I did not know the term at the time) to explore philosophical posthumanism. Initial varied works with SEM (Scanning Electron Microscope) imaging, lithophanes and drying blood on acrylic lead to a natural (although unexpected) turn to the non-human.

This turn was productive as it opened a whole new emerging research field of OOO for me. While I have explored philosophical posthumanism in this exegesis and I would now classify myself as a posthuman; the way this has occurred have been different than I expected.

Reflecting on this process and journey, I realise that due to time constraints and the natural progression of thought, I spent a long time initially looking exclusively at the 'human', so caught up in Philosophical Posthumanism that I was blind to the non-human objects I was engaging with. Ironically, in a quest to de-center myself from thought, I centered myself further in thought. This changed on encountering the sirens, the brick and OOO. The object's agencies and OOO's perspectives widened my perception to the world around me and brought a new criticality to the work I had already produced (*Manifestations of Digital Waste*, pages 25—28). This deeper thought and analysis happened half-way into my thesis journey. Perhaps if I had been more receptive to the non-human at the beginning, I would have had more time to realise additional ideas for works with encountered objects that could not be realised or included in this thesis.

Through the artistic interventions and analyses of the real objects explored in this exegesis, some questions

about both the objects themselves and how they fit into our lifeworld start to emerge. If we start to analyse objects in this way, how does it affect the use of objects in the wider political environment? For example, what happens if we begin to look at fossil fuels as objects in their own right rather than regarding and using them as fuel for our combustible engines? What could happen if we looked at the detritus we discard as having their own agencies and impacting the world themselves?

If we look at discarded objects not as inert, passive and dead, but 'alive' and operational to other objects, what would happen? It was never the intention to answer these questions in this thesis. Rather, through these interventions and artistic explorations of real objects, an inquiry has been opened through an OOO, Philosophical Posthumanist and New Materialist lens. It is hoped that the questions readied by this project might prompt further reflection by other people who encounter the creative works or read this thesis.

Ultimately, this research exists as an example of a way of working informed by the philosophical fields of OOO, New Materialism, Philosophical Posthumanism, Philisophical Carpentry and Bricolage as opposed to illustrating or literally applying the ideas or methods that these schools of thought hold. The varied artworks detailed in this exegesis as well as in the final exhibition provide a way for others to engage with questions or points-of-view introduced by these new philosophical ideas. Future works in these fields aren't dependent on personal style or individual artistic vision. Instead, work produced in the same vein as this research is dependent on the response to real objects themselves. Artists, philosophers and makers looking to engage with the ideas laid out in this research are 'responders' to the sensual objects that 'things' give off as opposed to 'shapers' who seek to warp the objects by imposing their anthropocentric will.

The way I view the world is changing, viewing things and other people as 'real' and inherently withdrawn objects with their own hidden realities and narratives. We only ever get a glimpse at the real objects we perceive through their sensual objects. This brings a certain mystique and glamour to objects, especially those with colourful histories and a hidden past. The sense of wonder is brought back to the world which was lost in a traditional humanist mindset. The impact of this thinking doesn't end with the conclusion of this exegesis or my final exhibition. As a creative practitioner and an artist, my future artworks will be influenced heavily by all that I've learnt through this research. My visual art practice has already been changed by the techniques learnt here, becoming more improvisational and focussing on the objects at hand rather than realising a planned and 'perfected' artistic vision. Given the opportunity to present in galleries, farmhouses, public walkways, abandoned factories, ocean floors or the top of mountains, further ideas could be realised.

Discarded objects can be used as mirrors to gain a deeper understanding about ourselves and where we stand in what has come to be an unknowable world of an unknowable amount of unknowable objects.

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_appendix A

CODE V2.4

```
/*
  This code makes the sIren installation run.

  The 'state' int controls which 'mode' the installation is in.

  Pins 1-11 control mosfets that turn the sirens on or off when they are written HIGH

  Sirens 2-6 are smaller with their own modulation unit in them, allowing them to be turned
on and off
  Sirens 7-9 are larger and require a higher input voltage
  Sirens 10 and 11 are larger, but lack the internal circuitry to produce their own sound and
thus require an input tone of 700-800 to sound like they may have when opperational

  @Charles Johnson v2.4
  22/03/21
*/

int randomPin = 0;
int randomTime = 0;
int randomInterval = 0;

/*
  State switch:
  0 = Random time + Random Interval
  1 = 10 seconds between sirens (.5 seconds on)
  2 = 30 seconds between sirens (1 second on)
  3 = 1 minute between sirens   (2 seconds on)
  4 = 5 minutes between sirens  (5 seconds on)
*/
int state = 1;

void setup() {
  Serial.begin(9600);
  //mosfet control for small sirens
  pinMode(2, OUTPUT);
  pinMode(3, OUTPUT);
  pinMode(4, OUTPUT);
  pinMode(5, OUTPUT);
  pinMode(6, OUTPUT);

  //mosfet control for large sirens
  pinMode(7, OUTPUT);
  pinMode(8, OUTPUT);
  pinMode(9, OUTPUT);

  //mosfet control for input large sirens
  pinMode(10, OUTPUT);
  pinMode(11, OUTPUT);

  //input pin for sirens 10 and 11
  pinMode(13, OUTPUT);
}

void loop() {

  if (state == 0) {
   //selects a random value for the pin, time and interval
   randomPin = random(2, 12);
   randomTime = random(100, 500);
   randomInterval = random(0, 1000);

   //sends a random tone between 700 and 800 to sirens 10 and 11
   int i = random(700, 801);
   tone(13, i);

   //prints to the serial monitor which siren is going off currently
   Serial.print("Siren #");
   Serial.println(randomPin);

   //tell the randomly selected siren to go off for a randomly selected time and then turn off.
   digitalWrite(randomPin, HIGH);
   delay(randomTime);
   digitalWrite(randomPin, LOW);

   //delay between 0 and 10 seconds
   delay(randomInterval);
  }

  if (state == 1) {
   randomPin = random(2, 12);

   //sends a random tone between 700 and 800 to sirens 10 and 11
   int i = random(700, 801);
   tone(13, i);

   //tell the randomly selected siren to go off for a randomly selected time and then turn off.
   digitalWrite(randomPin, HIGH);
   delay(500);
   digitalWrite(randomPin, LOW);

   //delay between 0 and 10 seconds
   delay(10000);
  }

  if (state == 2) {
   randomPin = random(2, 12);

   //sends a random tone between 700 and 800 to sirens 10 and 11
   int i = random(700, 801);
   tone(13, i);

   //tell the randomly selected siren to go off for a randomly selected time and then turn off.
   digitalWrite(randomPin, HIGH);
   delay(1000);
   digitalWrite(randomPin, LOW);

   //delay between 0 and 10 seconds
   delay(30000);
  }

  if (state == 3) {
   randomPin = random(2, 12);

   //sends a random tone between 700 and 800 to sirens 10 and 11
   int i = random(700, 801);
   tone(13, i);

   //tell the randomly selected siren to go off for a randomly selected time and then turn off.
   digitalWrite(randomPin, HIGH);
   delay(2000);
   digitalWrite(randomPin, LOW);

   //delay between 0 and 10 seconds
   delay(60000);
  }

  if (state == 4) {
   randomPin = random(2, 12);

   //sends a random tone between 700 and 800 to sirens 10 and 11
   int i = random(700, 801);
   tone(13, i);

   //tell the randomly selected siren to go off for a randomly selected time and then turn off.
   digitalWrite(randomPin, HIGH);
   delay(5000);
   digitalWrite(randomPin, LOW);

   //delay between 0 and 10 seconds
   delay(300000);
  }
}
```

LINK TO VIDEO DOCUMENTATION AND TESTING

tinyurl.com/CJMCTSIRENDOCUMENTATION
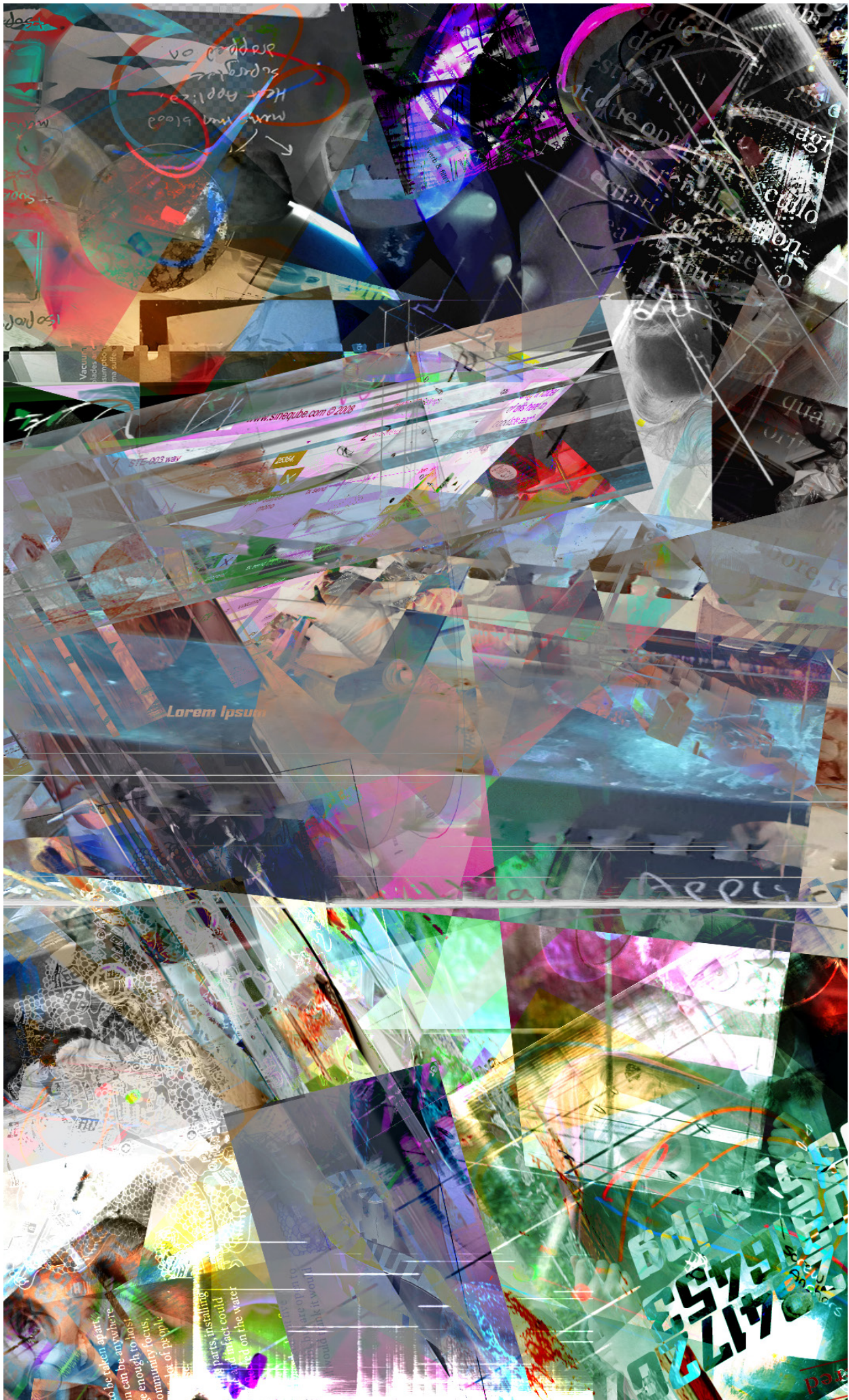
LINK TO VIDEO DOCUMENTATION OF INTERVENTIONS

tinyurl.com/CJMCTSIRENINSTALLATIONS

_appendix B

From April 2020 to May 2021, the ritualistic
practice of taking the month's deleted digital
ephemera on my personal PC has created the
pieces detailed in this appendix.

I have intentionally not recorded, kept or
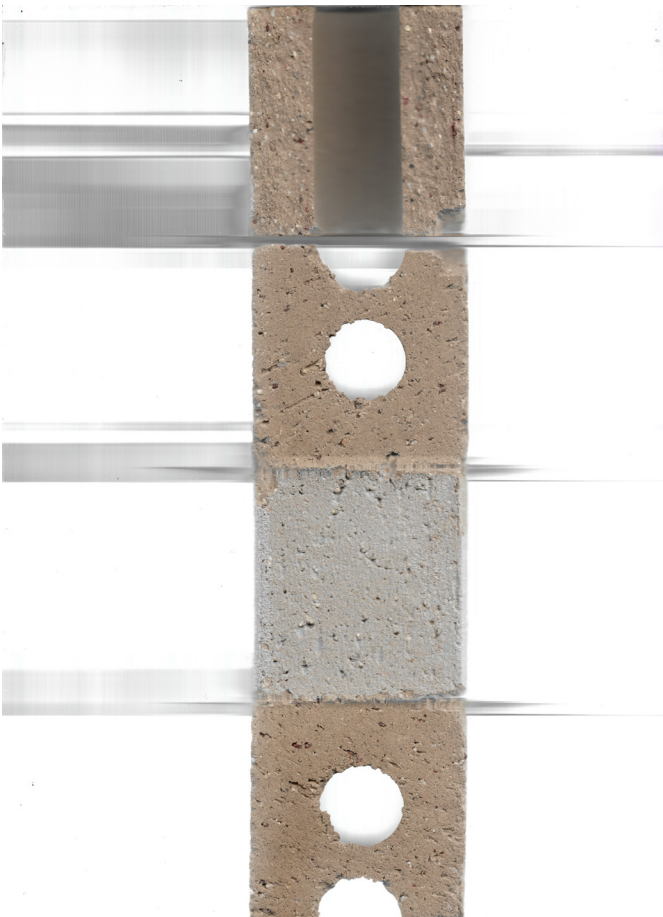transcribed the original files in each piece.

Introducing Linux

Linux was created as a free OS for personal computers. Because of its integration with XBee Radios advantages, it quickly made its way into a plethora of applications. Nowadays, Linux is used on a wide range of hardware platforms, such as mobile phones, tablets, embedded systems, servers, and routers.

Linux is a good example of the strength of an open-source community. No company developed this OS. Instead, thousands of people all around the world contributed their knowledge to create and improve this software — at no cost at all.

Linux is hands-down the most popular software around. Programmers and developers, mainly because anyone can have full access to the code, modify it, study it, and distribute it. Read Chapter 4 for a more detailed description of Linux, including its advantages and proper use.

The Linux kernel is the core of your computer's software. It's the lowest level of software that interfaces with the hardware; it's the code that controls every thing, translating whatever you do on your computer into a language that your hardware can understand.

Selecting a Distribution

A *distribution* is a complete Linux package that contains the Linux kernel and a couple of other pieces of open-source software that provide functions.

Knowing the factory defaults on your BeagleBone

We recommend that you follow the instructions in this chapter to install the operating system, Debian distribution, which is used throughout this book. Every new BeagleBone is configured to work out of the box by default; however, The original configuration depends on your board:

About the Technical Editor

Scott Fitzgerald is an educational practice computing in the Internet of Things works for the Arduino family.

Table of Contents

Part I: Covering the Basics

The analogWrite() command sets the duty cycle of the value you pass to it:

A value of 0 with analogWrite() indicates a duty cycle of 0 percent (always low).

- Writing a 255 indicates a square wave with a duty cycle (always high).
- Writing a 127 indicates a square wave with a duty cycle of 50 percent (high half of the time, low half of the time).

The graphs in Figure 2-4 show that for a signal with a duty cycle of 25 percent it is high 25 percent of the time, and low 75 percent of the time. The frequency of this square wave, in the case of the Arduino, is about 490Hz. In other words, the signal values between high (5V) and low (0V) about 490 times every second.

Part I: Getting Started with the BeagleBone

1 square = 5 feet

USB hub: The USB hub enables you to expand the number of USB ports on your BeagleBone. This accessory is essential if you want to have multiple peripherals connected at the same time (see Figure 1-4).

USB-to-TTL serial cable: If you have a BeagleBone Black, this cable could be useful to debug your BeagleBone Black during the booting process. The original BeagleBone has this feature built in, so you don't need the extra cable.

Other cables: If your display doesn't have an HDMI output, you may be required to use a Micro HDMI-to-VGA or Micro HDMI-to-DVI converter. That way, you can repurpose your old desktop display.

Using converters for the Micro HDMI adds a whole other layer of incompatibilities. We recommend that you check our sidebar at the end of this chapter.

Case: The BeagleBone arrives without a case, and some people actually prefer that look and feel, but it's important that your board stay away from static electricity, conductive metal, and liquids. It's a piece of electronics, after all. The best way to protect your BeagleBone is with a case.

Breadboard: A solderless breadboard is the best way to prototype. It's really easy to use, as it doesn't require any soldering. That means that you don't make any permanent connections and can easily modify your circuit at any time.

Multimeter: A multimeter is a useful device that measures many things related to electricity.

Soldering iron: Solder is a metal that liquefies easily when heated applied to and quickly cools and hardens again the moment it's exposed to air temperature. A soldering iron is used to melt solder to establish permanent metal.

Other parts: Some projects in this book use extra components such as resistors, capacitors, sensors, motion sensors, and electrical wires. You don't

It is not mandatory at this stage, but you can practice document your design process as this will be useful for your final assignment; Assessment 2. The fusion file you have submitted is enough to speak about your approach through analysis of the history.

SUBMISSION FORMAT

Fusion 360 files submitted through A360 using the defined naming convention.

*"Student Name_ID number_Object.f3d"

CTEC603 Digital Fabrication 2019

ASSESSMENT 3 – Lynda

SUMMATIVE ASSESSMENT OUTLINE

ASSESSMENT DEADLINE

BRIEF

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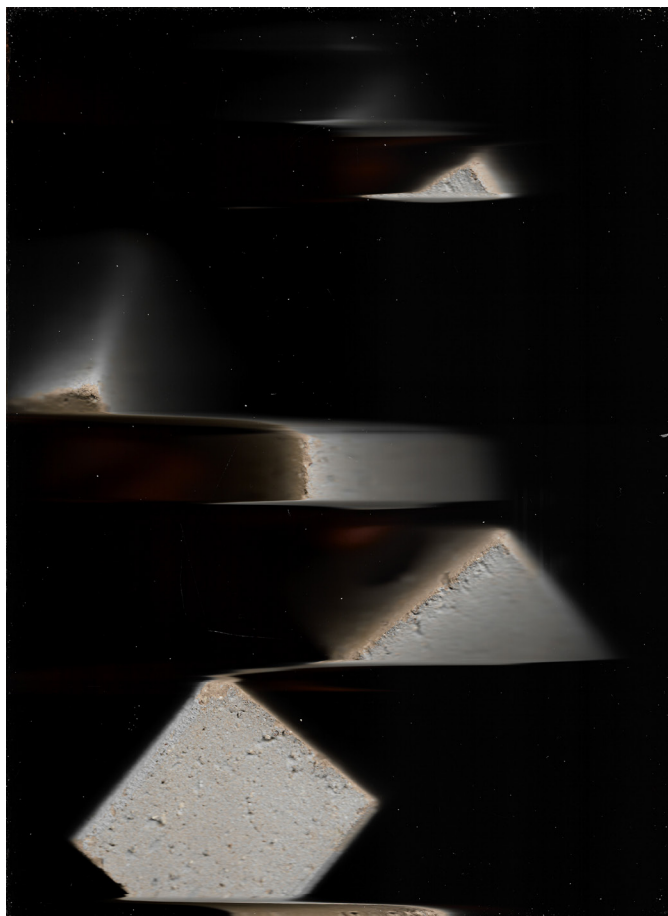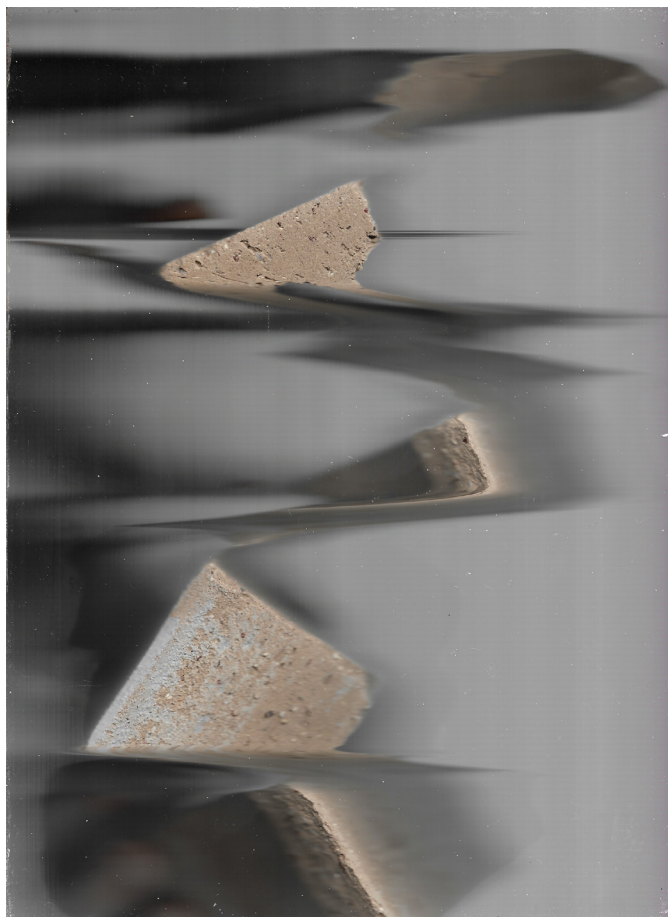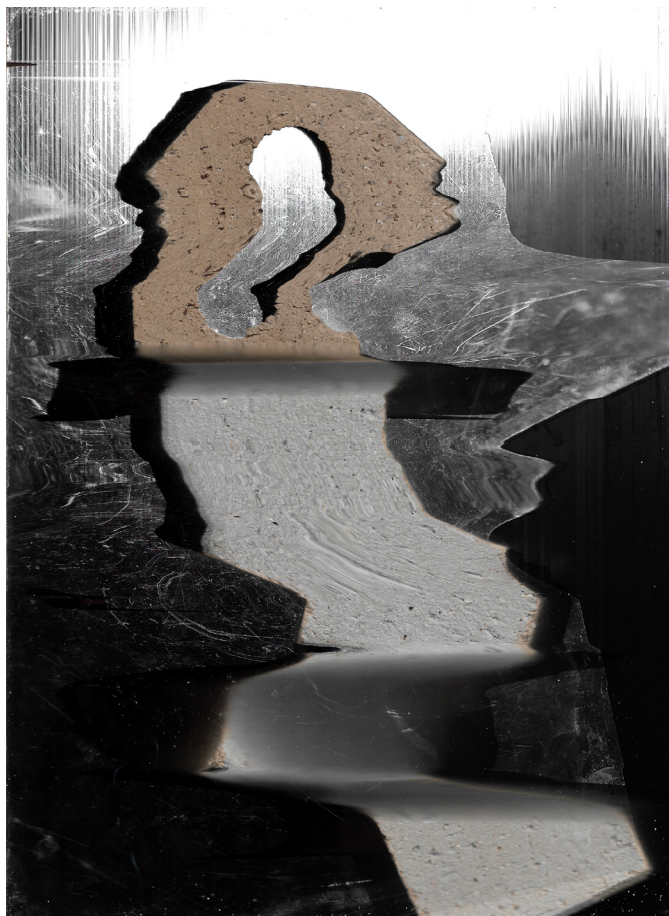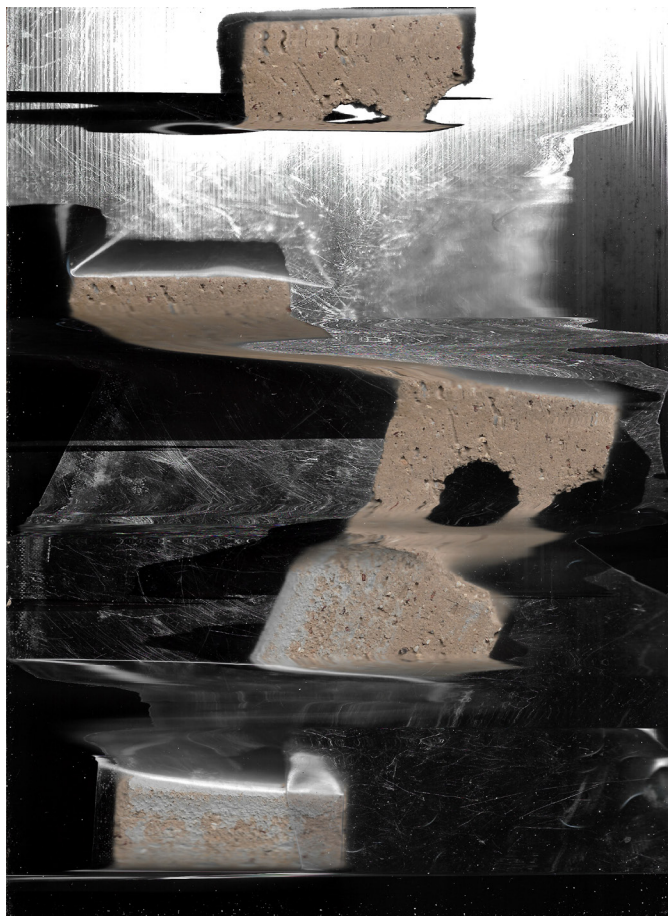
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thank y[ ]u_