

Uncalibrated:

Drawing, Photography and the Raw Images of Astronomy

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Abstract

This practice research responds to the raw images from the Cassini space mission to Saturn, a collection of nearly 400,000 unprocessed digital photographs captured by the cameras onboard the Cassini probe. These sources are explored through a contemporary art practice with a multimedia approach to drawing. Through the development of a body of artistic work, the research explores the possibility of new outlooks on the association between Saturn and melancholy grounded in contemporary concerns and practices.

The research develops 'drawing with' as an artistic methodology to articulate the relationship between the artist, materials and processes. Elaborating on bricolage-inspired models, 'drawing with' brings together various ideas from recent critical thinking and consolidates them through drawing practice. This model is shaped by the creative work exploring drawing's relationship with digitality and digital image-processing technologies. The research rehabilitates the digital photo mosaic as a digital drawing method.

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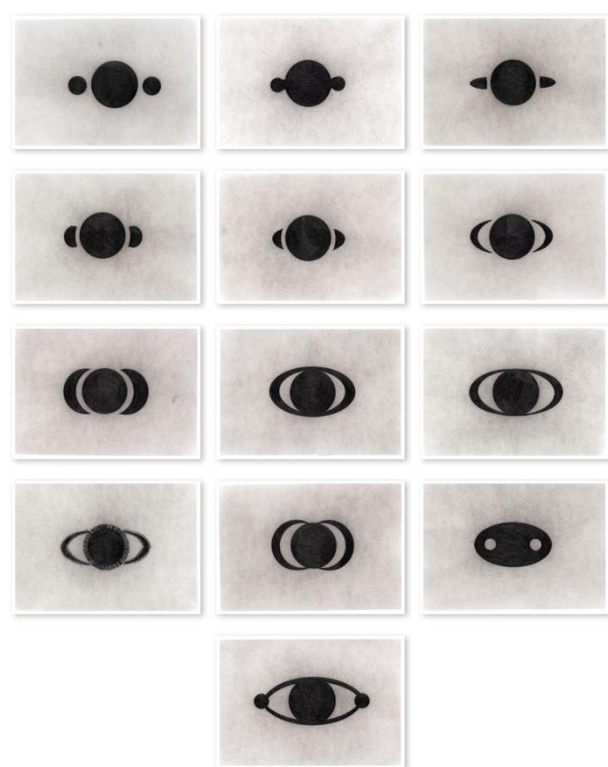
Note to Reader

This is the thesis's written element, and it should be seen alongside the body of artistic practice research that responds to the unprocessed images of Saturn captured by the Cassini probe. The first chapter in this document is a portfolio documenting the artistic output included in the exhibition *Uncalibrated*, held at Sunny Bank Mills Gallery in July 2023. Subsequent chapters contain the metacommentary on the research as led by the practice. These chapters are richly populated with images that include historical references from astronomy and art and studio experiments that came to a dead end or remain – even today – stubbornly embryonic. Every experiment pushed the research forward, and some still do, pushing it beyond its current boundaries. On some occasions, the images reinforce the written commentary; other times, they provide alternative visual evidence to offer a rounder perspective on the multi-directional nature of practice research. The format of document places images and words side by side to aid flow. As in a Warburg-like atlas, images are allowed to 'speak for themselves'. Woven within the written discussion are also diaristic excerpts of text, demarcated by a different font, with autobiographical undertones that showcase the different role writing has played within the research.

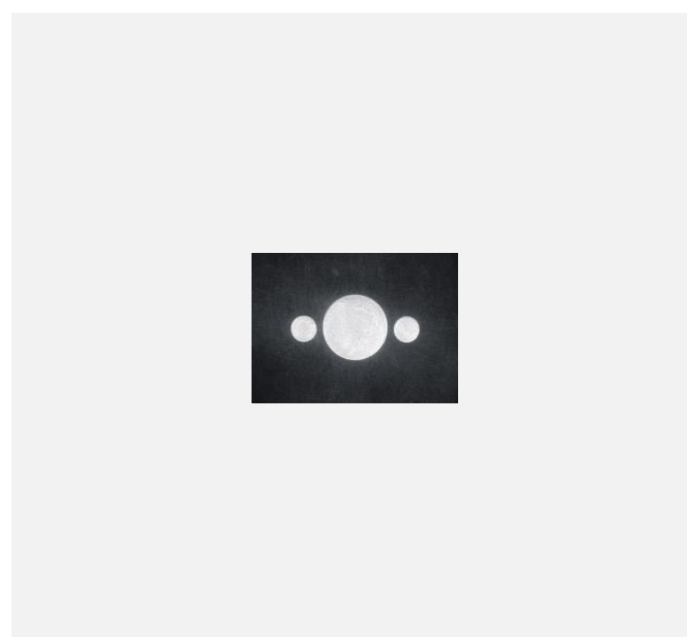
Chapter One

Portfolio

This chapter contains visual documentation of the main part of this thesis, a body of artistic practice created in pursuit of the research questions. The works are presented in the order in which they are discussed in subsequent chapters. Images of unfinished works, studies or work-in-progress are documented in subsequent chapters of this document.

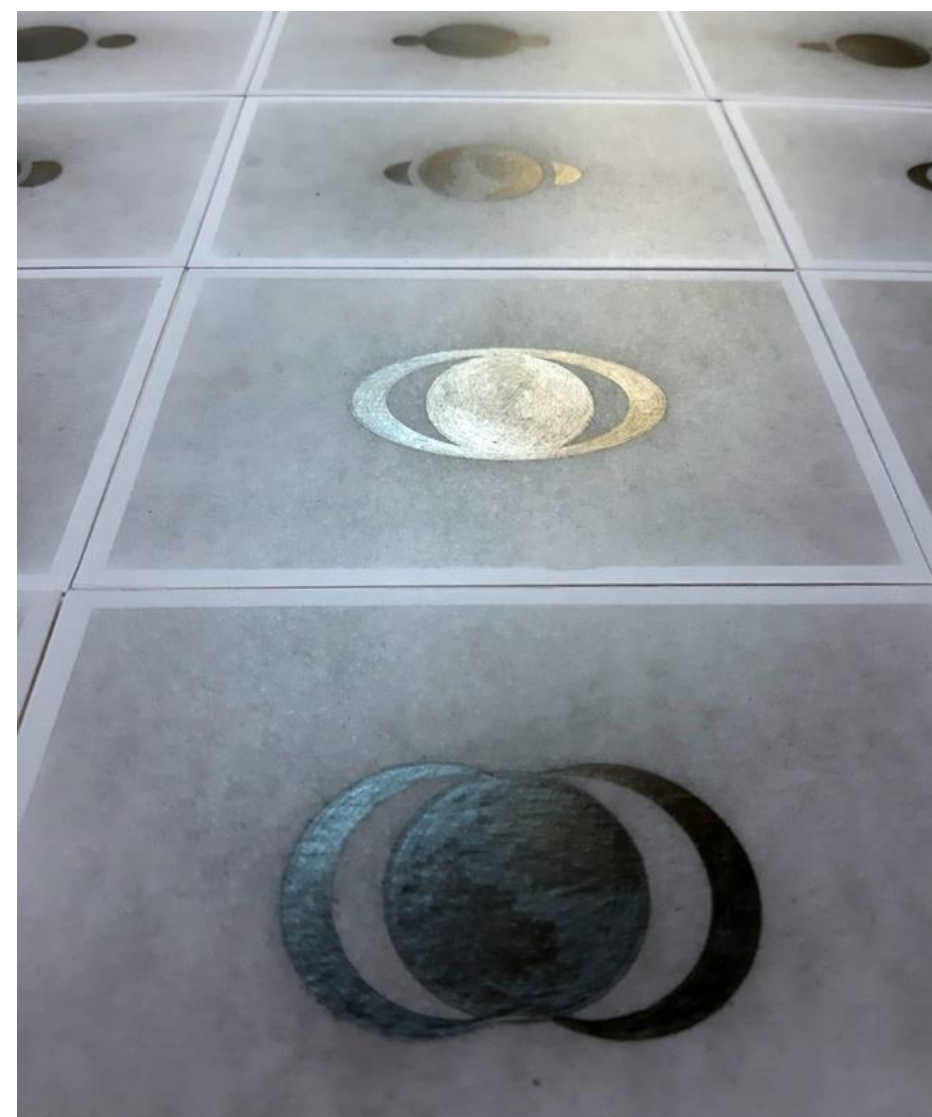


1. Fraga, H. 2018. oOo. Each 15 x 10 cm. [Pencil on Paper]

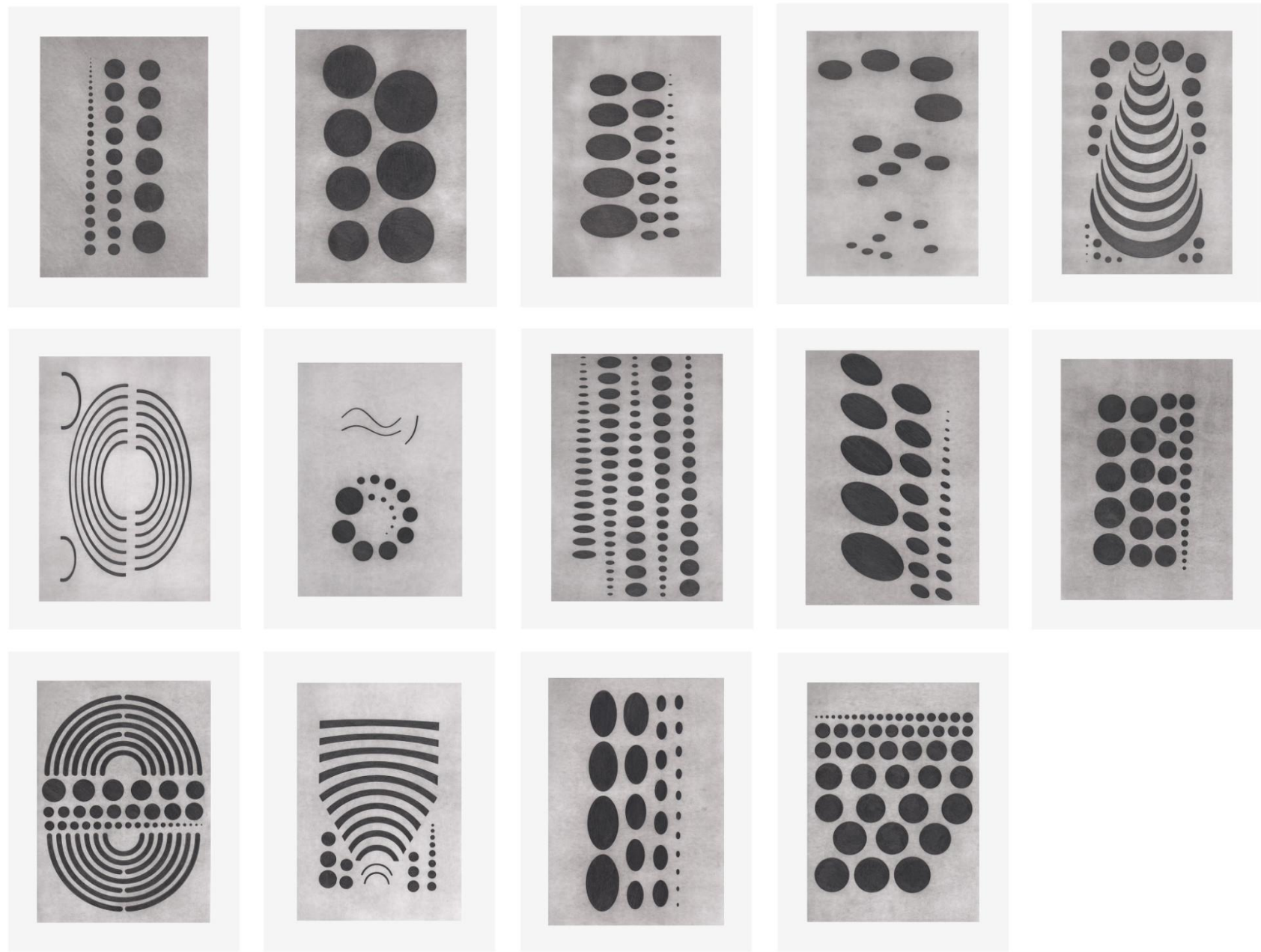


2. Fraga, H. 2023. oOo. [Animated GIF]

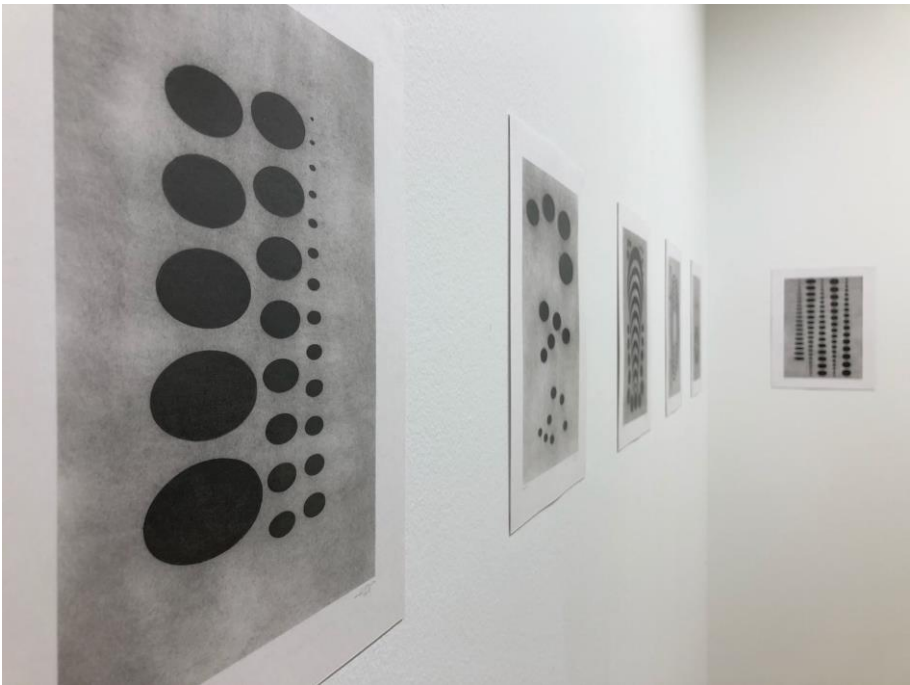
Link: <https://www.hondartzafraga.com/2024/02/06/ooo/>



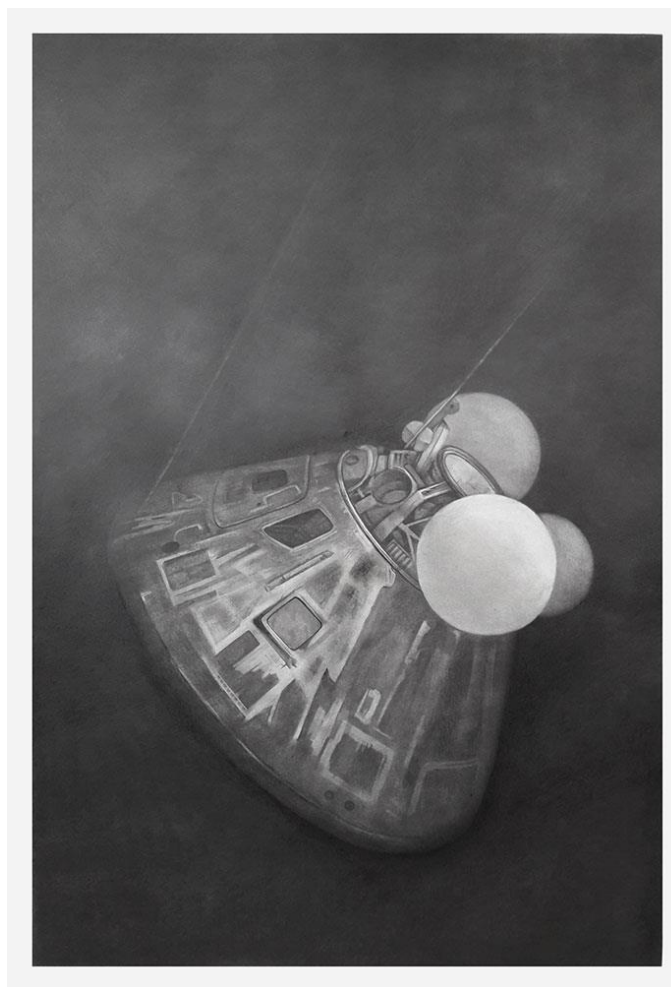
3. Fraga, H. 2018. Close-up of oOo. [Pencil on Paper]



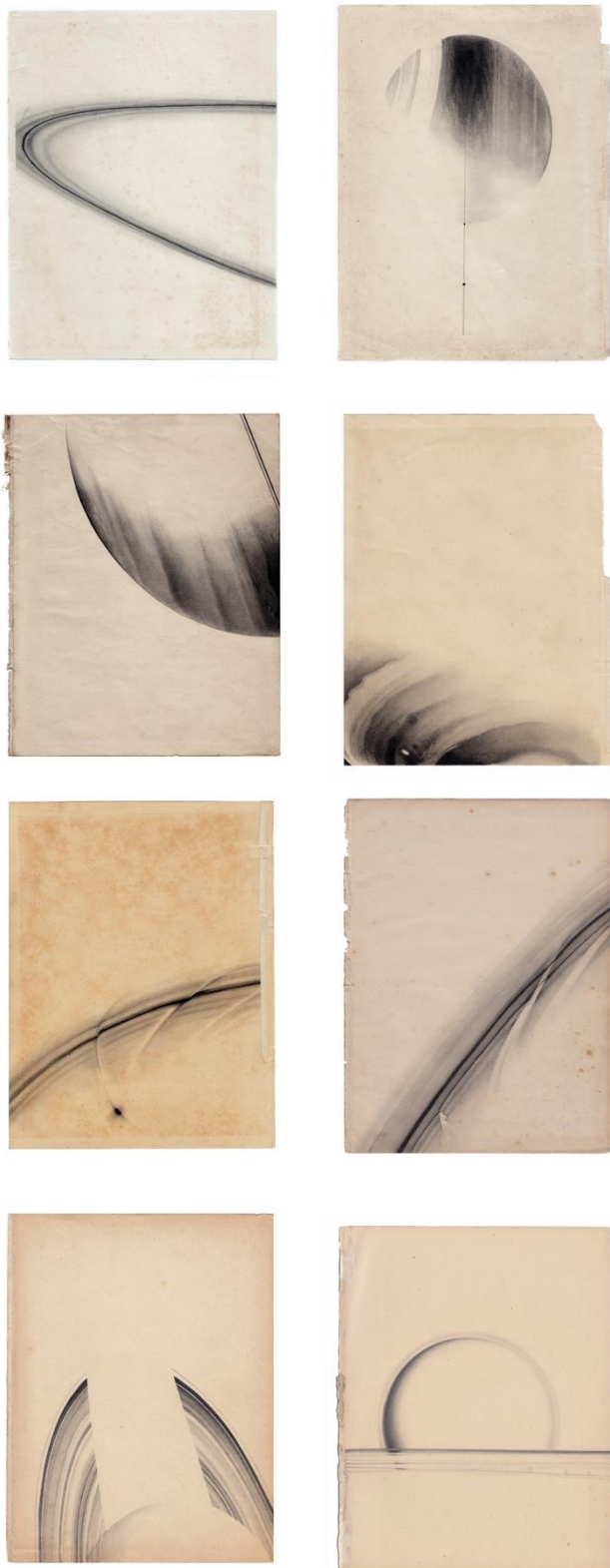
4. Fraga, H. 2018. *Figures 001-014*. Each 25 x 33 cm [Graphite on Paper]



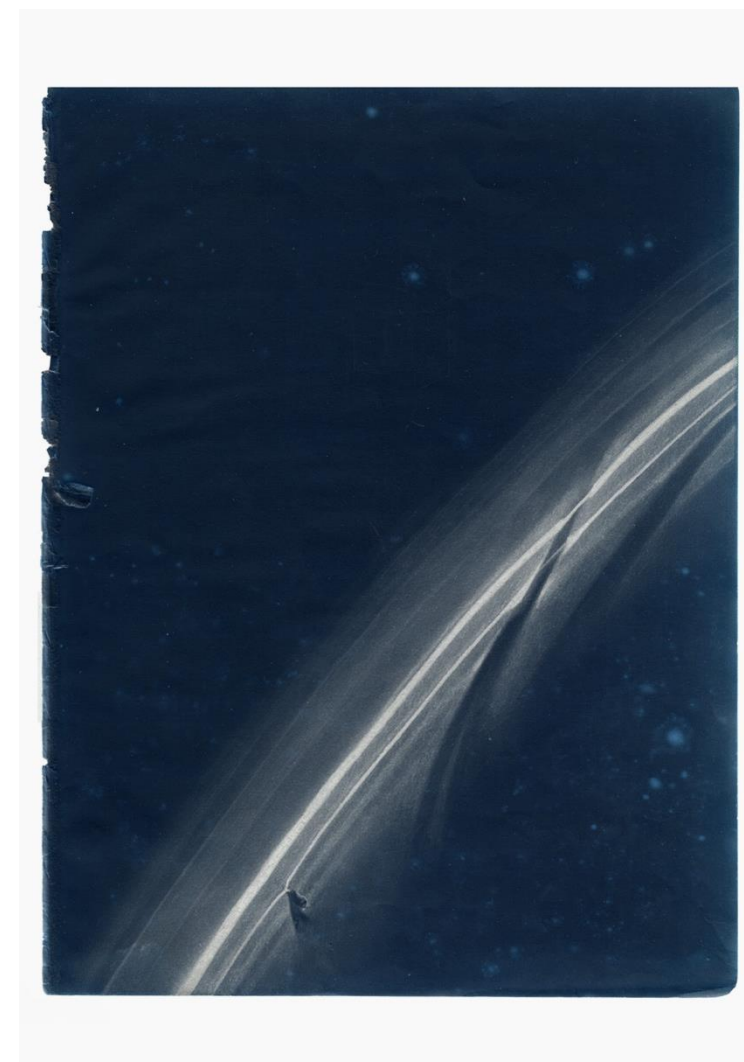
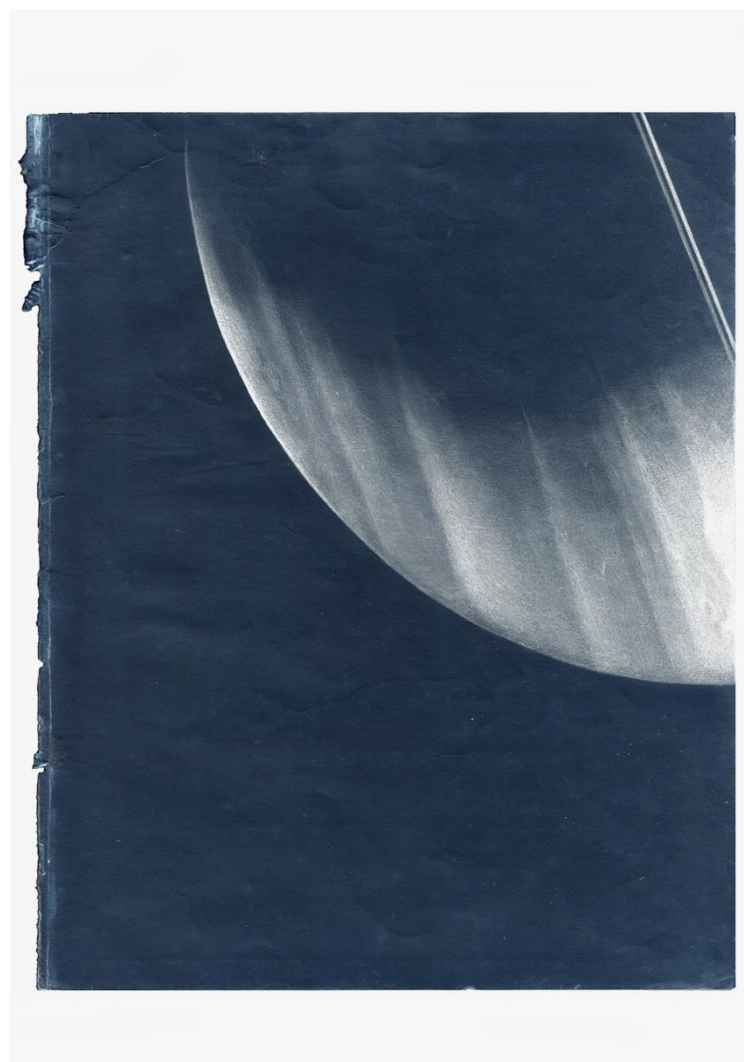
5. Fraga, H. 2018. *Figures installed at Arte Santander, Spain*. [Photograph]



6. Fraga, H. 2018-2019. *Specimens*. Each 70 x 100. [Graphite on Paper]



7. Fraga, H. 2019. *Incognito (Negative Drawings)*.
Each 30 x 25 cm approx. [Pencil. On Antique Paper]



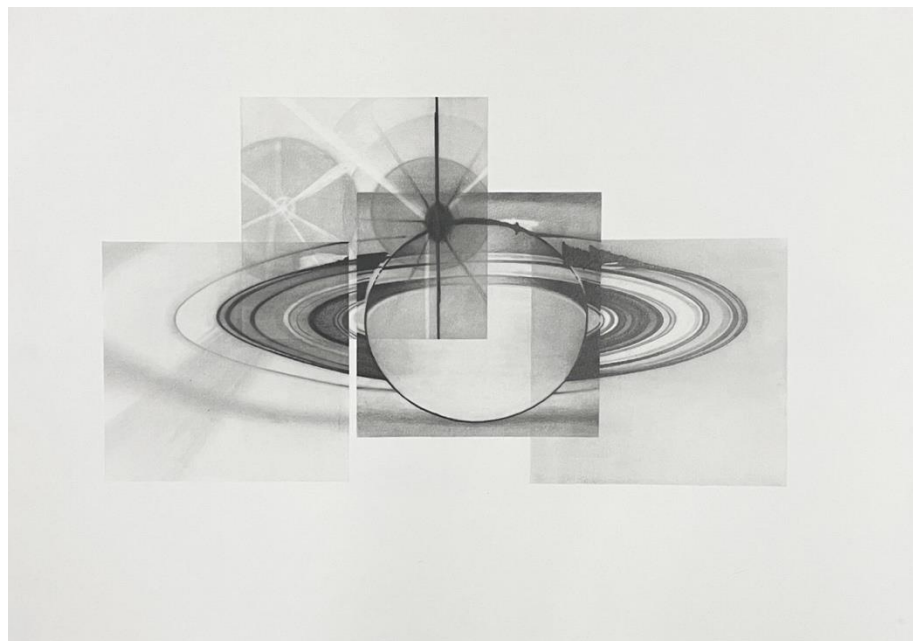
8. Fraga, H. 2019. *Incognito (Positive Prints)*. Each 42 x 59.4 cm. [Print]



9. Fraga, H. 2023. *Incognito* installed at Sunny Bank Mills, Leeds. [Photograph]



10. Fraga, H. 2023. *Incognito* installed at Sunny Bank Mills, Leeds. [Photograph]



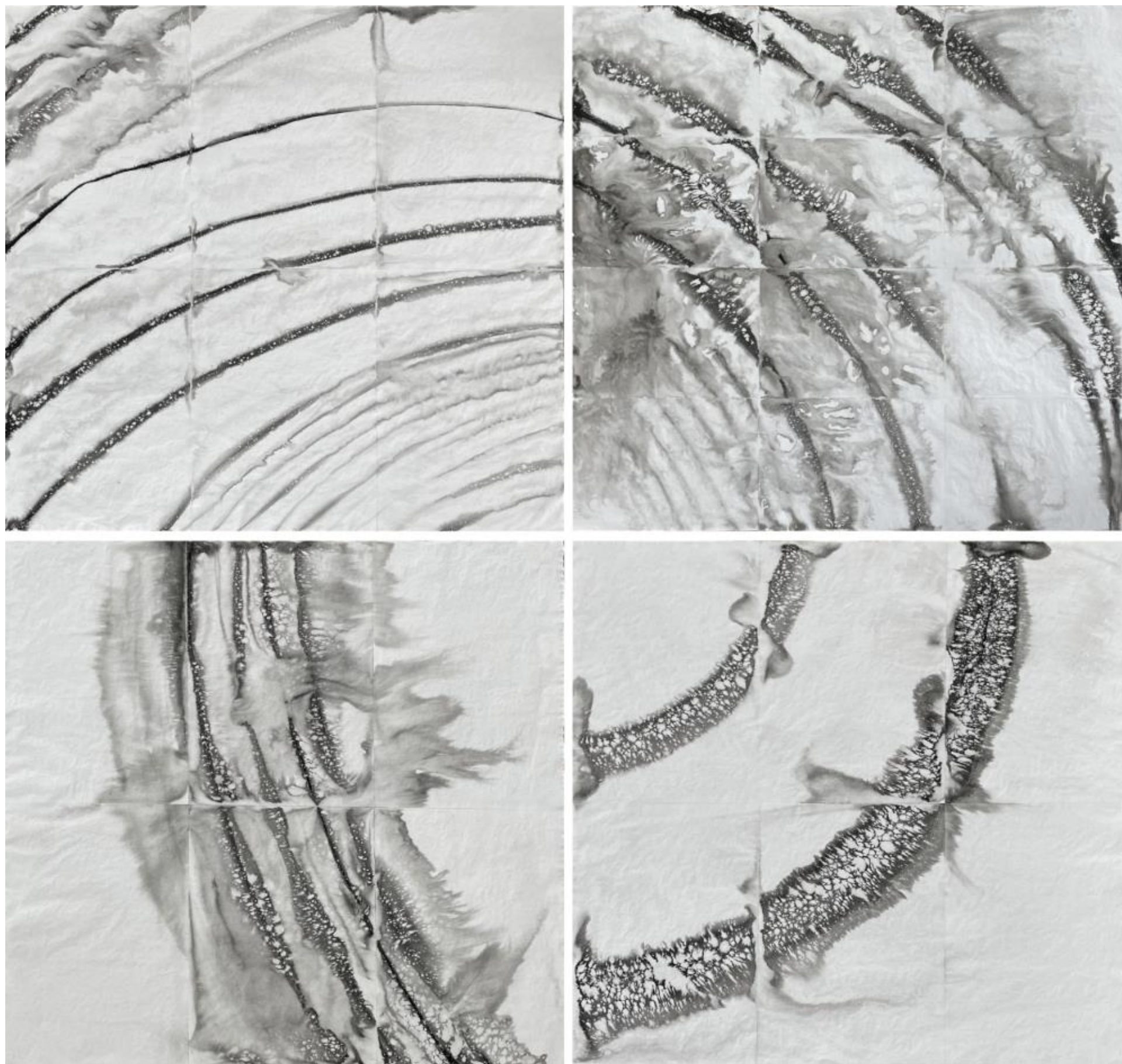
11. Fraga, H. 2020. *In Saturn's Shadow*. 59.4 x 42 cm. [Pencil on Paper]



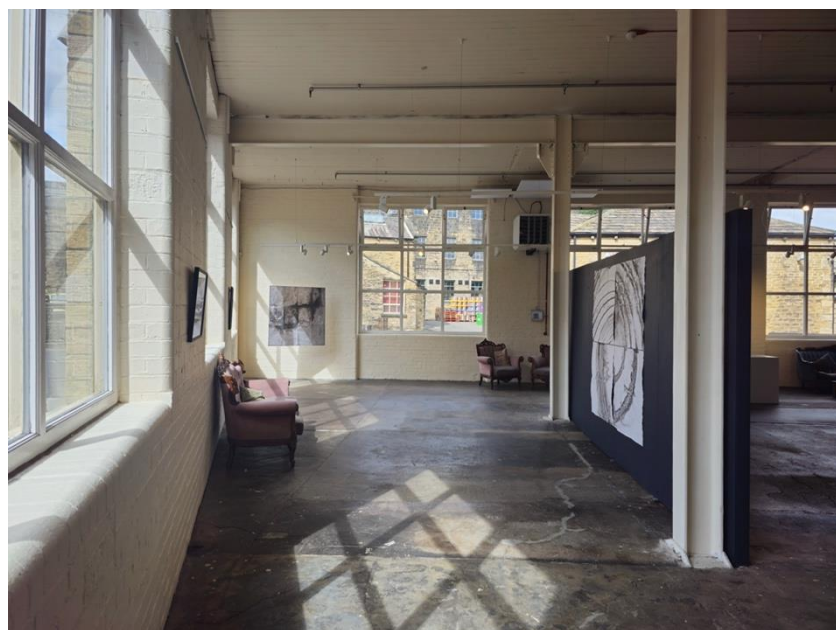
12. Fraga, H. 2020. *Turntable drawings* exhibited at *Tracing Entropy* at Foyer Gallery, University of Leeds. [Photograph]



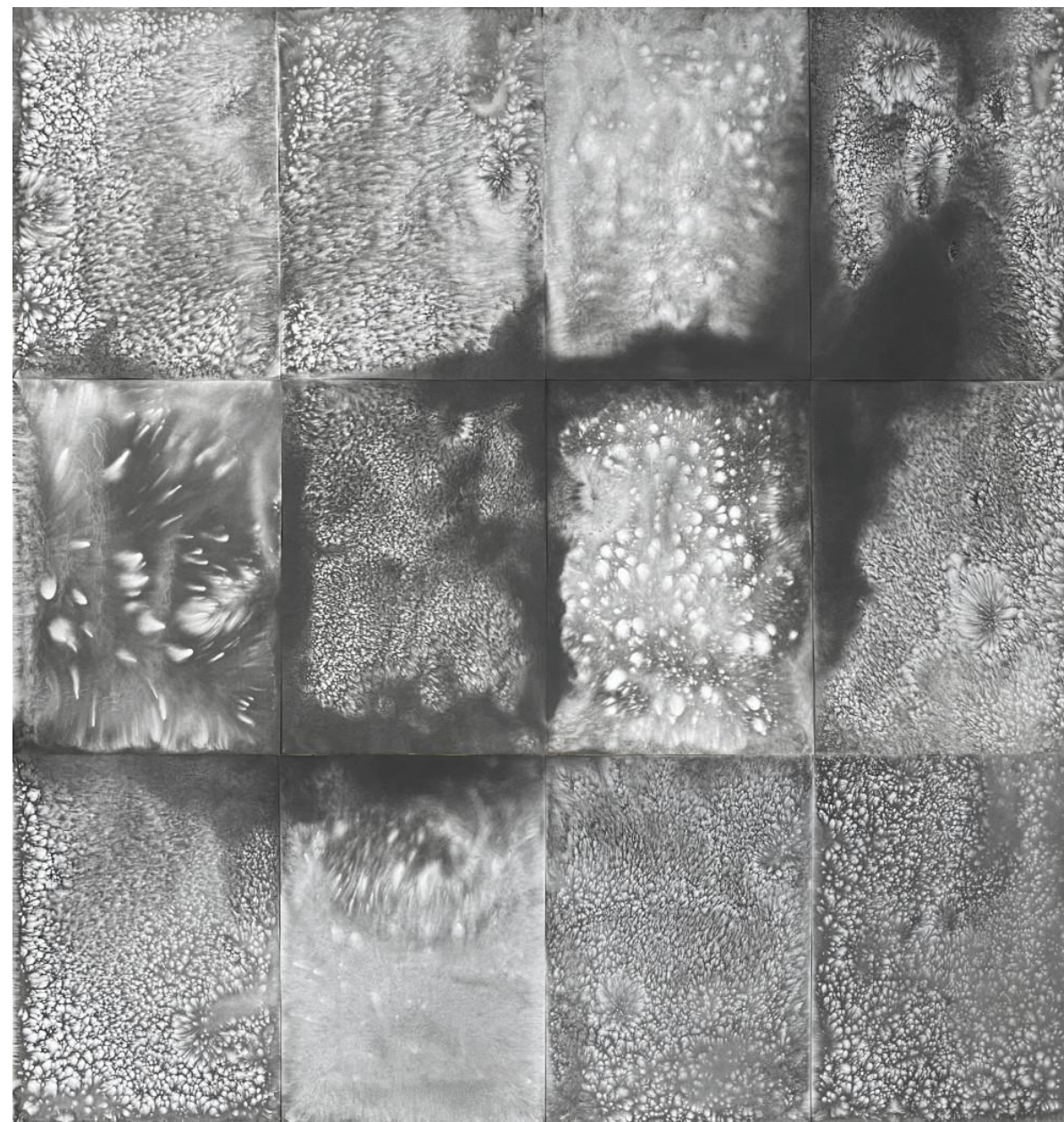
13. Fraga, H. 2020. *Small turntable drawings*, each 5 x 5 cm. [Water-soluble Graphite on Paper]



14. Fraga, H. 2021-2023. *Temperamental*, group of four. [Ink on Paper]



15. Fraga, H. 2023. *Temperamental* installed at Sunny Bank Mills, Leeds.
[Photographs]



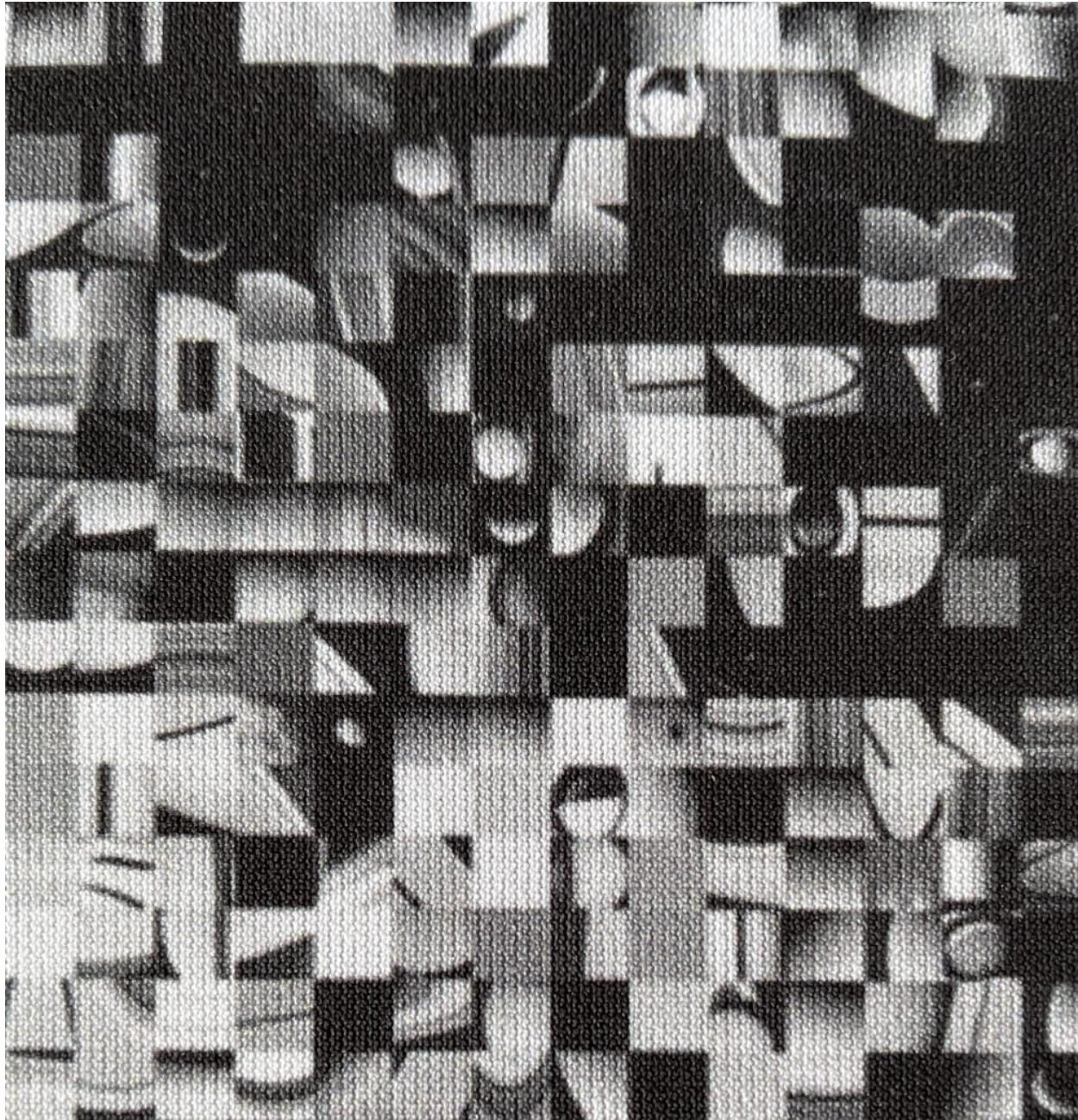
16. Fraga, H. 2022-2023. *Saturnian*, 120 x 126 cm. [Ink on Paper, Speaker, Sound]
Audio file created by Rebecca Jones available here: https://www.hondartzafraga.com/blog/wp-content/uploads/2024/02/Saturnian_FINAL_mixdown.mp3



17. Fraga, H. 2023. *Saturnian* installed at Sunny Bank Mills, Leeds. [Photograph]



18. Fraga, H. 2023. *Back of Saturnian*, showing bone conduction speaker. [Photograph]



20. Fraga, H. *Ghost close-up*. [Printed fabric]

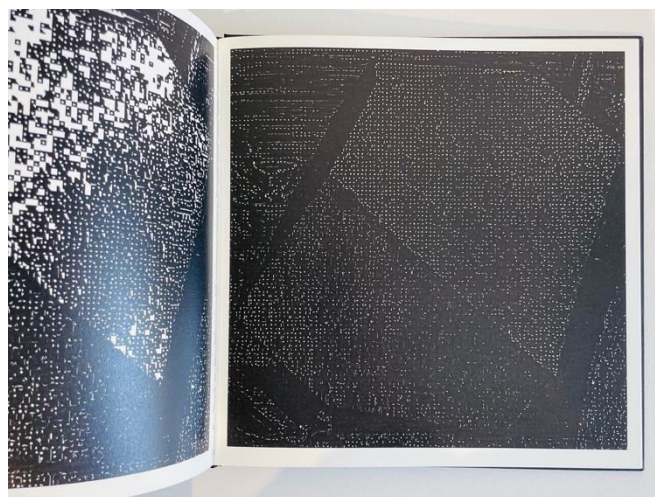
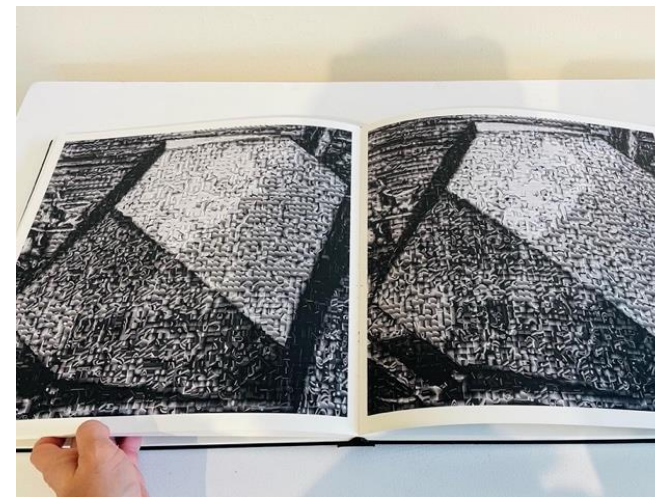
19. Fraga, H. *Ghost installed at Leeds Art Gallery*. [Photograph]



21. Fraga, H. 2022. *Ghost*. [Animation Stills] Link to animation: <https://vimeo.com/694805107>



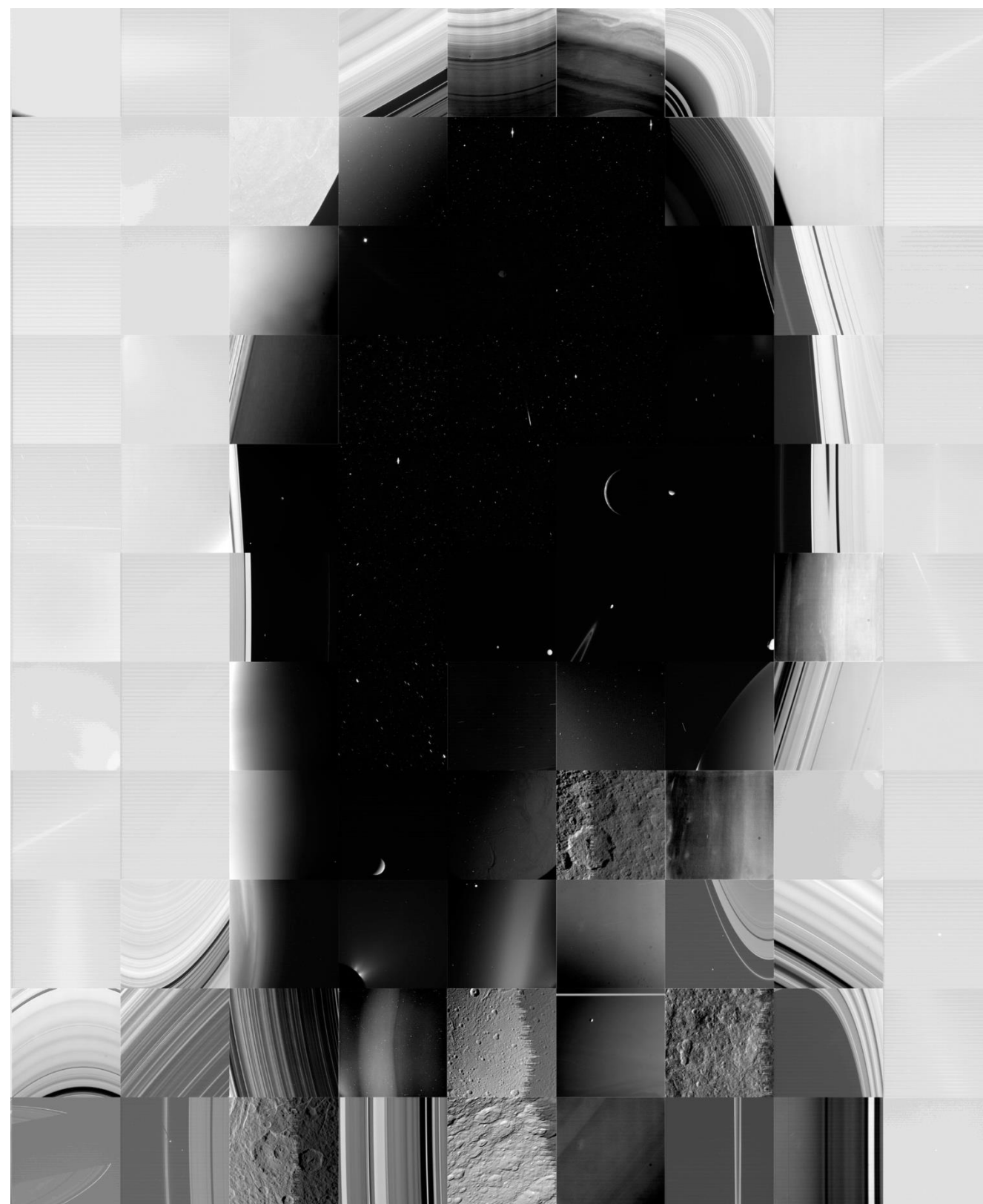
22. Fraga, H. 2022. *Solid* installed at Sunny Bank Mills, [Photograph]



23. Fraga, H. 2022. *Solid*, hardback book installed at Sunny Bank Mills, Leeds. [Photographs]



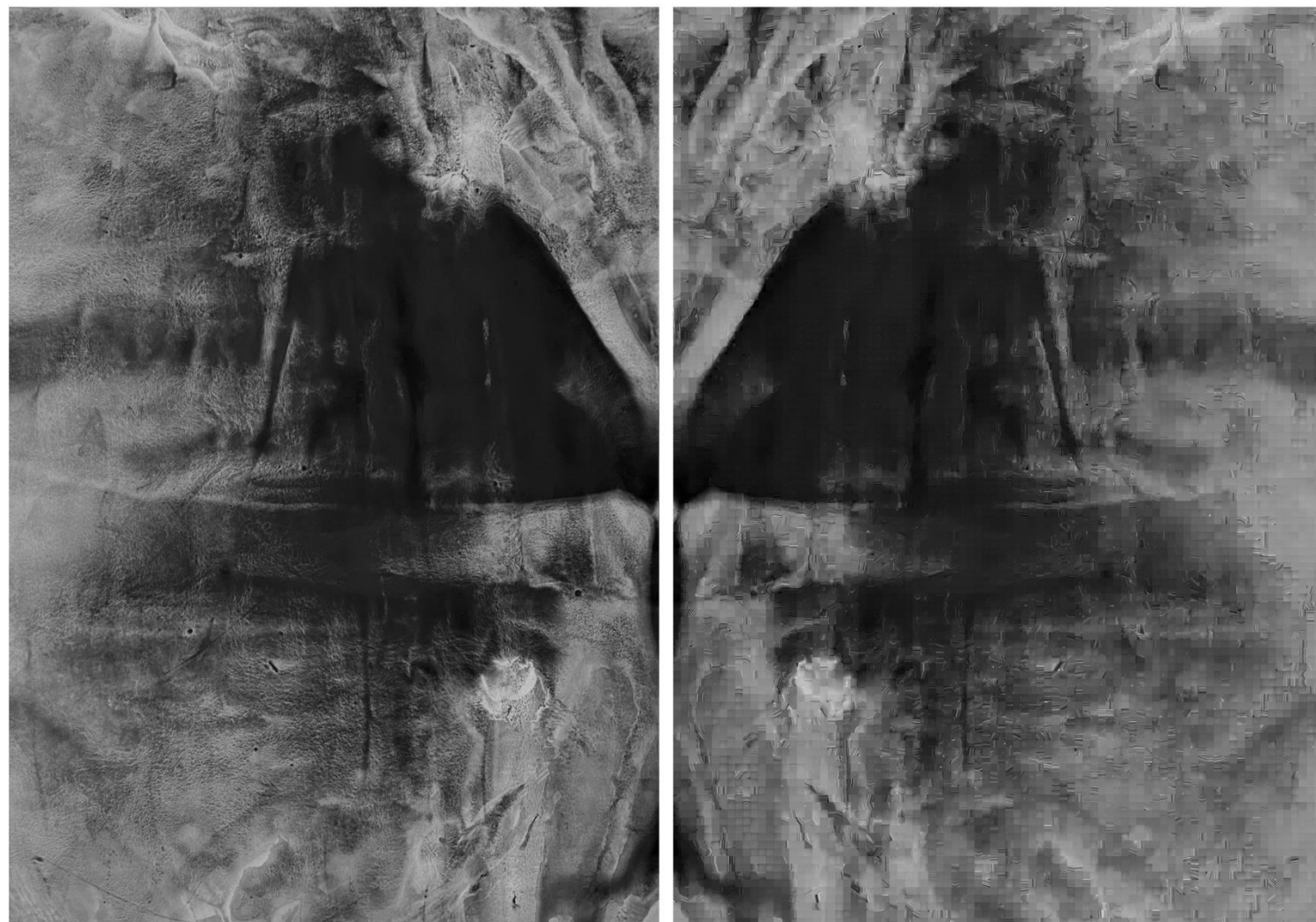
24. Fraga, H. 2021. *Saturn Head* [print on aluminium], and *Head study* [pencil on paper]



25. Fraga, H. 2021. *Saturn Head*. [Digital Image]



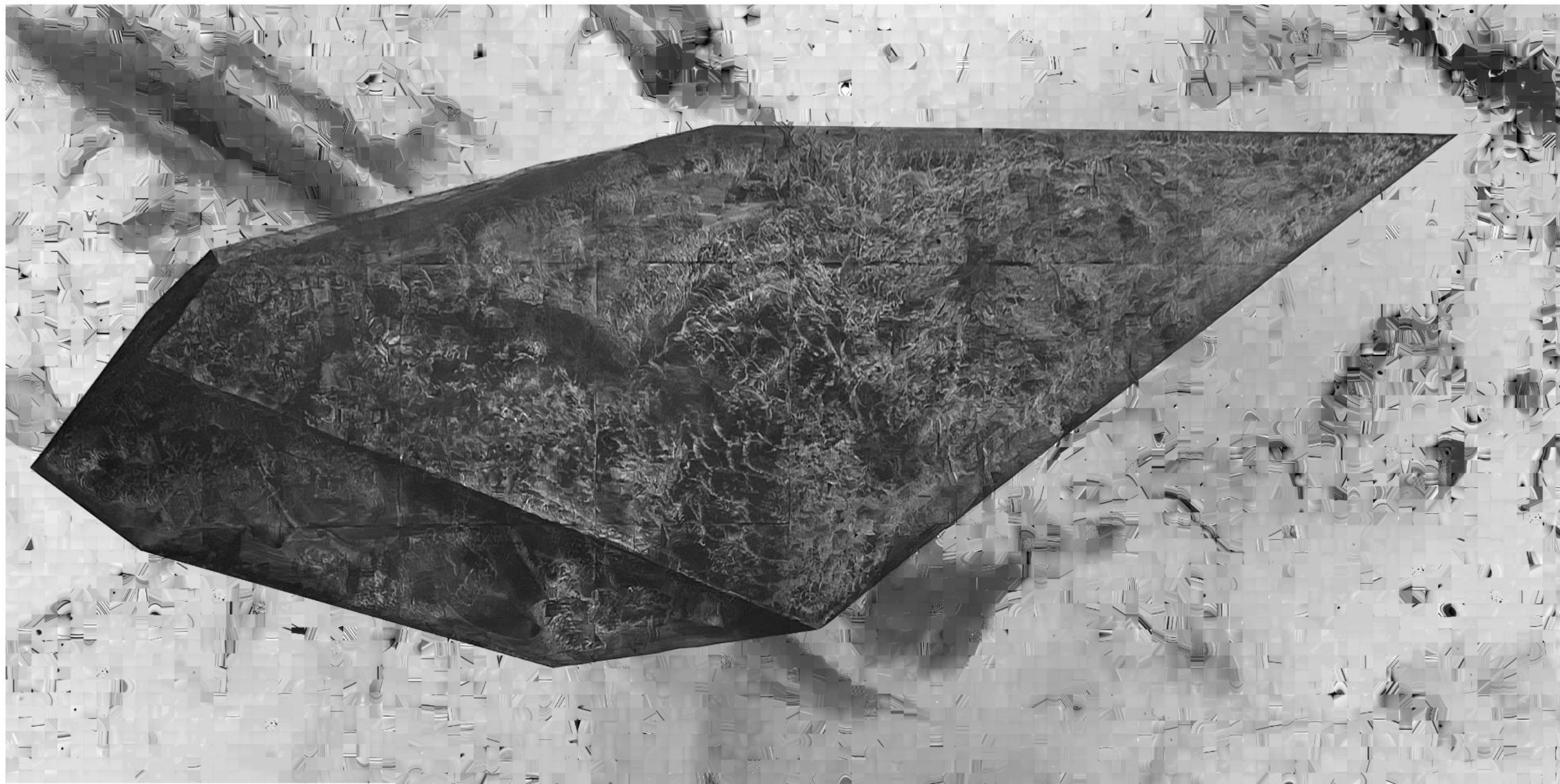
26. Fraga, H. 2023. *Installation views at Sunny Bank Mills, Leeds.* [Photograph]



27. Fraga, H. 2022. *Saturn and Melancholy*, diptych. [Graphite powder on paper and photo mosaic print]



28. Fraga, H. 2023. *Details of Saturn and Melancholy at Sunny Bank Mills, Leeds*. [Photographs]



29. Fraga, H. 2023. *Dark (Prototype)*, 240 x 120 cm [charcoal, ink, graphite on photographic print]



30. Fraga, H. *Views of Dark (Prototype)* at Sunny Bank Mills, Leeds. [Photographs]

Chapter Two

Introduction

Saturnian Images

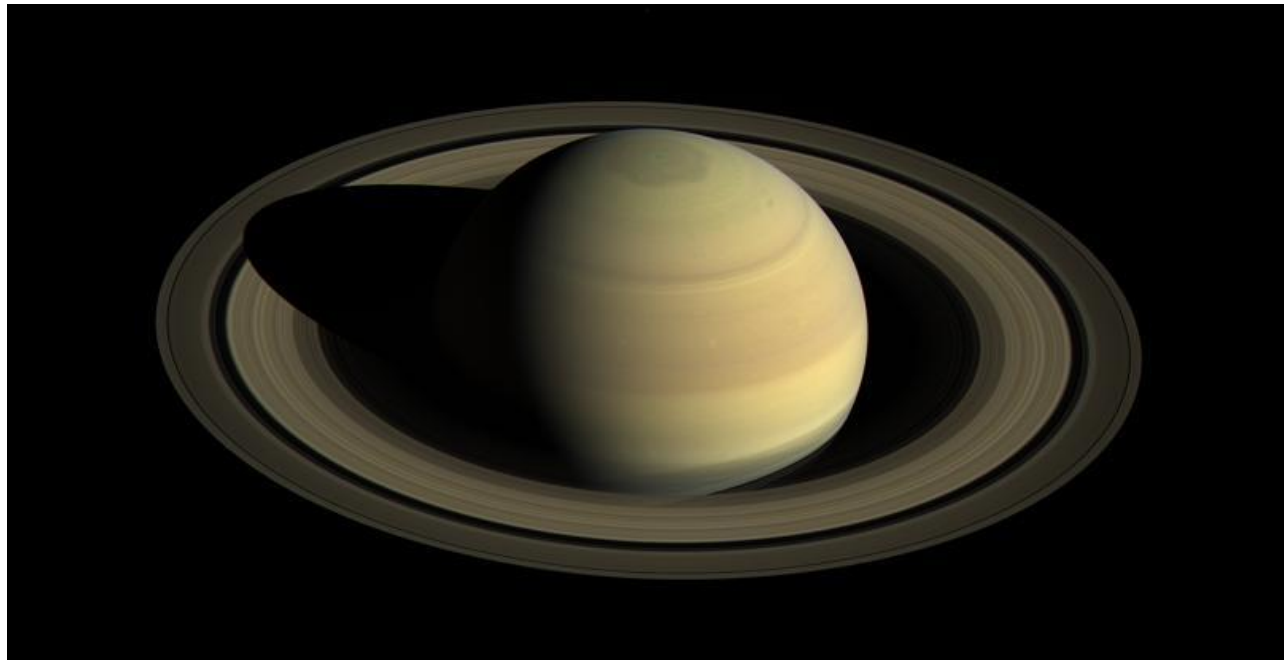
The Cassini mission to Saturn is a space-research collaborative project launched in 1997 and completed in 2017 (fig. 31). Among the many other instruments onboard, two digital cameras took nearly half a million images during the probe's 13-year-long orbit around Saturn (NASA, 2018). Besides the officially processed images, raw images (unprocessed 'previews') were regularly published online while the mission was active. Since the mission's finale in 2017, the complete Cassini raw images can be downloaded via NASA's website (<https://science.nasa.gov/mission/cassini/>). My study responds to the Cassini raw images (henceforward CRIs) through multimedia works including drawings, installations, photographs, sound, digital works and an artist's book. Through practice research on the theme of Saturn and melancholy, the project reappraises the interplay between the planet's symbolic resonance and the notion of melancholy as a complex human condition, examining the implications of using digital materials and technologies in an expanded drawing practice.

Background

In *Cosmos*, Carl Sagan evocatively describes the mesmerising effect of the first lander images of Mars,

I remember being transfixed by the first lander image to show the horizon of Mars. This was not an alien world, I thought. I knew places like it in Colorado and Arizona, and Nevada. There were piles of rocks and sand drifts and a distant eminence, as natural and unselfconscious as any landscape on Earth. Mars was a *place*. (Sagan, 1980, p. 121)

Sagan's fascination is triggered by how the images transform an alien planet into a familiar place (fig. 32). The CRIs fascinate me for the opposite reason, for how they remind me that Saturn is decidedly not familiar. Saturn is a self-contained body surrounded by a magnificent band of bright rings: majestic, complete, sublime. When the Cassini mission ended in 2017, what some commentators lamented most was the interruption of Cassini's lineage with previous spacecraft (Timmer, 2017). The image of Saturn has been perfected over centuries of evolving optical technologies and is so recurrent that it has become *natural*. Cassini's official images, and most artworks, perpetuate this sense of familiarity (fig. 33-34). Before the complete digitisation of astronomy practices, raw data would rarely reach the broader public (McCray, 2014), let alone with such



31. NASA. 2016. *PIA21046: Saturn, Approaching Northern Summer*. [Online] Available from: <https://science.nasa.gov/resource/saturn-approaching-northern-summer-2/>



32. NASA/JPL. 1976. *The first colour picture of Mars*. [Online] [Accessed 6 February 2024]. Available from: <https://time.com/4402596/mars-viking-orbiter-photo/>

readiness and in a user-friendly format. Seeing the raw images from a space mission *before* they are processed foregrounds how contingent our familiarity is on the mediation of imaging technologies and aesthetic conventions that guide image processing.

Then again, there is something familiar about the CRIs, about *the apparatus they make conspicuous* with their low-resolution format, square and greyscale, full of glitches and instrumental artefacts (fig. 35). Cassini launched in 1997 when digital cameras reached the consumer market (Benson, 2013; Mitchell, 2001). When the spacecraft reached Saturn's orbit in 2004, Cassini's one-megapixel cameras had become rudimentary compared to the continued and rapid evolution of digital capabilities on Earth. The shortcomings of Cassini's cameras can be significantly overcome in post-production, but the traces of their early-digital character are preserved in the raw images, like *digital relics*.

With the 'raw' label comes an implicit invitation to own and participate in their transformation. When I discovered the CRIs in 2009, the mission was in full swing. The discovery of NASA's 'live stream' of raw images inspired me to create a series of short animations of the raw images (fig. 36). That early work hinted at the potential for exploring these images in relation to melancholy, a millennia-old concept that was once deeply connected to Saturn.

Melancholy is a key term in this research, but it resists easy working definitions. A pensive sadness, a longing, an underlying darkness, debilitating pathology, a bodily substance. It can be applied to people as much as things. The familiarity of the term turns to slippery abstraction when one attempts to define it. Melancholy is often associated with the fragmentary, repetitive, and dislocating aspects of modernity (Olalquiaga, 1999). This research contends that the CRIs disclose many melancholy aesthetic traits that complement their thematic connection to Saturn. Technology – and the value we place in it – is said to play a role in the deep state of melancholia we find ourselves in, a condition characterised by no longer searching for meaning when it is in the very search that meaning resides (Bollas, 2018). The CRIs are part of a complex technological apparatus encompassing the collection, production, and distribution of vast amounts of information. We live in a post-digital and post-Internet –perhaps even post-post-digital? – world. In this world of remote and mediated forms of relating to and being in the world afforded by technology, our sense of self is profoundly fragmented and disoriented.



33. Trouvelot, E. L. 1882. *Saturn*. [Chromolithographic print]



34. Longo, R. 2006. *Untitled (Saturn)*. [Charcoal on Mounted Paper]

Research Questions

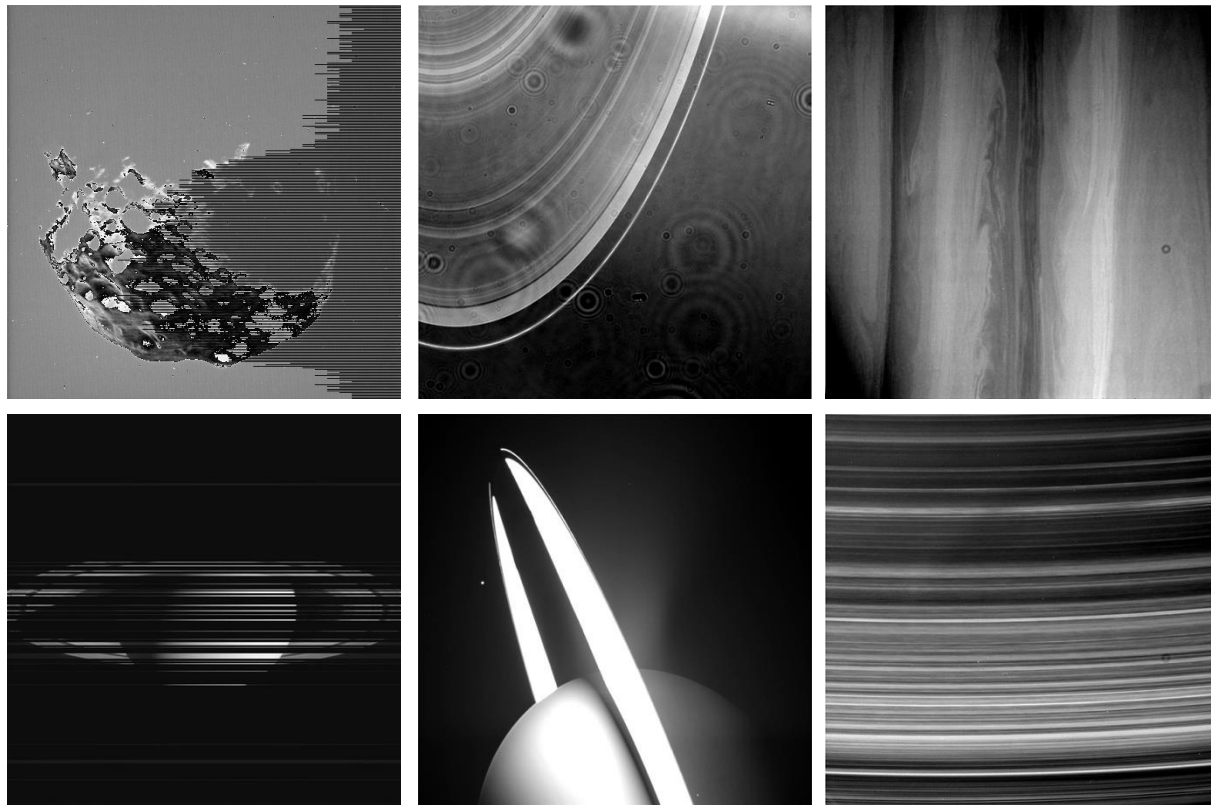
Drawing is often posed as the medium that best embodies the sense of incompleteness, fragmentation and melancholy in a technology-centric world (Newman & de Zegher, 2003, p. 78). To draw is to “denote ourselves” (Dexter, 2005, p. 6). Drawing is thus often seen as the most primal of human activities; singled out of all other artistic media as the most direct, immediate and intimate of non-verbal forms of expression. *To draw is to be human, and to be human is to draw.*

Like sculpture, drawing has been ‘expanded’ into a nebulous field that can incorporate digital materials and cutting-edge technological processes. In my experience, the world of post-isms –post-digital, post-Internet, post-media, post-conceptual– means that neither drawing nor art complies with single definitions according to unifying categories of style, processes, subject matter, medium, materials or contexts. How do such practices fit within the mainstream narratives of drawing? My return to the CRIs as a catalyst for artistic research is motivated by the conjecture that their aesthetic appraisal would offer new insights into contemporary drawing practice in correspondence with a cluster of concepts: melancholy, technology, astronomy and nature.

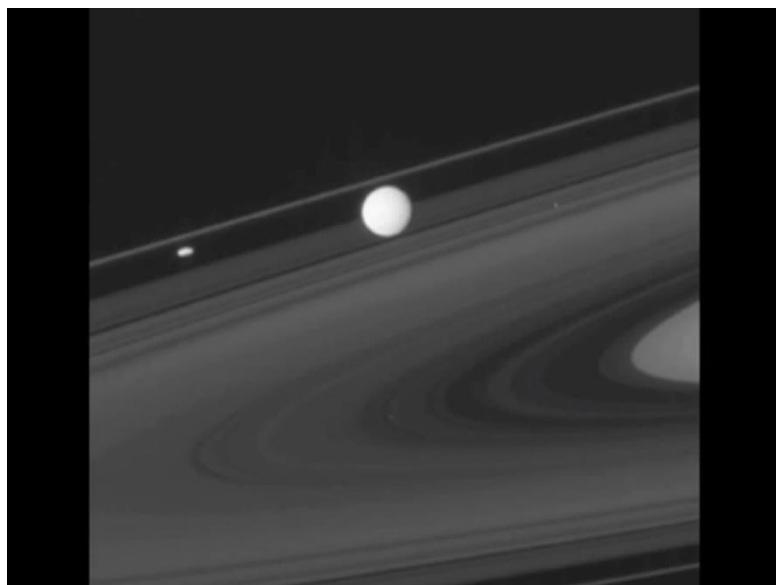
This research’s remit is articulated as a series of questions:

- What are the implications of ‘drawing with’ the CRIs of Saturn?
- How might expanded drawing practice navigate the presumed disparities between the digital and the handmade?
- How might art practice offer new apprehension(s) of Saturn and melancholy?
- What is the significance of melancholy for a drawing practice with digital elements?

The reasons for punctuating ‘drawing with’ in my primary question will be explained in the next section where the methodological approach is discussed. The research agenda has two distinct yet interconnected threads. On the one hand, it explores the source images and subject matters from the perspective of practice-research. On the other hand, the research explores the resonances between melancholy and drawing. The final form of these questions has been fine-tuned through reflexive observation, documentation and interpretation of the art practice as it unfolded (Skains, 2018). Reflexivity is a spiral progression that “constantly returns us to our original point of entry but with renewed understanding” (Trimingham, 2002, p. 56). Saturn, melancholy and the



35. Sample of six Cassini raw images. [Digital Photograph]



36. Fraga, H. 2009. *Uncalibrated Melancholy*. [Animation Still] Available: <https://vimeo.com/manage/videos/13879407>

CRIs are not arbitrary prompts for the practice, they have been chosen for the conceptual associations they can bring into it. The relationship between the artistic process and its source (subject matter, provoking ideas) drives this research's agenda. Drawing also becomes a concept to be examined. Drawing denotes a set of methods (drawing practice), a methodological approach (drawing with) and the discipline to which this project is contributing (drawing research).

The core aim of this research is to investigate the dynamic and transformative interplay between artistic practice and its chosen source material. Additionally, the study broadens our comprehension of the incorporation of digital materials and processes into the domain of drawing. Another objective is to evaluate the CRIs using artistic practice as a lens to provide a fresh and unique perspective on the theme of 'Saturn and melancholy'. This investigation seeks to expand our knowledge and appreciation of the relationship between drawing and technology.

Methodology: Drawing With

In her talk 'Drawing with the Web', artist and researcher Charlotte Webb considers her internet-based work through the lens of drawing and explains the dual meaning of 'with' (Webb, 2016). 'With' indicates its ordinary sense of functionality, as in a tool or materials used to carry out a task. 'With' also implies being responsive to the medium's possibilities (thinking along with), in Webb's case, the Internet. I employ this significant dual meaning of 'with' as a methodological approach. The practice is not 'about' the CRIs or Saturn but 'with' them. This is not a study 'of' but 'with' drawing and digital technologies. 'With' entails a hands-on approach to materials, tools and processes while, most importantly, remaining attentive to their idiosyncrasies. This approach has deep affinities with the writings of anthropologist Tim Ingold whose interests focus on the relationship between humans and their environments. Ingold argues that we can learn more effectively by immersing ourselves in the subject matter ('study with to learn from' or 'knowing from the inside') rather than studying it from a distance, paying close attention to the properties and characteristics of materials ('following' and 'corresponding'), and allowing them to guide our actions and decisions (Ingold, 2013; Ingold, 2021; Ingold, 2022). Attunement is often chosen as a metaphor for the process of working 'with', not just by Ingold, but also by philosophers Timothy Morton and Clive Cazeaux. Attunement involves a deep awareness of the productive and active interconnectedness of all things (Morton, 2018; Morton, 2013; Cazeaux, 2017). 'With' instead of 'of' or 'about' is essential for this project because it shifts the focus away from description or representation and towards responsiveness and, crucially, emphasises hands-on, experiential learning.

Concepts, Materials, and Metaphors

In his book *Art, Philosophy, Research*, Cazeaux provides a comprehensive analysis of contemporary artistic research (Cazeaux, 2017). He highlights the importance of metaphor to understand and interpret the world in art and philosophy. For Cazeaux, materials in art function primarily metaphorically. For example, charcoal – and how it is used – in a drawing of the night sky will bring connotations (its dustiness, its darkness) that will interact with the associations of the subject matter (p. 99-100). At the core of Cazeaux's argument is the proposal that concepts are the basic units of contemporary artistic practice and, crucially, research. Concepts are not reducible to abstract ideas or text; they are embedded and embodied in the material and sensory

experience of the artwork itself. Concepts are created, transformed and reinterpreted through the artistic process, providing a dynamic and evolving framework for artistic research.

Cazeaux's model is a useful starting point for my project because of its emphasis on the role of concepts, but my methodological approach also draws from long-established bricolage models. In fact, my research contends that the philosophies of Ingold, Morton and Cazeaux are closely related to the methodology of bricolage in the arts and humanities. Originally, 'bricolage' referred to making art using leftover or non-traditional materials. It was expanded into the social sciences by Lévi-Strauss as a metaphor for a process of meaning-making significantly different from scientific rationality (Rogers, 2012). Bricolage is a research approach that uses multiple data sources and other analysis methods to create a new and unique understanding of a subject. It is a flexible and adaptive approach that encourages researchers to use materials and methods creatively and resourcefully. Many artist researchers adopt bricolage because it favours qualitative over quantitative analysis, eclecticism, interdisciplinarity, subjectivity, reflexivity and ad-hoc approaches as legitimate methods of critically rigorous research (Roberts, 2018). Two specific aspects of bricolage make it the most suitable model for this project.

One is bricolage's favouring of working with raw materials and tools *at hand*. The studio practice uses materials and tools that are *at hand*, that already exist and that are chosen ad hoc. These include familiar tools and materials (software or graphite) and those that might not be familiar to me but are encountered or found through playful experimentation (such as the photo mosaic). Working with what is at hand narrows what would otherwise be an overwhelming boundlessness of possibilities for a contemporary artist. The Internet has made information and images more at hand than ever, not just the CRIs but also the art of the past, which can be endlessly recycled, repurposed or referenced. And while this poses an unprecedented broadening of choices, one of the things that allured me to the CRIs was their simple accessibility, their 'at-hand-ness'. The CRIs could be easily downloaded and viewed through standard image software (already in my computer) rather than demand additional software and thus, further decisions and possibilities.

Bricolage places the researcher at the centre of the research process and its results (Roberts, 2018; Stewart, 2001; Rogers, 2012). This does not entail that all artistic research is autobiographical but will be irremediably entangled *with me and my circumstances*, including my "emotional, personal and subjective" motivations

(Barrett & Bolt, 2007, p. 4). The artist's choices of materials and themes are crucial but not all deliberate, many are "arguably not choices but social and environmental elements that are constitutive of the artist being an artist in the first place" (Cazeaux, 2017, p. 162). My proposed way of articulating this is that in a practice-driven research, the researcher herself is one more element *at hand*, with the possibilities and limitations this carries. Reflexibility is the crucial tool the bricoleur possesses to constantly question one's position, biases, and assumptions as a researcher and how these factors may influence the research process and findings.

Reflexivity is the other aspect of bricolage essential for a project like this. By being reflexive the researcher can actively consider multiple perspectives and incorporate them into their research, leading to a more comprehensive understanding of the object of inquiry (Rogers, 2012; Green & Williams, 2018; Skains, 2018). In this project, the critical tool for reflexive analysis was a private website. From the beginning of the project, the website recorded the process of thinking through making, including reflections on exhibitions, books, ideas, works in progress, incomplete thoughts, doubts and moments of insight. The website acts as a repository, archive and index for the project. It was also a communicative tool between me, my supervisors and occasionally other researchers and peers. It enabled me and others to see the project's progress in a visually organised manner.

The concept of bricolage itself was used metaphorically when placed at the service of methodology. Metaphors remain essential for artistic research as the vehicle for art to harness the properties embedded in materials and manipulate those properties to evoke further ones (Cazeaux, 2017). Metaphorical exploration is closely associated with a form of 'poetic' knowing (Cazeaux, 2017; Roberts, 2018; Magee, 2018). The term 'poetic' is significant for the considerations of melancholy explored in this project. The denotation of 'poetic' distinguishes the melancholy of temporary moods and aesthetic experiences from the pathological ones (Klibansky, et al., 1979, pp. 217-218). In this research, the 'poetic' is understood not as a way of looking *away from* scientific discourse but *beyond*. Metaphor is a crucial element in the branch of philosophy known as Object-Oriented Ontology, of which Harman and Morton are vital proponents. Harman believes that metaphor is a fundamental aspect of all thought with the power to reveal hidden connections between objects and help us to understand their actual nature (Harman, 2018; Harman, 2018).

On the other hand, Morton sees metaphor as a way of dealing with the complexities and uncertainties of our relationship with the environment, bridging the gap between our perception of the world and the reality of the world (Morton, 2018; Morton, 2013). Metaphors are critical in this research for understanding how the artworks relate to their sources. Metaphorical language is also vital for discussing the artworks produced in the exploration of the research questions. As will be expanded on in the literature review, the relationship between Saturn and melancholy can only be understood metaphorically.

Drawing

Drawing is integral to a 'drawing with' methodology. Drawing is at the heart of my practice and is not constrained to specific materials, processes or styles. A 'drawing with' method furthers our understanding of drawing as a research discipline. Remaining responsive to materials, familiar or not, means finding ways to stay with the unknown to discover something new (Cocker, 2013; Hållén, 2015; Skains, 2018). Ingold suggests that research is, in its literal sense, a second search, an act of searching *again* (Ingold, 2018). However, searching 'again' does not entail exact repetition but building upon previous searches to create an original intervention that invites another search. As a result, between one search and the next, there is always a differential or a difference, and every step is a new beginning. A methodology of 'drawing with' entails this sense of searching *again* by paying the same close attention to familiar and unfamiliar materials, images, processes, materials or tools. In my searches, I employ digital technologies to solve what traditional drawing modes cannot. These 'solutions' in turn, bring out new issues, set new searches in motion. Exhibiting artworks at different stages of production is an active part of my practice (a complete list of exhibitions is included in Appendix A). Exhibitions are opportunities to reflect on the ongoing evolution of the research. Curating an exhibition has been a strategy to place my work in dialogue with other contemporary practices. This is discussed further in my review of contemporary practice.

In 2021, I was one of ten participants in the pilot programme *Growth*, run by Drawing Correspondence (Taylor, Kovats, and Briggs). My participation was supported by the Large Award scheme from the White Rose College of the Arts & Humanities (WRoCAH). The course was an online six-week programme of shared drawing sessions, discussions and presentations of works in progress, and one-to-one feedback sessions. The end of the programme was marked with a publication (available here: [Drawing Correspondence: Growth](#)). The

programme was an opportunity to reflect on my drawing practice and its relation to the digital, not just in my existing approach to digital tools but in the broader context of sharing and discussing work digitally necessitated by the COVID-19 pandemic. Primarily, the course enabled a reflexive distance from the research and immersion in a wide range of drawing techniques and materials, some familiar and some unfamiliar. The experience strongly impacted my methodology by bringing specific studio experiments, which I had thought were peripheral, to the centre.

Although it might be impossible for me to articulate why and how the programme was transformative, it is possible to address how such transformation manifested. The playful experimentation with materials and techniques and the conversations with mentors, especially those with Tania Kovats, pushed me to articulate the importance of 'with'. The symbiotic relationship between making and thinking through the programme enabled me to return to some drawing experiments I had begun before the course with a refreshed understanding. These included using a turntable I had adapted for drawing and other systems to disrupt or interfere with my mark-making. The new understanding was not about *knowing* their purpose or meaning but the importance of following the materials *without* knowing. In turn, this enabled a further move away from description and representation, which were still the dominant aspects in the works thought of as central till then. These chance-abstract drawings resulted from my attuning to the CRIs through art making.

In summary, this research develops a methodology of 'drawing with', a set of methods using what is at hand in a responsive, flexible and open-ended approach. This model has affinities with existing models but places a new emphasis on drawing practice.

Literature Review

Throughout this research, theory and practice have a symbiotic relationship. Existing literature is not pursued as content to be illustrated but as frameworks that the practice interrogates. Reading followed an eclecticism of sources, with texts from fields as diverse as art history, history and philosophy of science, astronomy, aesthetics, critical theory, psychoanalysis, history of medicine and texts by contemporary artists. This literature review is not intended to be exhaustive but to provide an overview of the theoretical understandings that underpin this project. It has been grouped into three sections. The first addresses the literature on scientific representation, consulted as a response to the CRIs. The second addresses the existing literature on drawing and the third outlines the consulted literature on Saturn and melancholy.

The Cassini Raw Images

This section summarises the reading informed by the catalyst material: the CRIs as ‘raw data’ resulting from a techno-scientific inquiry process. My research asks what the implications of drawing with these images are, so attention is given to the growing field between art history and the history of science that examines the conjunctions and divergences between arts and science as activities of image-making and knowledge production. This has been done to reflect upon the implications of artistic intervention *for our relationship with the CRIs*.

A wide range of literature examines the problematics of the term ‘raw data’ and the broader ontological and epistemological complexities of ‘realism’ and ‘objectivity’ in scientific representation (Gitelman, 2013; Coopmans, et al., 2014; Cazeaux, 2015). Similarly, comprehensive studies address how the arts and the sciences inform or challenge each other in past and contemporary practice (Bippus, et al., 2007; Jones & Galison, 1998; Ede, 2000; Elkins, 1995; Elkins, 2001). The CRIs belong specifically to the history of technologically mediated astronomical observation, representing the recent complete “digital turn” of astronomy practice (McCray, 2014). I have consulted a broad spectrum of historical, as well as contemporary, texts addressing the role of the verbal (Messeri, 2011, p. 12) and non-verbal representation (Hentschel, 2000), as well as the essential role drawing played in the evolution of astronomy (Nasim, 2013). The tensions between artistic and scientific approaches to the ‘processing’ of astronomy’s images have also been the focus

of some critical studies (English, 2017; Kessler, 2012). These are relevant for situating artistic interpretation of astronomical imagery relative to representations of the Astronomical Sublime and melancholy aesthetics.

Beyond their disciplinary origin, the CRIs belong to the broader category of 'digital photography', sharing ontological aspects with digital and analogue photography. Concerning photography in a pre-digital sense, I have turned to pivotal authors such as Sontag (1973), Barthes (1982) and Berger (2013), as well as a broad spectrum of essays much indebted to them and new accounts such as the hot-off-the-press *How Photography Changed Philosophy* (Rubinstein, 2023). On the transition between pre- and post-digital, I have also turned to crucial authors such as Mitchell (2001) and Manovich (2001; 2003). Beyond these seminal works I have consulted many contributions exploring the continuities between the analogue and the digital (Benson, 2013; Drucker, 2001; Godfrey, 2005; Riches, et al., 2011). These resources have acted as provocations for thinking about the CRIs, and the hand-made and digital processes employed in the studio.

Drawing with the Digital

The previous section focused on the existing literature that connects the CRIs to the broader concepts of raw data, digital photography and astronomical representation. To examine the implications of 'drawing with' the CRIs *for drawing practice*, my query zooms in on drawing's relationship with photographic and digital technologies. Here, I address the literature consulted concerning drawing as a medium in contemporary art practice and a research discipline.

One of the most substantial monographs on drawing in recent years is *The Primacy of Drawing* (Petherbridge, 2010). Still, other key examples cover centuries of practice and a wide range of disciplines in which drawing is (or has been) key, such as *The Stage of Drawing* (Newman & de Zegher, 2003), *Drawing the Line* (Craig-Martin, 1995) and *The Drawing Book* (Kovats, 2017). Other studies focus more on the modern and contemporary period (Winter, 2007; TRACEY, 2007; Rose, 1992). Surveys like Phaidon's *Vitamin D* series (2005; 2013; 2022) present bird's-eye views of the most up-to-date practices in which we can see an incredible range of materials, subject matters, techniques, styles and media. It is telling that most of the main contributions to discourse are publications that accompany or supplement exhibitions, demonstrating the symbiotic relationship between drawing theory and practice. Recent studies such as *Writing on Drawing*

(Garner, 2008) or *A Companion to Contemporary Drawing* (Choperning & Fortnum, 2021) exemplify how the field of drawing research (with practice at its core) spans a diverse range of disciplines, including computer science, history, psychology, pedagogy, as well as critically engaged art. The role of drawing as a tool for knowledge – its production as well as communication – remains at the centre of drawing research, as demonstrated by a plethora of studies such as *Drawing as a Way of Knowing* (Anderson, 2019) and some key examples from the Bloomsbury's *Drawing In* series (Casey & Davies, 2020; Meskimmon and Sawdon, 2016; Graham, 2021). I have drawn extensively from the drawing journals *TRACEY* (Loughborough University, since 1997) and *Drawing: Research, Theory, Practice* (Intellect, since 2016).

There are notable examples addressing drawing's relationship with photographic and digital technologies, such as the double venue exhibition *Double Take* (at the Drawing Room and The Photographer's Gallery in London, 2016) and its accompanying publication (Macfarlane, 2016) and a full-day symposium (<https://drawingroom.org.uk/>). Another critical resource has been artist James Faure Walker's writing on the subject. Faure Walker picks up on how the issue of drawing and technology remains a subgenre in a mainstream discourse that still overwhelmingly values "the raw and the gritty: crude charcoal, the leaky pen, anything low tech" (Faure Walker, 2008, p. 78).

My practice is situated within contemporary art as a category with no consensus regarding styles, media, processes, or contexts – as discussed in the methodology. Drawing is caught in a nebulous, theoretical foundation, with anxiety about boundaries and definitions, joining painting and sculpture as an expanded field (Petherbridge, 2008, p. 27). My approach to drawing participates in the media hybridity characteristic of contemporary art. My research had to draw from the seemingly disparate, mainstream narratives of drawing practice and digital arts. Drawing practices that explicitly address photographic and digital entities and processes are well-established, ranging from the photorealist to the algorithmic, whether these algorithms are executed by hand or a computer. Sol LeWitt, for example, delegated the execution of his rules to other humans, while Manfred Mohr – like many more digital pioneers – delegated his to a machine (Speidel, 2016). In a sense, mine fits Petherbridge's description of a 'multipractice', in which artistic outputs take a wide range of media, styles and references (2010, p. 431). However, drawing in my practice does not carry the autographic authority Petherbridge ascribes to hand drawing in such multimedia oeuvres (p. 431). My position towards drawing is instead as a conceptual nexus for a constellation of media plurality.

More specific issues relating to the digital had to be found in different narratives about video, digital and Internet art. An essential resource has been *High-Tech Trash* (Kane, 2019) because its scope spans beyond the boundaries of 'digital art', but there are many others which have provided essential references on the subjects of digital materiality and the post-digital (Betancourt, 2017; Rubinstein, 2020; O'Riordan, 2017; Tavin, et al., 2021). There are overlaps here with the texts discussed previously concerning the nature of the raw materials of this research, the CRIs. Finally, although not addressing drawing specifically, the PhD thesis of artist Paul Magee (2018) has proven an invaluable reference point for this research because it examines the internal tensions of a digital fine art practice in relation to the concept of knowledge in art and science.

Saturn and Melancholy

My research seeks to revisit the thematic trope of Saturn and melancholy through the lens of artistic practice. My own intuitive understanding of melancholy was cross-referenced with existing scholarship on melancholy's long, complex and dense association with Saturn. An association that predates the invention of optical technologies and today's sharp disciplinary boundaries. Before the modern era, we drew correspondences between cosmic events and human affairs in more causal terms. The millennia-long association is examined in the highly influential *Saturn and Melancholy: Studies in the History of Natural Philosophy, Religion and Art* by Klibansky, Panofsky and Saxl (1979). In its pre-modern scope, this study continues to provide an evocative and quasi-encyclopaedic account. In modern and contemporary thought, the association between Saturn and melancholy survives as metaphorical or symbolic in many literary examples (Wittkower & Wittkower, 1963; Sebald, 1998; Sontag, 1981). My study seeks to revise the Saturn and melancholy theme within a metaphorical dimension while incorporating the contemporary visions of Saturn through the CRIs.

Robert Burton's magnum opus *The Anatomy of Melancholy*, first published in 1621 but subjected to numerous extensions and alterations during the seventeenth Century, is an eclectic and wide-reaching study of melancholic suffering that still fascinates today. Melancholy has persisted as a profoundly complex human condition that defies strict definitions, much like drawing. Its affinities to artistic activity can be traced back to a Renaissance worldview. In modern times, melancholy has been cemented in psychiatry and psychoanalysis with a tendency to focus on its pathological side, Sigmund Freud's *Mourning and Melancholia* (1917) is a touchstone in this field. A more recent key text might be Kristeva's *Black Sun* (1987). Within this field, my

research has focused on the texts that address melancholy broadly, beyond the pathological, as an intrinsic part of our all-rounded experience of the world (Miller, 2014; The School of Life, 2021; Radden, 2000; 2009; Bell, 2014; Bollas, 2018, Olalquiaga, 1999). Many texts address the artistic resonances of melancholy at many different levels. Some pose melancholy as an inherent part of art (Bowring, 2008; Bowring, 2016; Brady & Haapala, 2003), making it (Sandström & Atopia Projects, 2006), looking at it (Schwenger, 2006) or even writing about it (Holly, 2013). The correspondence of aesthetic qualities between contemporary art and the 'depressive' dimension of melancholy is addressed by studies such as *The Aesthetics of Disengagement* (Ross, 2006). Other, broader texts examine the longevity of melancholy as a concept (Bubonik, 2019). The existing literature on melancholy has been used to relate, compare, and reflect upon the tensions between the handmade and the digital in my work and to offer a revision of the theme of Saturn and melancholy from a contemporary perspective. Melancholy in this practice has been approached through subtle allusion as an aesthetic sensibility.

Contemporary Practice Review

I curated the exhibition *Seeing Stars* at The Stanley and Audrey Burton Gallery, University of Leeds, as part of this investigation. The show was accompanied by a publication that included three newly commissioned texts from arts professionals, extracts from existing texts by some artists and an introductory text by me (documentation of the exhibition is included in Volume I of this submission). The exhibition's remit was to provide a more comprehensive view of how contemporary artists address our fascination with outer space. The exhibition included a range of local, national and international artists, established and emerging, all working with various media. The thematic focus of the exhibition was on how contemporary artists re-interpret scientific resources and materials through old and new media. The artists included were (in alphabetic order according to surname) Stella Baraklianou, Vija Celmins, Sarah Charlesworth, Zachary Eastwood-Bloom, Julie F. Hill, Lia Halloran, Mishka Henner, Risa Horowitz, Mark Lascelles Thornton, Melanie King, Paul Magee, Katie Paterson, Thomas Ruff and The Highrise Project.

An electronic copy of the catalogue of *Seeing Stars* can be accessed here:

<https://www.hondartzafraga.com/blog/wp-content/uploads/2023/10/Seeing-Stars-2022-Catalogue-Copy.pdf>

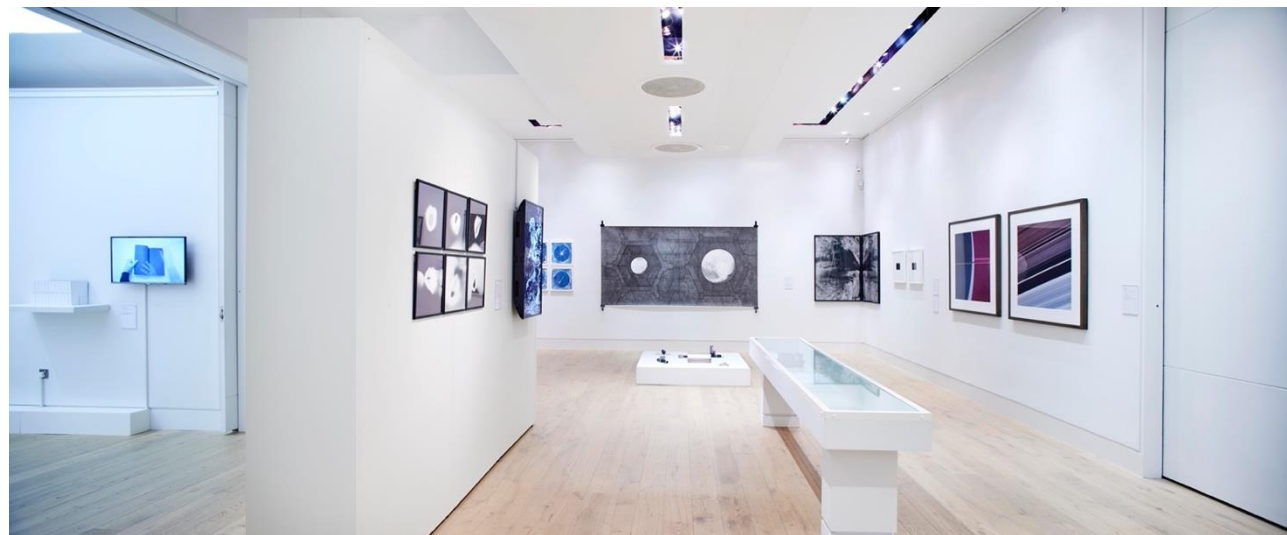
This exhibition *is* my review of contemporary practice, situating my work in a current artistic milieu, from which correspondences with others' works are made in actual space and time (figs. 37-). The publication should be understood as a stand-in for the reader who can no longer experience the exhibition directly. This section situates the exhibition within the broader field of contemporary art, followed by a discussion on other artists using the CRIs in their work (Thomas Ruff and Tom Ireland).

Poetic Reappraisals

The exhibition *Seeing Stars* echoes the recent wave of contemporary revisions of Romantic attitudes in art which involve re-evaluating and legitimising emotion, intuition and subjectivity as critically rigorous approaches. These have been addressed explicitly by Jörg Heiser in his exhibition and publication *Romantic Conceptualism* (Heiser, 2007) and Rebecca Partridge in her essay *Critical Subjectivity and the Metamodern Sublime* (Partridge, 2018) published in the accompanying catalogue for the exhibition *Scaling the Sublime: Art at the*



37. The Stanley and Audrey Burton Gallery. 2022. *Views of Seeing Stars* exhibition. [Photographs]

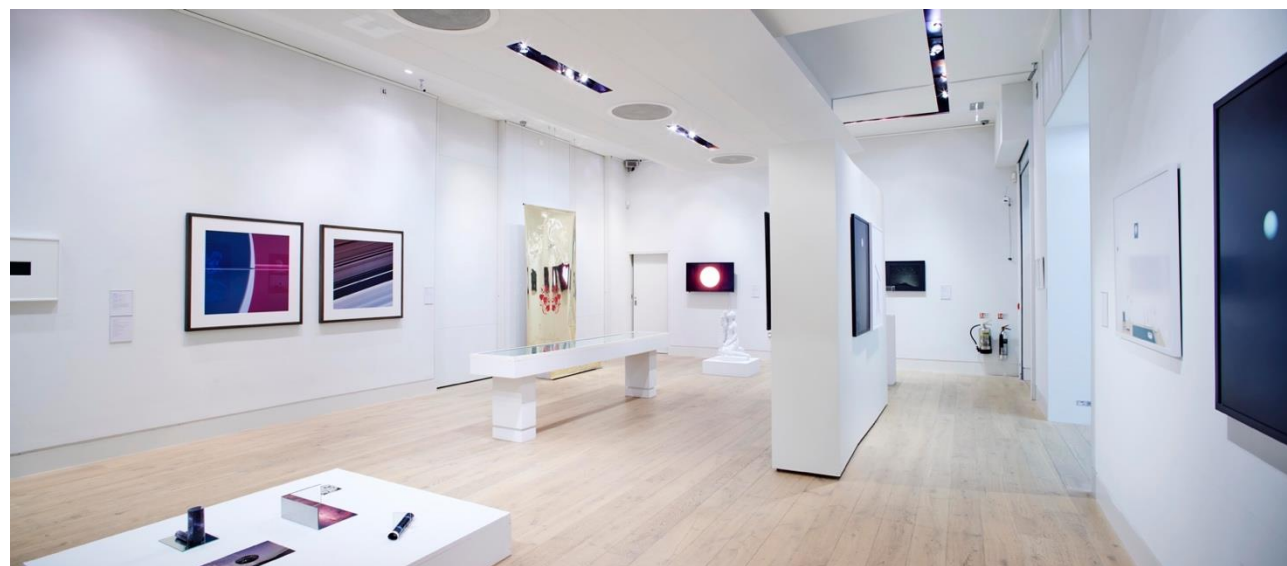
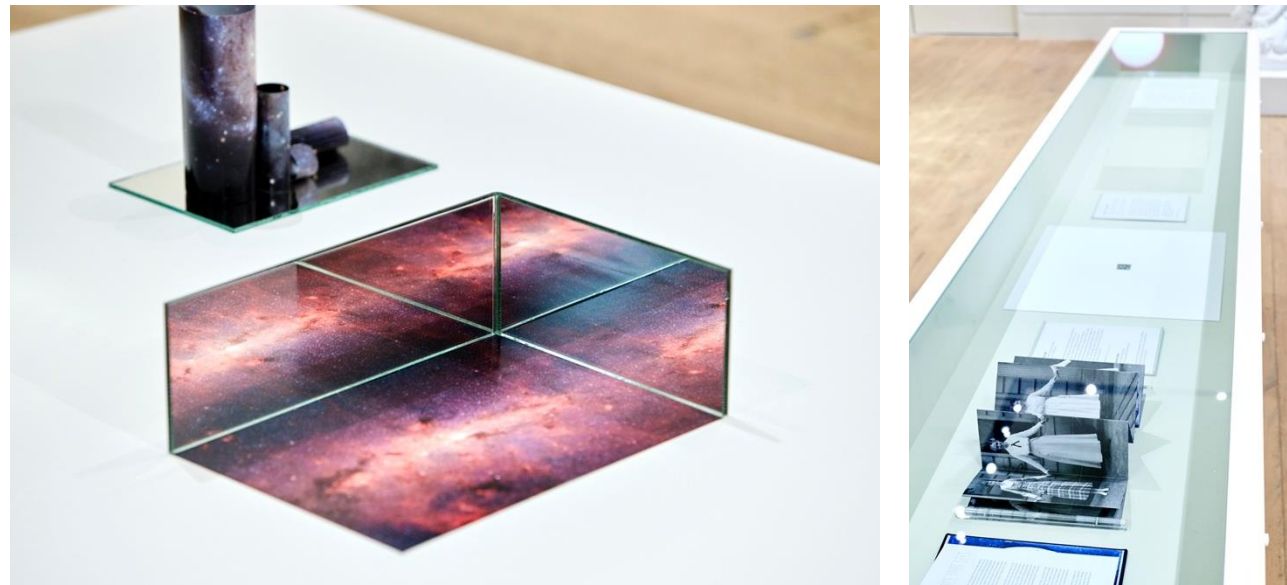


38. The Stanley and Audrey Burton Gallery. 2022. Views of *Seeing Stars* exhibition. [Photographs]

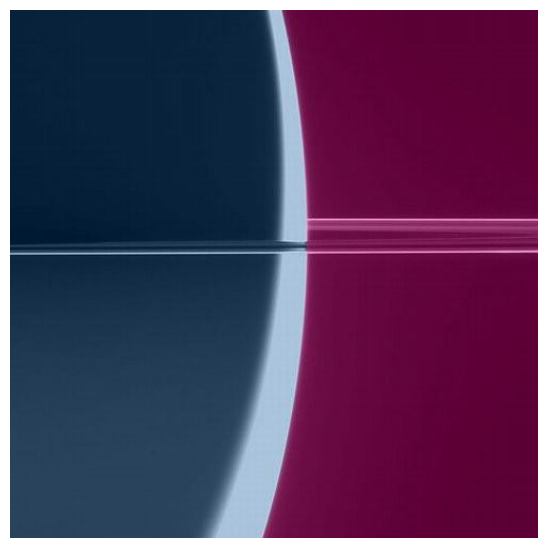
Limits of Landscape at Nottingham Lakeside Arts (2018). Three other exhibitions in the same year have similar scope: *Wilderness* at The New Art Gallery Walsall, *Strata – Rock – Dust – Stars* at York Art Gallery, and *Jacob's Ladder* at Edinburgh's Ingleby Gallery which linked to and coincided with the exhibition *Astronomy Victorious* at University of Edinburgh Main Library. These exhibitions offer poetic reappraisals of human relationships with the universe and include a wide variety of media ranging from traditional to cutting-edge. London-based art collective Lumen regularly organises exhibitions on light and astronomy and my work has been included on several occasions (Appendix A). The online history of their exhibitions (<https://www.lumenstudios.co.uk/>) was a research aid for my curation of *Seeing Stars*. *Jacob's Ladder* has more tangible synergies with *Seeing Stars* for its thematic focus and critical scope. However, there is only a small crossover between the artists included (Katie Paterson and Vija Celmins are in both).

Although not a physical exhibition, Phaidon's comprehensive survey *Universe* (2017) is another recent example of a desire for a contemporary revision of old, new, artistic and scientific modes of visualising the cosmos. The subject of artistic representation of the cosmos was also the focus of the exhibition and catalogue *Cosmos: From Romanticism to the Avant-Garde 1801-2001*, curated by Jean Clair (1999-2000). Jean Clair was also the curator of the exhibition *Melancholy: Genius and Madness in the West* (Grand Palais, Paris 2006). On the metaphorical dimension of Saturn and melancholy, the T2 Torino Triennale exhibition *50 Moons of Saturn*, curated by Daniel Birnbaum in 2008, used Saturn as a symbolic reference to address the melancholy tones pervading the works featured.

The exhibition *Double Take* and related event *What is the Digital Draw?*, already mentioned in the literature review, address the interface between drawing and photography. Within this field, the work of Vija Celmins has been a sustained influence on my practice. Celmins' highly finished drawings based on photographs foreshadowed (by several decades) the current wave of photorealist drawing, including artists like Paul Chiappe, Richard Foster, Mark-Lascelles Thornton, David Musgrave, Thomas Zimmer, Paul Sietsema and Juan Zamora. Robert Longo is another artist known for making large-scale, hyperreal charcoal drawings of well-known photographs and paintings (made by others). Both Celmins and Longo have drawn images borrowed from astronomical sources. I return to their work in Chapter Three to draw equivalences and differences between the processed and the raw in astronomy images.



39. The Stanley and Audrey Burton Gallery. 2022. *Views of Seeing Stars exhibition*. [Photographs]



40. Ruff, T. 2008. *cassini 01*. [Chromogenic Print]. At: David Zwirner Gallery

The Cassini Raw Images in Contemporary Art

Considering the long-standing appeal of Saturn and the ready availability of the CRIs, it is unsurprising to find other artists using them. Two significant contributions to the field will be discussed in this section. One is Thomas Ruff's *cassini* series (begun in 2008), where Ruff singles out individual CRIs and enhances their abstraction using colour. The other example is a video work by artist Tom Ireland entitled *Actuality Picture / The Magic Lantern* (2009-2017), which is a montage of all the raw images in sequence, as in a time-lapse video.

Two pieces from Thomas Ruff's *cassini* series were included in *Seeing Stars* (figs. 40-41). In *cassini*, Ruff continues his tradition to rework images from existing scientific archives. Most of Ruff's work overwhelms the viewer with large-format photo prints. His series *Sterne (Stars)* (1982-1992) are large-scale prints of starry night skies, in *ma.r.s* (2010-2014), images of Mars from NASA are distorted and colourised to evoke a natural, realistic view. In contrast, *cassini* has a more intimate scale and avoids naturalistic colourisation. Colour in astronomical images has two functions: mimic human vision ('natural colour') or highlight specific information ('false colour'). Raw space images are usually black and white because the cameras register more light wavelengths available to our natural vision (Adams, 2013). Colour in astronomical images indicates a *reduction* of the available possibilities (Rehnberg, 2014). In art, colour is conventionally understood as an *additive*, belonging "to the realm of artifice, cosmetic and appearance" (Kane, 2019, p. 71). Colour is an interpretative and communicative tool in art and astronomy – but *what* is communicated differs profoundly. Ruff's colour in *cassini* is neither naturalistic nor informational, acting more like *noise*, in the sense that it "halts unconscious processes of data interpretation and in so doing, opens up a space of questioning" (Kane, 2019, p. 72). On the other hand, while colour may boost abstraction and negate conventional resolutions of this kind of images, it can also be seen as a *signal* to those alternative resolutions.

There is an essential aspect of the CRIs that Ruff has overlooked and that contributes to their abstract appearance: the artefacts (glitches and noise, for example) so idiosyncratic to raw data. Whether Ruff has corrected them or deliberately chosen images without them is irrelevant; what is significant is that the 'raw' visual manifestations that denote the presence of the imaging apparatus are not in Ruff's *cassini*. This

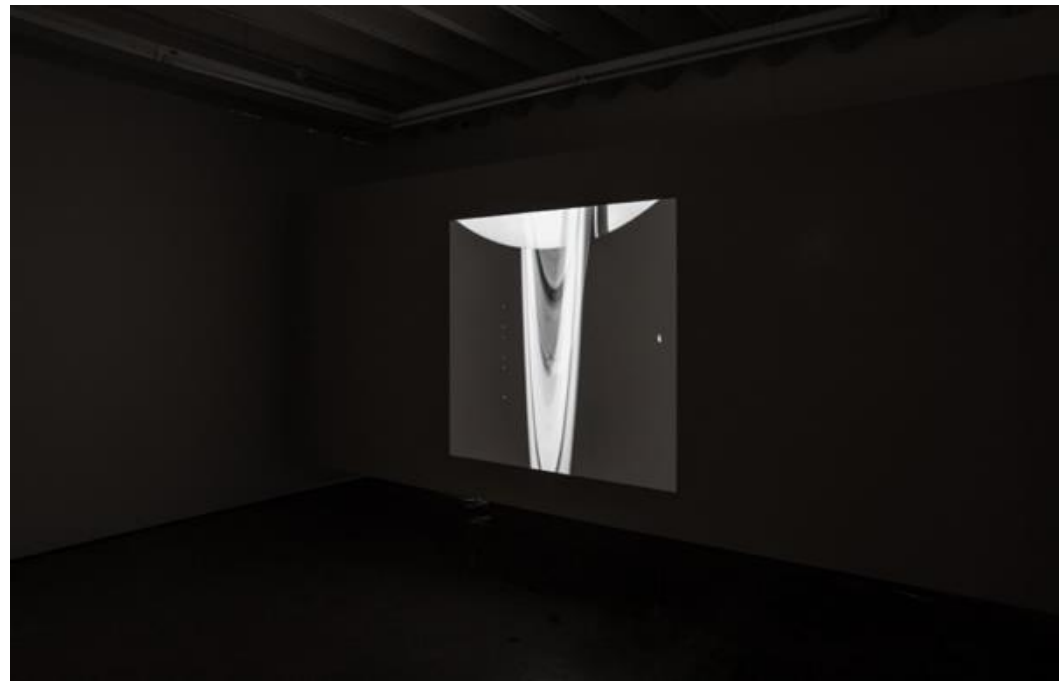
indicates, again, that Ruff is interested primarily in foregrounding the raw abstraction of nature. Foregrounding the abstract character of raw nature denotes the CRIs as neutral.

Ruff himself explains that he was attracted to the already-abstract beauty of the images and that colour was his way to enhance this: “to make it a kind of post-Suprematist photograph” (Artnet, 2014, transcribed by me). Malevich, founder of Suprematism, understood art’s purpose as that of “embodying nature’s true (read, abstract) being” (Shatskikh, 2014). Ruff’s work brings to the fore the abstraction of astronomical images and inserts the CRIs into the alternative narrative of abstract art. But his explicit link to Suprematism also signifies that his attention is directed towards the abstract reality captured by the images (the content). Following the CRIs took my practice along different paths from Ruff’s. My work reacts to the fragmentation and abstraction of the CRIs’ in a more expansive way, considering the deep entanglement of reality and imaging apparatus. As I discuss in Chapter Three, my work addresses other abstract aspects of the CRIs, such as their status as unprocessed public previews (*abstracted from scientific*) and their digital nature (*existing in the abstract*, without a concrete physical body). My ‘drawing with’ methodology enables and entails giving every element the same attention. The artefacts and glitches are attended to as intrinsic parts of the CRIs, foregrounding their constructed nature and interfering with the notion of neutrality and transparency. Next, I discuss Tom Ireland’s artistic response to the CRIs precisely because he draws attention to the issue of neutrality and factuality in our so-called objective representations.

Tom Ireland began working with the CRIs in 2009, the same year I did, and has taken a similar approach: animation. While my 2009 animations were selections of CRIs grouped by content (moons, glares or halos and rings), Ireland has compiled all the raw images into a single animation, *Actuality Picture / The Magic Lantern* (2009-2017). Essentially, Ireland’s film compresses the thirteen-year-long orbit of the Cassini probe into a four-hour time-lapse (fig. 42). The film was screened as part of 2018’s Artists’ Film International which focused on the theme of ‘truth’ at the Whitechapel Gallery in London. In his own words, Ireland’s artistic strategy is “subtle intervention and slight gesture” (Ireland, 2022). It is apparent that the individual images are raw and have not been corrected or enhanced. Ireland’s choice of title is critical. The first half, *Actuality Picture*, alludes to a well-known type of documentary filmmaking, seemingly situating the film as a contemporary extension of the genre. The second half, *The Magic Lantern*, brings a sense of ambiguity or ambivalence to such an assumption by alluding to pre-photographic, mechanical devices used for illusionistic projections. Exploiting a low-tech



41. Ruff, T. 2009. *cassini 21*. [Chromogenic Print]. At: David Zwirner Gallery



42. Ireland, T. 2009-2017. *Actuality Picture/The Magic Lantern*. [Projected Single Channel HD Video]



43. van Vuuren, S. 2018. *In Saturn's Rings*. [Film Posters]

aesthetic, Ireland's film is silent, black and white and jittery. Ireland's minimalistic and subtle intervention goes a long way to problematise the rawness of 'raw data' by questioning notions of truth in what are presumed to be objective representations of reality. Although one can find many virtually identical time-lapse videos of the CRIs on YouTube (for example, <https://www.youtube.com/watch?v=OGCWA6o8LE4>), these lack the critical reflexivity of Ireland's version.

A similar absence of questioning is also apparent in more maximal artistic interpretations of the CRIs, such as the large-format IMAX film created by independent filmmaker Stephen van Vuuren. The film takes the audience "on a 14 billion light-year journey of the mind, heart and spirit from the big bang to the near future via the Cassini-Huygens Mission at Saturn." (IMDb, 2018). The dominant rhetoric of the film is 'the real', stressed on posters, trailers and repeatedly within the film itself, with a telling favouring of the term 'photograph' over 'image' (fig. 43). To create a fully immersive and realistic experience, van Vuuren has employed all cinematic and artistic devices available, there is music, narrative, as well as extreme image processing and enhancement. "We will sail through these photographs thanks to the magic of multiplane animation, a century-old technique pioneered by none other than Walt Disney" (2018, 01:40 of private screener). This explanation of technique seems addressed to ward off potential assumptions of the smooth and seamless images as computer-generated. *In Saturn's Rings* overtly leans into the aesthetic conventions of the Astronomical Sublime, with its seamless, colourful and spectacular images accompanied by smooth, sweeping motion set to slow, dramatic music.

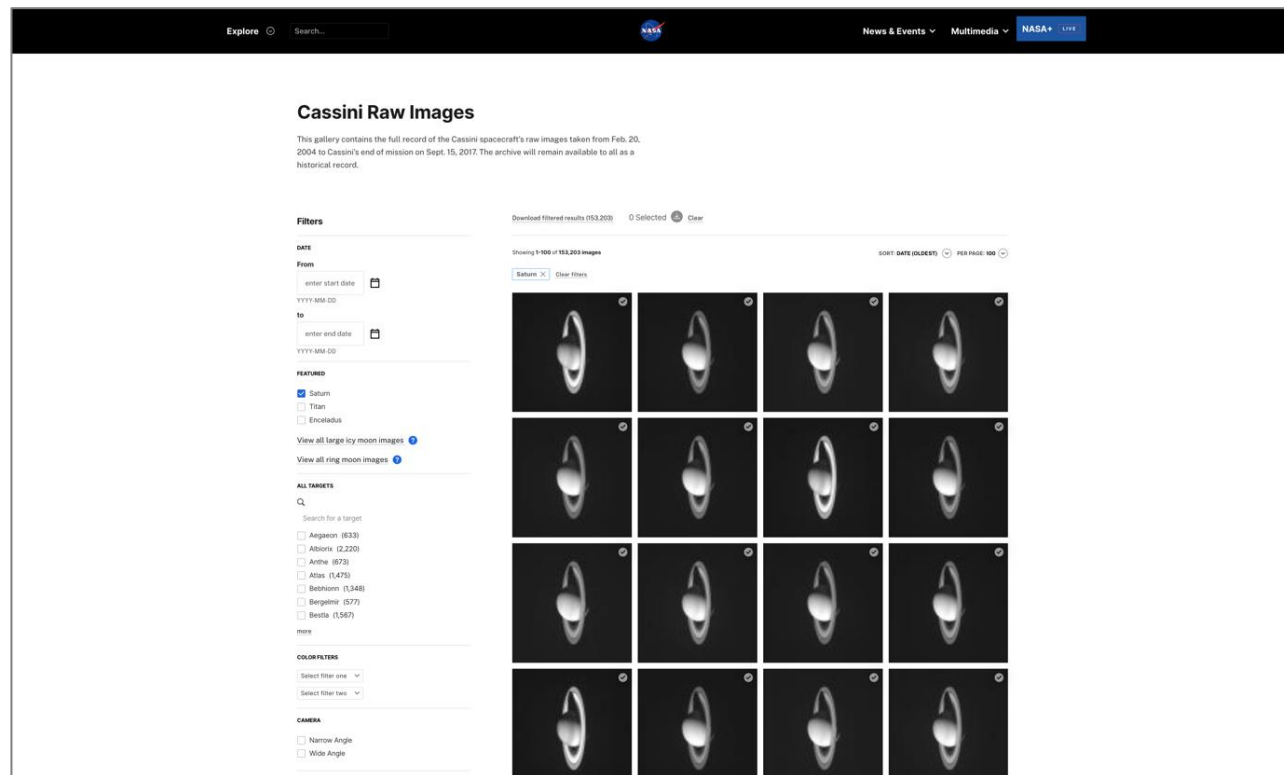
Ireland's and van Vuuren's focus on realism (whether they question or take it for granted) lies in the photographic nature of the images rather than in the motion the artists have added. In contrast, film scholar Tom Gunning argues that the root of cinematic realism rests with motion and not with the indexical nature of photography (2006). Gunning explains that common fixation on a reductive understanding of the index – as a trace of reality – and excludes other types of film modalities, such as animation or digital processes (p. 30-34). Gunning argues that placing motion (whether recorded or created) at the core of cinematic realism enables us to reclaim animation as the intrinsic part of cinema it always was (p. 38). Contrasting Barthes' articulation of the photographic still image as implying the past, Gunning notes how the moving image evokes the present (p. 41). The deeply entrenched notion of the photographic index as an imprint of reality is at the root of the public's (mis)perception of scientific images as photographs, when in fact "scientific imagery is never mimetic" (Latour,

2014, pp. 348-349). Ireland and van Vuuren use motion to enhance the sense of 'here and now'. Even when the use of multiplane animation would seem to contradict the emphasis on the real because it is often associated with non-realistic genres according to Gunning, van Vuuren places the technique unmistakably at the service of the photographic indexical sources to dazzle a viewer with the magnificence of the real.

Despite the nostalgic nods to an old animation technique, van Vuuren's film looks undoubtedly sleek and contemporary. Ireland's contrasting minimalistic approach results in an aesthetic throwback to the early days of cinema. This nostalgic effect, supported by the work's title references to actuality pictures and magic lanterns, slightly undermines the 'live' effect of motion. Nostalgia also masks the digital nature of the images as they evoke the beginnings of an era rather than the cutting-edge technologies that make them possible. I recognised this nostalgia effect as problematic when I made my 2009 short animations. Even if back then I could not articulate why, I instinctively chose melancholy (over nostalgia) in my title. This research has allowed me to delve deeper into the significance of a distinction between nostalgia and melancholy and it is addressed in Chapter Three.

Motion is implied in the CRIs even when encountered as a grid on thumbnails on a website. Anyone can notice their repetitiousness: dozens of near-identical images with the tiniest changes (fig. 44). *They already look like frames*. Motion is also important in my artistic responses to the CRIs. However, my focus on drawing has led me to use it more subtly and in alternative ways, as in my works *Ghost* and *Solid* discussed in Chapter Four.

Each of these artists has understood and reacted to the rawness of the CRIs very differently. Ruff sees Saturn's *abstract* beauty and uses colour to express and enhance it, while van Vuuren enhancement techniques seeks to overwhelm the viewer with Saturn's *natural* beauty. Ireland leaves the images entirely unenhanced to unsettle the documentary quality of the raw images. All these works resolve the CRIs as if Saturn were a stable concept. As we shall see throughout this thesis, the very idea of Saturn itself becomes more abstract, fragmented and fluid in the process of 'drawing with' the CRIs. Although Ruff has explicitly attended to the digital in other series, most notably *jpegs* (completed in 2007), he has chosen to leave digital idiosyncrasies out in *cassini*. As some critics have noted, using digital technologies has been deeply absorbed into our relationship with images and no longer seems to demand critical consideration (Rattemeyer, 2013). Ruff, Ireland and van Vuuren underplay the digital technologies they lean on, instead preferring to evoke the



44. Fraga, H. 2018. *Computer screen looking at the Cassini raw image viewer*. [Screenshot]

analogue processes those digital technologies mimic. Is this indicative of nostalgia for a pre-digital world or a 'blind spot' of the post-digital era caused by the ubiquity of digital media? Does it even matter that the CRIs are digital?

In this practice research, the digital nature of the CRIs matters immensely because the application of 'an epistemology of interconceptuality' entails giving the same attention to every aspect (Cazeaux, 2017). As digital images, the CRIs are primarily encountered and embodied in individual electronic devices. Only the experience of making –and a methodology rooted in reflexive practice– manifests the complexities of handling such digital relics.

Introduction to the following Chapters

The following chapters will examine the practice produced as part of my investigation. It is important to understand that the making of these works did not occur in the linear way they are arranged in this discussion. In many cases, making was an overlapping process, especially across works discussed in separate chapters. However, when issues arising from one work led to another, this is stated explicitly. The works have been divided into chapters to focus the discussion on certain topics.

Chapter Three, 'Drawing with Analogue Means', focuses on responding to the CRIs drawing by hand. This Chapter examines the relationship between the 'analogue' aspects of handmade drawing and the digital technologies needed to access the CRIs. Chapter Four concentrates on 'Drawing with Digital Means', where the practice is primarily executed digitally from start to finish. The photo mosaic is appraised as a tool for digital drawing. Chapter Five, 'Drawing with it All', picks up where Chapters Three and Four end, focussing on a single work that combines hand-made and digital processes. Finally, Chapter Six presents a conclusion on the practice as a whole and reviews the contributions to knowledge made by the research.

Chapter Three

Drawing with Analogue Means

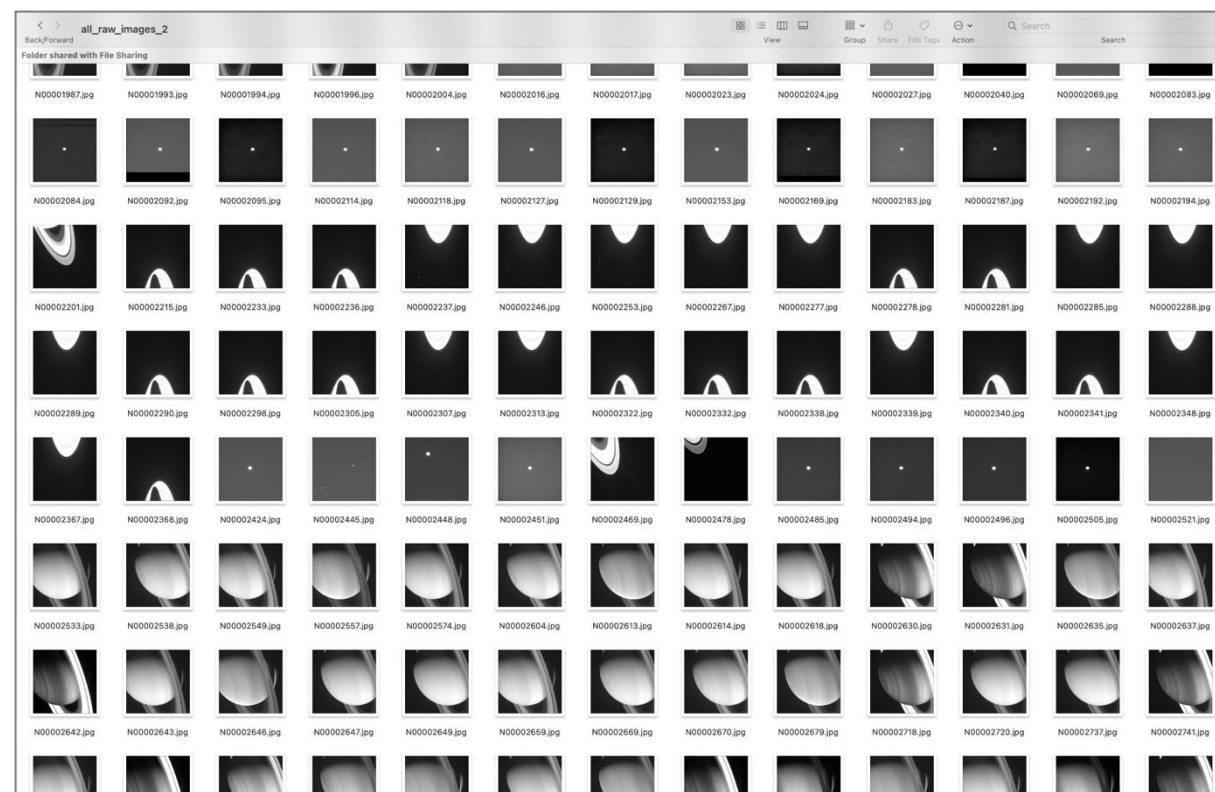
The Draw of the Raw

Three hundred ninety-five thousand eight hundred ninety-seven files downloaded to my computer backed up in another hard drive. I spend hours scrolling through endless files, ‘tagging’ any images that grab my attention to order some print copies. Immediately, I am overwhelmed with possibilities. What size? What type of paper? Matt or gloss? Every choice brings about gains and losses. What I gain in tactility, I lose in resolution. I wonder whether the prints are as raw as the digital files still on-screen or whether the computer files are as raw as the copies –virtually identical– saved on the hard drive. Something of the rawness seems irreparably lost when the images are printed, extracted from the screen and their native digital format. I wonder whether rawness is relative or absolute. The raw has a powerful draw, but is there a difference in seeing the CRIs as ‘raw materials’ or ‘raw data’?

This chapter examines the process of ‘drawing with’ the CRIs using analogue means. The term analogue is chosen deliberately to address the continuity of ‘transmission’ between input (the mark-making instrument or process) and output (the trace or register of that input) and to contrast with its presumed opposite, the digital, which is an intrinsic part of the object of desire. I have found a strong echo of my own desire to respond to the CRIs through drawing in translator Kate Briggs’ words:

The lines producing the initial desire to write (what Barthes calls ‘the hope of writing’) are those that, in their irreducible, unalterable, necessary power, invite, open themselves up to, make a stage for the collaboration – the audacious counteraction – of the active force that is me (2017, p. 117)

Briggs frames translation as *doing something new in the name of againness*, a new thing in the world that will “gesture toward its origins, to its already existing first manifestation.” (p. 230). The sentiment resonates with the translation of an existing photograph into a drawing. The CRIs are not the authored literary works that inspire Briggs; their irreducible and unalterable qualities are due to being the smallest and unprocessed units from which bigger images might be built (fig. 45). The CRIs are notably incomplete fragments of larger wholes: the entire set of raw images, the complete data collected by the Cassini mission, the entire history of empirical observation of Saturn and the even larger whole of humankind’s relationship with Saturn.



45. Fraga, H. 2018. Screenshot of folder with Cassini raw images. [Screenshot]

'In the Raw' with Materials

As raw, astronomical images, the CRIs were taken *to be altered*, processed, validated and calibrated; this much is made clear by their official denomination as 'unvalidated and uncalibrated' images (NASA, 2021). They are *raw materials* from which scientific knowledge will eventually be extracted. Yet, my experience of handling the CRIs is that their 'rawness' imbues them with an aura of untouchability (fig. 46). As *raw data*, they carry specific properties of instrumental objectivity and authenticity. Photographs and scientific representations are laden with this aura of *unmediated truth*, problematically seen as mirrors of nature (Cazeaux, 2015; Daston, 2014; Kemp, 2014; Latour, 2014). We might know that raw data is never neutral, natural, context-free or perfectly objective, yet we tend to perceive it as autonomous and authoritative (Gitelman, 2013; Daston & Galison, 2007; Barrowman, 2018). The contrast between how raw data should be perceived and how it is perceived is akin to how David Pye laments the perception of art materials in *The Nature and Art of Workmanship*:

We talk as though the material of itself conferred the quality. Only to name precious materials like marble, silver, ivory, ebony, is to evoke a picture of thrones and treasures. It does not evoke a picture of gray [sic] boulders on a dusty hill or logs of ebony as they really are – wet dirty lumps all shakes and splinters! Material in the raw is nothing much. (1968, p. 18)

The analogy with Pye's sentiment helps us think about the (mis)placement of value in the common perception of raw data. Raw data is seen as silver or ebony instead of as material in the raw. Thinking of raw data as material 'in the raw' is *not* to situate as 'natural' – that would be to fall in the same trap, but to emphasise the need for raw data to be treated (processed, interpreted) to be of value-use. In most appraisals of the CRIs, Saturn is the bringer of quality to the CRIs. "Saturn cannot take a bad picture", states a science journalist (Street, 2017). But, in the raw, the CRIs are indeed nothing much – many are bad pictures. Their low resolution, glitches and artefacts are fractures, seams or scars (the 'dirt' and 'splinters') that make the imaging apparatus *conspicuous*. Besides their photographic and digital idiosyncrasies, as digital entities, they have no material fixed bodies *of their own*. They exist as multiple identical iterations of themselves, as many as devices to view, download, store and display them.



46. Fraga, H. 2018. Selection of printed Cassini raw images on studio floor. [Photograph]



47. Fraga, H. 2018. *Saturn to the naked eye, as captured by smart phone.* [Photograph]



48. Fraga, H. 2018. *Saturn in the telescope, as captured by pointing smart phone to the eyepiece.* [Photograph]

Embedded in the CRIs are seemingly conflicting meanings of 'raw', and the depth of this entanglement becomes apparent when one attempts to *handle* them. Even the most straightforward printing process foregrounds just how *digital* the CRIs are (figs. 45-46). Digital imaging is accused of turning photography into an "increasingly disembodied medium" because screens are diminishing our "opportunities for a tactile engagement" (Riches, 2009, p. 32). Even at this early stage, practice highlighted *everything* the CRIs are not: they are *not* chromogenic prints as in Ruff's work; they are *not* film frames as in Ireland's work. These are material bodies *given* to them, neither entirely arbitrary nor inevitable. The CRIs 'in the raw' are digital files that must be downloaded and/or viewed through the mediation of an electronic device. The deceptively simple act of printing just a handful of images led me to think about such 'raw' conundrums with regards to the CRIs but also with regards to Saturn. Saturn is, after all, accessible 'in the raw' to the naked eye and the magnifying power of telescopes. The sight of Saturn through a telescope is often said to be transformative (Andersen, 2016; Sobel, 2006), and it was something I had yet to experience, knowingly. How could I continue to explore the concept of Saturn without this experience? To have material for comparison, on a clear night in June 2018, I drove to the outskirts of Leeds where members of the Leeds Astronomical Society had agreed to show me Saturn (figs. 47-48).

The Sun finally set, and a few bright stars were scattered across the cloudless sky. "That's Venus, and that's Jupiter," someone said, "so that one must be Saturn". Just like that? So bright, so... there. I wondered how many times I had seen it before, unwittingly. Then, the telescopes were set up. I put my eye to the eyepiece, and... there, I see it. The body and the rings are unmissable. The vision is fragile, tremulous, and slippery due to atmospheric disturbances and Earth's rotation. Here is a vast, alien, distant object. Yet, the impression is of intimate closeness. Here it is. And here I am. Saturn and I share a moment in the present. But it is not long before the astronomers take their eyes off the eyepiece and connect their cameras and laptops, effectively transforming the telescope into a camera that can now stack multiple pictures. The camera-telescope machine smooths out the raw imperfections that had been, for me, the most essential part of the experience. It was those imperfections that made space-time tangible, substantial, and continuous.



49. Fraga, H. 2018. *A pencil drawing of Saturn encased in enlarger lenses.*
[Photograph]



50. Fraga, H. 2018. *A video showing a drawing submerged in water with the image inverted.* [Video Still].

For some philosophers (Pomian, 1998; Schwenger, 2006), even our natural senses produce representations (pictures). Within this extreme understanding of the human experience as irreparably entrapped in representation, melancholy can be regarded as intrinsic to all perception since perception “always falls short of full possession” (Schwenger, 2006, p. 2). Photographs are considered notably melancholy objects precisely because they foreground the spatial or temporal distance between a beholder and the object photographed (Lopes, 2003; Sontag, 1973; Barthes, 1982). However, not all pictures are equal and not all optical devices make ‘pictures’ (Walton, 1984). Unlike the picture-producing camera, a microscope or a telescope is more readily accepted as an *extension* of our natural vision – even if it enables a different type of cognition to that of the naked eye alone (Pomian, 1998). If it were a picture, the picture of naked-eye or telescope Saturn is ‘nothing much’: a featureless pinprick of light the former, a trembling blob in the eyepiece the latter. Multiple astronomers’ accounts recognise how it is the realness of Saturn, the fact that it is not a picture, that seduces the most (Dunphy, 2018; Gaherty, 2015; Ventrudo, 2018). The interferences produced by the atmosphere and Earth’s movement profoundly impacted my experience of seeing Saturn through the telescope. The rawness of the object’s dithering in real-time is what makes the experience impactful, a first-hand reminder that, indeed,

The eye is not a passive camera that records the world but an organ that experiences it. As such, it always distorts, invents, blurs, and bends, and our perception of the world is only ever an approximation that the body imagines. (Huberman, 2019, p. 2)

Astronomers’ accounts of live observation ascribe their transformative power to Saturn’s greatness regardless of its diminutive size on the eyepiece (Dunphy, 2018). These sentiments echo those cited earlier about Saturn’s ‘natural beauty’. A key moment for this research was the personal realisation that the experience had been powerful not *despite* limitations and constraints but *because of* them. This led to the reaffirmation that the CRIs were alluring not despite their errors but because of them, a sort of ‘rawness of the real’. My practice sought to explore the ‘rawness of the real’ in the CRIs, not by comparing it to the live encounter with Saturn, but in its own terms, in their displaying of the picture-making apparatus, in their remote, deferred, digital existence as pictures.

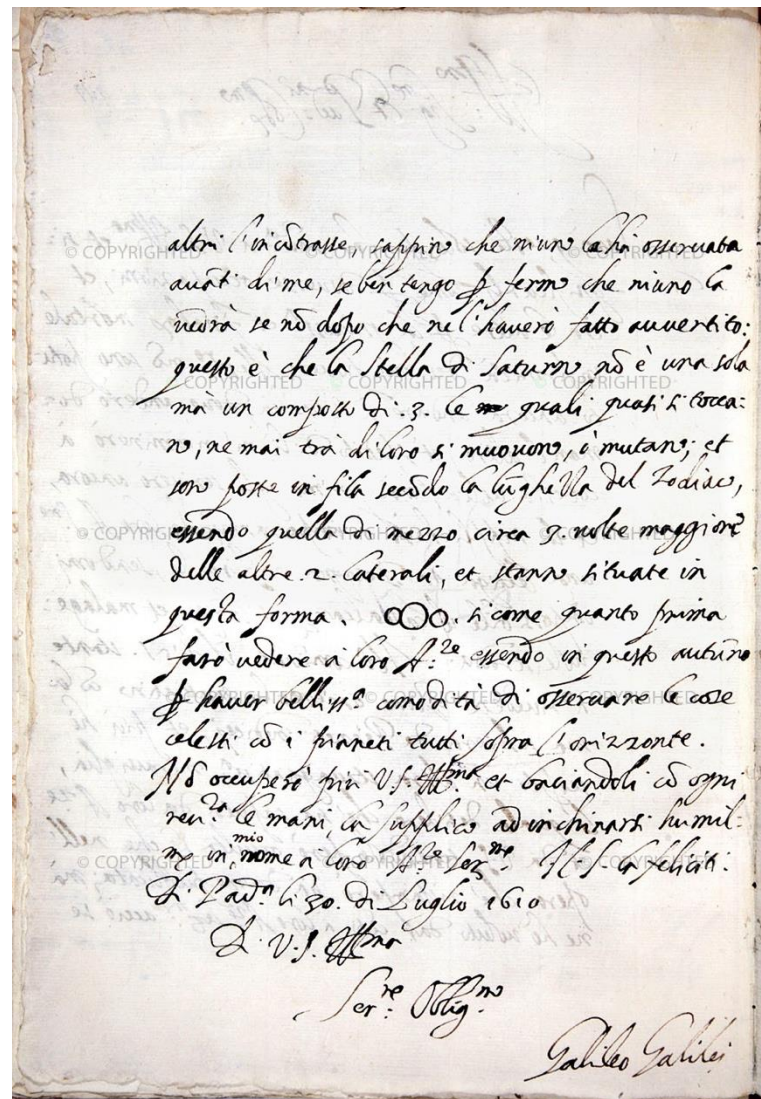
The issues raised by the deceptively simple process of printing the CRIs impel a reflective pause and, alongside the experience of seeing Saturn ‘live’, a series of experiments began to emerge in the studio,


addressing the experience with the telescope (figs. 49-50). and other significant historical astronomical images. At this stage, drawing is a tactic for circumventing the CRIs, exploring other significant images from the history of astronomy. These works are important to the discussion because they demonstrate the breadth of drawing approaches at the beginning of the research.

Drawing around

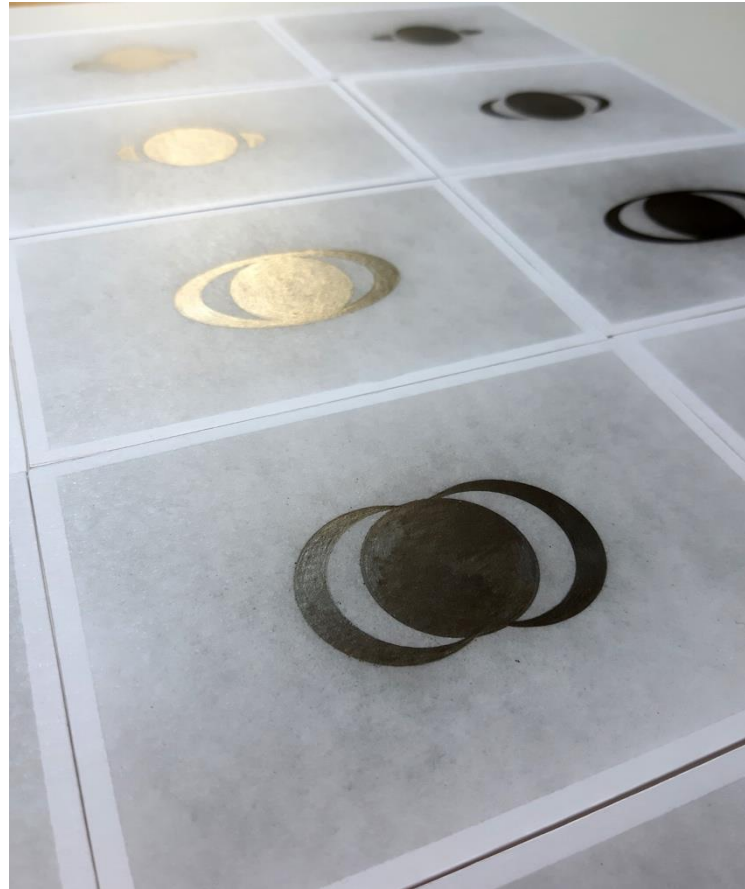
Seeing Saturn through a telescope made me think of the time of Galileo and the first-ever telescopic observations. When Galileo pointed his by-today's-standards rudimentary telescope towards Saturn in 1610, Saturn appeared to be a triple star (figs. 51). Galileo described his observation with a hand-written (or hand-drawn) 'oOo' but a later letter shows Galileo's bafflement when the side stars disappeared (Partridge & Whitaker, 1896). Galileo's observations denote a *before-and-after* in our observation of Saturn. Critic, Melanie Bono, notes "Galileo's wider view into the depths of the universe altered not only the entire world picture as previously held but also the concept of sight" (2011, p. 49). *Before*, astronomy and astrology were not separate disciplines, and the firmament was considered a known and fixed entity (Colwell, 2017, p. 20). *Before*, empiricism and mythology were often conflated, as demonstrated by Galileo's own words – pointed out by curator Birnbaum (2008). *After*, domains would become irreparably severed. *After*, the universe would be thought of as unknown but ultimately, thanks to ever-advancing technology, knowable. Reading through astronomy blogs (Dunphy, 2018; Gaherty, 2015; Ventrudo, 2018), it becomes apparent that disbelief among first-time lookers is due to the resemblance of what appears in the eyepiece to previously seen images. Today's bewilderment lies in the trouble ratifying the live experience against those familiar but second-hand precedents. Galileo's had no precedents; today, we have too many.

My piece oOo pays tribute to that first period of Saturnian bewilderment rooted in the rawness of the new and unprecedented. Taking as title Galileo's hand-written-drawn description of Saturn, oOo comprises thirteen postcard-sized drawings and an animated gif (figs.1-3 and 52). The drawings are based on a diagram (fig. 53) published by Christiaan Huygens in his *Systema Saturnium*, reproducing the evolution of nearly five decades of observations, including Galileo's (1659). Unlike the source, in oOo, the figures are drawn in negative (dark against light) and reverted to positive in the animation, foreshadowing an artistic strategy later applied to the CRIs. This work reconstructs iconic but irrevocably outdated images of Saturn, a pre-photographic time when

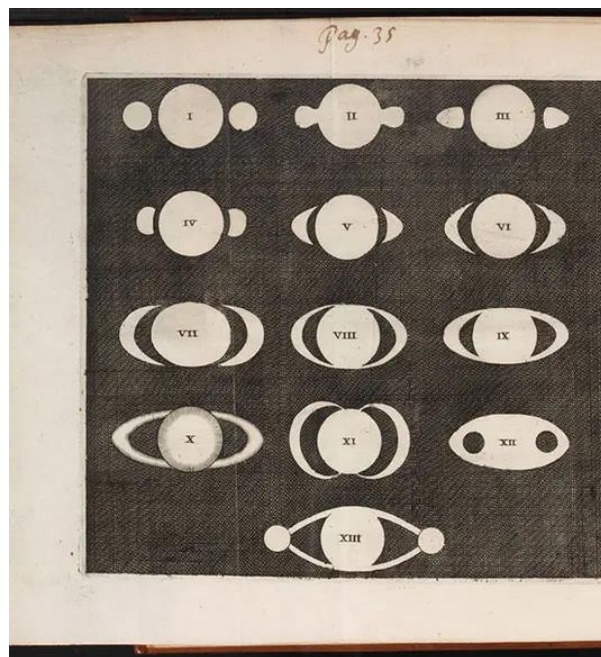


non posse in fila scedo la lunghezza ou
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51. Galilei, G. 1610. Letter to Belisario Vinta. [Handwritten Letter]. At: Florence, Biblioteca Nazionale Centrale. Ms. Gal. 86, f. 42r



52. Fraga, H. *Close up of oOo drawings in the studio.* [Photograph]

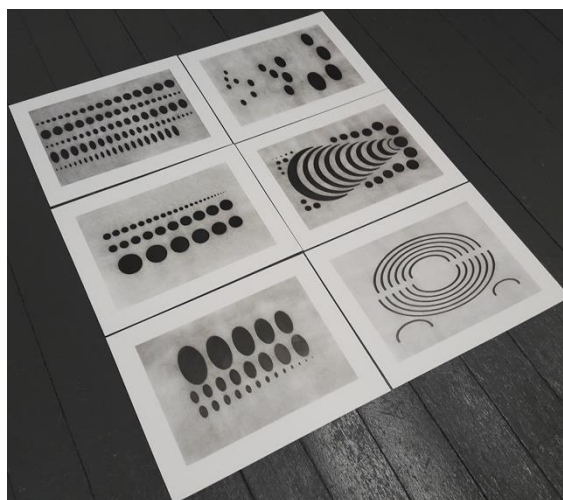


53. Huygens, C. 1659. *Drawing of Saturn by various observers 1612-1656.* [Engraving]. At: Linda Hall Library

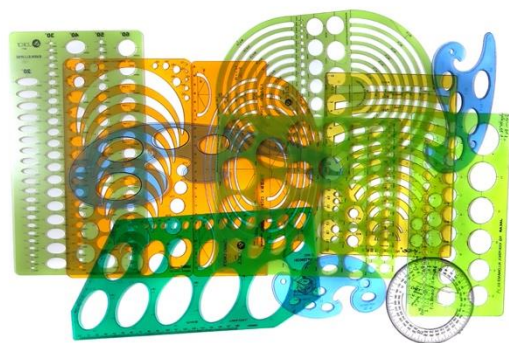
observations had to be recorded and shared through drawings. Much attention has been given to how Galileo's drawing skills transformed our ability to see the Moon as a three-dimensional object (Hentschel, 2000, p. 15). Galileo's hand-made 'oOo' translates seamlessly into *typed* text (the one you are reading) yet remains closer to drawing than writing. It is only in hindsight that oOo can be seen to foreshadow an exploration of the relationship between hand-made and digital drawing, discussed in Chapter Four.

Alongside oOo emerged the series *Figures*. Unlike oOo, the compositions in *Figures* use the readymade shape arrangement inside stencils and do not intentionally resemble any specific phenomena (figs. 4-5 and 54). The circle, the ellipse and the hyperbole are essential shapes in astronomy, representing the shapes of celestial bodies and the trajectories of those bodies in space. What each drawing means is left unexplained and open-ended, even as the title, 'figures', alludes to the explicative function of these types of pictures. The small series of fourteen drawings denotes the beginning of the practice's acknowledgement of its working materials. Attention is moving away from simply placing the drawing tools at the service of a pre-planned image (as in oOo, made with the same stencils) and moving towards drawing 'with' the stencils (fig. 55). These two works employ a diagrammatic and minimalistic style; the oOo animated GIF utilises a more realistic aesthetic. While still unnaturalistic, the inverted drawings playing in sequence recall the unsteadiness of Saturn's image in the eyepiece.

Using a very different graphic style to oOo and *Figures*, the series *Specimens* resulted from thinking through the idea of 'firsts' in technologically mediated exploration. *Specimens* are a group of three figurative renditions made with graphite on paper of vessels built and used to carry humans to the deepest parts of the ocean and the surface of the Moon (figs. 6 and 56). The drawings feature not giant rockets or ships but the small vehicles that performed the last legs of those journeys: Alvin, a deep-ocean submersible built in the 1964 (Woods Hole Oceanographic Institution, 2023), and a lunar lander and command module from the Apollo missions to the moon (NASA, 2019). Most space exploration occurs remotely through ever more advanced robotic crafts and space-bound telescopes. Saturn remains too remote for such a type of exploration and has no ground to land on, unlike the ocean, the Moon, Mars, or even Titan (Saturn's largest moon). The objects are recognisable as icons of a specific period, a period of 'firsts', but enough detail has been withdrawn to suggest that the drawing could also depict a maquette or a model. Perspective and *chiaroscuro* create a realist depiction and an aesthetic of romantic melancholy, evoking the romance of the adventurer, the risk-taker. The title, 'specimens',



54. Fraga, H. 2018. *Figures series on the studio floor*. [Photograph]



55. Fraga, H. 2018. *Various stencils used to make oOo and Figures*. [Photograph]

has a built-in ambiguity, simultaneously suggesting a typical example and a *rarity*. With that term, I was thinking about the vessels and the humans that would venture inside, standing in for all humanity and standing out as a breed apart.

In *Specimens*, and to a great extent also in *oOo*, photographs – through the digitised versions – are only reference material; the drawings' focus is their content. Drawing around the CRIs by responding to images from the expanded universe in which the CRIs exist was useful primarily for *maintaining* a drawing practice. The 'outsourced' prints of CRIs made clear that focusing on content alone would imply overlooking their objectness, their materiality or lack thereof. Even a direct-to-print process foregrounded the loss of 'something' of the raw digital original. Experiments moved onto analogue alternatives to 'extract' the CRIs from the computer that would somehow *acknowledge* this loss.

The term alternative is chosen by organisations like AlternativePhotography.com or the London Alternative Photography Collective (LAPC) to champion the practice of historical (analogue) photography methods. The Sustainable Darkroom is an offshoot of LAPC that promotes using sustainable and environmentally friendly photographic materials (Fletcher, et al., 2023). The work of artist and researcher Melanie King (founder of LAPC) centres on various analogue antiquated processes (fig. 57). King is concerned with the materiality of photography in relation to the astronomical image in her research project (2023). King often captures her own images of celestial phenomena but also re-images existing digital images from NASA or ESA through her analogue methods.

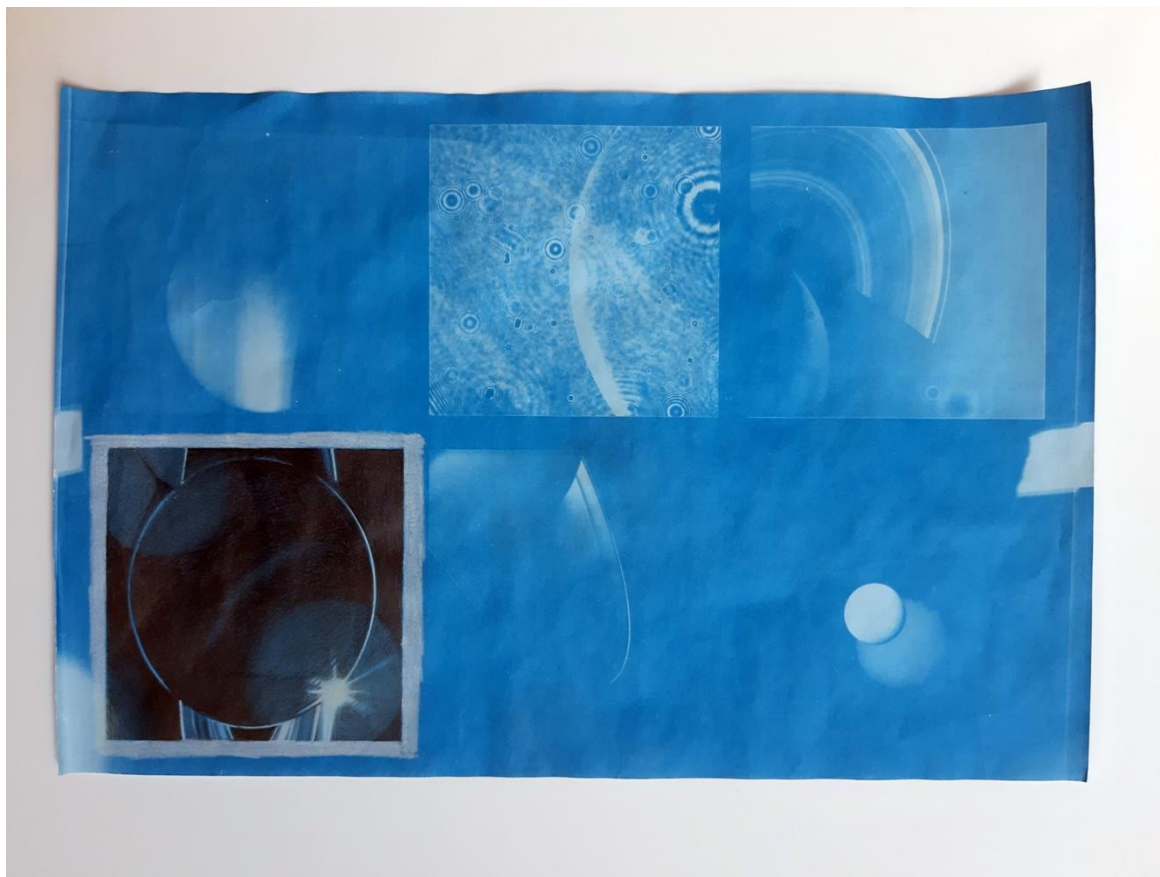
The idea of making cyanotype prints from CRIs was inspired by these alternative photographic practices and the desire to give the digital CRIs an analogue body outside the virtual domain of the computer. Analogue photography, through the cyanotype, became a crucial step for the practice. To make a cyanotype print, a 'negative' must be fabricated: selected images were inverted digitally and printed on clear acetate (fig. 58). The inversion of the CRIs marks a pivotal moment in the development of the practice. The next section of this chapter explores how making this work enabled a reflection on how analogue drawing navigates the digitalness of the source material.



56. Fraga, H. 2023. *Specimens installed at Sunny Bank Mills*. [Photograph]



57. King, M. 2015. *The Orion Nebula*. [Cyanotype]



58. Fraga, H. 2018. *Early experiment with cyanotype, with added pencil on the bottom left corner*. [Cyanotype and pencil]

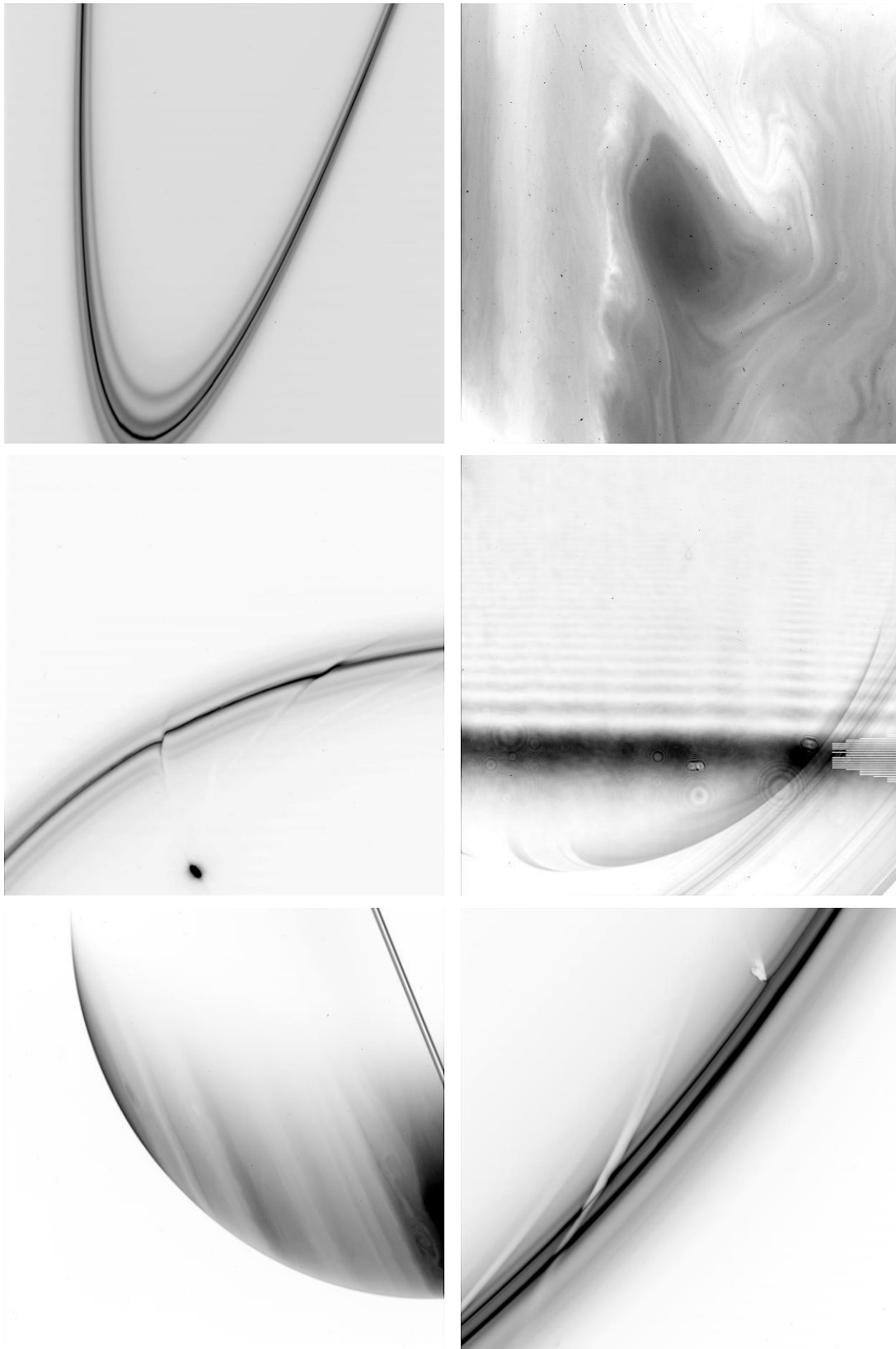
Analogue Drawings of Digital Photographs

*I am drawn to the CRIs that are most abstract. Those with objects or lines extending beyond the edges. Those with the most dramatic or psychedelic glitches. Those where Saturn's orb is only seen in fragments, crescents or sharply interrupted by the harsh profile of the rings. Those featuring the F ring, the most string or line-like of all, the one that cannot be seen from Earth, the one on the edge of the main rings. Seeing these alluring images **in the negative** was a moment of release. The linear character of Saturn's rings was there in the positives, of course, but now I no longer need to subject these lines to be just representations of them. I can now see them as lines. I no longer see Titan's atmospheric halo; I see an incomplete fuzzy circle. I revel in the lines, streaks, rings, blots, smudges. I revel in the mark-like character of these images. This is how the images open themselves up to drawing, to be drawn by me.*

The concept of drawing is well embedded in the history and etymology of photography. In *The Pencil of Nature*, William Henry Fox Talbot, inventor of the negative-to-positive process, refers to his images as 'photogenic drawings' (1844-46). It is still worth remembering that photography was invented as a *technical support for drawing*. The inverted CRIs evoke the well-trodden adage of light's 'drawing' on a light-sensitive surface and leaving a latent negative image. But that is not the only way they summon drawing; they also happen to display many quintessential characteristics of drawing. The now-lighter background recalls the neutral blankness of paper surfaces on which most drawings are produced. The now-dark features resemble, above anything else, *drawn marks* (fig. 59). Furthermore, out of all types of marks, it is *the line* that dominates many images. Seen as drawings, the inverted images are re-interpreted – made again – as drawings, through drawing (fig. 60-61).

Revealing in abstractions

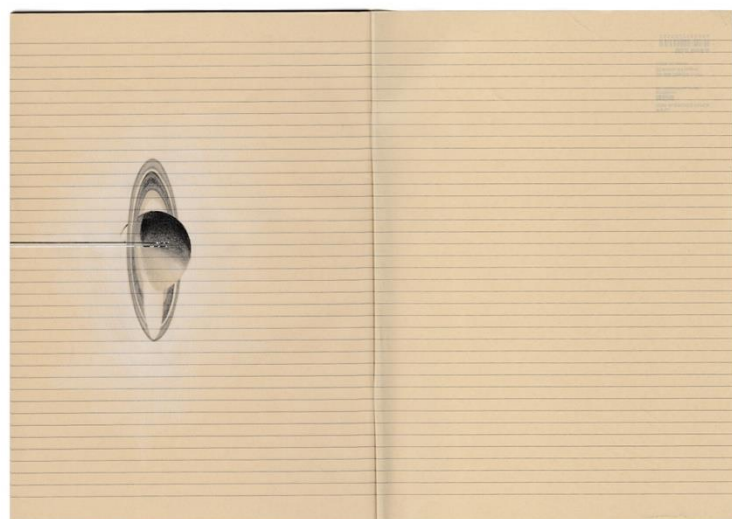
The work *Incognito* (figs. 7-10) instantiates thinking through the concepts of abstraction and materiality. Distributed as uncalibrated and unvalidated data, the CRIs are thus *abstracted from* the linearity of scientific measurement and interpretation. Their designation as 'previews' reinforces their nature as *abstracts*, excerpts of what is to come. Their public status and the user-friendly format imply an invitation to process and respond.



59. Fraga, H. 2018. A selection of inverted Cassini raw images. [Digital images]



60. Fraga, H. 2018. *Studio experiments, drawing with pencil and white colour pencil on various papers.* [Photograph]



61. Fraga, H. 2018. *Drawing on lined sketchbook.* [Pencil on paper]



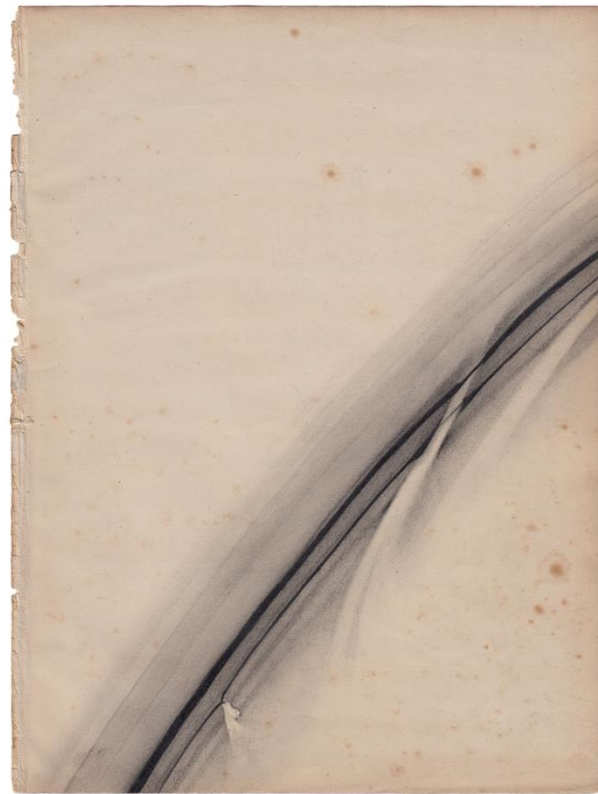
62. Fraga, H. 2018. *Blank antique papers.* [Photograph]

Astronomical images are generally perceived as anonymous (attributed to a corporation rather than individuals), as data they have “little relevance to national security and, unlike meteorological or climate data, have little to no political valence” (McCray, 2014, p. 913). The CRIs can be owned by anyone and everyone. Making an artwork out of them might change the status of the images. Ruff’s, Ireland’s or mine are authored and copyrighted artworks while the CRIs remain unauthored and public (the raw images fit these two notions even better than processed images). As source material, they are abstracted from controversy; it makes little sense to discuss them in terms of *appropriation art*. Outside the linearity of a scientific information-extraction process, the CRIs are effectively *found photographs*. The use of vernacular photography in art is said to imbue artworks with a dose of reality and an air of profound mystery while preserving their poetic potency and avoiding any definitive interpretation (Bush, 2003). Incompletion is intrinsic to the CRIs. They are objects in limbo, in abeyance. Drawing single CRIs over their processed counterparts sustains this sense of abstraction, abeyance and mystery.

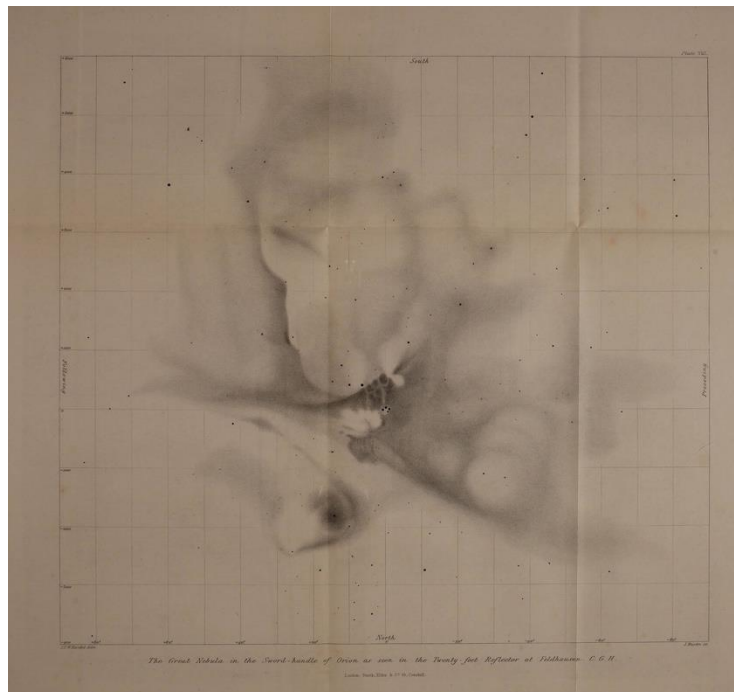
As born-digital media, the CRIs also exist *in the abstract*. They are, effectively, bundles of information in the form of images and their bodies and locations are fluid, subject to different types of decay from those afflicting analogue photographs. Identical files multiply in endless electronic devices, each iteration as ‘original’ or ‘real’ as any other. Digital images dematerialise our photography experience, the accusation goes. Screens diminish the “opportunities for a tactile engagement with the increasingly disembodied medium” (Riches, 2009, p. 32). Writing about Tacita Dean’s book of flea-market photographs, Mark Godfrey laments that “one day soon there will be no more discarded photographs that have been taken, rejected, fingered, scratched, lost, found and wondered about, no more object/images cluttering our lives” (2005, p. 119). This perception expands beyond old flea-market photographs and their patina of lost human narratives to photos from magazines or books such as those collected by artist Vija Celmins for her drawings. Even such multiples, by having material form, can “become unique objects that bear the traces of age and use” through the act of being collected and used as referents for drawing; they “take on the properties of the artworks that result, becoming tactile, specific, and intimate” (Jacobus-Parker, 2019, p. 87). The CRIs are digitally *handy*, easy to download, view and copy, but until (or unless) they are ‘extracted’ from the electronic device, they lack those charming traces of age and usage: tactility, specificity and intimacy. Celmins began making her drawings of photos (found or taken by herself) in the sixties, long before the widespread use of digital imaging – the photographs she used had fixed



63. Fraga, H. 2018. *Incognito (Negative Drawings, 001)*. [Pencil on Paper]



64. Fraga, H. 2018. *Incognito (Negative Drawings, 006)*. [Pencil on Paper]



65. Herschel, J. c1834. *Results of astronomical observations made during the years 1834, 5, 6, 7, 8, at the Cape of Good Hope*. [Pencil on Paper]

paper, size and resolution. As Faure Walker writes, since “we value the raw and the gritty: crude charcoal, the leaky pen, anything low tech” (2008, p. 78), digital images are stubbornly seen as disembodied and lacking in personality.

Drawing the CRIs in the negative and on aged paper is far removed from the high-finish common to photorealist drawing (fig. 62-64). Highly precise drawings of photographs, such as those by Celmins, are said to “put images back in the ‘real world’ by the real-time of her laborious hand drawing” (Petherbridge, 2010, p. 281). In *Incognito*, ‘putting images back in the real world’ is a form of overcompensating. Photographic and technological rawness has been replaced with the rawness of the hand-drawn and the ostentatiously aged paper. The papers used in *Incognito* are genuinely aged, displaying the signs of ageing (yellowing) and ‘foxing’ (brown spots). Purchased from online retailers and of diverse origins, they all have a noticeable raw edge showing that they had been torn carelessly from a once-bound-together whole. These blank papers were once discarded like those flea-market photographs, then found and re-packaged, loose and unbounded. These papers are raw fragments, readymade carriers of those valued signs of age and use. Perfectly imperfect and conspicuous.

The drawing expands the process of abstraction that the digital inverting had begun, the abstraction of the image’s photographic identity. And with the withdrawal of the image’s original identity, the identity of the content also withdraws. It is not about Saturn’s rings; it is about lines. The antique paper gives the images an exaggerated tactility, specificity and intimacy. There are no masked-off margins to, as Petherbridge explains, separate and resolve the enclosed area from the uncertain space and scale of the paper (Petherbridge, 2010, p. 165). A masked-off edge also gives a sense of finality to the drawing, an added frame-within-a-frame. Pushing the composition to the edge draws attention to the paper as the only – readymade, found – framing device. But the idiosyncrasies of the paper compete with the pencil marks, making the ground on which the drawing stands obtrusive. The patina of the paper becomes a *fictional* part of the drawing. Besides exaggerating materiality, the aged paper also exaggerates time. While the Cassini imaging team might be attempting to overcome the shortcomings of Cassini’s cameras, my work had led me in the opposite direction, leaning into their ‘digital relic’ nature, the CRIs are now encoded in a body that evokes a time much more distant than their original one, fictionally simulating a longer elapse of time between the image-drawing’s production and the viewer’s encounter with it. The hand-made drawings in *Incognito* would never be mistaken



66. Mann, S. 2003. *Battlefields, Cold Harbor (Battle)*. [Gelatin Silver Print].
At: National Gallery of Art, Washington.



67. Fraga, H. 2018. *Incognito (Positive Prints, 006)*. [Print]

for photographs – as photorealist drawings often are. Instead, they resemble quick sketches that could have been torn from a modernist's sketchbook or a nineteenth-century astronomer.

To draw in the negative was once a typical way of recording astronomical observations – William and John Herschel's inverted depictions of nebulae in the mid-1800s are among the most well-known examples (fig. 65). Making 'negative astronomical drawings' is still praised among amateur astronomers considered better for foregrounding specific details (Rix, 2015). In such cases, it is the astronomer who translates what they see into its negative. Drawing (by hand, in the positive or the negative) was once the primary tool to record, share observations, and collectively *resolve* what was seen (Nasim, 2013). The Christiaan Huygens diagram used as a reference for *oOo* – which incidentally I made 'in the negative' – shows just how long this resolution could take. For *Incognito*, however, the inversion pre-dated the hand-drawing process. Drawing the inverted was not a way of getting closer to a resolution or knowledge, but a way getting further from their photographic resolution, *a way of being 'with' the CRIs unresolved state*. Inverted, the CRIs resemble drawings, so *making* them into drawings is a fulfilment, turning allusion into actuality, an abstract entity into a concrete one. In *Drawing Investigations*, Sarah Casey and Gerry Davies demonstrate how drawing still plays an unparalleled role in scientific enquiry, generating information in unique and idiosyncratic ways while integrating the artist/scientist as a component of the investigative apparatus (2020). I found that drawing in my project was attempting to play a different role from the one it serves in astronomical observational drawing. *Is drawing always a form of resolution or can it sustain rawness?*

The qualities of unresolvedness and abstraction are a profound part of the CRIs' allure, but they are elusive qualities. Rawness becomes slippery when you are not trying to resolve it. In her introduction to Phaidon's survey of drawing, Emma Dexter writes of drawing: "its very nature is unstable, balanced equally between pure abstraction and representation, its virtue is its fluidity" (2005, p. 10). Petherbridge expands this, defining drawing as "an immanence, always pointing to somewhere else – to a chain of serial development, another condition, another state, even when, as a gestural flourish, it appears to have said everything in the most economical manner" (Petherbridge, 2008, p. 37). My act of drawing from the CRIs was not seeking to generate information – to resolve – in the scientific sense discussed above. If anything, my drawings render the sources unviable as carriers of objective information. Hand-drawing the images gives them a concrete, tactile, aged –

and still ageing – body, but the actuality of drawing is that of allusion. Another manifestation of how ‘drawing with’ had found a way of resolving the CRIs while staying ‘in the abstract’.

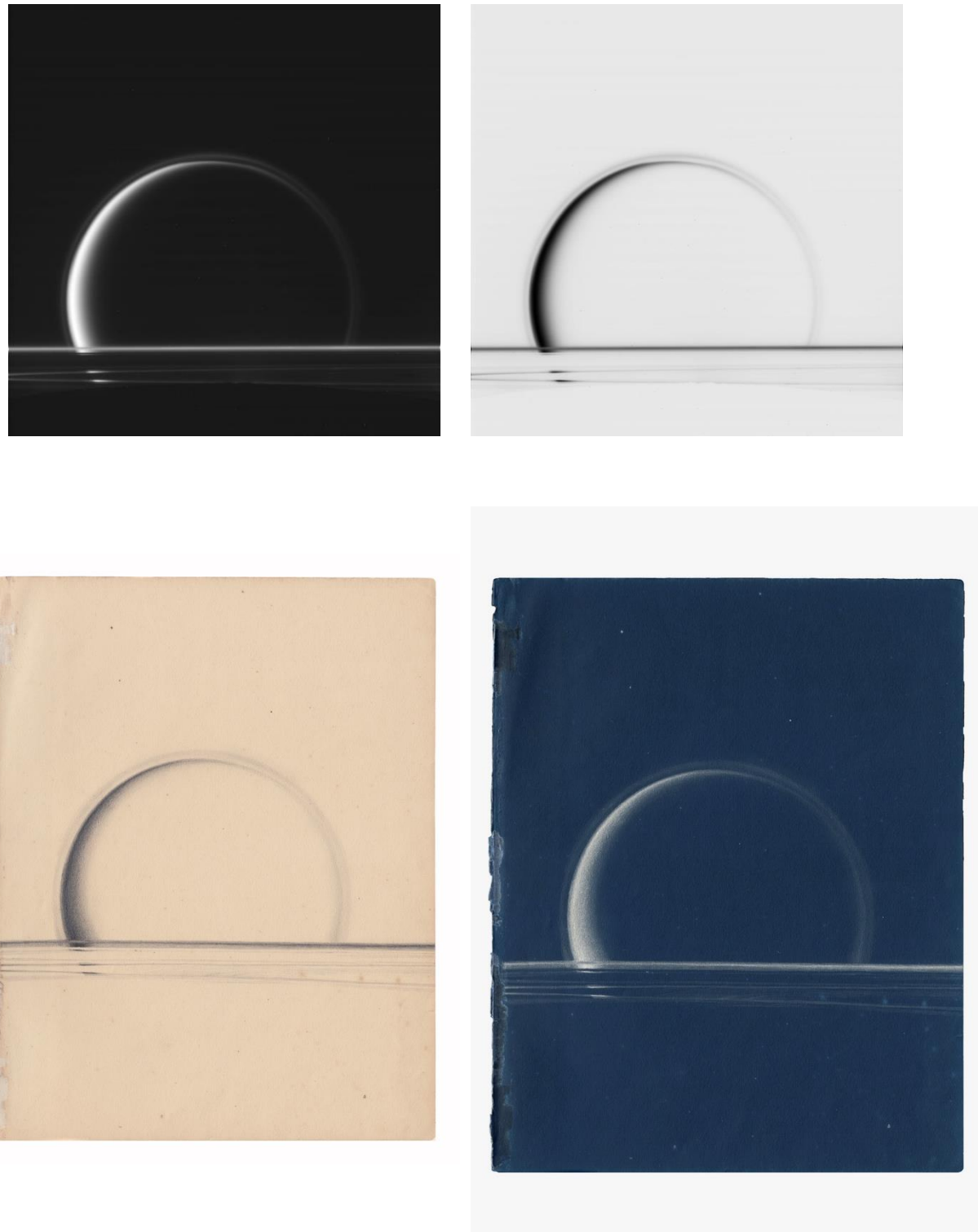
Turning Negatives into Positives

Drawing, the discourse goes, preserves our child-like wonder on the ‘miraculous’ conjuring of images; drawing is pure, uncontaminated, lowly, direct, anti-monumental and, at times, close to being the holy grail of the dematerialised object (Dexter, 2005, p. 7). Drawing is praised for its material and temporal presence as much as, paradoxically, its dematerialisation of the art object. What is seen as a positive in drawing is often characterised as a negative in the digital. The adulation of the manual and temporal aspects of drawing mirrors much of how archaic photographic techniques are appraised. Photographer Sally Mann uses nineteenth-century photographic techniques, such as ‘wet collodion’, in which the manual coating of a glass plate inevitably causes visible imperfections (fig. 66). Artist Tacita Dean often sets the analogue in direct opposition to the digital, ascribing a meaningful poetic depth to analogue processes with words like “miracle” or “magical transformation” (Dean, 2011). According to philosopher Peter Benson, the flaws of old techniques connect us to reality *precisely because they obscure it*, embracing them is a way of holding onto a sense of reality endangered by the digital (2013). Manovich astutely points out how such romanticised interpretations unwarily recycle criticisms against the digital that were once made against analogue photography, first seen as a carrier of the “inhuman, devilish objectivity of technological vision” (2003, p. 242).

Drawing in the negative impelled me to re-invert my drawings into new positives – this was done by scanning and digitally processing the drawings (fig. 67). These new inversions were produced as enlarged prints (fig. 68). Inserting the drawings *back* into the digital realm (and extracting them again with another body) is another way to *stay with the rawness* of the CRIs: avoiding giving any one object the final word. Ruff’s *cassini* has a sense of finality and wholeness to each print, with their high-quality state-of-the-art production values. In contrast, my drawing is made on aged paper in a visible state of decay and deterioration, fraught with flaws. In the inverted drawings, these flaws are confounded with my pencil marks; but the different nature of the two remains noticeable. In the new positive prints, however, the two types of marks are consolidated. Tonal variation is tempered, it becomes harder to distinguish what is a pencil mark and what a ‘foxing’ spot, what is made and what found. In these positive prints, the hand-drawings are made less object, more image, more



68. Fraga, H. *Incognito* installed at Sunny Bank Mills, Leeds. [Photograph]



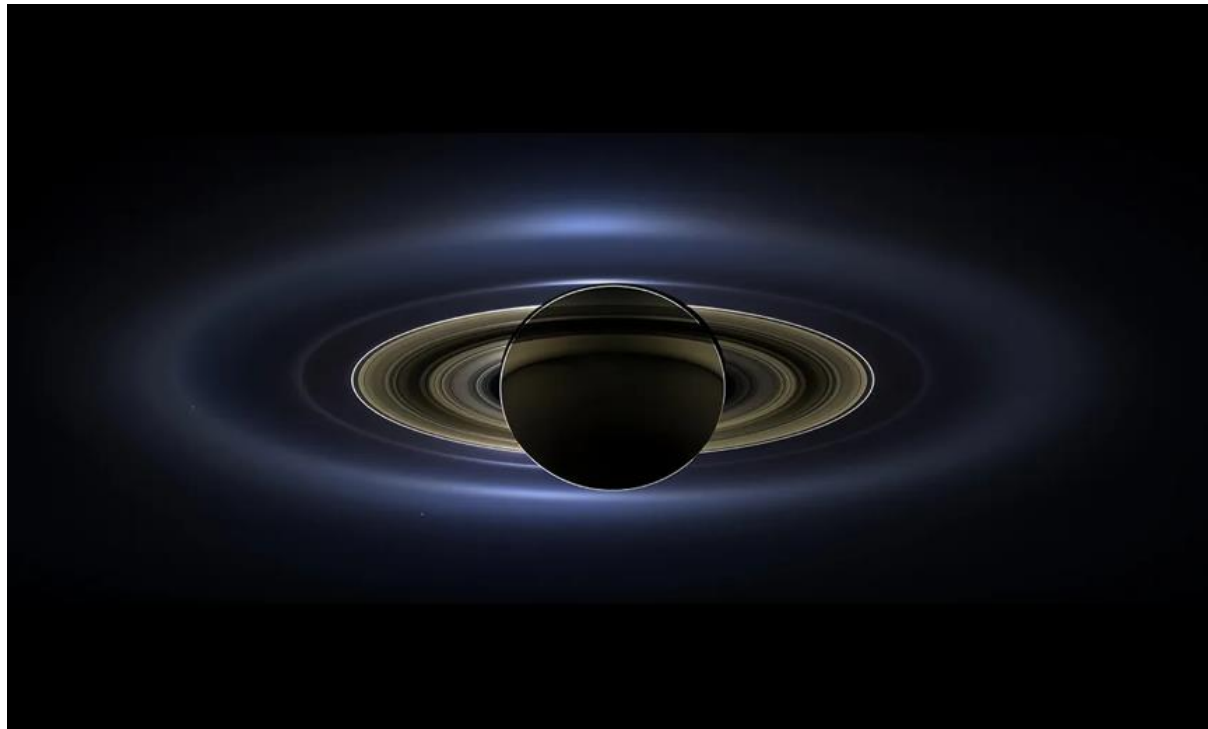
69. Fraga, H. 2018. *The transformations of a Cassini raw image in Incognito: from original (top left), to inverted (top right) to drawing (bottom left) to print (bottom right)*. [Composite Image]

readily interpretable in a photographic way. The deep blue hues and rough edges recall the unevenness of light-sensitive chemicals coated onto photographic plates in traditional photographic processes, a throwback to the cyanotype experiments that prompted the initial inversion of the images. The prints simultaneously – and paradoxically, perhaps – affirm and deny the drawings’ identity as an autonomous art object. The prints denote the ‘negative’ drawings as an intermediary, while reinforcing their aura as unique ‘originals’ from which more copies can be made. In *Incognito*, the digital origin of the CRIs and the digital processes involved in the making (inverting and re-digitising) are largely withdrawn from view, nor are easily deducible. So, is *Incognito* concurring with or parodying an idealised understanding of the analogue and the manual?

Incognito embodies my grappling with the issues surrounding drawing and photography without necessarily reaching a conclusion. *Incognito* might seem a nostalgic move *backwards*, concurring with the idealised and romanticised view of the analogue. But, framed as an outcome of a process of ‘drawing with’, it can be seen a way of moving *forward with* the implicit unresolvedness of the source material. In this sense, drawing is a process of thinking akin to what Ingold terms ‘joining with things’ rather than ‘joining things up’ (2021, p. 13). Joining with things involves connecting to their ever-emerging forms while joining things up takes things as already-formed.

Drawing the inverted textures of Saturn’s atmosphere and the lines of the F ring was pure joy. I revel in copying the subtle changes of line, from solid and assertive to diffuse and dubitative. Saturn and the CRIs became bringers of ‘drawable’ marks. I appreciated Saturn’s rings for their line-like qualities. Lines were a reality, not just the illusory effect of distance and photographic reproduction.

“Within copying”, Petherbridge notes, “the terror of authorial intentionality can be put on hold” (Petherbridge, 2010, p. 283). Inverting the CRIs enabled a new perspective on them which in turns enable drawing with more freedom from the photographic ‘document’ while retain the pleasure activity of copying. According to Ingold, accuracy refers to the proximity to a standard or target, while precision implies care and responsiveness, “the capacity to flex in response to others’ movements” (2021, p. 13). Making the negative drawings in *Incognito* was intensely pleasurable because it was an exercise of copying, but it no longer demanded the level of accuracy of photorealism. *Incognito* was driven by the rigour of precision, not of accuracy.



70. NASA. 2013. *The Day the Earth Smiled*. [Collage of 141 Cassini raw images]



71. Eyerman, J. R. 1966. *Technicians at work*. [Photograph] At: National Geography Image Collection

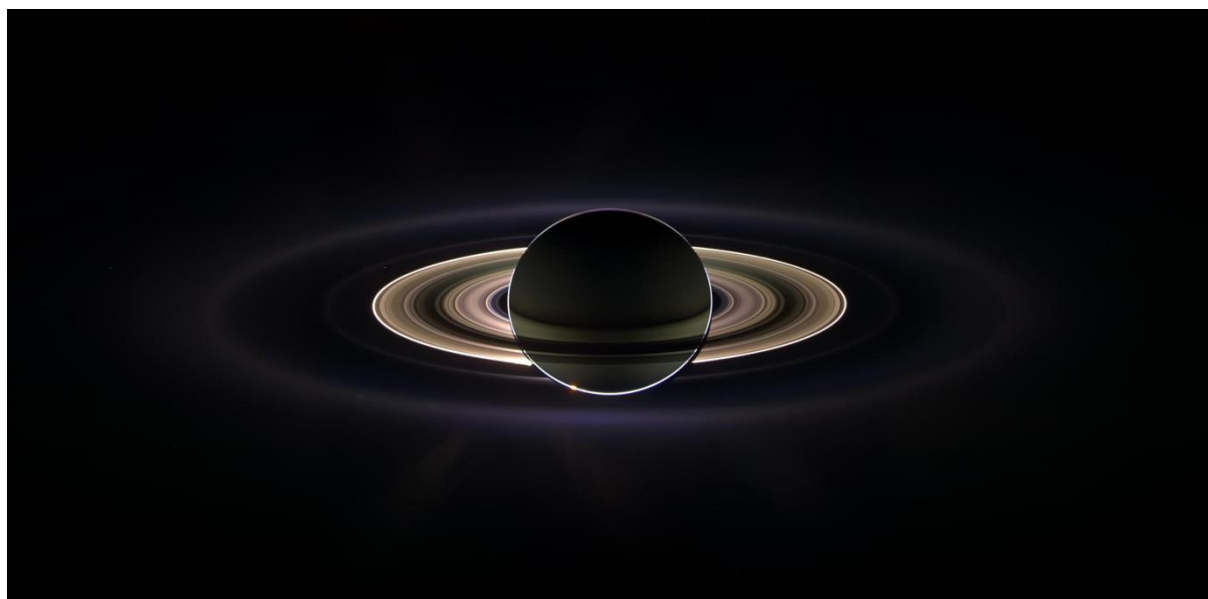
I now turn to how making *Incognito* addresses the theme of Saturn and melancholy. Saturn and melancholy are most profoundly bound by metaphor. For example, the slowness of Saturn's orbit and melancholy's slowness are related by analogy (Klibansky, et al., 1979, p. 159). Fragmentation, incompleteness, futility and loss are common traits of melancholy (Olalquiaga, 1999; Bowring, 2008). In *Incognito*, such qualities are exaggerated. The individual CRIs chosen for the drawings are highly ambiguous and my pencil marks are dedicated to the features in the images which are part of Saturn – much like Ruff does. But unlike Ruff, the paper contributes the flaws and other idiosyncrasies that become analogous to the photographic-digital idiosyncrasies in the CRIs. I use drawing as an enhancer of fragmentation and incompleteness, abstracting the images further from their responsibility as photographic mirrors. Making *Incognito* was, more than anything, a way of thinking through the presumed loss, or lack, brought about by the digital: materiality, temporality, depth and realism (fig. 69). For despite my efforts to stay with abstraction, ambiguity and unresolvedness – which are drawing's strengths – I was still losing *something* critical of the originals. I was unable to retain the fluidity and ambiguity of their digital identity. The focus on an individual image per drawing also demanded overlooking the collection's vastness and repetitious, jigsaw-like, nature. The title, 'incognito', was initially intended to refer to how Saturn was depicted in the CRIs, unfamiliar and abstract. But gradually became a reminder of the things that remain incognito in the work itself. *These new objects I made, the new drawings and prints, were stubbornly something other than the objects that had inspired them. And a part of me could not help but mourn that loss.*

In Saturn's Shadow

A sense of loss propelled the practice forward to consider clusters of images, instead of individual ones. The drawing *In Saturn's Shadow* addresses the disappearance of seams in contemporary astronomical mosaic images. Most processed, contemporary images of astronomical phenomena are composites of dozens, even hundreds, of raw images (fig. 70). This is true of many official images from the space missions or amateur images that use software to instantaneously 'stack' hundreds of frames. Nowadays, digital technologies enable these compositions to be almost entirely seamless, whereas before, multiple images would be collated by hand and disclose the seams (Whiting, 2009, p. 43). The fragmented aesthetic of early handmade mosaics was the accidental result of technological limitations (fig. 71). Although the descriptions that accompany those



72. Celmins, V. 1971-72. *Moon Surface (Surveyor I)*. [Graphite on synthetic polymer ground on paper]



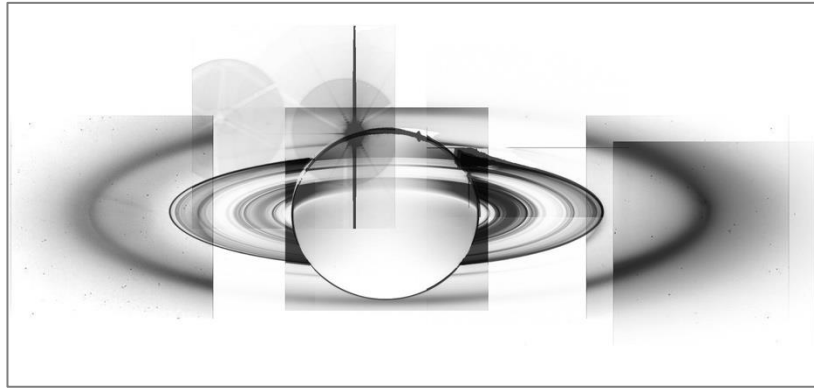
73. NASA. 2006. *In Saturn's Shadow*. [A mosaic of 165 raw images]

images inform of their composite nature, the seamlessness afforded by digital imaging reinforces the rhetoric of the single, unique moment captured in a single, unique shot. Artists that choose to preserve this fragmentation, like Vija Celmins' (fig. 72), "examine how the conflation of automated and artistic vision reconfigure visual experience in the space age" (Whiting, 2009, p. 41). Celmins' drawing is not just about this mechanical way of looking, but a way of working *with* it, by choosing a visibly fragmented image and retaining the seams.

My work *In Saturn's Shadow* was my reaction to an official image published by the Cassini mission that offered a view of Saturn, backlit by the Sun, impossible from Earth (fig. 73). My drawing uses the raw images used in the official composite to offer an intentionally non-naturalistic and flawed reconstruction (figs. 74-75). The work keeps the inverting technique of *Incognito* but returns to the inconspicuousness of a blank, clean-edged, standard-sized paper.

Despite being often used interchangeably, nostalgia is fundamentally different to melancholy. In *The Artificial Kingdom: A Treasury of the Kitsch Experience* (1999), Celeste Olalquiaga builds on Benjamin and Freud to argue that nostalgia and melancholy are radically different. Nostalgia is traditional, symbolic and totalising, using memory to conceptually complete the partiality of events, seeking to protect them from the decomposition of time; melancholy is modern, allegorical and fragmentary, glorifying the perishable aspects of events, seeking in their practical and decaying memory the confirmation of its own dislocation (1999, p. 298). For Olalquiaga, melancholy is superior and capable of generating dialectical images (those that enact a push and pull between opposing forces). The move away from the antique paper reflects my apprehension about the weight of its potentially nostalgic associations and my desire to favour melancholy. The use of blank, clean-edged paper evokes the unobtrusiveness and transparency of the virtual screen on which the images 'float'.

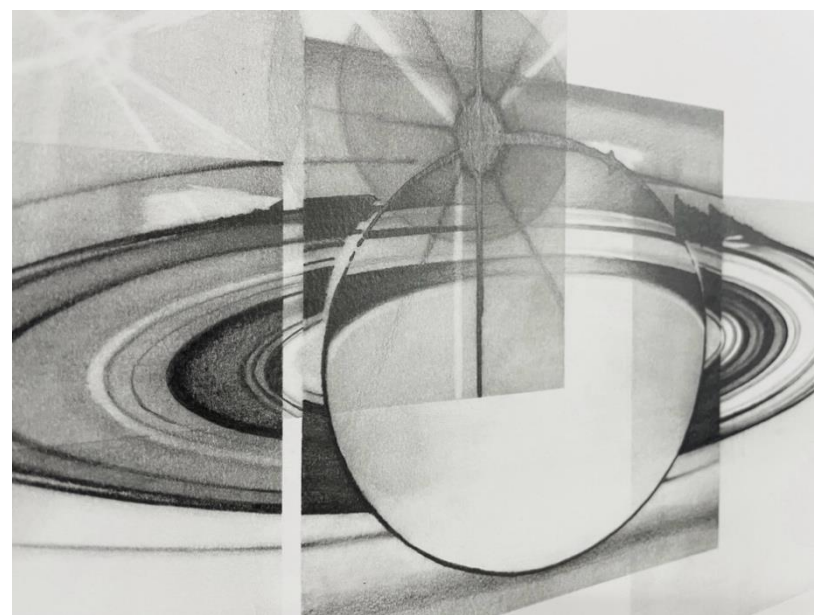
The title, *In Saturn's shadow*, is taken from the official processed composite. What is literal in the original (the spacecraft was *literally in the planet's shadow*) has a metaphorical potential in the drawing. Despite the enhancement of fractures, the drawing still relies on a familiar image of Saturn. The shadow is a potent metaphor in psychoanalytic discourses on melancholy. In his famous phrase, "the Shadow of the object has fallen upon the ego", Freud meant that a person absorbs the image of the lost object into herself, and anger is



74. Fraga, H. 2019. *Digital composite*. [Digital image]



75. Fraga, H. 2023. *In Saturn's Shadow at Sunny Bank Mills, Leeds*. [Photograph]



76. Fraga, H. 2020. *In Saturn's Shadow (detail)*. [Pencil on paper]

redirected from the thing onto the self (Cregan, 2019). Psychoanalyst Christopher Bollas builds on Freud to introduce his concept of the 'unthought known' to describe a particular kind of unconscious knowledge that individuals possess but are not consciously aware of, so deeply embedded in our psyches that they cannot be easily accessed through conscious reflection or verbalisation (2018). The concept of the shadow of the object and the idea of the 'unthought known' both describe unconscious aspects of the psyche that can influence our perceptions and experiences of the world.

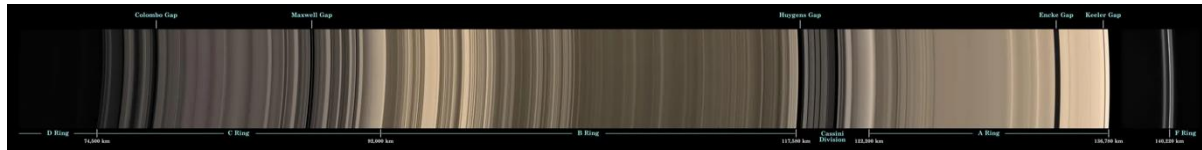
The familiar but mediated, technology-constructed image of Saturn still casting its shadow over me. Was this image so embedded in my mind that I couldn't help but recreate it? Attempts to follow the CRIs unresolvedness by utilising an aesthetics of unfinishedness (the antique paper), fragmentation and multiplication (negative and positives, recreating an uneven mosaic) had not managed to shed the familiarity with Saturn deeply entangled with the photographic apparatus. Both *Incognito* and *In Saturn's Shadow* gesture towards moving away from photographic realism but seem stubbornly contingent on a photographic referent. Psychoanalysis's shadow metaphor, as something that lurks in our unconscious, is useful to articulate the realisation triggered by practice. Thanks to the various methods I was exploring for 'drawing with' the CRIs, I was gradually becoming conscious of the deep grasp this familiar image had on me, and this awareness raised the need to find alternative ways to correspond with the CRIs.

The Raw in Drawing

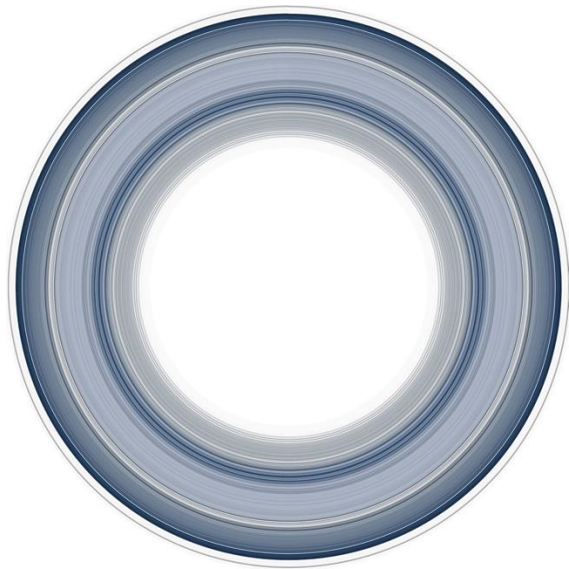
I could not help but feel disappointed with all the work produced so far. Initially, I had thought copying had been the source of pleasure in these drawings, but now I wondered if that pleasure had arisen from the abstraction that the inverting process had enabled. The inversion entailed the mark-making process to concentrate on the lines featured in most of my chosen images. Pleasure had come from the drawing of lines rather than from the drawing of the phenomena that those lines represented (Saturn's rings), which lay somewhat outside of it. This realisation, enabled by the practice itself, catapulted the studio experiments into an exploration of essential form and mark-making for its own sake.

In *Object-Oriented Ontology*, Harman argues that metaphors often arise from recognising a "weak sort of resemblance" between two objects or ideas (2018, p. 119). Furthermore, "the weakness of the link should be visible in the shape of certain *failures*, since when two objects fit together too quickly, and easily it is usually a question of a literal combination rather than a symbiotic link." (2018, p. 120). When we encounter two things that share a slight resemblance or similarity, we may be prompted to make a metaphorical connection between them, seeing one object in terms of the other. Harman argues that recognising the importance of these slight resemblances between objects is vital for a genuinely transformative understanding of the world. This is important because it was the superficial resemblance between Saturn's rings and a vinyl record that prompted new studio experiments (figs. 77-79).

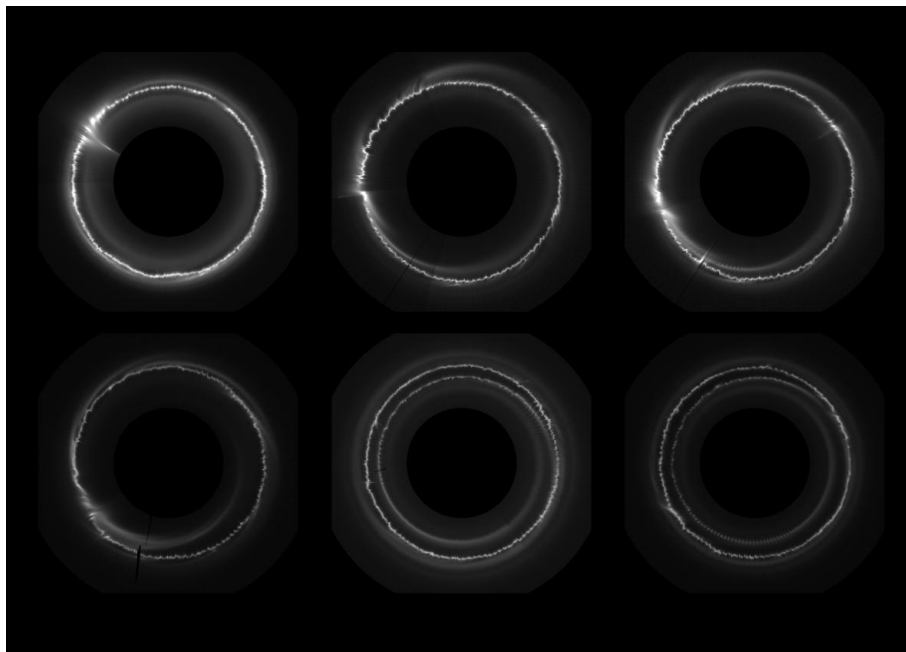
Recognising such a resemblance prompted me to start drawing with a turntable I *happened* to have in the studio. Initially, the reference to the rings informed drawings of self-contained circles and spirals, made by holding my hand very still while the machine rotated the paper. But gradually, 'process' took over 'image' (figs. 80-90). Drawing with ink on wet paper began to distort how this gesture was recorded. Then, the hand started moving, resulting in even more distortion between the originating gesture and its trace on the paper. Other experiments sought to break the circle by pre-cutting the paper, drawing on the mixed-up pieces, and re-assembling it back to its original form. Then, the turntable was used to disrupt previously made marks. Quick abstract drawings made with water-soluble graphite would be placed on the turntable to be re-drawn using only water. Eventually, the turntable was outgrown.



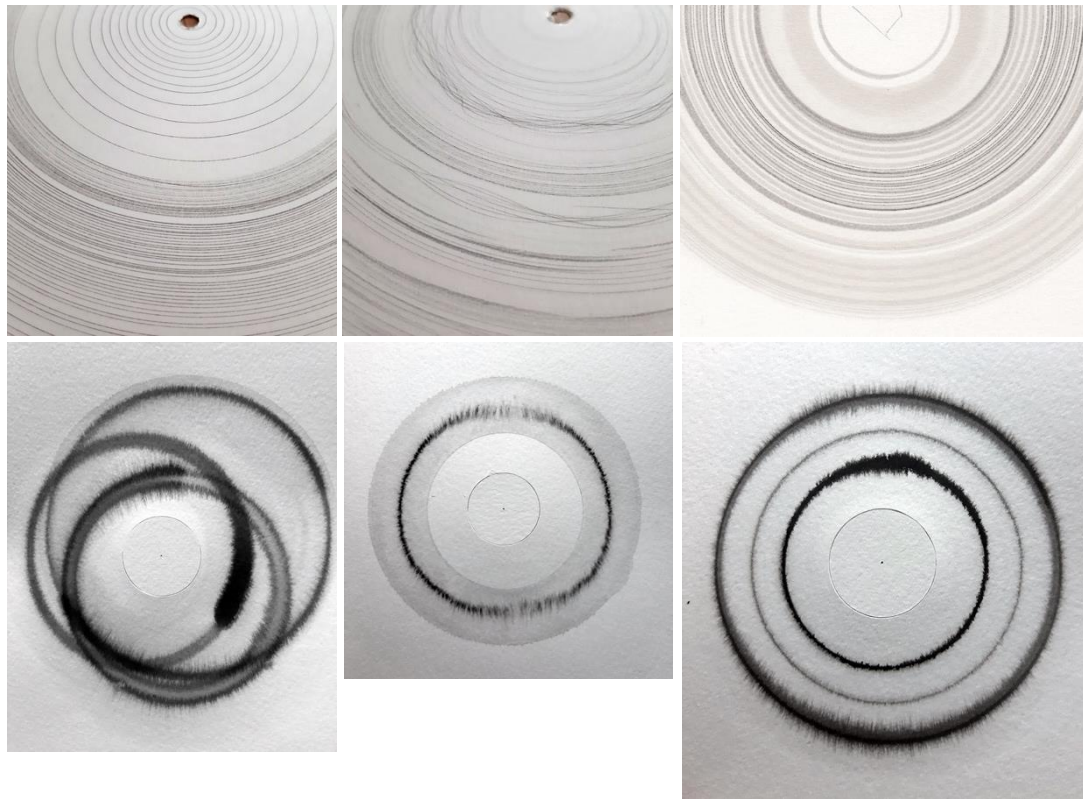
77. NASA. 2007. *Expanse of Ice*. Image showing a 'slice' of Saturn's rings [Mosaic of 45 raw images]



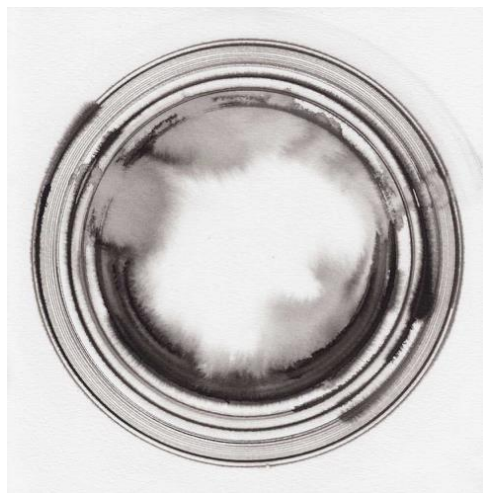
78. Fraga, H. 2020. *Digital image created by modifying NASA's image of the 'slice' of rings*. [Digital image]



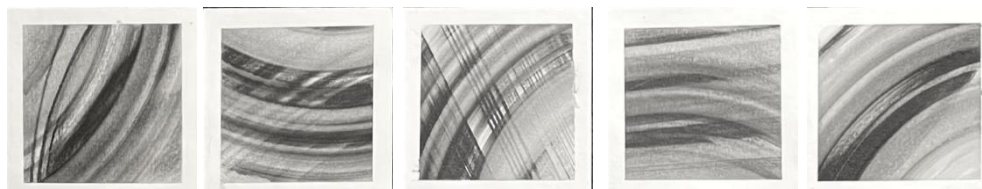
79. NASA. 2006-2008. *PIA15505: Wavy, Wiggly Ring*. [Digital Image] A composite image exaggerating Saturn's F ring to make radial structures more visible]



80. Fraga, H. 2020. *Early drawings with the turntable*. [Ink on Paper]



81. Fraga, H. 2020. *Combining wet and dry* [Ink on Paper]



82. Fraga, H. 2020. *Small turntable drawings*. [Water-soluble Graphite on paper]

Autofiguration

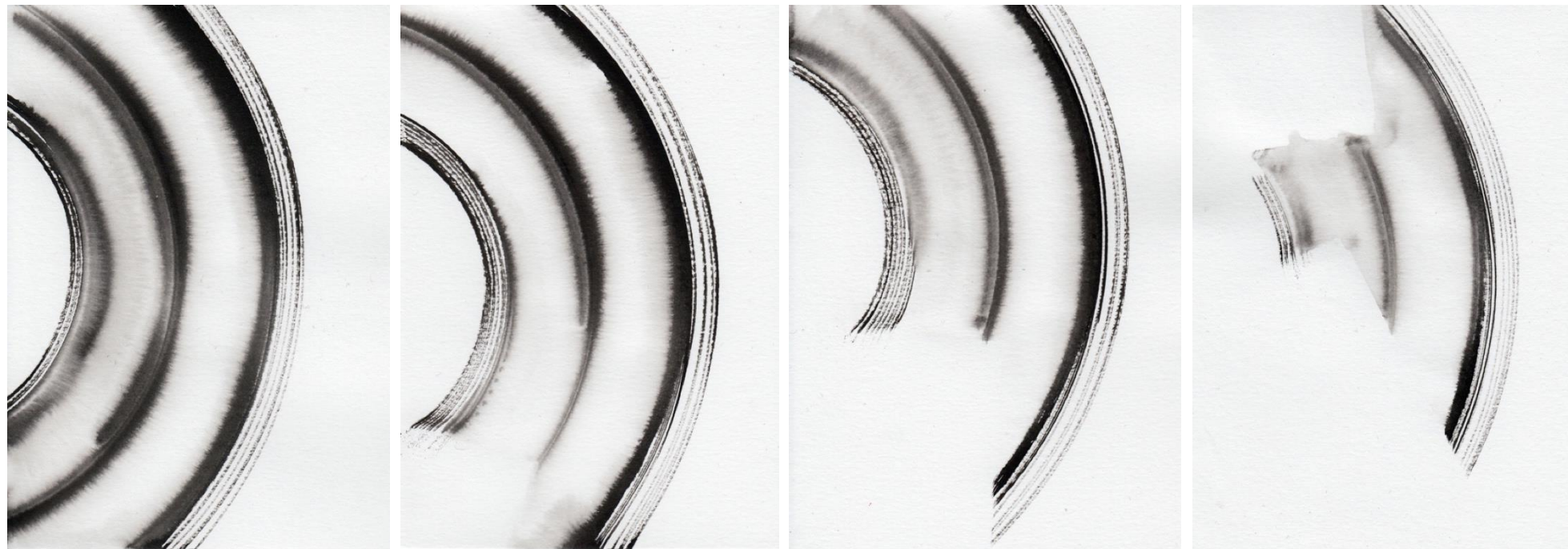
Positing drawing against photography, Charles Blanc argued that “drawing is not a simple imitation, a copy corresponding mathematically to the original, an art reproduction, a pleonasm. Drawing is a work of the mind” (Blanc quoted in Petherbridge, 2010, p. 281). The photographic nature of the CRIs had until now been given too much authority in the artworks produced. Even the resemblance between Saturn’s rings and a vinyl record was based on a photographically mediated representation. The practice itself enabled thinking to become *unstuck* in this regard. The analogy of ‘Saturn’s rings look like a vinyl record’ is superficial and flawed, but following it helped the mark-making process to take over and new thinking to emerge about how to correspond with the CRIs. Attention moved towards how gestures, materials and technologies interacted with each other and how they were affected by the environment in which they were being produced. Gravity and the centripetal forces generated by the spinning were also active agents in the drawing, determining how the gestures were registered. This mode of working, where attention moves away from an artistic control of the materials at the service of depiction, is explored by Cazeaux as *autofiguration* (2017).

Autofiguration, as Cazeaux examines, “places emphasis on materials as objects in the world whose status as such is waiting to be explored in conjunction with an artist’s reflection on their body as an object in the world, to explore what the interlocking capacities and resistances of object and body reveal of themselves and what they depict or display beyond themselves.” (2017, pp. 137-138). Using an example of a tree, Cazeaux explains that the goal of autofigurative work is not to recreate appearance but to artistically explore the tree as an active agent in the making of marks or traces (p. 143). Autofiguration is not about suppressing or negating human intervention, which could be seen as still believing in the myth of ‘nature drawing itself’ that haunts photography and scientific representation (as explored at the beginning of this chapter). In autofigurative work, the artist’s role is to enable traces from the interactions between the object or source, technologies and materials. The work is not about the object, materials or technologies but about the artist’s encounter with them. Throughout his book, Cazeaux uses the term ‘working with’ to refer to the responsive capacity of artistic practice to allow materials to generate unexpected qualities and adapt correspondingly to those new conceptual interactions (2017). Autofiguration can then be seen as placing emphasis on ‘with’.



83. Fraga, H. 2020. *View of the turntable with a cut-up drawing*. [Photograph]

And this is what was happening in the studio. Instead of using the materials and the turntable at the service of depiction, the studio process begins exploring the materials and instruments as mark-making or trace-making possibilities. The drawings are about the artist's interaction with those materials and tools, they depict their coming into being and any further depiction becomes secondary but, crucially, not entirely negated. The drawings are no longer *of* the CRIs but in *the style of* the CRIs. The fragmented circle drawings mirror the fragmented way the large phenomena of the rings are registered by Cassini's camera. The 'glitch' effects created by pre-cutting paper evoke the errors in data transmission from spacecraft and Earth. The numerousness of the CRIs was mirrored in the numerousness of making, the same gestures repeated over and over again in dozens of drawings. These experiments remained somewhat peripheral, it was only much later on that their significance was recognised, leading to their consolidation into the works *Temperamental* and *Saturnian*, which will be discussed in a concluding part of this chapter.



84. Fraga, H. 2020. *Four 'broken circles'*. [Ink on Paper]



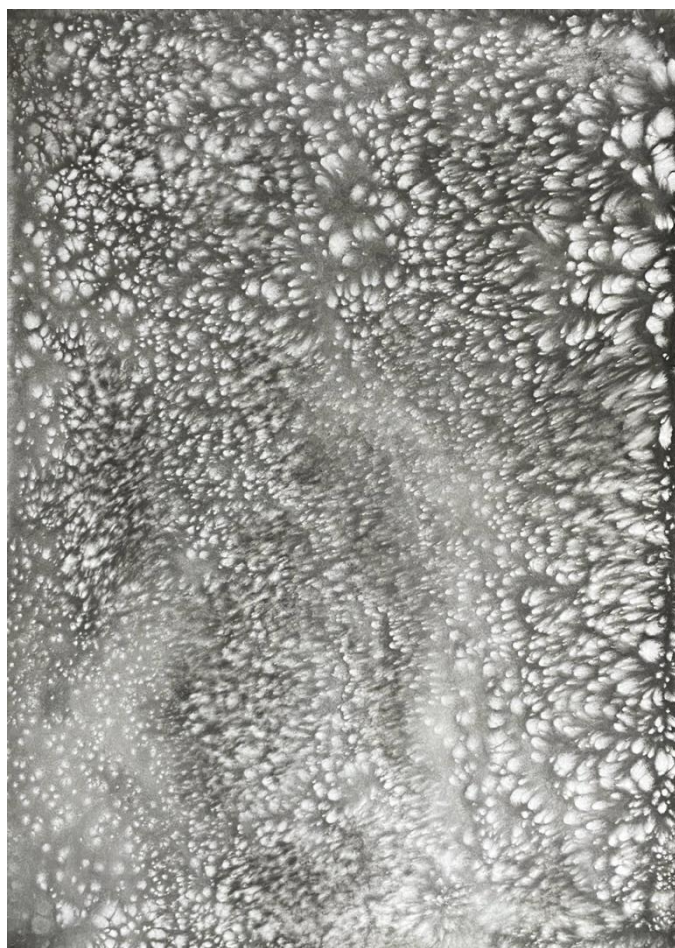
85. Fraga, H. 2021. *Minutia Grandis*. [Ink on paper]



86. Fraga, H. 2020. *Moving my hand as paper rotates.* [Ink on Paper]



87. Fraga, H. 2021. *Temperamental.* Ink lines on multiple sheets. [Ink on Paper]



88. Fraga, H. 2021. *A paper covered in ink 'glitches'.* [Ink on paper]



89. Fraga, H. 2021. *Drawing on multiple sheets of wet paper.* [Photograph]



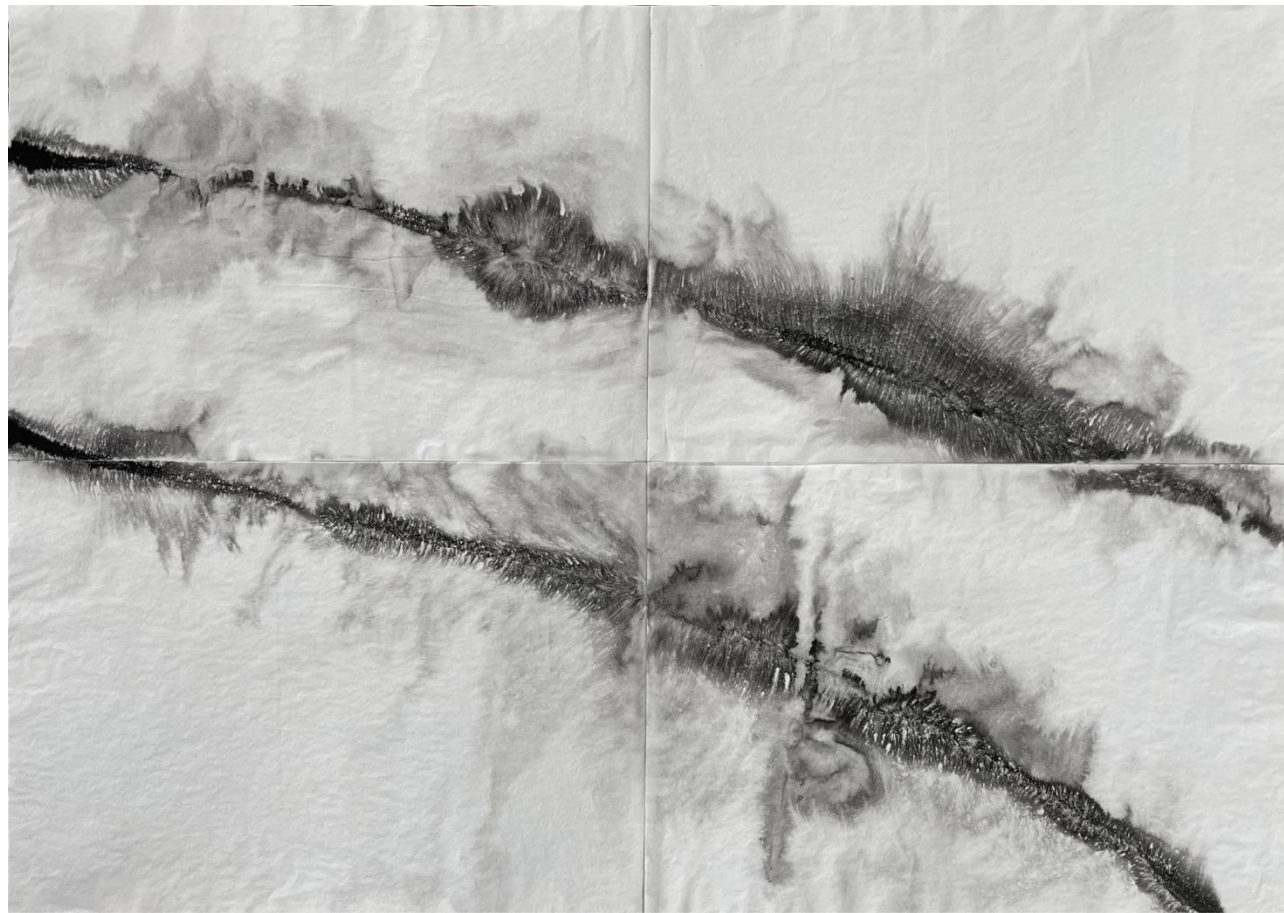
90. Fraga, H. 2021. *Arranging the pieces in different ways.* [Photographs]

Temperamental

Temperamental is the consolidation of a particular thread of studio experimentation: the line drawn with ink on multiple sheets of wet paper and a particular type of artefact (white spots) that resulted from a reaction between the damp paper and the ink. *Temperamental* remains a fragmented and indefinite series (figs. 14-15, and 91). Each piece is made on multiple sheets of paper. Earlier experiments submerging a particular type of paper (low-grammage, 'layout' paper) in water before drawing with ink resulted in unpredictable white spots – as the ink separated. This effect had been unplanned and unexpected – a sort of 'glitch' – from using a paper not designed for wet media. The line is the ostentatious subject matter of the work. The line is explored as an essential form, a quintessential element of drawing and a material entity. The grid becomes an active agent in making the drawing, affecting where and how the line breaks.

Although gestural lines and marks carry the imprint of the bodies that have made them, and therefore seem to be part of the phenomenal world, nevertheless, line itself – abstract, directional or imitative – does *not* exist in the observable world. Line is a representational convention, if a primary element in the formal arsenal of making art. (Petherbridge, 2010, p. 90)

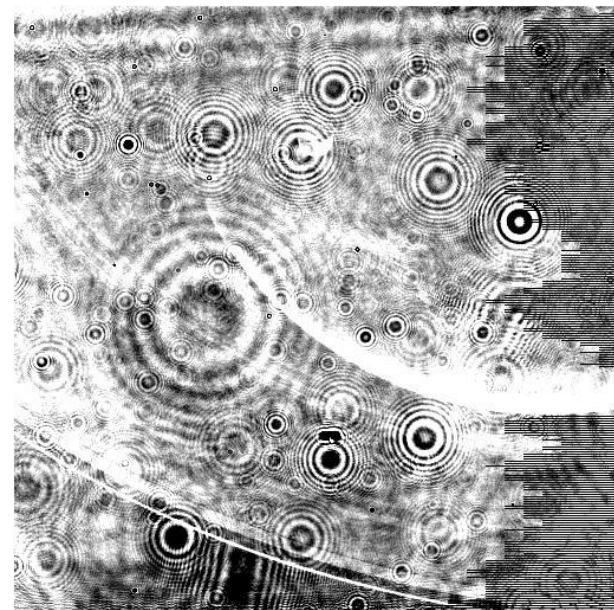
Such is the general scholarly perception on the line, but for Ingold, lines are a very real aspect of the phenomenal world (2021). Lines are how we participate in the landscape: recognising them, lining things up and drawing from them (Ingold, 2021). The rings of Saturn are a conglomerate of millions of particles of ice and rock in orbit around the planet; their line-like appearance is an optical illusion created by particles of wide-ranging sizes (NASA, 2018). Lines are ubiquitous in the CRIs. Saturn's F ring stands out for its single-like appearance – the reason it features in the series *Incognito*. Many other lines in the CRIs do not represent natural phenomena but the interactions between natural phenomena and the imaging apparatus. Dark, doughnut-like circles are the effect of dust particles on the camera filters (fig. 93), white streaks are caused by high-energy particles (cosmic rays) hitting the camera's sensors edge-on, horizontal wave-like bands in others are the effects of the internal noise in the signal (NASA, 2018). Like the fragments of rings depicted in the CRIs, *Temperamental* no longer presents full circles but only fragmented ones. The focus in *Temperamental* is not on the autographic trace but on how that gesture is affected by various forces. *The drawing is with me, but it is not about me.*



91. Fraga, H. 2021. *Temperamental*. [Ink on paper]



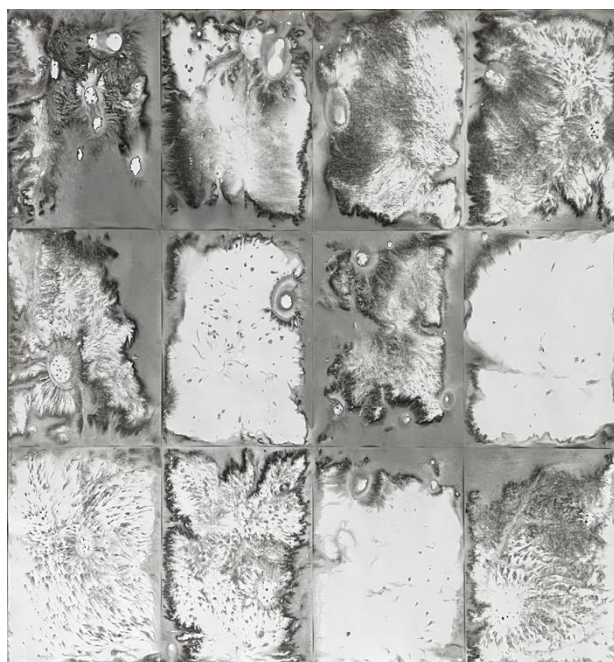
92. Fraga, H. 2021. *Temperamental*. [Ink on paper]



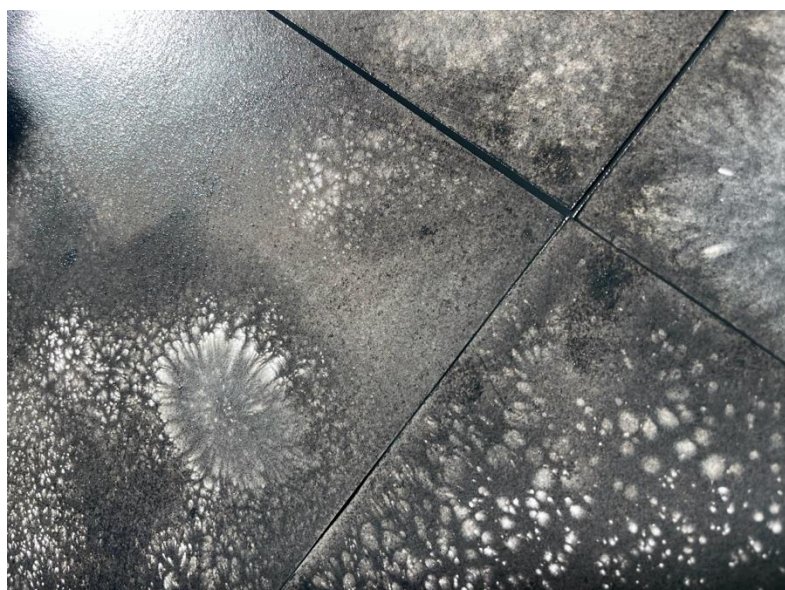
93. NASA. Cassini raw images showing 'dust doughnuts' [Photograph]



94. Traubeck, B. 2011. *Years*. [Record player, wood, electronics]



95. Fraga, H. 2021. *Saturnian (verso)*. [Ink on paper]



96. Fraga, H. 2021. *Papers covered in ink drying in the studio*. [Ink on paper]

As well as focusing on the line, the studio experiments explore all-over compositions by saturating the paper with ink and allowing the 'glitch' effect to take over the whole composition. One of these became a stand-alone work titled *Saturnian*, which returns indirectly to the motif of the vinyl record.

Saturnian

The resemblance of Saturn's rings to a vinyl record brought with it the implication of sound. Images of Saturn's rings have already been translated into sound. SYSTEM Sounds is a sci-art outreach collective that creates works translating astronomical data into sound and music. They have created various sound-based interpretations based on Cassini's data: the orbital frequencies of moons, the observed brightness of the rings and the oscillation frequencies of Saturn itself (SYSTEM Sounds, 2023). Many artists have mined the possibilities of the turntable as a drawing machine. In *Years* (2011), artist Bartholomäus Traubeck combines a turntable and other electronic equipment to 'play' a slice of a tree as music (fig. 94). Translating images into sound, or using sound to make drawings and vice-versa, is an equally widespread artistic practice. Greek composer Iannis Xenakis constructed a digitised computer to draw –instead of writing– music back in 1977 (Pangburn, 2017). Today, many off-the-shelf software options exist for translating images into sound. In contrast with those turntable examples that result in automatised drawings, in my work, the turntable is rather an aid to hand-made drawing, akin to the stencil that allows the hand to produce accurate shapes.

Saturnian does away with *all* mechanical or electronic aids. Instead of using the turntable to make ring-like patterns, the drawing combines the grid structure with the pouring technique and an all-over composition. Instead of using software to produce the sound, artist Rebecca Jones was commissioned to interpret the drawing as a graphic score (the audio file can be accessed here: https://www.hondartzafraga.com/blog/wp-content/uploads/2024/02/Saturnian_FINAL_mixdown.mp3). The sound she made and recorded is then played back using a bone-conduction speaker fixed to the back of the drawing (the drawing becomes the amplifier). The back of the drawing is left exposed to disclose the textures left by the ink (fig. 95). The shift in the practice towards embracing the more subjective, material and unpredictable aspects of making informed the decision to seek another human being to take the role of translator. It was a way of emphasising the human side in the process of corresponding with the abstraction of the CRIs. Instead of the rigid parameters of an image-to-sound software, a human brings their fluid combination of musical knowledge, whim and subjectivity. Music is

a notably abstract medium, often discussed as the closest to melancholy (Lindsay, 2008). Making this work led me to search for literature on the subject of melancholy and music. In his compelling essay *Music and Melancholy*, Michael P. Steinberg goes as far as to pose melancholy as the condition of all music, which lies on the sustained impossibility of overcoming music's "anxiety of articulation – the gap between music and speech, between music and meaning, between music and the world" (Steinberg, 2014, p. 310). He concludes his essay quoting Felix Mendelssohn: "What the music I love expresses to me is not thought too *indefinite* to be put into words, but, on the contrary, too *definite*" (p. 310, emphasis in original). Steinberg's essay, and Mendelssohn's quote in particular, certainly resonates with my experience writing this thesis and the anxieties of articulating artistic practice through language. *Could an argument be made for melancholy as the condition of all drawing?*

While the relationship between drawing and melancholy has acted as a drive for the research, such a totalising argument is not its goal. Still, the very emergence of the question is an insight in itself, as well as an avenue for further investigation.



97. Fraga, H. 2021. *Saturnian drying on the studio floor*. [Photographs]

Review of Chapter

In this chapter, we have seen the practice move away from directly representing the CRIs towards paying closer attention to the mark-making possibilities of the materials and technologies at hand. The insight lies in recognising this process *as also being about my presence before the CRIs*. We see how drawing with analogue means, using my hands and instruments found in the studio, gradually channelling the glitch aesthetic of the digital sources and their uncalibrated repetitiousness in analogous ways that avoid description in favour of allusion or metaphor. Drawing negotiates the digital rawness of the sources by becoming raw itself. Autofigurative drawing becomes a way to correspond with the CRIs using indirect allusion instead of direct description, enabling reflection about the CRIs' own 'autofigurative' formation beyond that of photographic indexicality. I came to think of the CRIs less as *images of* and more as *images with*. 'Drawing with' the CRIs involves shedding preconceptions of what defines noise and signal. Saturn became just one element among many – dust particles, space, light, time, the Cassini cameras with all their bits and pieces – that had interacted with each other to produce the CRIs. Artist Tania Kovats, although not using the term directly, clearly embraces autofigurative ways of making when she expresses that “there is an endless pleasure to be found in an object-orientated ontology, where I might abdicate being the centre of the creative act, and instead become an agent or catalyst to a process where the drawing makes itself.” (Kovats, 2021, p. n/p). The initial pleasure taken in transcribing a digital image into an analogue was overtaken by the pleasure of seeing the analogue image emerge from the interaction between materials.

The works invite the viewer to go along with the drawing as it is now: broken, glitched, flawed, incomplete. What the works capture is the time *after* the artist's intervention. The time between gesture and final form is embedded in the drawing but retains a numinous quality – it cannot be entirely 'decoded'. What 'drawing with' has enabled is a way of corresponding with the time embedded in the CRIs. The time elapsing between their remote capture, with no 'live' access to a viewfinder, and the images reaching *us*. The images' journey from camera to my desktop computer is perilous, full of opportunities for further glitching to occur. Even in the download process, further images get inevitably lost. For example, six files in my downloaded copy of the CRI collection cannot be opened; recognised by operating systems as 'corrupt'. *Temperamental* and *Saturnian* are the culminating works of a very productive period of studio experimentation where hundreds of drawings were produced. These works are autofigurative, analogue and handmade – even if the focus is not on the

autographic mark – but they could not have been possible without the influence of the digital exploration that was happening in the studio simultaneously. Making drawings in a mosaic-like manner, with multiple sheets of paper, is perhaps one of the most profound – yet nuanced – of these cross-pollination between analogue and digital means of drawing.

My discussion now moves on to ‘drawing with’ the CRIs using primarily digital means. While exploring the possibilities of analogue drawing, the practice also explored the possibilities of digital drawing. Chapter Four discusses all the works created using digital tools and processes, namely the technique of the digital photo mosaic, a way of compositing a larger image out of a set of individual ones. As noted in the introduction, strategies for analogue and digital making developed *simultaneously*, and the impact of this simultaneity is addressed in Chapter Five.

Chapter Four

Drawing with Digital Means

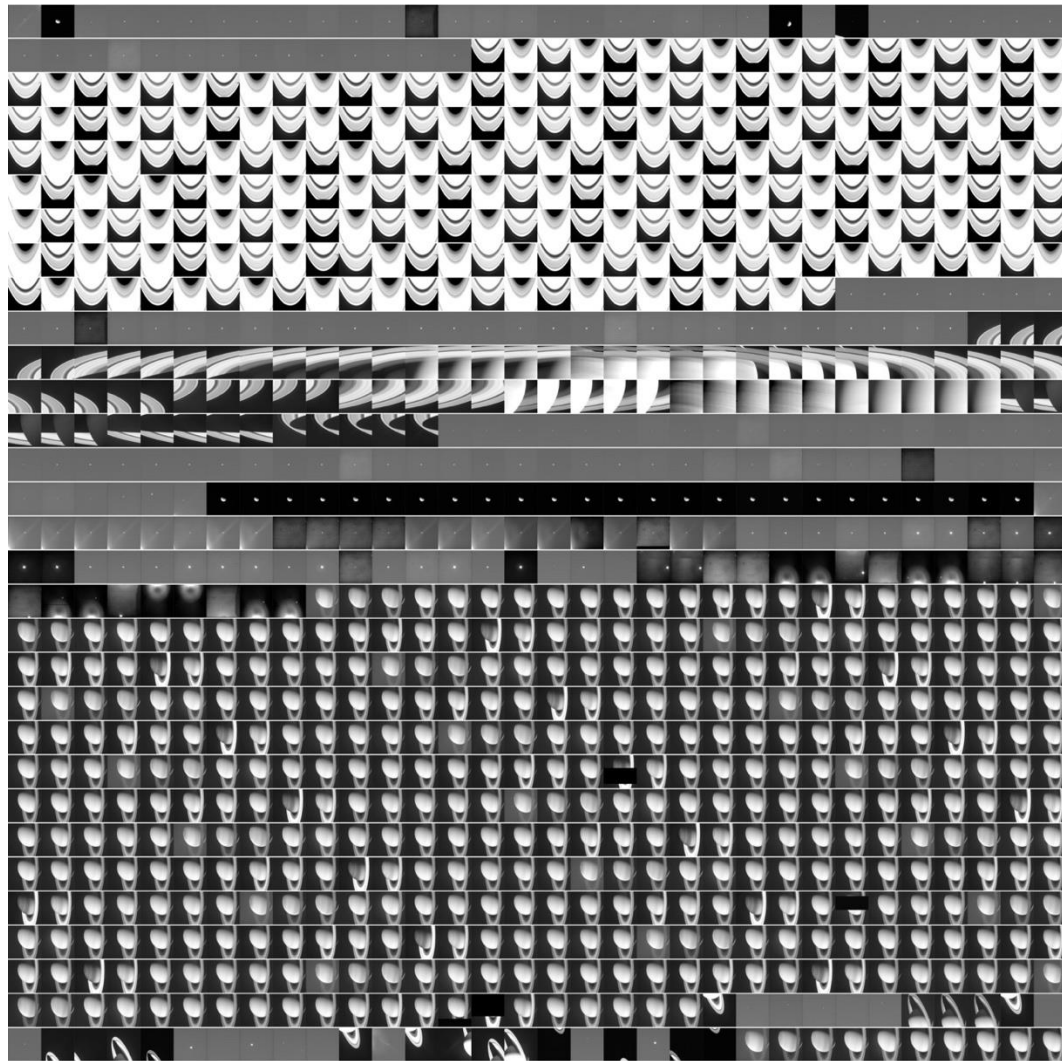
The Draw of the Digital

The square format of the CRIs echoes that of the graphic unit of all digital images, the pixel, at least, in its most common manifestation. Their fragmented appearance and abstraction, rather than self-contained images, resemble jigsaw puzzle pieces. I think about how all astronomical images are mosaics of hundreds of raw images put together smoothly and seamlessly to appear as one. I think of my collection of CRIs as a vast jigsaw, a bundle of pixel-like tiles I am compelled to put together even without the promise of a coherent whole.

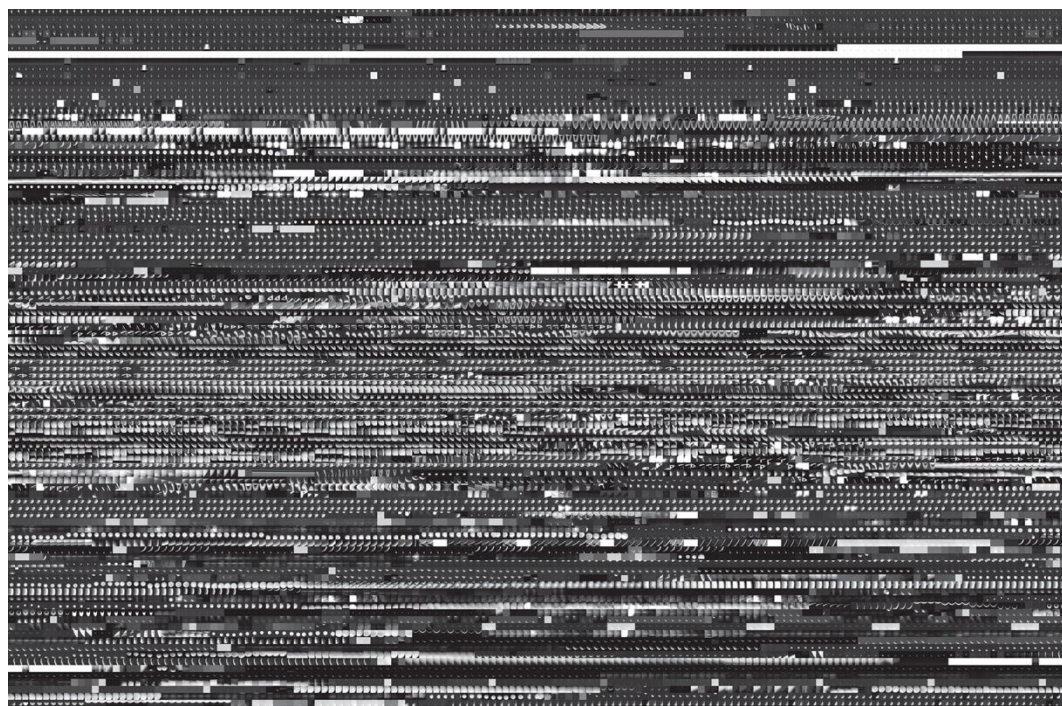
The previous chapter discusses how the process of drawing foregrounds how deeply embedded CRIs are in their native digital medium. The explorations with analogue means occurred simultaneously with a digital experimentation in the studio. Working with the CRIs digitally thrives on their lack of fixed materiality. The digital apparatus (the Internet, the computer) needed to view these digital files is also equipped with tools to copy, paste and process them digitally, deferring the issue of physical form, *the matter of matter*. The digital realm is the most immediate way to engage and operate with natively digital sources, but it complicates the concept of 'drawing'. This chapter explores the complex relationship between drawing and the digital, expanding the understanding of 'digital drawing' beyond the current discourses on the field. While some notable exceptions will be discussed, digital drawing is commonly understood as mark-making using dedicated software that digitally recreates the trace of the gesture made through a graphical user interface. Instead, the digital practice examined in this chapter utilises the digital technique of photo mosaic as technical support for *drawing with readymade digital marks*.

The Photo Mosaic

As discussed in the previous chapter, most published astronomy pictures are mosaic-like compositions of sometimes hundreds of individual images. Each Cassini raw image is only a fragment of ever larger entities: a file in a huge set of similar files, a set among many other data sets gathered by the Cassini instruments, one space mission among many other missions, and so on. When the mission ended in 2017, the CRIs went from being an ongoing trickle of images with an active transmission, to becoming a complete historical artefact with



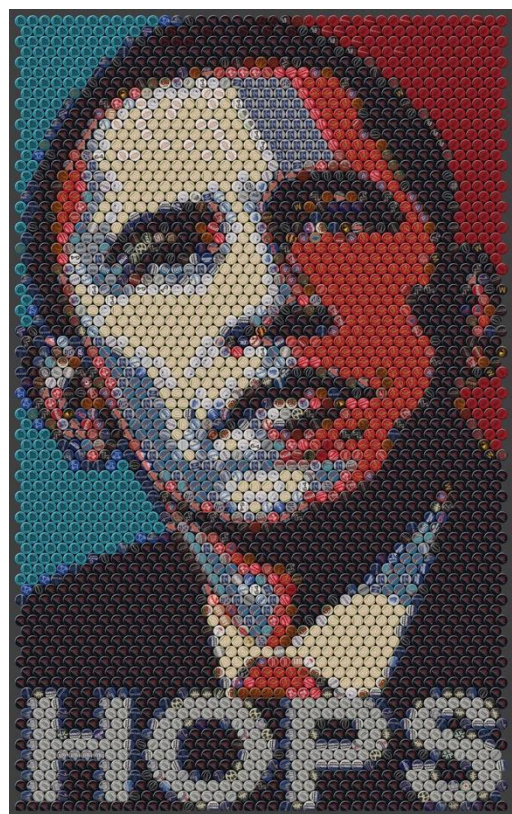
98. Fraga, H. 2018. *A contact sheet of 1000 Cassini raw images, created with Photoshop.* [Digital Image]



99. Fraga, H. 2018. *A contact sheet of the first 15352 Cassini raw images, created with InDesign.* [Digital Image]



100. *Triumph of Neptune standing on a chariot pulled by two sea horses*. Circa 3rd Century AD. [Mosaic] At: Musée archéologique de Sousse



101. Feinson, R. [Mosaic made with bottle tops]



102. *Invader*. *Pixel Art*. [Street art mosaic]

transmission permanently interrupted. The idea of compositing *all* the CRIs into a single image is a way to address the collection as a single object and an attempt to visualise it as such. As discussed in Chapter One, Tom Ireland, *recognising* the motion implied in the collection, instantiates the whole collection as a film, effectively denoting the raw images as frames. His work belongs to the lineage of montage through its digital video incarnation. Instead, I looked to the digital lineage of the photomontage. The formal evocation of the pixel by the square format of the CRIs reinforced the notion of a grid-like composite. What sort of image would emerge from such a composite?

This deceptively simple idea posed, in the first instance, an unexpected technical challenge to the *seamlessness* of working digitally: the standard image-processing software that was 'at hand', struggled to handle so many files simultaneously (figs. 98-99). Looking at off-the-shelf and customisable solutions led me to the 'photo mosaic' format. A photo mosaic is a rather niche type of digital photomontage where a composition of individual pictures that, when seen from a distance, generates the optical illusion of a single, coherent, large picture (much like a traditional mosaic). The set of small tile images is known as the *library*, while the overall composite image that is recreated is referred to as the *target*. As a system for arranging multiple images, the photo mosaic is systematically very different to the contact sheet – the format of my initial experiments. A photo mosaic arrangement is based on the visual features of the images involved. With their uniform format and copiousness, the CRIs seemed perfectly suited as a readymade library. The target image provides a template for the software, not unlike the picture printed on the box of a jigsaw puzzle. With its caveat of needing a target image, the photo mosaic opened a new set of considerations: the composite image would no longer be a mystery but a deliberate choice. Before delving further into the chapter, I briefly discuss the history of this particular digital picture-making technique.

The digital photo mosaic emerged from computer programming in the mid-nineties and many have staked claims to its invention. Joseph Francis claims to have invented the first specialised software for photo mosaics in 1993 (2017), while Robert Silvers patented his specific algorithmic process and trademarked the term 'Photomosaic' in 1996 (1998). In the few years between Francis and Silvers, others created their own algorithms and today, myriad consumer-ready photo mosaic software applications exist. The digital photo mosaic has become *technically* redundant; *stylistically*, it was born outmoded. Its crude grid aesthetic can be seen as reminiscent of millennia-old mosaics or the mid-nineties' digital pixelation, as in *Pixel Art* and *Glitch Art*



103. *The first digital image, created in 1957 with a rotating-drum scanner, first invented by NIST.* [Online]. [Accessed 6 February 2024]. Available from: <https://www.nist.gov/mathematics-statistics/first-digital-image>



104. *Bell Labs' scientists Ken Knowlton and Leon Harmon with their, Computer Nude (Studies in Perception I), 1967, a pointillistic, computer-generated art picture they created.* 1969. [Photograph]. At: Nokia Bell Labs.

(figs. 100-102). Like the CRIs, the photo mosaic is a digital relic of early computer art and digital imaging (figs. 103-106), retaining the low-res and low-tech aesthetic features of a technology rooted in the 1990s (the spacecraft launched in 1997).

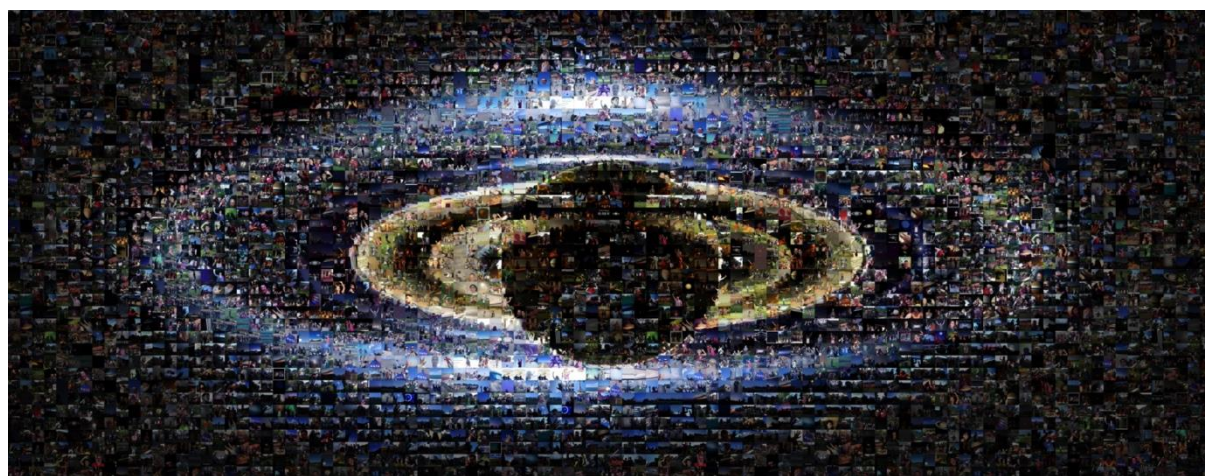
This brief history backgrounds my personal reservations against the photo mosaic. Seemingly surviving mostly as a gimmick within the world of customisable gifts and corporate events, was this a medium with any critical potential and currency left? The photo mosaic software selected and used in this project, Mazaika, was chosen for its capability to handle a vast library – not all photo mosaic applications do – and its comprehensive and flexible user control. Ultimately, obsolescence stimulated a self-reflexive, open-ended and experimental approach that uncovered new potential for criticality and new ways to think about digital drawing. My research's reappraisal of the photo mosaic as a tool for drawing digitally is one of this research's contributions to knowledge.

Crossing the Digital Line

Drawing is not inherently antagonistic to technology (Kurczynski, 2011; Faure Walker, 2008). Digital drawing is a recognised – albeit understudied – mode of expanded drawing, usually involving software explicitly designed for drawing. Some commentators attribute the gap in drawing literature to a handmade bias pervading art criticism since the 1990s (Kurczynski, 2011, p. 99). The 1990s is a decade of particular significance for my project. Cassini's 1997 launch coincides with the critical discussions on the notion of medium specificity underscoring the artistic incorporation of computer and digital technologies. In her writing from the late 1990s, Krauss proposes the term 'technical support' to recognise the obsolescence of the traditional medium and acknowledge the media hybridity and multiplicity in contemporary art practices (1999; 2006). Commercial, low-tech, low-brow and already somewhat redundant technologies are, for Krauss, the best-suited technical supports from which to wrestle a new set of aesthetic conventions (2006, p. 57). Krauss highlights critical reflexivity as an essential trait in the post-medium artistic repurposing of the new-but-already-absorbed-into mass culture (1999; 2006). Media theorist Lev Manovich has extensively addressed the impact of computer and digital technologies on medium specificity (1996; 2001a; 2001b). In *Death of the Computer*, Manovich distinguishes two co-existing artistic approaches to new technology: one is characterised by irony, irreverence and self-criticality, while the other is characterised by opposite traits (1996).



105. Silvers, R. *Alien Made From Space*. A photo mosaic made with images of space from NASA [NFT]

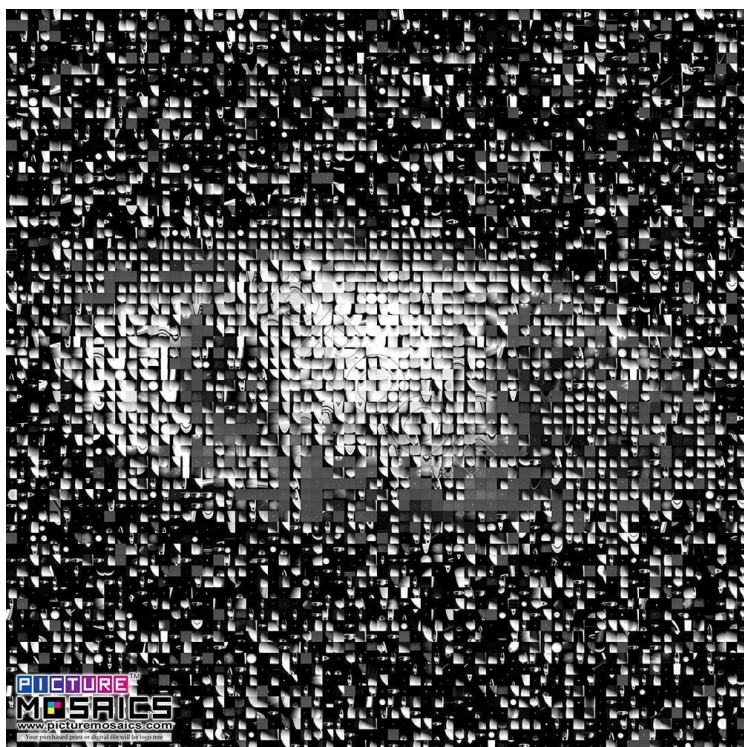


106. NASA. 2013. *Wave at Saturn*. [Digital Collage]. [Accessed 6 February 2024] Available from: <https://science.nasa.gov/resource/the-faces-of-wave-at-saturn/>

Pixels are listed as one of the tools artists use for drawing in MoMA's exhibition *On Line* (2010). Yet, central to the discourse on digital drawing is the perceived alienation between the gesture and its trace in computer-digital technologies, as discussed by Tamarin Norwood and Jane de Almeida in their respective essays in *A Companion to Contemporary Drawing* (Choperning & Fortnum, 2021). Norwood focuses on the mode of transmission, analogue or digital, to explore how artists might and have exploited or exposed the breakage in digital transmission between the hand and mark against the software pursuit to cover it up (2021). De Almeida points out how the introduction of the computer screen blurs the boundaries between the 'image-drawing' and the 'image-photograph' (p. 413). The line is the key focus of digital drawing, in particular attention lies on *the making of that line* taking centre stage, with very few exceptions.

Against this, the photo mosaic software seems far removed from the act of drawing. The photo mosaic reconstructs and reproduces *already-made images*. This does not entirely obliterate the possibilities of gaining insights into digital drawing through the photo mosaic, and vice versa, insights into the photo mosaic through the lens of drawing. Considering the works produced from the drawing perspective disturbs the initial link to the category of photomontage and re-focuses the attention on the line - not the line drawn, as in most examples of digital drawing, but the lines already there, in the lines of the grid arrangement of images and the CRIs themselves. The two works that are examined next are entitled *Ghost* and *Solid*. They both represent the culmination of a lengthy experimentation with the chosen software to contain the whole library of CRIs, with various target images and different formats of presenting the complete photo mosaics. Early experiments focussed on a family snapshot that showed my grandfather holding me as a baby (figs. 107-109), a choice informed by the notion of melancholy in photographs of family members as explored in the writings of Barthes (1982) or Sontag (1973). But attention eventually shifted towards images of Saturn from art history that belonged to a collective history.

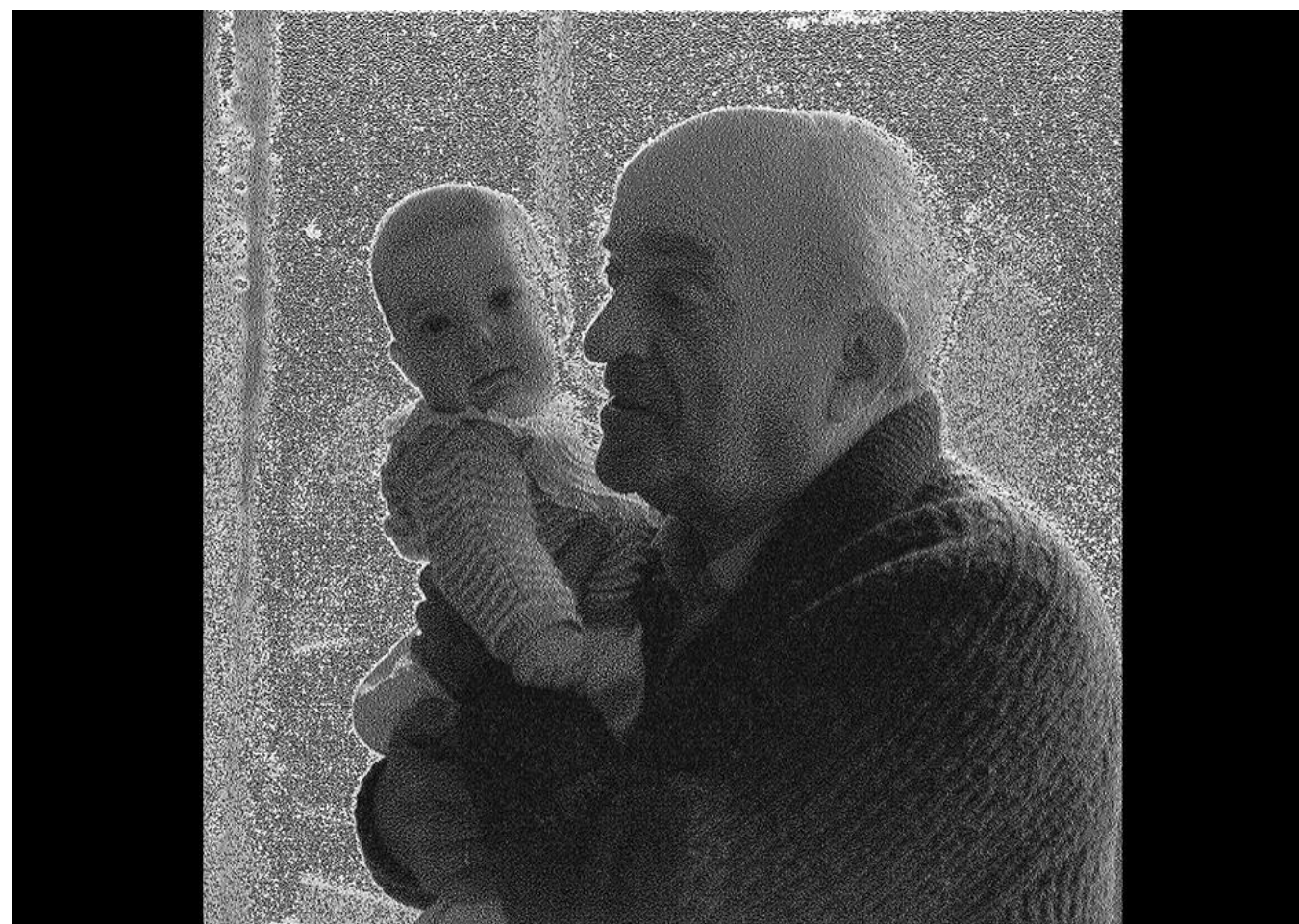
Ghost is an installation comprising a large fabric and a flatscreen monitor, propped on its side, in front, and against the fabric piece. Both objects display different photo mosaics of the same target image. *Solid* is a large format picture book presented on a plinth so viewers can browse its pages. The book contains all the CRIs arranged in a photo mosaic fashion. The target images used in both works act to subvert, stretch or challenge the CRIs thematically, enabling insights into the dialectical potential of the medium.



107. Fraga, H. 2018. *Photo mosaic test with free mosaic website and my own photograph of Saturn through the eyepiece as 'target' image.* [Digital Image]



108. *A family 1982's snapshot, showing myself as a baby in my grandfather's arms.* [Scanned Photograph]



109. Fraga, H. 2018. *Figments of Saturn* [Animation Still]. A work using multiple photo mosaics of the same target image. An animated GIF available here: <https://www.hondartzafraga.com/blog/wp-content/uploads/2023/12/figments-aitite-small.gif>

Ghost: The Other Saturn

In 1997, I was fifteen years old and entirely unaware of the Cassini mission launch that same year. At that time, I was engaging with a very different vision of Saturn to the one the Cassini spacecraft was after. I remember the art history lessons at school, with the image of Francisco de Goya's painting Saturn (1820-23) projected on the classroom wall in front of us. My mum always commented on how grotesque she found Goya's work. The image of Goya's Saturn has pride of place in art history. It is easily recognisable to the point it has become a bit of a cliché, a stock image used and abused, from which copious kitsch products have been generated.

Ghost is one of the key artworks in this research because it embodies many artistic strategies that subvert the current conventions of the photo mosaic. It is the culmination of a long process of experimentation, getting to know the photo mosaic and the possibilities of Mazaika as a tool. The large textile hangs smoothly but not fully stretched, allowing the fabric's materiality to be noticeable. The screen, propped on its narrow side against it, repeats the image in a different support and resolution. There is a sense of theatricality in the large scale and the staging of the objects. From a distance, the screen resembles a window or a portal, an opening within the giant backdrop. When a viewer encounters *Ghost*, it is the double reproduction of Goya's monster they encounter first and foremost (fig. 110).

Ghost deploys the target image as a device to explore the theme of Saturn in dialectical terms. The CRIs are used as picture units to draw a vision of Saturn that embodies everything they are not. The image of the humanoid monsters caught in the act of devouring another is crude in all senses of the word. Goya's *Saturn* belongs to a series known as the Black Paintings, initially painted in his house, posthumously transferred to canvas, restored and donated to the Prado Museum (fig. 111-112). The one thing Goya's *Saturn* cannot be accused of is leaving a viewer indifferent and the labels of "scariest", "disturbing", or "horrifying" (Pushchak, 2018; usartnews.com, 2020) to describe it seem fairly earned. The image is of a crude and haunting scene: a humanoid 'beast' committing an unspeakable act of cannibalism is facing directly at us. Yet he also seems to look *past* us, too engrossed in his gruesome activity to truly notice us. The Black Paintings – with *Saturn* at the centre – are considered icons of modernity because, as expert Jesusa Vega puts it, "Right now, they are the



110. Fraga, H. 2023. *Installation view of Ghost at Sunny Bank Mills*. [Photograph]



111. Goya, F. 1820-23. *Saturn*.
[Mixed method on mural transferred
to canvas]. At: Prado Museum
Collection.



112. Laurent, J. 1874. *Photo of "Saturn" from the series of Black Paintings of Goya*. [Photograph] At: Fototeca IPCE



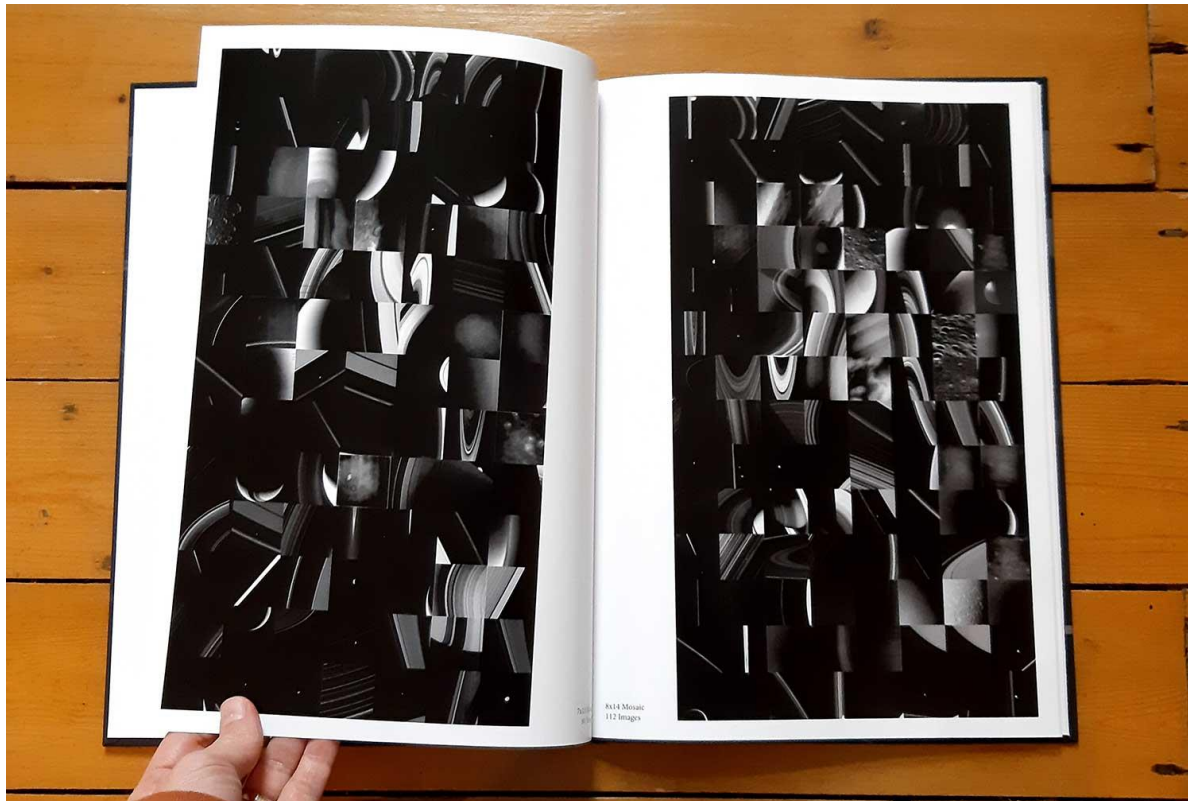
113. Fraga, H. 2020. *Test of photo mosaic sequence on newsprint*. [Photographs]

ones that best express our contemporaneity: fragmentation, bewilderment, insecurity, aggressiveness, sadness and melancholy." (Vega, 2019, p. my translation). An already overwhelming body of scholarship keeps growing with ever-renewed interest. The stubborn absence of ultimate or conclusive interpretations attests to the works' raw ambiguity, as irresistible as inexhaustible.

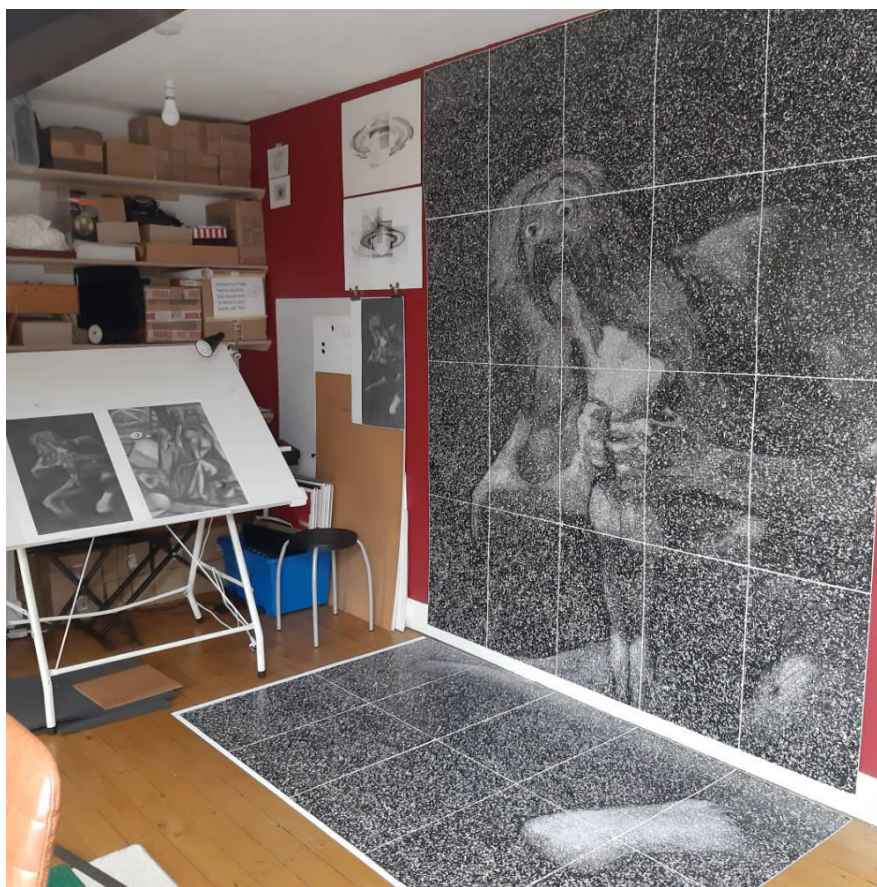
A certain degree of familiarity with Goya's painting might be expected of the viewer who encounters *Ghost*, a familiarity capable of overcoming the degradation of the photo mosaic process – lacking its colour and painterly textures. In *Ghost*, the fuzzy image of Goya's work recalls the static noise ('snow') of a poorly tuned old television, with the enormous figure emerging out of this noise like an unwanted apparition. The fabric gives the work added spectral associations. The trope of the 'bedsheet ghost' evolved from the actual practice of wrapping the dead in shrouds (Alexandra, 2021; McDaniel, 2019). An avid associative leap might lead us to the most legendary of all death shrouds, the one purported to have the negative imprint of Jesus Christ's face (Encyclopædia Britannica, 2023). A commentary, perhaps, on the extended reverence given to Goya's original?

When we get up close, the images goes from grainy to pixelated. But these 'oversized pixels' are nothing like the flat, single-value squares one sees when zooming into a digital image. The photo mosaic nature of the composite is revealed – the screen reveals this much earlier than the fabric because the 'tiles' are larger.

Closer still and new levels of noise appear, that of the weave in the cotton fabric and the inherent resolution of the LCD screen. The final form of *Ghost* is the culmination of a long explorative voyage to negotiate the self-imposed caveat of including all the CRIs (figs. 113-115). Finding the materials, formats and scale was essential because, after all, the photo mosaic stills need to be extracted from, concretised, my computer screen in order for a viewer to encounter it. For example, the fabric print needs to be large enough for 'pixels' to be discernible as whole images but small enough that the overall picture can be taken in at a glance and from a distance – to work 'with' the limitations of a gallery wall. Working with animation enables more artistic control on the temporal dimension of the work. Each of the one hundred photo mosaic that makes up the 'slideshow' differs from the previous one because no Cassini raw image has been used twice. After a photo mosaic was created, the 'used up' images were removed from the library. With each iteration, the library becomes smaller and the reconstruction cruder. The motion effect in *Ghost* is unlike the one in Tom Ireland's work (fast, 'lively') but that of an almost-still image that gradually deteriorates, as if heavily glitched. The last



114. Fraga, H. 2020. *Test on high resolution photo paper and hardback binding.* [Photograph]



115. Fraga, H. 2021. *Studio tests with poster prints.* [Photograph]

few frames are highly abstract, mainly of plainly black and white squares (fig. 116). When the degradation is complete, all the frames play quickly backwards, resembling a glitch in the work itself, and the slideshow starts again.

All mosaics signal to the viewer's active participation in resolving – or dissolving – the image. The making of *Ghost* was a process of learning how to use this potential to its maximum advantage. 'Drawing with' the photo mosaic capabilities to deny either source absolute resolution, to stay in a place of unresolvedness. Even the title, 'Ghost', reinforces the idea of haunting relationships and indeterminate presences (or non-presences). Which image is haunting which? Neither target nor library images can be apprehended in isolation without interference from the other. Which 'Saturn' is winning? Is the pre-modern vision in Goya's work subverting the modern scientific one embodied by the CRIs or expanding it? Are the two sources working together or pulling each other apart?

The Dialectic of Devouring

Horkheimer and Adorno characterised the dialectic character of the Enlightenment: in idealising reason, rather than eliminate the monsters of mythology, it resulted in barbarism and monsters of its own (Geuss, 1998, p. unpaginated). Goya best captured the contradictory nature of the Enlightenment in his engraving *The Dream/Sleep of Reason Produces Monsters*, at least according to Aldous Huxley (Routledge, undated). But in Goya's *Saturn*, another kind of dialectic is going on; the monster seems consumed by its act of consumption. Cannibalism is an important trope in psychoanalysis, the melancholy 'eating' of the lost thing can stilt a 'normal' recovery from loss but also lead to artistic production (Birnbbaum, 2008, p. 29). What I discovered through the making of *Ghost* was resonances between Goya's themes of melancholy devouring, enlightenment and myth and the relationship between target and library images.

As I was finishing up this document, long after having made *Ghost*, I stumbled upon Jay Griffiths' dark analogy between the myth of Saturn and the Cassini mission (2000). She considers the Cassini project and the nuclear industry the epitome of modernity's enactment of the myth,

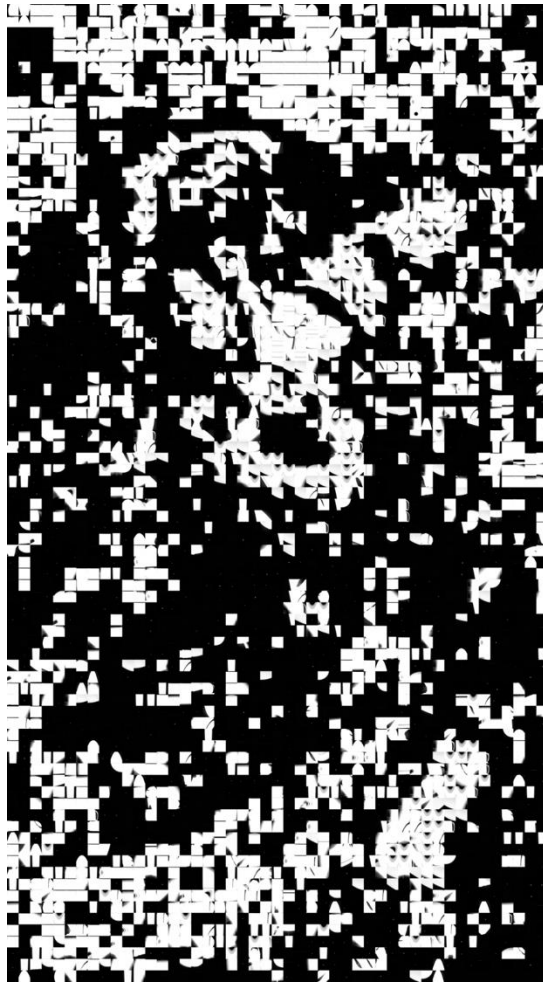
It is a portrait of today; until now, humankind has been able to think of itself as the child of time. Now, past the critical moment when we started using more than nature could replace, starting polluting faster

than nature could clean, we have grown up. We have become Saturn, eating our own progeny. We have become the very cartoon of creation, picnicking on our own children, not out of anything so grand as fear or self-defence, but out of casual cannibalism, stupid self-indulgence and chronic greed. (p. 231)

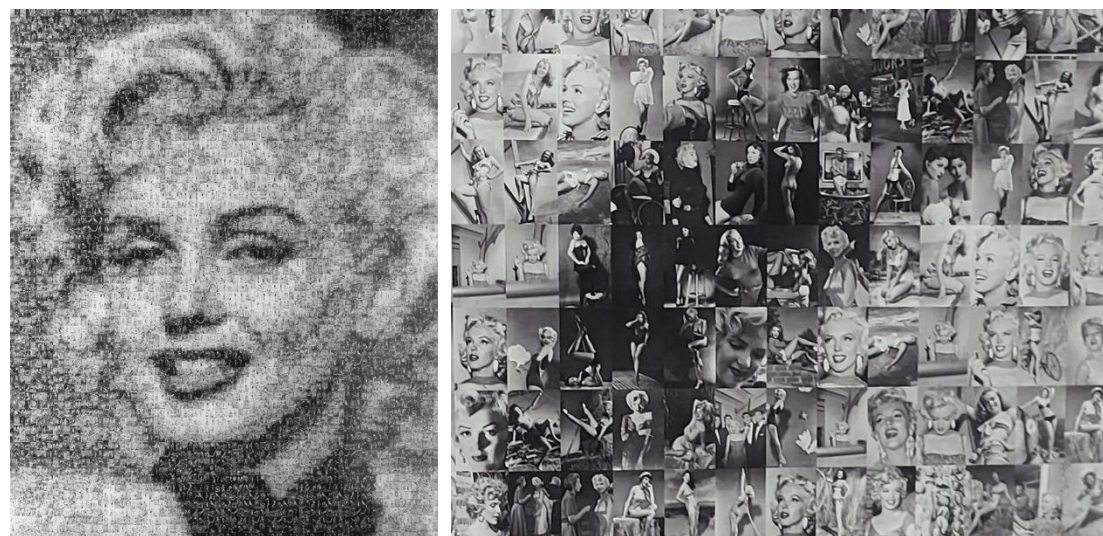
The CRIs certainly seem to ‘eat away’ at Goya’s work like a computer virus – technological rationality corroding emotional irrationality. But I had primarily considered this as a visual analogy of the way scientific progress tries to defeat the monsters of myth. Griffiths analogy suggests a powerful and politically charged interpretation of *Ghost*, but one to be pursued outside this research. The remit of my research stays within art practice. The parts and whole in a photo mosaic simultaneously cancel and preserve each other in dialectical and melancholy terms. For considering whether this dialectical tension might be implicit in all photo mosaics, one must look at contemporary examples of photo mosaic practice.

Today’s approaches to the photo mosaic perfectly encapsulate Manovich’s two ‘art worlds’ of critical contemporary art and computer art (Manovich, 1996). Artists like Robert Silvers or the designer studio The People’s Picture celebrate the photo mosaic as technical innovation with a noticeable reverence and lack of irony, while critically engaged artists like Joan Fontcuberta deploy it only in pursuit of interrogating photography. *How* an artist exploits the parts-to-whole relationship can indicate the presence or absence of criticality and self-reflexivity. Examining these artists’ works closely demonstrates that the dialectical potential of the photo mosaic is largely untapped by current practice and that my own approach challenges and expands current conventions, re-appraising this technical support for drawing.

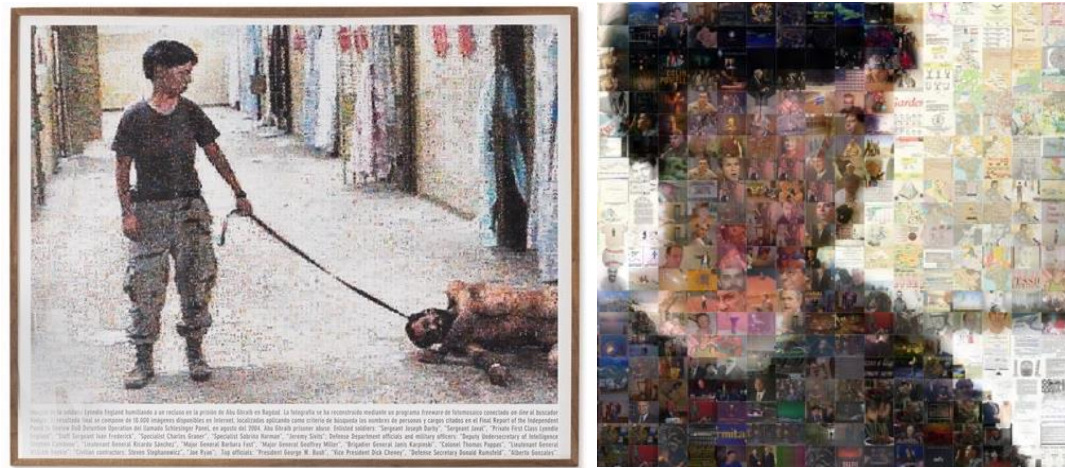
Robert Silvers’ photo mosaics are sold as prints, posters, jigsaw puzzles, books and NFT Crypto Art (Silvers, n.d.). They usually depict well-known cultural or political figures. The relationship between target and library images in Silvers’ photomosaics tends to be either tautological – a portrait of Marilyn Monroe made from other Marilyn portraits – or arbitrary – a portrait of Elvis made from stamps (fig. 117). There seems to be a complacency with the medium characteristic of most producers of photo mosaics. Photo mosaic artists are often tightly associated with computer art (Roy Feinson or Joseph Francis) and place emphasis is placed on technical competency, innovation, pioneering and record-setting.



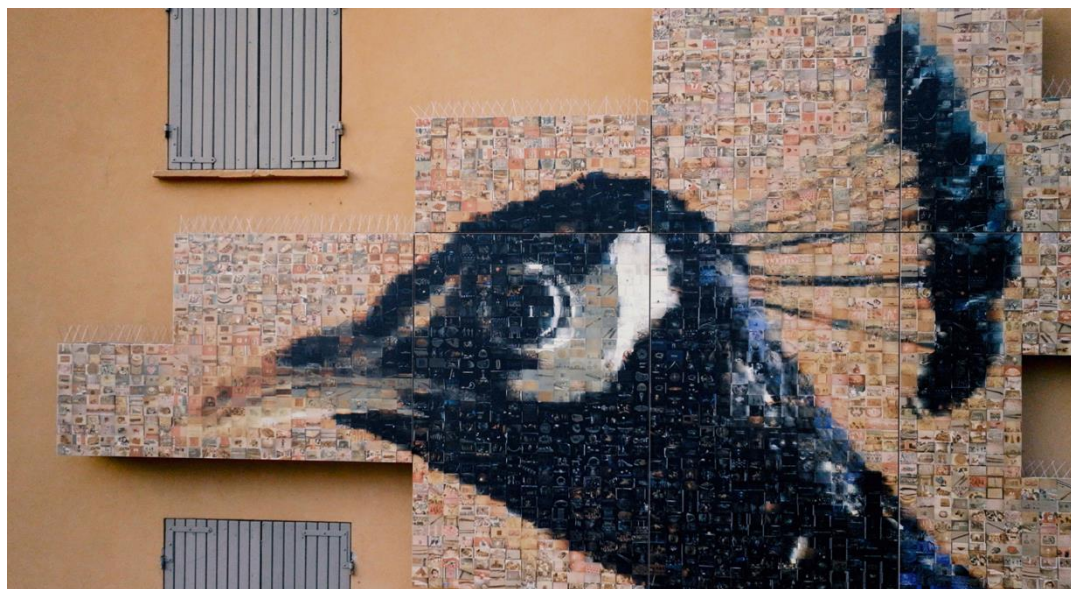
116. Fraga, H. 2022. *Ghost animation*. [Animation still]



117. Silvers, R. 2007. *Classic Marilyn*. [Photomosaic print on photographic paper]. Full image (left) and detail (right)



118. Fontcuberta, J. 2005. *Googlegram 5: Abu Ghraib*. [C-Print]. Full image (left) and detail (right).



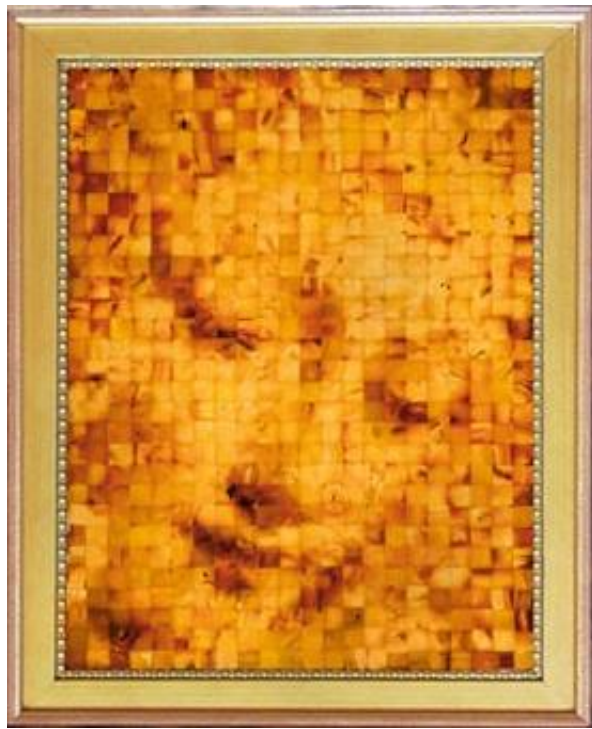
119. Fontcuberta, J. 2022. *Curiosa Meravigliosa*. [Ceramic Tile Mosaic] At: Palazzo dei Musei in Reggio Emilia, Italy.



120. The People's Picture. 2008. *The Big Picture*. [Public Installation]

The work of Joan Fontcuberta sits at the other end of the spectrum. Fontcuberta, like Ruff, is a conceptual artist with a practice rooted in photography. Fontcuberta has created numerous works using photo mosaic principles that exemplify how the target-library relationship *can* be pushed in a critically engaged way. His *Googlegramas* series (2004-2010) has a robust, socio-political gravitas using images from a wide range of sources, from war reportage, art history, politics and activism (fig. 118). The series makes a self-referential commentary on how images and their meaning circulate. The mosaics are made using freeware photo mosaic software connected to Google that extracts images from the Internet based on given words. The final composites are exhibited as large-scale prints which include a caption describing the process. Fontcuberta's work has been characterised as scathingly witty (Casper, 2005). Content is prioritised over form. The relationship between parts and whole is one of mutual problematisation: *Googlegramas* includes pornographic and violent images. His various public installations of photo mosaics use less controversial images with mellow subject matters (figs. 119).

These commissioned mosaics usually include library of images consisting of family snapshots and selfies, submitted by local residents in response to a theme specified by Fontcuberta (Marazzi, 2022; Street Art Barcelona Blog, 2014; Askham, undated). The photo mosaic works of The People's Picture (<http://www.thepeoplespicture.com>) is another example of this strategy (fig. 120). This seems a common strategy in public or commercial examples of the photo mosaic, from individual artist like Fontcuberta, to design studios or even NASA (see fig. 106) to attempt collective inclusion and public participation. The public might see themselves in the work literally and metaphorically. Against these kinds of libraries, the CRIs appear most unusual. They have more in common with the abstract appearance of naturally flawed materials such as tiles, shells or gemstones, which incidentally, are used in a subgenre of 'Impressionist Mosaics' (Feinson, undated), which combines digital photo mosaic technologies and traditional materials (fig. 121). In my photo mosaics, the viewer will find neither images of families nor familiar images. Nor the tautology of Silvers' mosaics. Unlike Silvers' portrait of Marilyn, the two 'Saturns' in *Ghost* are radically different. If the rawness of the CRIs lies in scientific and technological measurement and the promise of objective knowledge, the rawness of Goya's Saturn lies in myth, viscera and the power of artistic expression. Using reiteration in *Ghost* (of Saturn as content, as well as of the photo mosaic formal possibilities) was a way of expose the infinite possibilities of the photo mosaic software. A photo mosaic software might be designed to make only photo



121. Feinson, R. *Impressionistic Mosaic*. [Tiles]. Impressionist Mosaics are created by digitally photographing actual tiles which are then assembled using photo mosaic specific software. <https://royfeinson.com/impressionist-mosaics/>



122. *House decoration in New Orleans*. [Online]. [Accessed 13 February 2024]. Available from: https://www.reddit.com/r/NewOrleans/comments/liz0s/saturn_devouring_his_poboy_my_personal_favorite/

mosaics, but this does not mean that it can make them only in one way, or that they can only be extracted into one type of material.

Filmmaker and writer Hito Steyerl proposed the term to describe substandard resolution images circulating endlessly online (2009). A *poor image* is “a ghost of an image, a preview, a thumbnail, an errant idea, an itinerant image distributed for free, squeezed through slow digital connections, compressed, reproduced, ripped, remixed, as well as copied and pasted into other channels of distribution” (2009, p. unpaginated). The CRIs fit well with many aspects of Steyerl’s definition, undoubtedly low-res, in a compressed file format (JPEG), distributed digitally for free, unaccountably reproducing and getting remixed. However, they do not share the history of marginalisation and underappreciation of Steyerl’s cases. As already noted in regard to *appropriation art*, there is nothing clandestine, radical or non-conformist about downloading, owning or sharing the CRIs. Making *Ghost* promoted reflection about the use and abuse of images enabled by the Internet and Social media networks, where digital images’ capacity to multiply endlessly runs wild. The image of Goya’s *Saturn* has been ceaselessly reproduced, translated and appropriated, evidencing its lasting, iconic status in a post-digital, post-Internet age. There is a staggering amount of Goya’s *Saturn* interpretations out there, where low-brow pastiche kitsch co-exists with high-brow artistic homages in animated GIFs, oil paintings and video installations (figs. 122-128).

Ghost exploits the low-resolution aesthetics of *poor images*. The CRIs are visually compromised and resolution-poor due to their status as digital relics. My approach to the photo mosaic leans in on such aesthetics of compromised visibility. Fragmentation is inherent to the photo mosaic format, reliant as it is on the outdated aesthetic of early digital images or the even older aesthetic of the traditional mosaic. Chris Horrocks has already pointed to traditional mosaics as the earliest form of digital images that predate electronic technology (Horrocks, 2012). Even *within* this fragmented, mosaic aesthetic, there are standards for what makes good photo mosaics, many of which *Ghost* purposefully deviates from.



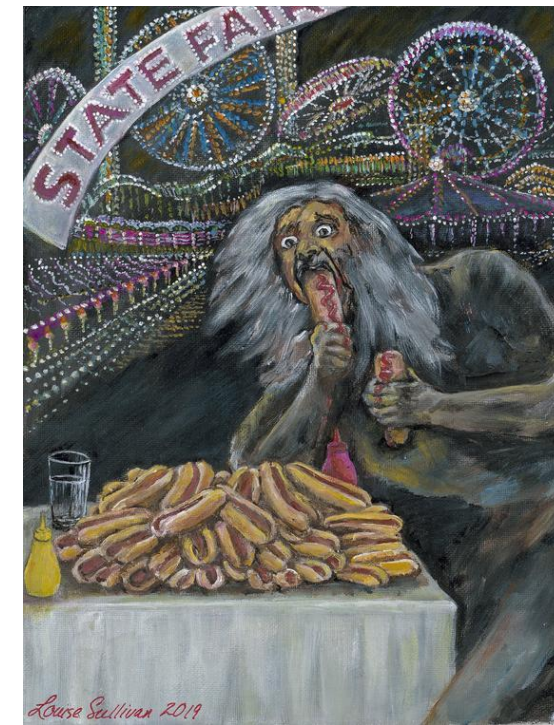
123. Dudek, P. 2014. *Goya's Saturn Devouring His Son*.
[Unknown material]



124. A figurine of the body being devoured by Saturn. [Online].
[Accessed 13 February 2024]. Available from:
<https://www.bluemondaypress.com/product/saturn-devouring-his-son-figure>



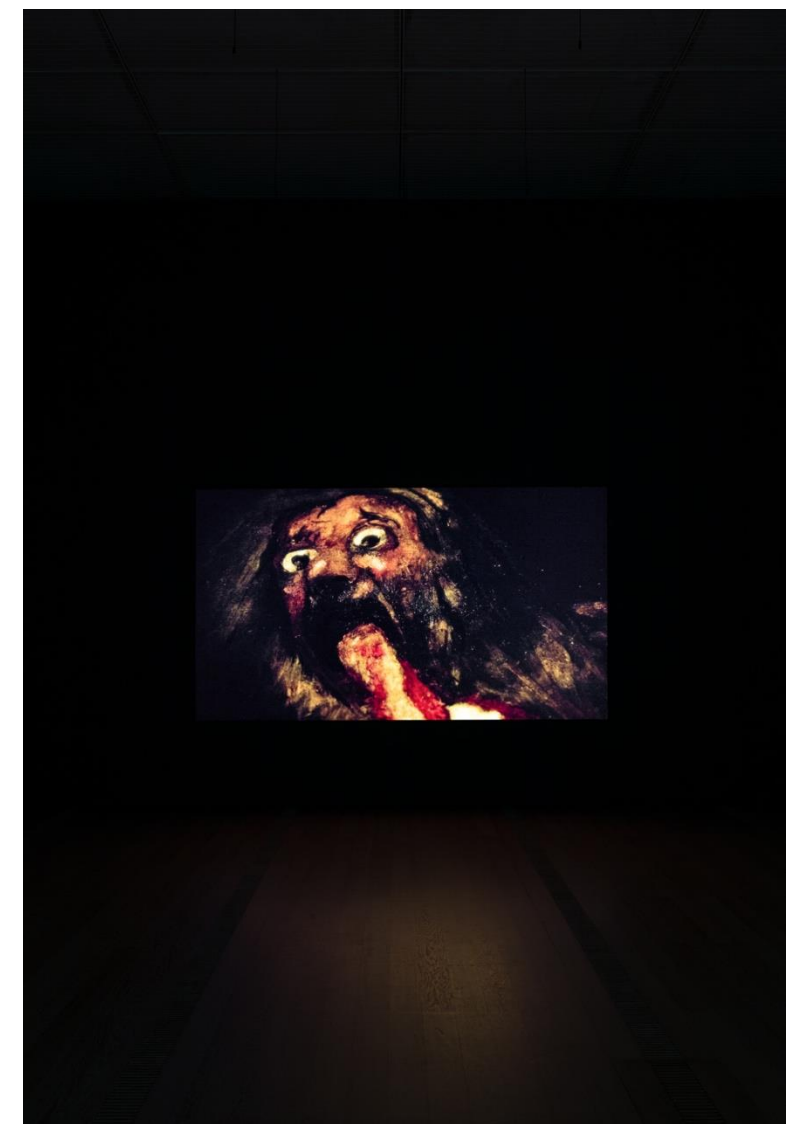
125. Buck, M. *Goya Galactus*. [Graphite]



127. Sullivan, L. 2019. *Saturn Devouring His Dogs*. [Painting]



126. Muñoz, I. 2021. *Photograph re-interpreting Goya's Saturn*.
[Photograph]. At: Territorio Goya

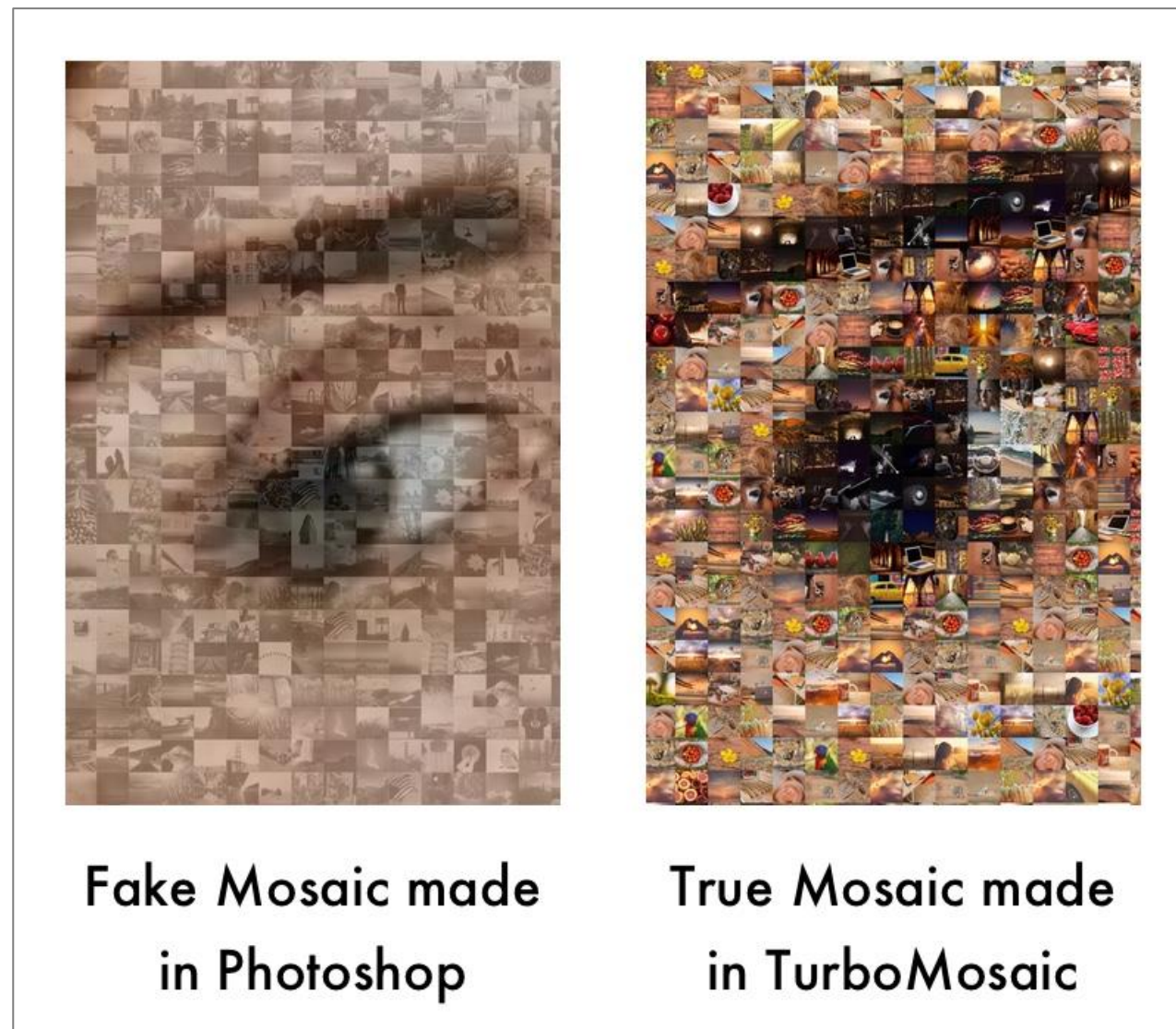


128. Parreno, P. 2021. *La Quinta Del Sordo*. [Color film, 5.1 sound mix]

Making 'Bad' Photo Mosaics

According to several photo mosaic blogs and companies, a 'good' photo mosaic must avoid superimposing (ghosting) the target image onto the library images or changing their colours (fig. 129), both considered forms of 'cheating' (Photomosaic.org, 2016). The other indication of a 'good' photo mosaic is the size of the tiles; smaller tiles might make the target image easier to recognise, but the library images are harder to see, which is seen as defeating the very point of a photo mosaic. Other photo mosaic designers expand the guidelines for "true mosaics" to include high-resolution printing, a diverse and sizeable library of cell images, and a simplified target image (Picture Mosaics, 2020; DeCarolis, 2015). These technical concerns are echoed by 'photo mosaic artists' such as Robert Silvers, whose photo mosaic works are produced as high-resolution objects, whether prints, NFTs or jigsaw puzzles. Roy Feinson, digital mosaicist and founder of various software firms, promises 'award-winning' mosaics for every occasion (Doubletake Images, n.d.). Theirs are the opposites of 'poor images' and exemplify a fetishization of resolution as a marker of value and authorial validation in a contemporary hierarchy of images (Steyerl, 2009; Chateau, 2022). Silvers and Feinson's zealous attempts to guard the specifics of their technology become futile against what is already possible with affordable software like Mazaika (the software I purchased for my work).

Purposefully-poor image is Lucie Chateau's elaboration on Steyerl's *poor images* (2022). Chateau's purposefully poor images employ aesthetics of alienation; they have been intentionally corrupted to overstate the signs of degradation and circulation, making explicit what a poor image can only imply: loss of resolution, ownership and control, thus conveying the alienation resulting from that loss (2022). Although Chateau addresses meme culture, some aspects resonated with the process of making *Ghost*. I, the author of neither library nor target images, can easily access their poorer versions. I began to realise that my choices in *Ghost* were those that acknowledged the loss or distance from their originals – 'bad' mosaics as an equivalent of purposefully-poor images. If 'good' mosaics seek clarity of reproduction in both target and library images, *Ghost* makes the loss of clarity part of the subject matter of the work. The decision to not colour, stretch or crop the library images or superimpose the target image onto the final composite has, in the context of this project, more to do with staying true to the rawness (poverty) of my original materials rather than a desire to make 'good' mosaics. Including the complete library inevitably means having small tiles or a print overwhelmingly large. It also means that the composite result will not be smooth because the software must

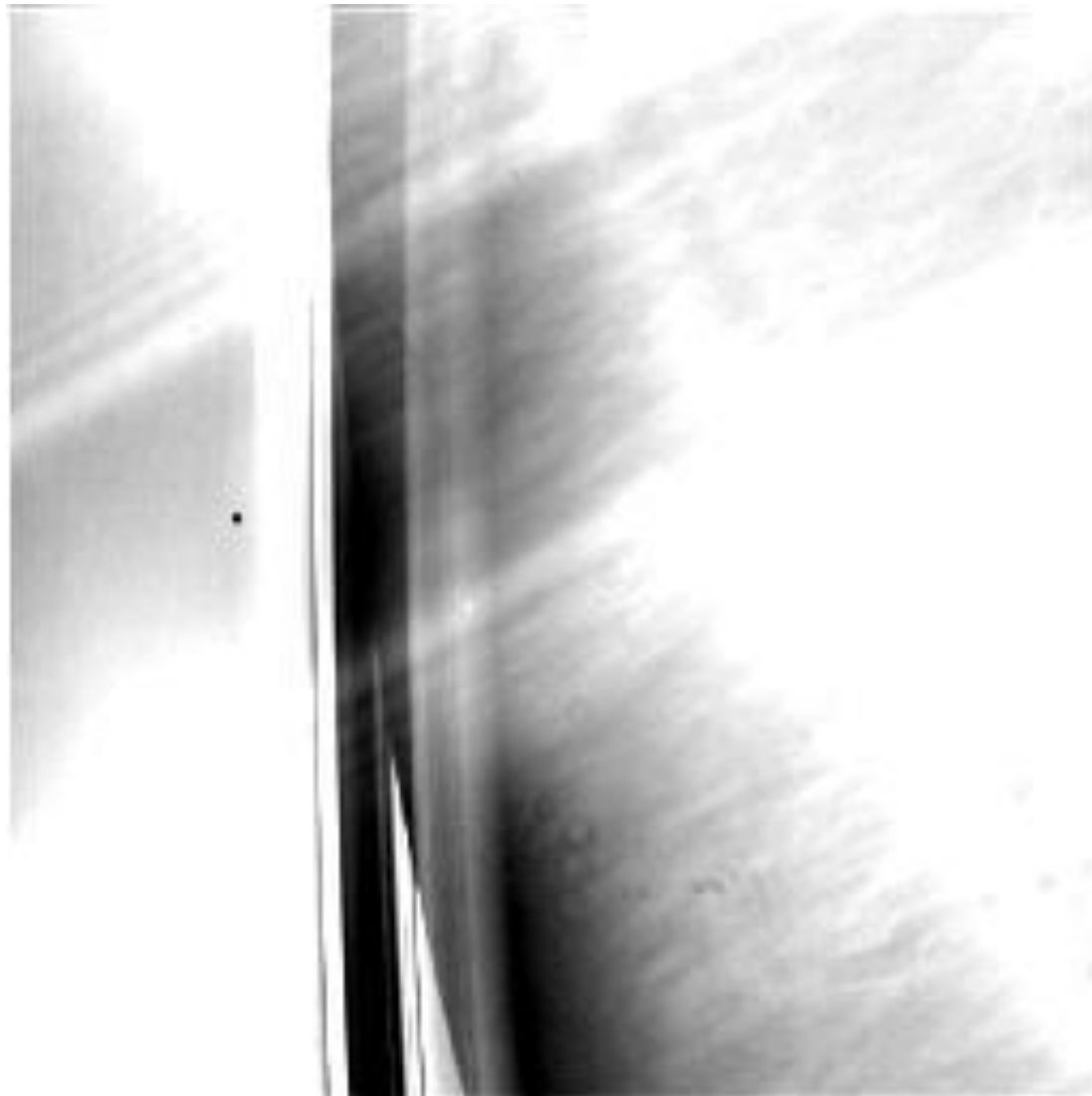


129. An image illustrating the difference between a 'bad' fake mosaic and a 'good' true one. [Online]. [Accessed 13 February 2024]. Available from: <https://www.turbomosaic.com/make-photo-mosaic-in-photoshop.html>

allocate all the tiles without repetition, even if they are not good matches. In the animation, gradual deterioration becomes the subject matter. While the CRIs are poor due to the limitations of the technology at the time of their capture (fig. 130), *Ghost* is intentionally made poor, even though the software Mazaika can produce 'rich' mosaics. Goya's original is often discussed for its raw 'ugliness', yet it has painterly complexity, subtle textures and tones that are sacrificed to privilege the raw appearance of the CRIs (fig. 131).

My artistic decisions in *Ghost* signify an irreverence or ambivalence towards the aesthetic standards of the medium that mirror how critically acclaimed artists such as Fontcuberta also use the medium. Unlike Silvers, Fontcuberta's photo mosaics appear to use colourisation to improve clarity. For Fontcuberta, the photo mosaic is merely one in an extended repertoire of photographic-digital supports, while Silvers or Feinson focus on 'good' technique, use simple stock-like images and take themselves very seriously. Fontcuberta works are self-referential, irreverent towards the technology used and draw attention to content, fitting with Manovich's and Krauss's characterisations of post-media contemporaneity (Manovich, 1996; Krauss, 2006). The implications of 'drawing *with*' the CRIs are that the unintentional poverty of the CRIs leads to a corresponding poverty – intuitive but deliberate – in the application of the chosen tools and materials for the work. The implications of '*drawing with*' for *drawing* must necessarily address the question of mark-making, a seemingly unmoveable tenet of drawing. Working with the photo mosaic does not involve making marks in any conventional way, nor even in a digital form. How far do these works stretch the concept of drawing as mark-making? Can 'bad' mosaics become 'good' drawings?

The technical standards for 'good' photo mosaics have no equivalent for drawing. Today, no 'bad' drawings exist because every mark "can be loaded with profound significance and can contain multiple meanings, however truncated its form" (Petherbridge, 2010, p. 429). Petherbridge laments that this will to ascribe profound meaning to every graphic gesture is reducing the critical, investigatory and functional dimensions of drawing (p. 431). The line made by hand seemingly holds even more power as "the important signifier of the autographic self in contrast to the fragmentation of the rest of an artist's practice" (p. 431). While the digitally drawn line has been naturalised, it still falls short compared to the "the line pressed across paper by the pencil" which possesses the highly valued raw and low-tech grittiness (Faure Walker, 2008). The argument for the photo mosaic as drawing needs to negotiate both the fetishisation of the mark *made*, by hand or digitally.



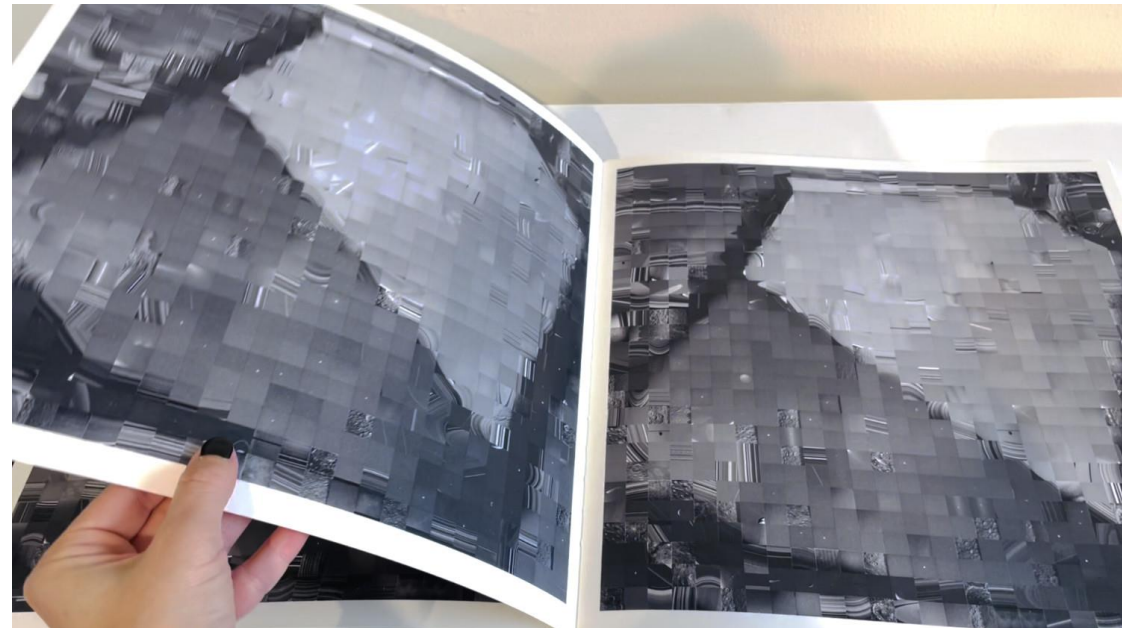
130. Cassini raw image file name: W00109571. [Digital Photograph]

Against the meaningfulness of the drawn mark, the photo mosaic might stand out as utterly *meaningless*. Any technological wizardry there might have been in photo mosaics has been completely assimilated into the mainstream. This technical obsolescence could be equated to a kind of meaninglessness and it is what prides an opening for reconsidering the currency of the photo mosaic for digital drawing. Before continuing the discussion on photo mosaic and drawing, another work manifests my ongoing exploration of the medium and other possibilities of using sequences.



131. Fraga, H. 2020. *A close-up of one of Ghost animation still*. [Digital Image]

Solid: Abstract Melancholy



132. Fraga, H. 2023. Screenshot from video documentation of *Solid*. [Screenshot]. Video available at: <https://vimeo.com/manage/videos/912565554>



133. Fraga, H. 2023. *Solid* at Sunny Bank Mills. [Photograph]

Solid is an artwork in book format (figs. 22-23). The viewer is invited to handle it and flick through its pages (<https://vimeo.com/manage/videos/912565554>). A book professes the reproduced nature of the images contained within it, as Sontag noted, but it can also protect otherwise fragile objects: in books photographs lose less of their “essential qualities” than reproduced paintings and are more collectable than when transcribed to film (1973, pp. 2-3). In this sense, a book acts as a highly tactile material container for what would otherwise exist only digitally. *Ghost* exaggerated the degradation of the source images, conflating the CRIs with the textures and grains of the chosen materials and mirrored in the aesthetic of purposefully poor images. *Solid* stretches the conventions of the photo mosaic format in a different way, the sleekness of high-resolution printing puts at the forefront the qualities that belong to the CRIs alone.

In *Solid*, I add a new variable to the device of sequencing to include all library images without repetition. Instead of using a fixed number of tiles as in *Ghost* (the same number of rows and columns), in *Solid* the sequence begins with a one-tile mosaic and tiles are increased exponentially with each new mosaic. While *Ghost* arguably starts with a ‘good’ photo mosaic only to degrade into a poor one, *Solid* tests the very definition of a photo mosaic. The nature of the work as a photo mosaic only reveals itself if a viewer actively engages with the work enough to recognise it. Quite quickly, reiteration becomes overwhelming; page after page appears nearly identical as the increase of tiles becomes almost imperceptible (fig. 132). The book proposes an order to the images, but it allows something the animation does not: the viewer dictates the pace and can choose to subvert that order – a distinction also noted by Sontag (1973, p. 3). Once the presence of a target image has been detected, the viewer can retrace the sequence and search for it anew. As tiles increase, the target image does indeed gain detail, but only momentarily. As in *Ghost*, the diminishing library also eventually leads to the degradation of the target image. Despite being composites of thousands of tiny individual images, the last few pages of the book dissolve into single solid blocks of black (fig. 133).

A Fragmented Target



134. Dürer, A. 1514. *Melencolia I*. [Engraving]. At: Metropolitan Museum of Art, New York



135. Urrutia, A. 2017. *MIRROR RIM*. [Oil on Canvas]

As in *Ghost*, *Solid's* target image is a work of art that matches Goya's in status but contrasts it in style, medium and historical and geographical context. Whether a viewer recognises the source as it gradually reveals its presence, the figurative content is simple: an image depicting a geometric figure, a polyhedron. This is no ordinary polyhedron, for it is the one from Albrecht Dürer's well-known 1514 engraving *Melencolia I* (fig.134). In its five centuries of existence, *Melencolia I* has generated a vast body of literature that shows no signs of exhaustion, like Goya's *Saturn*. *Melencolia I* could easily be described as a visual encyclopaedia of melancholy iconography; the objects depicted in the engraving have been much scrutinised. *Solid*, however, narrows the attention to a single object in the engraving, the polyhedron, also known as Dürer's solid. Out of all objects in the engraving, the polyhedron is the one that most defies interpretation, and has instigated the largest number of artistic responses and re-interpretations (figs. 135-138). Jesusa Vega's description of Goya's Black paintings is worth repeating: "They are the ones that best express our contemporaneity: fragmentation, bewilderment, insecurity, aggressiveness, sadness and melancholy." (Vega, 2019, p. my translation). Vega's words could also apply to the polyhedron and explain its appeal to modern and contemporary artists; a fragment that has transcended the whole it was once part of. It has come, alone, to stand for the abstraction of melancholy (Bubonik, 2019). An object with sharp geometric edges, seemingly made of stone or concrete, the polyhedron is hermetic, opaque, self-contained and solid.

Solid minimalist aesthetic and austere formality somewhat echoes those aspects of the polyhedron. The CRIs are arranged in an orderly sequence of self-contained arrangements with clear-cut edges. The square format of the CRIs is reiterated in the format of the book and in each photo mosaic. Yet, in all these rigid formalisms, including the title of the work (*solid*) have a strong inference of the opposite: how fluid and far from stable meaning is.

In *The Pensive Image: Art as a Form of Thinking*, Hanneke Grootenboer describes a pensive image as one "that neither tells a story nor conveys a specific meaning but articulates, through its form and materiality, a line of thinking." (2020, p. 23). While theoretical objects generate discourse and invite interpretation, pensive images defy interpretation and instead send the viewer on a journey (p. 10). Goya's and Dürer's original works have become, or are treated as, theoretical objects, but *Ghost* or *Solid* do not offer the viewer a story nor do



136. Kiefer, A. 1990-1991. *Melancholia*. [Sculpture]. At: San Francisco Museum of Modern Art



137. Nicolai, C. 2004. *Anti*. [Structure, electronics, light-absorbent black paint].

they communicate specific meanings. Grootenboer identifies pensive images with stillness, and notices its prominence in moving image artworks, where “stilling and techniques of delay” are deployed to invite the viewer “not to interpret but to think” (pp. 27-28). Animation in *Ghost* is extremely slow, frames dissolve into each other almost imperceptibly and the looping nature of the work provides a space for contemplation. *Solid* does not use moving image medium, but the format of the book is a tactic to incite movement. *Solid* gives the viewer control but has built-in delaying devices. Going through the pages, I found myself entering a sort of trance-like contemplative state. Suddenly a little detail would jolt me out of the photo mosaic induced reverie. This was a very different experience to looking at the CRIs in my computer screen. While the click of the mouse would push me away – I would get easily distracted – the tactility and constant presence of the book will draw me in and keep me there.

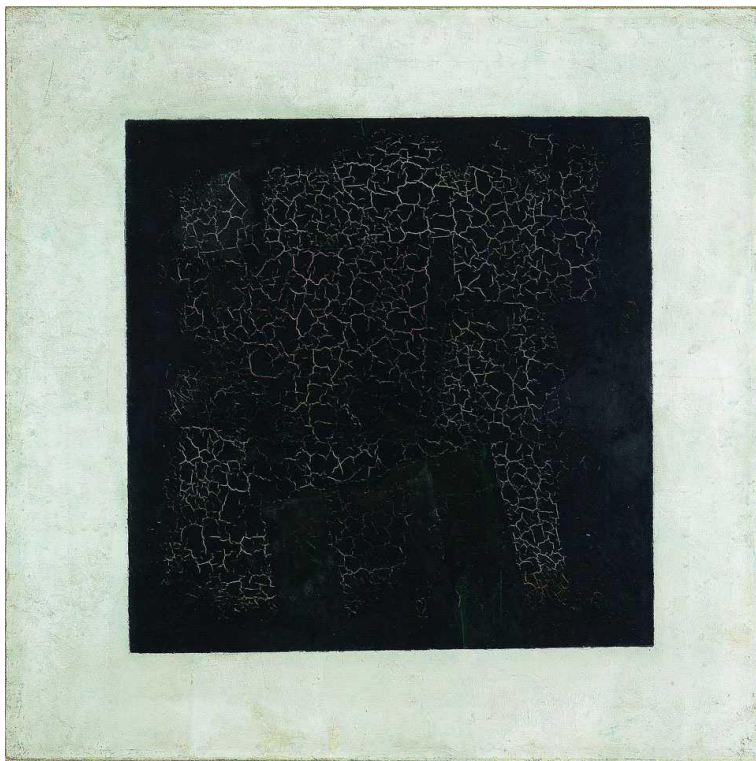
As in *Ghost*, *Solid* operates *within* the technical possibilities of the photo mosaic software. Every page is a photo mosaic that is technically ‘right’ but stylistically ‘wrong’ by the standard conventions. Once again, the work is making purposefully poor photo mosaics, exaggerating the aesthetics of the glitch, reiteration and low-res reproduction. Some of the pages in *Solid* defy the very concept of a photo mosaic. The book starts with a single image depicting a rock surface with a central protrusion or a crater, chosen by the software as the best matching library image to replace the entire target image. Is a photo mosaic of a single tile still a photo mosaic? Similarly, as the tiles increase in number but diminish in size and range, the CRIs become as indistinguishable as pixels. Are these last pages displaying a uniform surface of black ink still mosaics?

The last few pages of *Solid*, are *technically* also photo mosaics, but all the viewer encounters is a single image of a black square within the sharp white margins of the page. The more tiles there are, the less there is to see. For a couple of pages, the figure of the polyhedron can still be made out by tiny white specks against an otherwise homogenous blackness, like a ghostly afterimage. The logic of the system has been pushed to an opaque conclusion. And yet, with this ‘new image’ comes an opening, a new reference laden with potentially meaningful associations.

Kazimir Malevich’s 1915 *Black Square* epitomises the climax of modernist abstraction (fig. 139). Recognising the reference transforms the obliteration of both target and library images into a consolidation. As the two-dimensional projection of a black cube, the black square is a figure laden with melancholy and Saturnian



138. Dorotte, A. 2010. *Amalgamma*. [Aquatint on zinc and copper]. At: private collection.

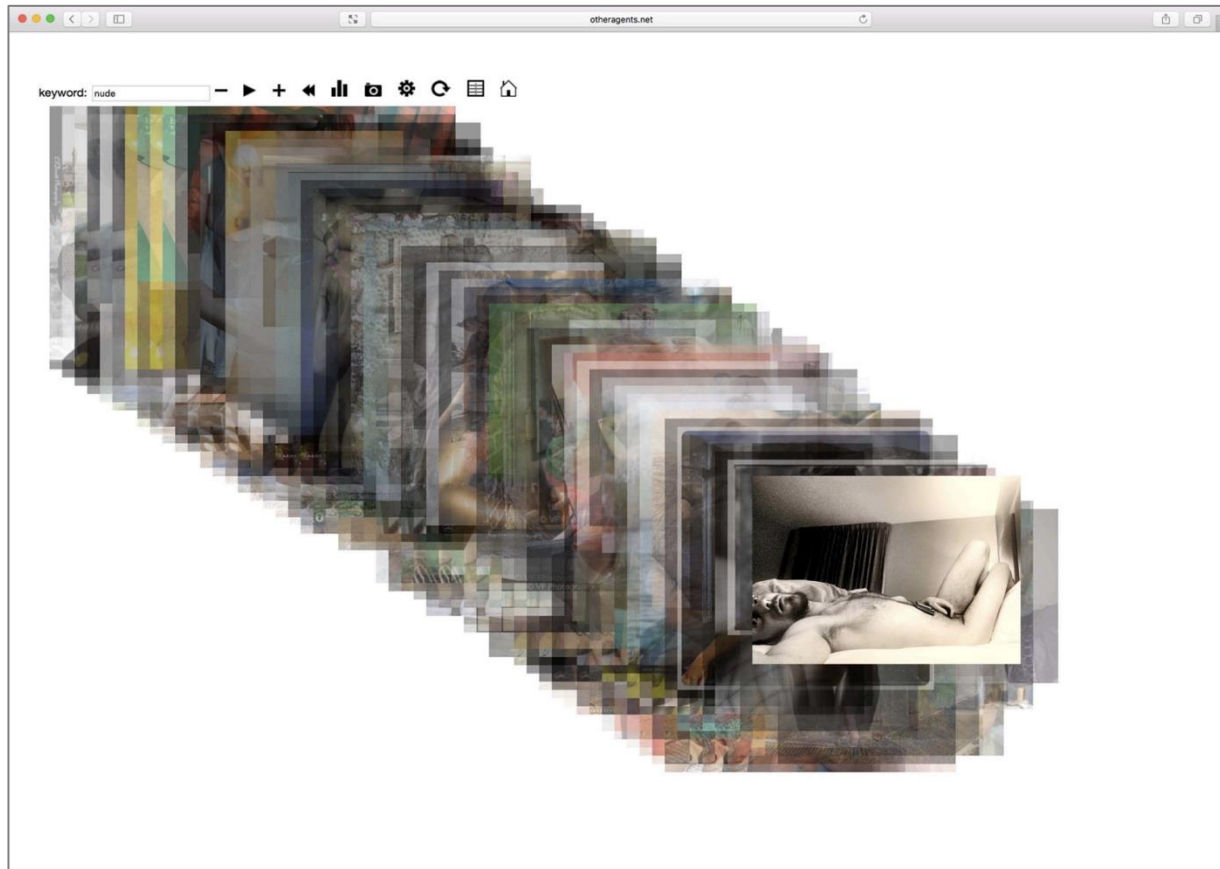


139. Malevich, K. 1915. *Black Square*. [Oil on Linen]. At: Tretyakov Gallery, Moscow

symbolism. The black cube represents Saturn in esoteric beliefs and practices (Kriss, 2017). The cube was the traditional geometric figure associated with melancholy, a convention Dürer subverted with his irregular polyhedron (Bubonik, 2019). Black has always been the colour of melancholy, tracing back to the word's etymology to more contemporary figurative associations with depression. Many thematic links can be made between the black square and the theme of Saturn and melancholy. The importance of the black square is not just the further conceptual associations it brings to the work, which could all lead to productive interpretative paths, but also what it says about the photo mosaic process. It demonstrates that stretching the aesthetic and technical conventions of the medium can expand the concepts brought in by the target and library images. It demonstrates that the photo mosaic has the capacity for articulacy. I will return to this in the last part of the chapter. I will now consider how *Ghost* and *Solid* exploit aspects of the photo mosaic that are often associated with drawing.

Linearity, Interrupted

To begin considering the photo mosaic as drawing, we must look at digital works that have already been addressed as digital drawings despite conspicuously not relying on the drawn line. Charlotte Webb's *Flickr Nude (or Noodle) Descending a Staircase* is a web-based application that searches for and displays, in real-time, images from Flickr tagged with 'nude' in a descending cascade or staircase configuration (fig. 140). What makes this piece a drawing, for Norwood, is the "uninterrupted lineage running from the object to its image on the computer screen", there is a digitally native form of transmission, "the pencil of the internet is the internet itself, which draws, and draws upon, the underlying code that organises information and structures our encounter with it" (2021, p. 403). This is also how Webb reframes her piece (as drawing *with* the web). The disclosure of its making is a well-known property of the linearity that drawing can assert (Petherbridge, 2010, p. 92). If marks are not drawn, then linearity becomes the concept one must hold onto to discuss digital works as drawing. Webb's piece works as a drawing because it makes digital, web-based, and interactive linearity its subject matter.



140. Webb, C. 2013. *Flickr Nude or Noodle Descending a Staircase*. [Web Application]

Photo mosaics can be created and displayed in real-time, in fact, various companies offer such modalities (Boothco, 2023; Picture Mosaics, 2023). However, this is not the strategy I have employed. Like the CRIs exist now as a fixed, finite collection, no longer streaming 'live', my photo mosaic works are fixed and finite. The linear character of a photo mosaic lies in the conflation of many pictorial spaces on one surface. Target and library images are held on this surface level, with a technical scaffolding that remains visible (the grid). As a pictorial illusion, the photo mosaic relies on its own breakage: the immediate recognition of the fragmentation draws a viewer back and forth between the parts and the whole. Software created for drawing strives to hide the inevitable interruption between a movement and its trace (Norwood, 2021; Petherbridge, 2010). The photo mosaic relies on a linearity of interruption that entices movement.

In *Ghost* and *Solid*, we encounter multiple versions of the same images, rather than a single self-contained one. Both work use tactics to delay accessing all the tiles at once. The work seems to be as much about containing all the CRIs as about the impossibility of seeing everything. To attempt to see everything –even if that attempt cannot ever be achieved – the viewer must activate the work by prolonged observation or literal movement, turning pages and getting closer or further away. It is the viewer who draws with their eyes



141. Gentileschi, A. 1622-1625. *Mary Magdalene as Melancholy*. [Oil on Canvas]



142. Fraga, H. 2021. *Photo mosaic of Gentileschi's painting*. [Digital Image]

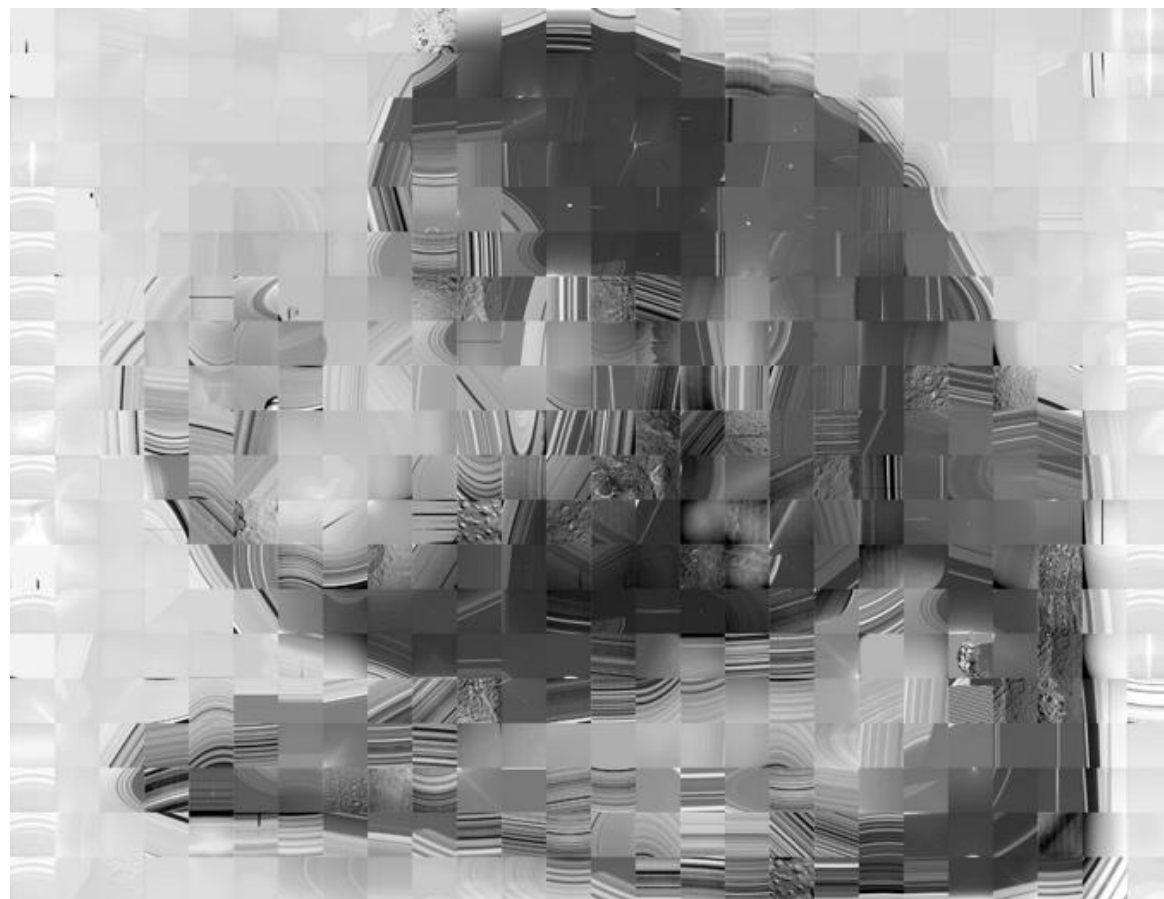
traversing across the tiles. This is a purposefully interrupted linearity, one that embraces the fragmentation of the digital.

Much is said about the capacity of the drawn line to convey movement. “No matter how the tools of drawing are used or simulated, or approximations of the linear are explored”, Petherbridge writes, “line asserts its abstract, directional and motile qualities” (2010, p. 88). For Ingold, the continuous line “arises from the movement of a point that [...] is free to go where it will, for movement’s sake. [...] And in reading it, the eyes follow the same path as did the hand in drawing it.” (2016, p. 75). Ingold takes a very negative view of the dotted line, which he sees as stagnant and prescribed by comparison. The dotted line “goes from point to point, in sequence, as quickly as possible, and in principle in no time at all, for every successive destination is already fixed prior to setting out, and each segment of the line is pre-determined by the point it connects” (Ingold, 2016, p. 75). The parallels between Ingold’s dotted line and the photo mosaic are strong. Ingold describes the process of joining the dots as reconstructing a pattern that already exists as a virtual object which, once completed, stands as a finished artefact with no further possibility for growth or development (Ingold, 2016, p. 77). This research considers Ingold’s view rather narrow because of its focus only on the negative aspects of the modern fragmentation of the line. Instead, this research attempts to shed the negative connotations and re-frame the ‘connect-the-dots-puzzle’ character of a photo mosaic as a positive way of working *with* the intrinsic fragmentation of the digital. While Ingold sees no movement in the line made by joining the dots, my research sees in the photo mosaic nothing but movement. Because the equivalent of the dots in a photo mosaic (tiles) remain disjointed, the line remains always somewhat unresolved. Rather than reconstructing the gesture that made the mark in the past, viewing a photo mosaic is a process of constructing and deconstructing in the present.

Solid makes visible the transformation of the CRIs from self-contained photographs to image-marks working together. As they get smaller, abstract qualities dominate and we begin to perceive them as marks within the larger composite. The photo mosaic treats all images democratically, no matter what those images were before (photographs, drawings, collages etc), or what they are images *of*, they all become digital assets. If inverting individual CRIs accentuates their drawing-like qualities, repurposing them as tiles in a photo mosaic reframes them as an *alphabet* of readymade marks.



143. Kollwitz, K. 1903. *Woman with Dead Child*. [Etching]



144. Fraga, H. 2021. *Photo mosaic of Kollwitz's etching*. [Digital Image]

I have chosen the term alphabet deliberately to make another analogy between the photo mosaic and drawing that relies on Ingold's distinction between writing by hand and typing. Elaborating on Heidegger's question of whether writing with a typewriter is writing 'with' at all, Ingold laments the fragmentation imposed on writing by typing (2013, p. 122). To Ingold, the typed word is stagnant compared to the handwritten one, and worse, "the button-pushing finger that operates the automatic machine is part of a hand that, although still anatomically human, has lost something of its humanity" (p. 123). My research contends that the photo mosaic is to 'drawing' what the typewriter (or electronic keyboard equivalent) is to 'writing': a tool for assembling a whole out of a finite set of units. To use another writing simile, photo mosaic is typographic while hand-drawing is calligraphic. If we can still refer to typing as 'writing', could this kind of visual assemblage of images not be a form of 'drawing'?

In this analogy, the CRIs are analogous to the set of fixed symbols/letters that can be combined to form words and sentences. The photo mosaic finds a way to draw with the digital-ness without being reduced to the mere transmission of information, as Ingold – after Heidegger – implies (Ingold, 2013, p. 122). The target images expand and complicate the subject matter of the CRIs without making informative statements. The CRIs are repurposed as mark-like picture elements – individually fixed as the finite collection of symbols on a keyboard – that can be composed in countless ways.

The emergence of the black square as an unpredicted visual reference in *Solid* subverts the presumed lack of growth and development of the fragmented line. I will examine this aspect of the photo mosaic through another work in which the medium's capacity to articulate something new beyond what is prescribed is placed at the centre of the work. *Saturn Head* is a photo mosaic print on aluminium (figs. 24-25). This work moves away from including all the library images and represents an important shift in the approach to using target images.



145. Howard, R. 2007. *Pudenda Memba*. [Mixed Media]

Saturn Head

Is this a head that is dreaming? Longing? Fearing? This void has stars and moons. It does not reflect, only absorbs, like a black hole. Even the grid vanishes in the matt, inky blackness. The head and the mind, the unfathomable realm to which melancholy has a special claim. Dark matter, dark energy, dark thoughts, dark humour. Saturn and melancholy always have two sides, one light, enabling, the other dark, disabling. I think about artists' heads, where the double-edged sword of creative activity, where infamously and mythologically, genius and madness often cohabit.

Experimenting with more 'melancholy' references from art history (figs. 141-144), I came across Rachel Howards' work (fig. 145) in Christina Reading's research exploring figurative representations of female melancholy by female artists (Reading, 2015). The sombre subject of Howard's work, the representation of female suicide in the media, seeps through the poured paint. The body is gendered, facial details are obscured by the solid lump of paint that represents the head-hair tilted forward. Black is the dominant colour, with other colours limited to the background. When I looked at my photo mosaic reconstruction on my large computer screen, I was struck by how the head had transformed into a void full of stars and moons.

The gendering of melancholy haunts the research questions my practice sets out to explore. It is an issue that, while recognised as pertinent to the artistic figures referenced in my work (Goya or Dürer) and their works or the psychoanalytical dimension of melancholy as explored by Judith Butler or Julia Kristeva, my practice has chosen to leave lingering. Although the issue of gender and melancholy is central to Reading's research, where I was introduced to Howard's work, my handling of Howard's painting in *Saturn Head* signifies that gender is not the primary concern of the current investigation. A theoretical examination of gender will thus not be pursued in this thesis.

As in *Solid*, *Saturn Head* presents only a cropped section of the original. Unlike *Solid*, the cropping in *Saturn Head* took place after a photo mosaic of the whole original had been created. Unlike in *Solid*, the original source used as the target image is much more likely to be unknown to the public. Working with a less-known work such as Howard's already defies photo mosaic conventions which usually employ easily identifiable target images, in one way or another (fig. 146). Either the source of the target image is easily recognisable as



146. Fraga, H. 2021. *Photo mosaic of Howard's painting*. [Digital Image]

a well-known painting, as in Silvers' photo mosaics of paintings by Vincent Van Gogh or Picasso (Silvers, 2008), or the content of the image is what needs to be easily absorbed, as in Fontcuberta's works already discussed. These works rely on presenting an image familiar to the viewer in the 'unfamiliar' way of the photo mosaic, something true of *Ghost* and *Solid* to a certain extent. But in *Saturn Head*, there is already a barrier in that it does not present an easily identifiable work from art history or clear figurative content. The specific gender of the figure and the thematic contents of the original source (suicide and the representation of female depression in mass media) are no longer accessible. The figurative content of a 'head' is simple but also vague and highly abstracted. It is not about recognising a particular source but about what has happened to the image of a head in the process of being remade (fig. 147).

Within every photo mosaic, the two sources (target and library) are always held in a sort of friction. In *Saturn Head*, the two sources work *together* to articulate something *extra in each other*. The target image's head is articulated as a void of stars, and a cluster of CRIs as a head. Howard's original representation of a head is painterly but decidedly opaque, it had no suggestion of a receding abyss. Similarly, there is no suggestion of anthropomorphic features in the CRIs. The *apparition* of the head/void in my first photo mosaic of Howard's whole painting was an arresting moment in the photo mosaic experiments. The detail of the head/void is zoomed in, followed to the point of constituting the primary focus of the work, printed on matt aluminium to harness non-reflective qualities of the ink and to a scale that mirrors an average viewer's life-size head. A small accidental feature had become the pull of the whole image, akin to Barthes' *punctum*, an element in an image that 'pricks you' and grabs your attention on a deeply personal and emotional level.

The *punctum* cannot be intentionally put there by the photographer, "it occurs in the field of the photographed thing like a supplement that is at once inevitable and delightful" (Barthes, 1982, p. 47). Although Barthes links the *punctum* to the reality the photograph captures, it has been expanded to other mediums. Petherbridge compares it to "the process of interruption and seizure within a continuum, halting and redefining a representation in a momentary freeze-stop", as in Sherrie Levine's homologous copies of other artists' work (2010, p. 283). Thinking of the *punctum* as something personal and subjective, something that resists representation, echoes characterisations of melancholy. Melancholy "thrives primarily where it can hardly be said to be the ostensible object or theme. And it is generally the case that where it can be identified in the strict sense, we encounter only its empty husk." (Földenyi, 2006, p. n/p). While making the head/void motif the



147. Fraga, H. 2021. *Saturn Head*. [Digital Image]

centre of the work risks 'emptying' the poetic strength of its spontaneous emergence, it also broadens and softens Howard's original. The themes of depression and suicide in Howard's original work are expanded to the existential melancholy of the human condition. The subject matter of the CRIs, Saturn as an object of scientific observation, is also broadened to Saturn as a symbolic object for reflexive introspection.

The Articulatory of Digital Materials

Beyond the thematic associations in *Saturn Head*, the piece instantiates thinking through making. The unpremeditated emergence of the motif of the head/void discloses a capacity for articulacy in the digital materials and technologies employed. The prescribed nature of the photo mosaic format as a process of drawing with the CRIs as literal picture units seemed to leave little room for discovery: the target image imposes a predetermined and fixed pattern. Yet, *Saturn Head* demonstrates how the medium can generate "new signifying potential" (Cazeaux, 2017, p. 93). A photo mosaic articulates its own making in the senses already discussed: we can see *through* the optical illusion. In *Saturn Head*, the target and library images are articulated in a way that expands the conceptual constellations of both. It is worth returning to Ingold's assessment of the dotted line as devoid of growth or development (2016, p. 77). This research posits that the photo mosaic's disjointed format foments movement, the joining of dots remains the beholder's role. Both *Ghost* and *Solid* expand this movement with their sequential formats, but in *Saturn Head*, the 'joining of dots' has enabled growth and development within a single still image.

Practical experimentation has rehabilitated the articulate capacity of the photo mosaic. The interaction between CRIs and the original target image in *Saturn Head* is akin to the autofigurative interactions between materials discussed in Chapter Three. In this way, the research expands Cazeaux's characterisation of autofiguration. Cazeaux underplays the autofigurative possibilities of "mechanical forms of representation" because he places them as "outside the body schema" (2017, p. 144). This, my research posits, is an oversight. The photo mosaic, as a natively digital medium, is naturally sympathetic to the digital nature of the CRIs. Reframing the photo mosaic as a form of drawing digitally re-focuses the CRIs as fluid materials capable of articulating more than just the objects they mechanically represent.



148. Fraga, H. 2021. *A pencil drawn copy of the photo mosaic.* [Pencil on Paper]

In many ways, the photo mosaic seems to contradict what is most valued in drawing: the continuous transmission between gesture and its trace, the uninterrupted linearity in the forming of the trace. Instead, the photo mosaic discloses an interrupted linearity. Only my dissatisfaction with my own stubborn attempts to render the photo mosaic as a hand-made drawing revealed that the digital photo mosaic was *already* a drawing (fig. 148). The integrity of the CRIs as mechanical representations is challenged when placed in a photo mosaic, forced to act as digital marks. Another highly valued aspect of drawing is its capacity to record and express time and movement. “The photograph arrests time,” Ingold elaborates on Rawson and Berger, while “the drawing flows with it” (2013, pp. 127-128). A photo mosaic is no match for drawing in this regard, but neither are most photorealist drawings. Petherbridge notes how photorealist drawing enacts a “halting of time” only to reclaim it via the labour of a hand-made copy (2010, p. 283). The photo mosaic also halts time, but it does not recover it through a labour-intensive manual reconstruction, it freezes in a suspended present. The gesture of drawing is carried out by the viewer, who negotiates the forming and dissolving of images. The gestures of this kind of drawing are digital and virtual. And while some hand-made drawing experiments persisted with the head motif, using the CRIs and the photo mosaic as abstracting filters (figs. 149-150), it was the revelation of the articulacy capacity of the photo mosaic *as already a drawing* that really pushed the research forward.

Review of Chapter

The greater distancing from a recognisable and well-known original in *Saturn Head* suggested that the target image role in a photo mosaic could be exploited in a different way, using target images which may also be unknown to a viewer and that could also be devoid of any figurative content. At the time *Saturn Head* was developed, my analogue drawing had also reached a point where the focus had become the autfigurative potential of materials. *What would be articulated by using these analogue drawings as targets to be redrawn digitally?* Further practical exploration of this question (fig. 151) eventually led to the work entitled *Saturn and Melancholy*, which forms the core of Chapter Five.



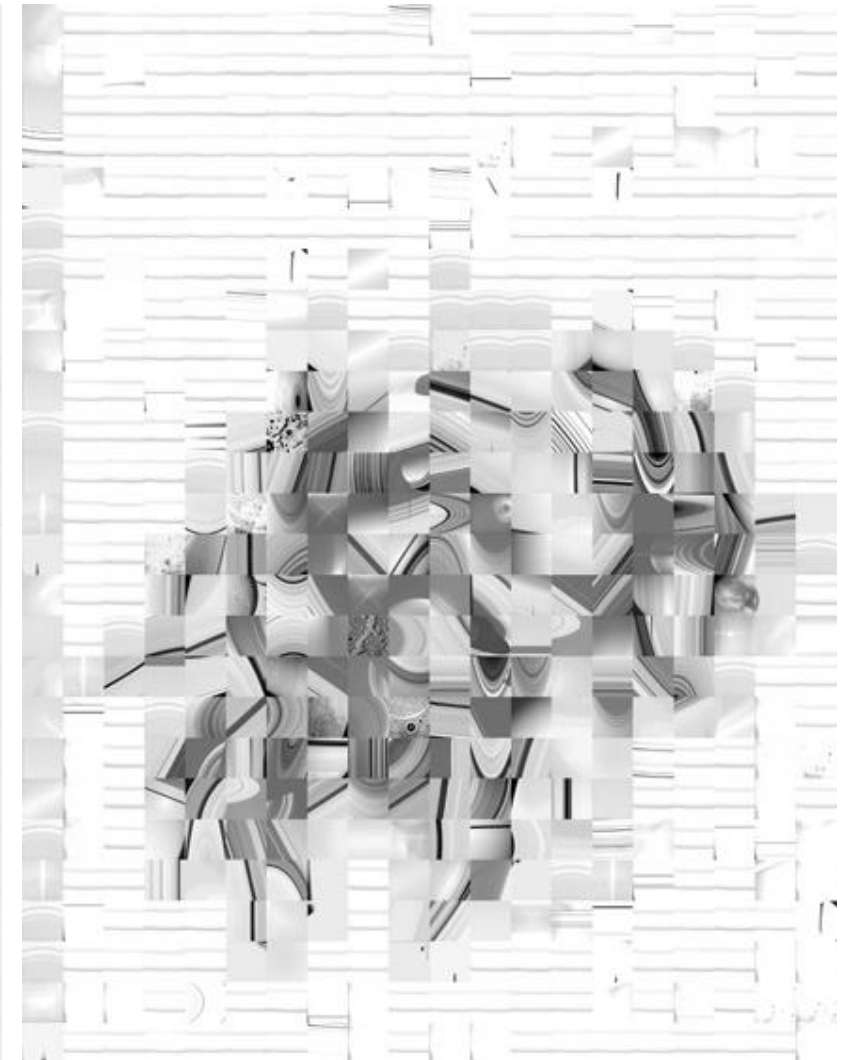
149. Fraga, H. 2021. *Pencil on paper of a photo mosaic.* [Pencil on paper]



150. Fraga, H. 2021. *Drawing of a photo mosaic of Goya's Saturn.* [Pencil on paper]



151. Fraga, H. 2021. *A drawing.* [Charcoal on paper] *Same drawing as photo mosaic.* [Digital Image]



Chapter Five

Drawing with it All



152. Fraga, H. 2022. *Visitors looking at Saturn and Melancholy* [Photograph] At The Stanley and Audrey Burton Gallery, University of Leeds, April 2022



153. Fraga, H. 2022. *Visitor pointing at Saturn and Melancholy* [Photograph] At The Stanley and Audrey Burton Gallery, University of Leeds, April 2022

Saturn and Melancholy

The work *Saturn and Melancholy* represents the culmination of the primary research, where drawing with analogue and digital means are brought into conjunction (figs. 27-28). In the explorative process of 'drawing with' the CRIs, this work encapsulates the striking of balance in the analogue-digital tension. The work is also a consolidation of conceptual associations, materials and techniques that imbricate all the research questions. *Saturn and Melancholy* showcases the maturing of the artistic strategies used in previous chapters and the emergence of new ones that point to future practice. The work represents arrival and departure simultaneously, a culmination of artistic probing of the CRIs, and a new beginning for further practice and research. This chapter reflects on how this work addressed the research questions through a constellation of conceptual associations. What implications of 'drawing with' the CRIs are foregrounded by this work? How does this work appraise the subject of Saturn and Melancholy?

In *Saturn and Melancholy*, the implications of 'drawing with' the CRIs are reflected on and honed in. Two seemingly identical, albeit mirrored, abstract pictures mimic the bilateral symmetry of a Rorschach test, but the illusion is broken as the viewer gets closer to the work (fig. 152-153). In Chapter Three and Chapter Four we see the practice steering away from photo-realism and towards processes where the technologies and materials can become active agents in the making with the capacity to articulate beyond themselves.

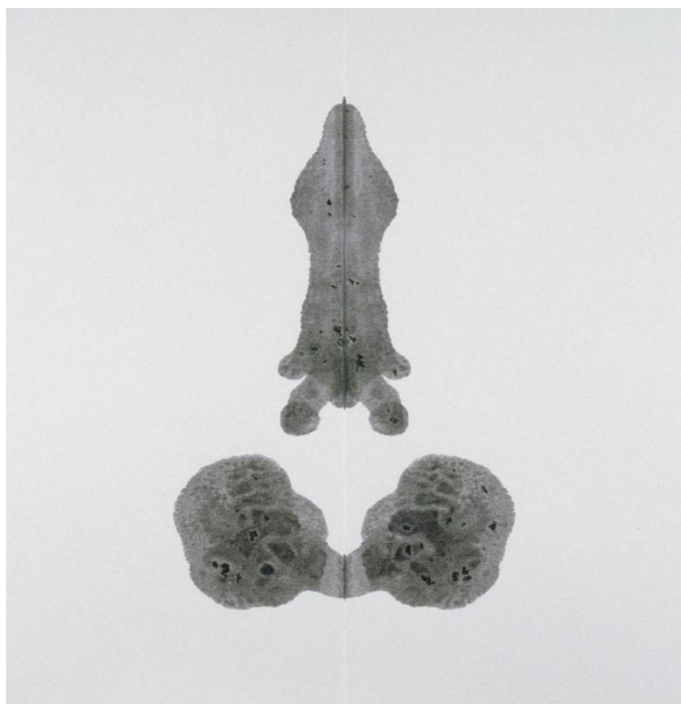
The Rorschach Tests

In *Saturn and Melancholy*, the evocation of the Rorschach test has a dual purpose. On the one hand, it is a familiar trope and technique for making abstract images; on the other, it makes an indirect but significant link to melancholy outside the arts. Most importantly, it corresponds with the rawness of the CRIs in its deferral of *resolution*.

The early twentieth century was awash in questions of abstraction. Hermann Rorschach, whose eponymous psychological test generated some of the most iconic images of the twentieth century (fig. 154), fastened on styles of abstract reasoning (Galison, 2012, p. 353). The abstraction of the Rorschach tests is intended to be *resolved* (by the viewer, the patient), enabling psychological insights into a person's thoughts, emotions and



154. Rorschach, H. 1921. *Ink blot test cards*. [Photograph]



155. Parker, C. 1996. *Pornographic Drawing*. [Ferric oxide on paper]

personality characteristics. I would argue that pictures created in a Rorschach-like manner epitomise the dual character of autfiguration, articulating their coming into being and something beyond it. Many artists have used the trope of the Rorschach test, including Marcel Duchamp, Andy Warhol, Cornelia Parker, Bruce Conner, Justin Carter, Tania Kovats and C J Henry (figs. 155-156). Used within an art context, the Rorschach reference primarily emphasises the beholder's share but abstains from judgement on whether and how the abstraction is resolved (fig. 156). The resemblance to a Rorschach test makes viewers more receptive to the invitation to activate the work's meaning while being aware that many other interpretative paths could have been taken. This is what Ingold phrases as *looking with* the work, rather than *at it* (2013, p. 127). My own experience of viewers' responses to *Saturn and Melancholy* confirms this. Viewers seemed much more readily engaged in sharing what they could see with this work than with any other abstract works in the same exhibition.

The Rorschach test reference also establishes a link to the medical history of melancholy. Although the original tests were not designed to aid the diagnosis of depression, they nonetheless belong to the domain (psychology, psychoanalysis, and psychiatry) where melancholy, as depression, has resided firmly since the beginning of the twentieth century. Matthew Bell examines the history of melancholia (the term he favours) from ancient times to the present in *Melancholia: The Western Malady*, primarily focusing on medical writings and the intersection of medicine and culture in early modern Europe (2014). He argues that melancholia is a culturally specific condition that flourished in the Western world due to the structure of Western medicine since ancient Greece and Western preoccupation with self-consciousness. While acknowledging that melancholia is distinct from modern depression, Bell explores how contemporary research on the latter can provide insights into the former. I was reading Bell's book when the Rorschach test emerged as a reference in the studio experiments. Bell's extensive examination of modern professional psychiatry and its transformational effect on the understanding of melancholia provided a thematic background to what was already emerging as an artistic strategy.

At its most debilitating, melancholy –understood as depression– culminates in the loss of meaning, a condition described by psychoanalyst Julia Kristeva as *asymbolia*, the inability to use or comprehend symbols (N., 2013; Miller, 2014). Asymbolia is a state of meaninglessness; in other words, abstracting from finding meaning. Abstraction, through the reference to the Rorschach test, is framed as something with the *potential* to be



156. Warhol, A. 1984. *Rorschach*. [Synthetic polymer paint on canvas]



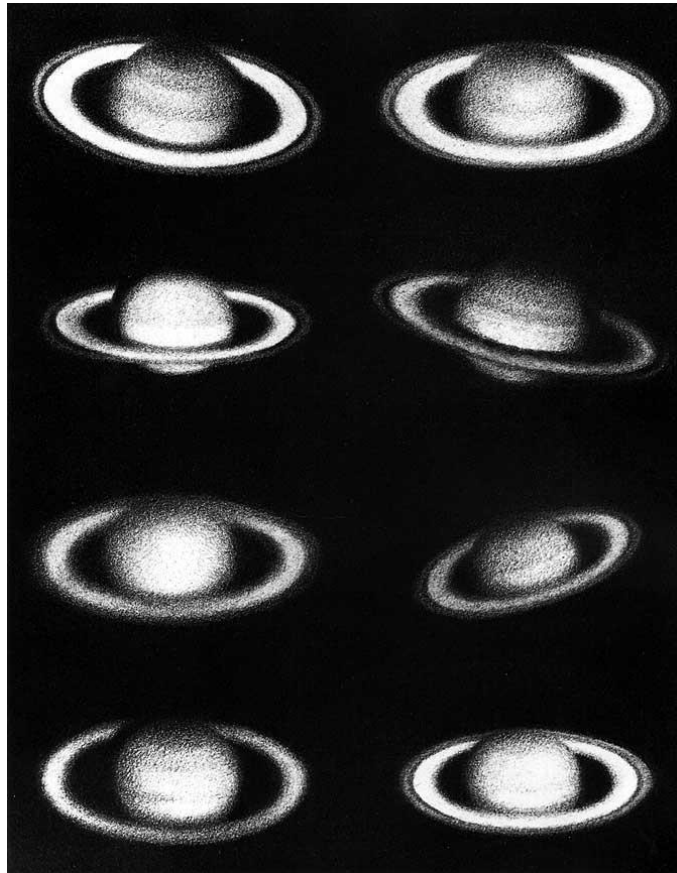
157. Fraga, H. 2021. *A sample of my own Rorschach-like drawings on the wall*. [Photograph]

resolved in the future interaction between a viewer and the work. The nebulosity or formlessness of the work is contingent on the implicit *possibility* of form. Melancholy is an abstract concept, hard to define, impossible to pin down to one single discipline, and pervasive albeit vague (Schwenger, 2006; Bowring, 2008). Of the four bodily humours once associated with mental states and health, melancholy – and the black bile it was named after – always transcended concrete existence (Arikha, 2008). Melancholy is often characterised as sadness without a cause, meaning that the cause of sadness is unknown or insufficient (Radden, 2000). Could we add, perhaps, that the cause might be too abstract?

Much like the CRIs, the work is simultaneously uncalibrated – to be calibrated or resolved by a viewer's perception and the result of a meticulous calibration process (to create it). The differences in scale, materials and all-over composition to a Rorschach-like picture are immediately apparent even from a distance, but as the viewer approaches, they become more pronounced. The Rorschach test reference is revealed as a 'trick', a fabrication, an artistic strategy to link two distinct types of images. This link afforded by mimic mirroring can then be used to critically reflect on the two kinds of drawing being made manifest. I will revisit what the work's dual nature does to the theme of Saturn and melancholy later in this chapter, as well as what it does to the concept of drawing. Before that, I consider the conceptual associations brought about by the compositional makeup of the work.

The Role of Titles

The role of titles in art has had its own evolving history; as historian Ruth Yeazell reviews, to contemporary sensibilities, titling your work is an authorial gesture (2015). A title "may be ambiguous and open-ended, but the ambiguity is the author's" (Yeazell, 2015, p. 263). In his *Object Oriented Ontology*, Harman briefly comments on the guidance role of titles in artworks, corresponding it to the role played by a concept in a metaphor (Harman, 2020, p. 30). "For metaphor to occur", says Harman, "there must be a connection between its two terms, but it must be non-literal and should not be made too explicit" (Harman, 2020, p. 27). Harman emphasises the reader's essential role in a metaphor (applying the qualities of one object to the other); without the reader's active engagement, "no aesthetic effect can occur" and the metaphor would collapse into literal statements (2020, p. 29). My project considers Cazeaux's concept-based model in its two potential directions: materials bring concepts to bear on the subject matter or research questions and, vice-versa, concepts from



158. Celmins, V. 1982. *Drawing, Saturn*. [Graphite on acrylic ground on paper]. At: Collection of Paine Webber Group Inc., New York

the questions also become materials to be worked with. By extension, the title of a work might play a considerable role in bringing concepts into play – which might not be there otherwise. As seen in previous chapters, certain titles like ‘incognito’ or ‘shadow’ have been useful prompts for reflection. In my work, I use titles with authorial intent, never with an authoritarian one. Within a model of ‘drawing with’ titles are reframed as one more material that can be manipulated to articulate concepts that will interact with the rest of the elements in the artwork. From a research perspective, the title also connects the artwork to the research questions. Many of my previous titles suggest abstract qualities or attributes (incognito, solid, temperamental) that might be of the works, or the themes and objects depicted in them. Even the noun ‘ghost’ evokes something rather abstract.

More than in any other works discussed previously, *Saturn and Melancholy* (the title) makes a more concrete link to the research questions, in particular to the question of how art practice might offer a new apprehension(s) of the theme of Saturn and melancholy (I return to this later in this chapter). Still, the title is not explicative; it does not provide an answer but acts as a prompt for questions. How is ‘this’ Saturn and melancholy? In which way do Saturn or melancholy resemble this? Against the resolute abstraction of the work and the absence of intentional autographic marks, the presence of a title as concrete as this might seem, at first, contradictory. Because all concepts interact with each other. The title implies that Saturn and melancholy somehow *look* or *are* like the artwork, and that the artwork is *somehow about* Saturn and melancholy.

Titles are anchors and catapults for interpretation. The abstract qualities of the work are given a concrete conceptual anchor from which to start the interpretative journey, and vice-versa, the concrete concepts of the title are catapulted into abstraction and ambiguity by the qualities of the artwork. *Saturn and Melancholy* defies representational conventions of both Saturn and melancholy. Laszlo Földenyi reminds us that the arts have long shed the need to use antique or medieval iconography and that melancholy “becomes inward and profound only where it is not manifested as a thematic choice” (2006, unpaginated). But when it comes to Saturn, art seems still to perpetuate familiar images (figs. 158 and fig. 34). A notable exception to this could be the 2008 Torino Triennale and corresponding catalogue, titled *50 Moons of Saturn* and curated by Daniel Birnbaum (2008), but that is mostly because Saturn functions as a shorthand for melancholy, which is the actual central theme of most works featured there. ‘Drawing with’ has expanded to utilise the title to create a tension between familiar concepts and representational conventions. The emphasis on the beholder’s share,

via the Rorschach abstract symmetry, and the dual character of the work also contribute to this tension. The title does not specify which term corresponds with each 'half'. Is the print of CRIs 'Saturn' and the dust-covered surface 'melancholy'? Even the conjunction 'and' plays a role, making the nature of the relationship between the two concepts ambiguous. Is this relationship harmonious or incongruous? As *Ghost* did for two differing visions of Saturn, *Saturn and Melancholy* provides no definite answer, only a gateway for reflection.

Dust

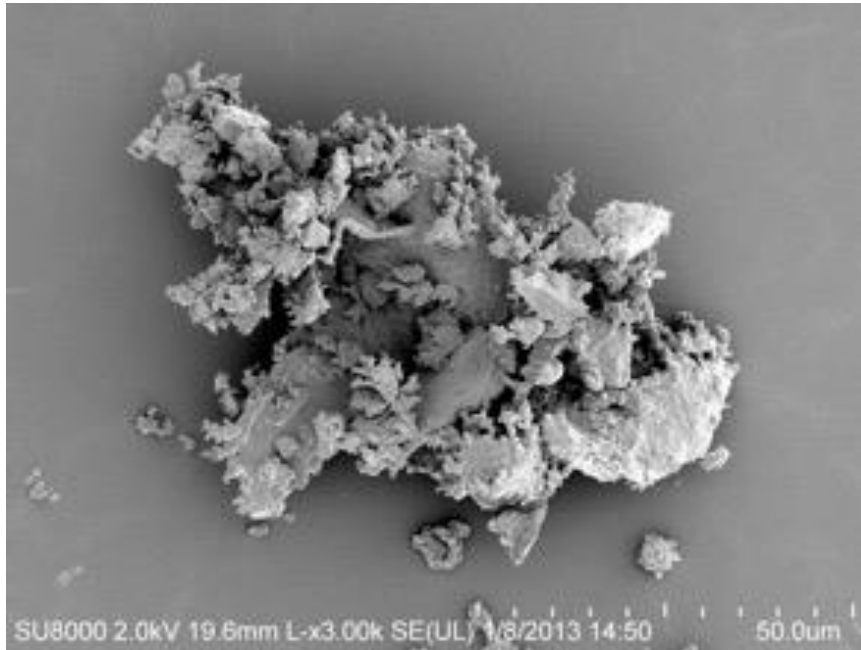
Dust is inevitable, infinitesimal, infinite. Drawing with the CRIs led me to draw with dust. It became more important to make images with dust rather than images of dust. The CRIs are already both images with and of dust. Dust denotes a condition of matter rather than a particular type of matter. Dust is omnipresent, a cosmic raw material, a sign of beginnings. Dust is mundane, a leftover or by-product, a sign of endings. Dust articulates melancholy. Dust is temperamental.

Dust is the primary signifier in *Saturn and Melancholy*. The dusty, dry nature of the material used is noticeable from afar, regardless of what else a viewer 'sees' in the abstract image (it is also listed as material in the work's description). Metaphors are omnipresent and essential for making sense of the world (Geary, 2011).

Dust is a material laden with metaphorical resonances. Before delving into how dust is handled in my artwork, it is worth noting some of the broader connotations of dust and the presence of dust in the CRIs.

Earthly versus Cosmic Dust

"Dust", curator Company reminds us, "has a double-edged relation to the camera. It must be kept well away from the equipment, but it is deeply photogenic" (2017, p. 27). The CRIs embody this dual character of dust (fig. 159-160). In a cosmic context, dust is the sublime raw material for stars, planets, and galaxies. Dust, in this cosmic sense, is a critical component of the Saturnian System. The CRIs capture the photogenic linearity of Saturn's rings, composed of countless individual particles. However, in the CRIs, we can also see the other, less glamorous side of dust. Particles trapped with the instruments – impossible to clean once in space – create one of the most common artefacts in astrophotography. Known colloquially as 'dust doughnuts', these dust particles are registered as patterns of concentric circles that are particularly noticeable in low-light conditions (NASA, 2018). The concentric rings expose the apparatus's mode of registering light, like the ripples created by a pebble on the water's surface. The particles diffract the light entering the sensors like the pebble diffracts the water's surface, the 'doughnuts' are the effect of dust particles, but they do not resemble them. As



159. NIAID. 2013. *House dust under high magnification*. [Microscope Image]



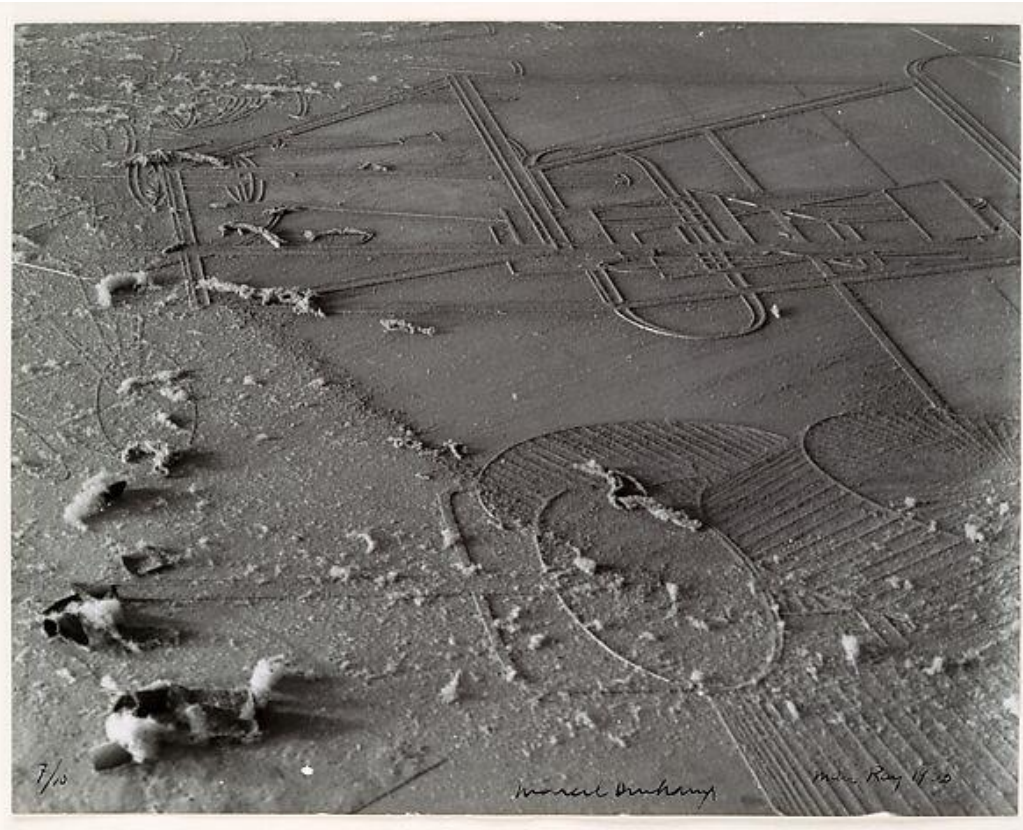
160. Hubble Telescope. *NGC 6302, the Butterfly Nebula*. [Photograph]

photographs, the CRIs are *images of dust* (of phenomena constituted mainly of dust) but in their uncalibrated state, the CRIs are also *images with dust*.

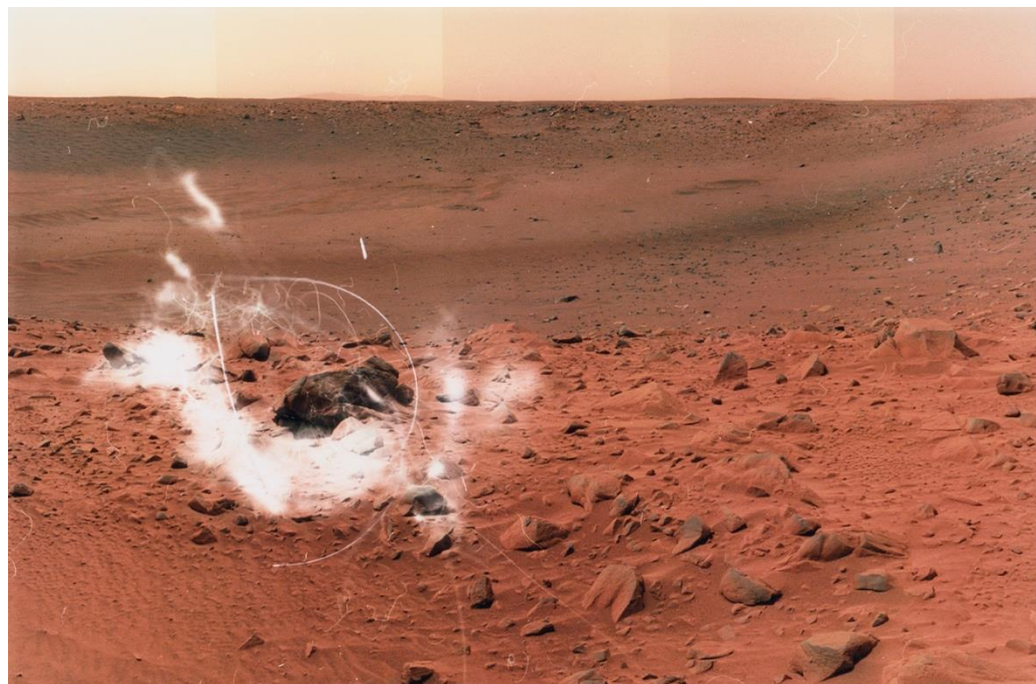
In a down-to-earth context, dust articulates melancholy. Drawing attention to dust means drawing attention to the transience of human life and the inevitable oblivion that befalls all things. Dust generally invokes notions of fragmentation, disintegration and pollution in our everyday earthly lives, “we come from it, go to it, and create it daily with all the inevitability of breathing, and dying” (Campany, 2017, p.27). Walter Benjamin famously threw a spotlight on dust as an overlooked aspect of modernity that exposes the stagnation of history, transforming things into opaque phantoms of themselves, poignantly instantiating the passage of time, oblivion, decay and death (Olalquiaga, 1999). Many artists have explored and exploited dust’s nebulous, ambiguous and melancholy character, conflating its cosmic with its domestic dimensions (figs. 161-162). The exhibition *A Handful of Dust*, curated by David Campany, brings together many key historical and contemporary examples (Campany, 2017). Eva Stenram’s work is of particular interest for her use of earthly dust to interrupt cosmic views of the Martian dusty landscape. Stenram had to produce physical negatives of what were originally digital images for those images to accumulate dust. Chance plays a vital role in the composition and placing of dust in both Stenram’s and my work. However, the type of dust and its application are very different in each case. Stenram’s is clumpy and localised; it interrupts the image surface that lies ‘behind’ it; mine is widespread and *creates* a surface. Stenram dust is domestic, mine is somewhat industrial, prefabricated and uniform. Stenram creates the duality ‘of and with dust’ through the literal overlapping of two photographic methods. Instead, I employ the juxtaposition (and mirroring) of two drawing methods, each alluding to the duality of dust in different ways.

Drawing With Dust

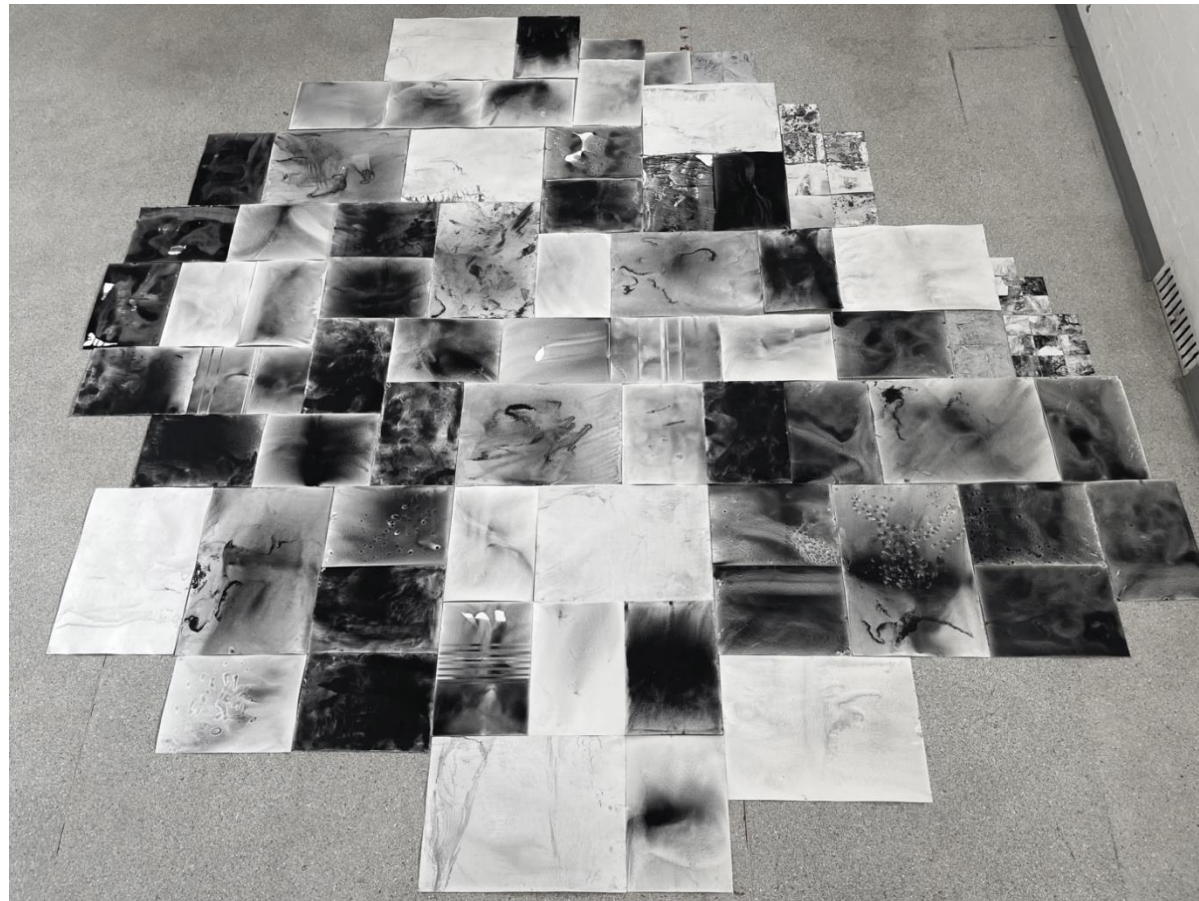
Domestic dust denotes human presence by being its crude residue or trace (Burbridge, 2007). Its melancholy resonances lie in this signification of a past human presence that is now an absence. Graphite dust does not carry such affective or raw implications. Graphite powder is not domestic, but a *domesticated* version of a material found in the wild. It is not charged with the pathos of the past, as domestic dust is, but with the rawness of the present and the future: *manufactured and packaged for drawing*. Graphite, ink, or charcoal are recurrent in my work as conventional and highly flexible drawing materials; they can be skilfully manipulated to



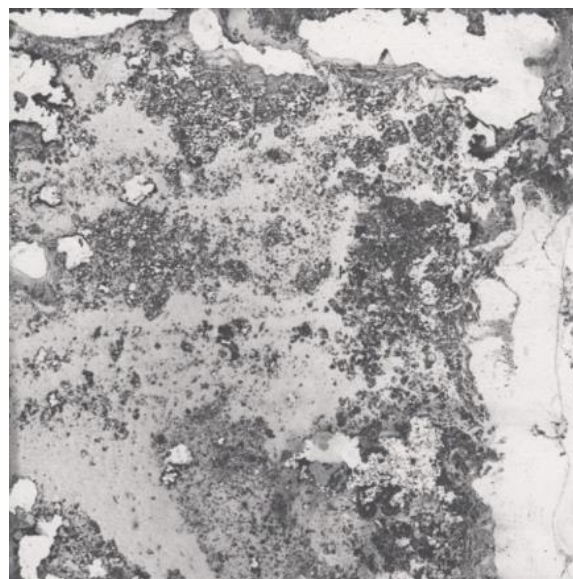
161. Ray, M. 1920, printed c. 1967. *Dust Breeding*. [Gelatin Silver Print]



162. Stenram, E. 2007. *Per Pulverem Ad Astra 3.API*. [C-type photograph]



163. Fraga, H. 2021. *Selection of drawings with graphite powder on studio floor.* [Photograph]



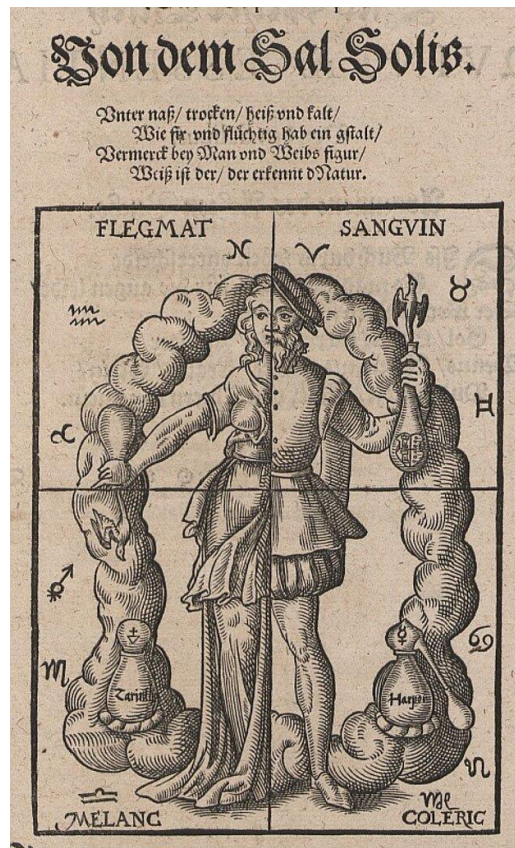
164. Fraga, H. 2021. *Small drawing* [Graphite on paper] Made by submerging paper in a tray of water and graphite powder.

create descriptive pictures. However, working with graphite in powder form was a new material *for me*, an exploration instigated by the autofigurative turn of the practice (figs. 163-164). The naivety that accompanies the first use of an unfamiliar material was something to be retained.

Graphite powder is handled in a way that articulates its uncalibrated, *untempered* character, mirroring the minimal processing of the CRIs in my photo mosaic work. The wave-like pattern left by my throwing unsophisticated technique infers the past ebbs and flows of the dust across the surface, like strata infers the motion of the Earth's crust, or like photography infers the motion while it freezes it. Can this trace of activity, now fixed, be a metaphor for the state of melancholy today? Melancholy was historically seen as "a movement towards a more elevated or more profound condition" (van den Bergh, 2006, unpaginated), much more central to our relationship with the world (Radden, 2000, p. vii). Has the concept become somewhat stagnant, relying on past 'ebbs and flows'? Or, can it be placed once more at the centre of the contemplative experience as a platform for flights of the imagination?

The point of autofiguration is to allow materials to articulate *beyond* themselves and the artist's own intentions. And so, the work must also allow for more than the imaginative retracing of the past. The Rorschach reference encourages a movement forward without prescribing the destination. The work becomes a site where many depictions (or none) could be found, a point of departure. Much like the CRIs, graphite powder is produced *for future use*. Drawing with *this* dust in *this* way was my way of corresponding with the CRIs in their state of limbo. Yet, the complex technological operation that create the graphite powder (the manufacturing process) or the photo mosaic (the software operations) remain invisible, much like the particulars of the technologies that produce the CRIs remain invisible in the CRIs themselves.

As in a Harman-like 'weak' similarity, the aggregate nature of dust echoes that of the CRIs as a collection of unique yet uniform units, suggesting a metaphorical relationship between the two. The formative past of the artwork is visible in the graphite-powdered surface and its photo mosaic re-construction like the glitches and errors are preserved in the CRIs. Like in all my photo mosaic works, the composition appears first as a poor 'pixelated' image, only to be revealed that these 'pixels' are rich in detail. *Saturn and Melancholy's* small but extreme high-resolution print (each tile is printed at 1 x 1 cm) allows viewers to appreciate, and get lost in, the details of individual CRIs. The viewer can appreciate the nature of the CRIs as images *of* and *with* dust.



Quelle: Deutsche Fotothek
165. Turneysser zum Thurn, L. 1574. *Illustration of the theory of four humours from Theosophie und Alchemie*. [Illustration] At: Deutsche Fotothek/Wikimedia.



166. Turner, N. 2021. *Anatomy of Melancholy*. [Mixed media]

Similarly, the work poses the CRIs as materials the work is, itself, an image *of* and *with*. The photo mosaic presents a printed version *of* the CRIs while also creating a new image *with* them. While graphite powder is a conventional drawing material (even if new to me), the CRIs and the photo mosaic are decidedly not, their “capacity of expression has not been exercised frequently before” (Cazeaux, 2017, p. 139). *Saturn and Melancholy* allowed me to further stretch and demonstrate the photo mosaic expressive capacity. Here, the digital photo mosaic is not just doubling but simultaneously completing and denoting as incomplete the dust drawing it mirrors. Digital and analogue materials and drawing modes articulate each other as essential to the whole artwork’s integrity. ‘Drawing with’ the photo mosaic repurposes the CRIs as *digital materials* with an articulacy that expands beyond their identity as photographic representations.

Black Bile and Lead

I now return to titles to delve deeper into how the words Saturn and melancholy interact with the materiality and appearance of *Saturn and Melancholy* to invoke two other materials long associated with melancholy: black bile and lead.

Black bile gave melancholy its name, evolving from the Greek for black bile, ‘black’ (*melan*) and ‘bile’ (*chole*). Black bile was one of four bodily fluids alongside blood, yellow bile, and phlegm (fig. 165). The ancient theory of Four Humours, or Four Temperaments, has been the subject of extensive scholarly exploration. All four humours are thought to have had a symbolic value even for the ancients, but black bile was always the most ambiguous and metaphorically charged (Arikha, 2008; Zimmerman, 1995). Black bile was believed to be produced by the spleen and characterised as cold, dry and dark, but modern medicine no longer recognises it as an actual bodily fluid. An example of a contemporary allusion can be found in Nicola Turner’s 2021 work, *Anatomy of Melancholy* (fig. 166). Turner’s work refers to the long lineage of melancholy (its title taken from Burton’s 1621 study). The black bile is evoked by the materials and subtle anthropomorphic yet fluid forms of the piece. Black bile was once thought of as a concrete, real substance but now exists only in a metaphorical dimension within the abstraction of melancholy itself. This lack of actuality – the fact that black bile does not actually exist – is exploited in this research as an open door to imaginative interpretation.



167. Encyclopædia Britannica. *Black Lead (Graphite)*. [Online]. [Accessed 14 February 2024] Available from: <https://www.britannica.com/science/graphite-carbon>



168. *Galena ore, a major source of lead*. [Online]. [Accessed 14 February 2024] Available from: <https://www.livescience.com/39304-facts-about-lead.html>

In humoral theory, it was the imbalance of the four substances that could cause problems; the wrong 'calibration' of black bile could determine whether melancholy was productive or destructive. Thinking of black bile in this way might make us think about graphite dust *again* in relation to the melancholy figure of the creative genius. Black dust might provoke images of industrial production and the presence of machinery. Blackness, the colour black and the absence of light are familiar metaphors for depression (Kristeva's black Sun, for example). Graphite powder would be dangerous if inhaled, but in *Saturn and Melancholy*, it has been domesticated, fixed and made safe for contemplation. Graphite also brings associations to another material that was once strongly linked to Saturn and creativity: lead (fig. 167-168). Graphite was mistaken for lead until late in the eighteenth century (Tate, n.d.). Although the toxicity of lead was known to the ancients, it was largely forgotten in later centuries and used in almost every aspect of everyday lives (Montes-Santiago, 2013). The alchemy symbol for lead also used to represent Saturn. In the archaic system of correspondences, Saturn was associated with lead through analogy with the slowness of Saturn's orbit (Klibansky, et al., 1979, p. 144). As lead poisoning was also known, Saturnism allegedly affected many artists and musicians, and it is the most generally accepted theory for Goya's various ailments (Montes-Santiago, 2013). Thinking of lead and black bile brings about creativity's potentially dual character without being bound to either side.

Saturn and Melancholy offers a contemporary outlook on black bile and lead as Saturnian substances, demonstrating the possibilities of art practice to offer an original apprehension of the subject matter. The originality lies in the focus on invoking black bile or lead as raw materials whose good or bad effects are not determined *yet*. The foregrounding of the uncalibrated character of the materials in the work mirrors the fact that those substances *by themselves* are neither good or bad, but it is only through our interaction with them (through interpretation or actual contact) that they can become one or the other.

Imperfect Mirrors

Saturn and melancholy once mirrored each other's double-sided nature. The longevity of the affiliation between Saturn and melancholy was largely due to the duality and duplicity associated with the planet and the black bile (Klibansky, et al., 1979, pp. 158-9). Seen as a representation of Saturn and melancholy, my piece matches the idiosyncratic character of their bond with the mirroring of two drawing modes, a strategy that grew as a logical extension to the doubling employed in earlier works. The symmetry in *Saturn and Melancholy* is contingent on distance, akin to the optical illusion of solidity in Saturn's rings. Distance blurs and totalises (fig. 169). The symmetry of a Rorschach-like print is organic, resulting from the process of pressing the material against two surfaces. Up close, the viewer can see that this symmetry is somewhat synthetic – created through a very different process. Like dust, the mirror motif is laden with metaphorical significance across many domains, from photography and representation (the mirror of nature) to psychoanalysis (the doppelgänger). This section examines the work through the lens of these mirror references.

A Matter of Scale

Saturn and Melancholy consolidates the possibilities of scale already utilised in *Ghost* or *Solid*. From afar, a viewer can take the work in. From up-close, a viewer is rewarded with the intimacy and intricacy of actual particles and high-res CRIs (printed at 1 x 1 cm). The analogue – autfigurative – and its digital reconstruction are locked in a 1:1 scale. The play on scales is what enables the optical illusion of symmetry from a distance but also what dissolves it into asymmetry from up close (fig. 170).

Every photograph involves a change of scale. Photographs, Sontag once wrote, “fiddle with the scale of the world, themselves get reduced, blown up, cropped, retouched, doctored, tricked out.” (1973, p. 2). When we interpret images – especially photographs – we tend to suspend our disbelief regarding scale. However, the success of a mosaic depends on it. In a mosaic, “information is granular”, E. H. Gombrich writes, “smooth transitions are transformed into discrete steps, and these steps can either be so few that they are obtrusively visible or so small that they can hardly be detected by the unaided eye” (1972, p. 89). The immaterial existence of digital images means that scale remains fluid until the images are disentangled from the electronic device. This is also the case for photo mosaics, which must be exported from the software as a fixed-



169. Fraga, H. 2023. *Looking at Saturn and Melancholy from a distance, at Sunny Bank Mills.* [Photograph]



170. Fraga, H. 2022. *Two close-up views of 'Saturn and Melancholy.'* [Photographs] Each image shows a 'corresponding' part on each side of the diptych.



171. An image illustrating Lacan's mirror stage. [Online].
[Accessed 14 February 2024]. Available from:
<https://mistahsaxton.weebly.com/lacans-mirror.html>



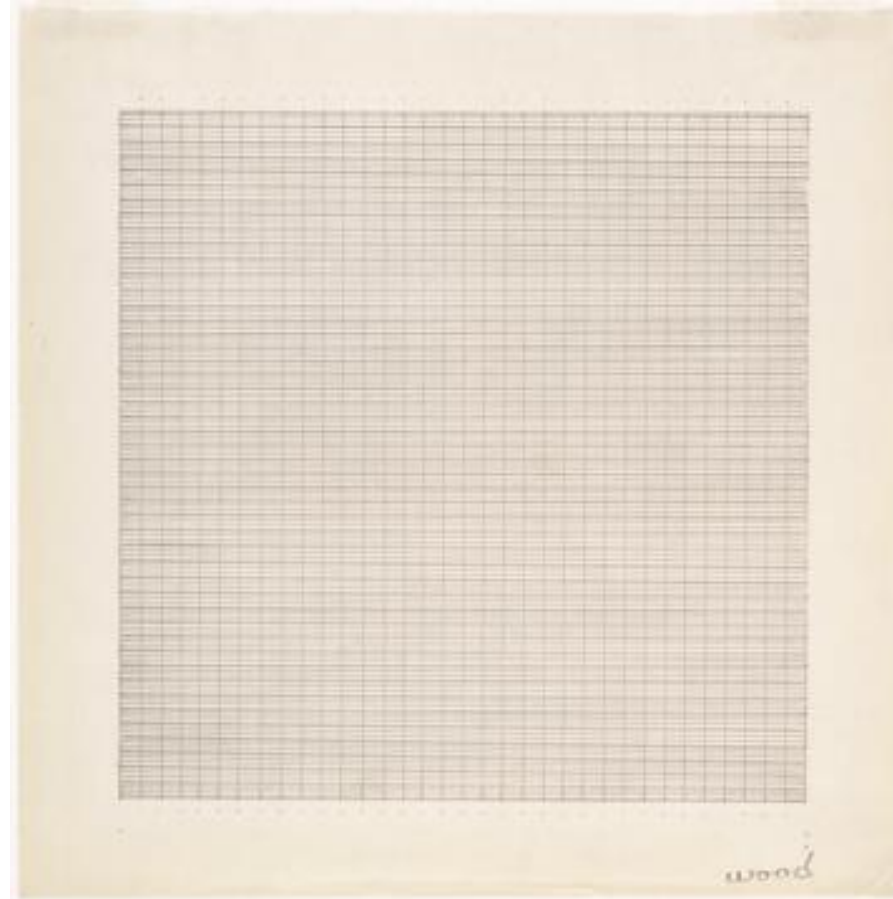
172. Rozin, D. 1999. *Wooden Mirror*. [Wood, motors, electronics]. Rozin creates 'mirrors' combining mechanical and electronic components. <https://www.smoothware.com/danny/index.html>

resolution digital file and later extracted from the electronic device, whether printed or presented in another electronic device. My practice has experimented with various formats and scales of presentation, including screens, textiles and paper prints. In *Saturn and Melancholy*, the CRIs can be appreciated with minimal interference from surface textures. The abstraction of the CRIs means that the actual scale of what is represented by these images remains ambiguous. Multiple scales are conflated. Whole moons are reduced to the size of graphite particles, and simultaneously, some CRIs hold as much intricacy as the entirety of the graphite surface. The CRIs, tiny and scattered, appear as particle-like themselves. Dust denotes tininess only from a human-centred scale. Dust and pixels can create meaning only in great numbers, but while great numbers make dust perceptible, the opposite is true for the pixel. The more pixels-per-inch an image has (higher resolution), the less detectable those pixels are. Pixels are not noticeable in *Saturn and Melancholy*, but the CRIs, in their pixel-like arrangement and pixel-like deceptive first-impressions, evoke and echo their presence.

Doppelgängers

Saturn and Melancholy manifests a novel use of the photo mosaic medium. Instead of standing in for an original that exists elsewhere, here, the photo mosaic actively stands alongside it and works *with* it, by mirroring it. The mirror motif invokes another psychoanalytical trope, the doppelgänger (figs. 171-172). The doppelgänger represents either a duplication or splitting of the self, equally resulting in the opposing 'copy' causing an identity crisis in the 'original' (Faurholt, 2009). As we have seen duplication has recurred throughout this investigation, from *Incognito*, *Ghost* or *Solid*, to the duplication of near-identical gestures in the *Temperamental* series. The very act of extracting the CRIs from the electronic device is an act of duplication that caused a 'crisis' in the original – the perceived loss of digital-ness. The strategy of mirroring one drawing with its digital version poses a crisis of identity to each of the parts. Which one is the original and which is the copy?

Even though the viewer can deduce which side came 'first' and which 'second' chronologically, this does not detract from what is now an atemporal bond between the two, with the ensuing identity crisis. The conceptually co-dependent relationship between the two halves denies the potential infinite replicability of the photographic-digital process, and the analogue drawing's role as a unique original. The photographic-digital part loses one



173. Martin, A. 1964. *Wood*. [Ink on paper]



174. Pollock, J. 1950. *Untitled*. [ink on paper]

of the quintessential qualities of digital photography – something that was exploited in works like *Ghost* or *Solid*, is suppressed in here. The analogue drawing is no longer a unique object but only half of one. As modes of drawing, each side also represents a polar end of a spectrum. The work also embodies two opposite ends of abstraction, on the one hand, the expressive throwing of material, the suppression of autographic control in favour of autographic indexicality, and on the other, the predictability of software, the determinism of a target image.

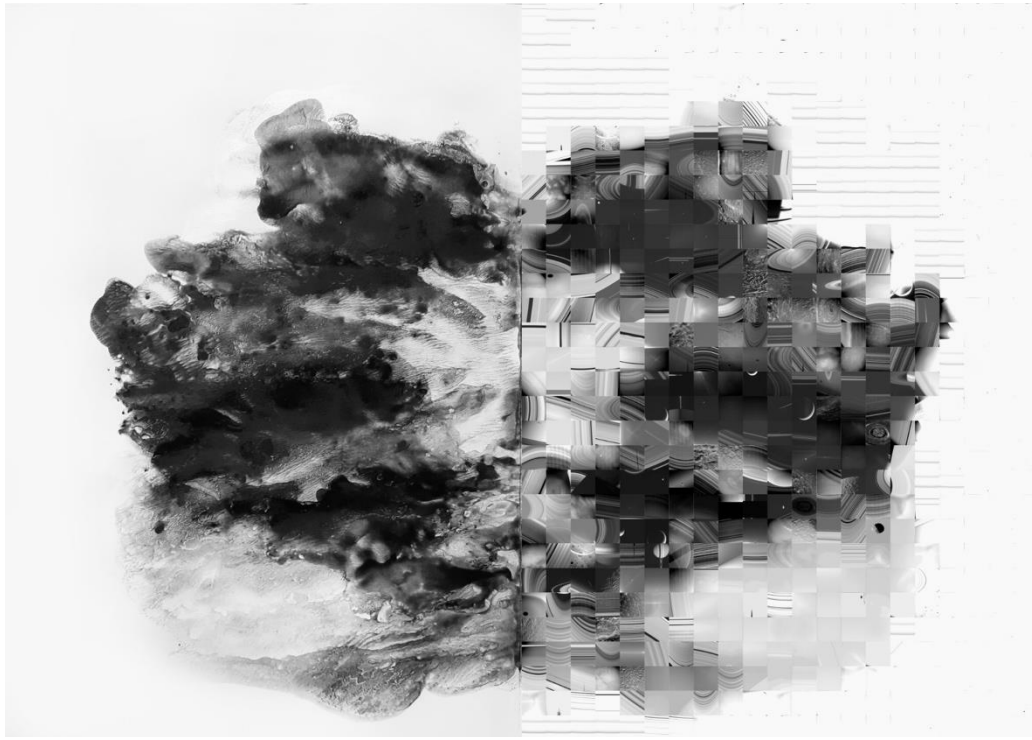
The Grid and the Drip

Saturn and Melancholy has a Janus-like character, each of its two sides or faces points to different drawing methods and abstraction. Throughout this discussion, we have seen the model of ‘drawing with’ pushing the practice further away from figurative representation and towards an autographic approach to materials.

Saturn and Melancholy brings together two types of abstraction, the grid and the drip (figs. 173-174). Are they in opposition or conjunction? Are such dichotomies tools or barriers to meaning?

The reference to the black bile identified earlier has embedded in it more metaphors that are useful to reflect upon the extremes of the grid and the drip. The bodily humours were considered according to hot/cold and dry/wet qualities. The black bile was cold and dry, much like graphite powder. But, in *Saturn and Melancholy*, the cold and dry qualities of graphite powder are challenged. The wetness of the PVA used to dilute, disperse and fix it on the paper, a fluid medium that leaves streaks and wave-like patterns. Graphite’s cold, metallic shine evokes the coolness of machinery and industrial production, while charcoal, with its built-in ‘heat’ connotations (as charred remnant) might be more suggestive of nature. Graphite’s coldness is tempered by the way it has been thrown on the paper and allowed to spread and ebb all over. Despite the ‘heated’ application of graphite, and although no two drawings made this way would be identical, the process that creates them has a mechanistic character that is easily replicable.

And what happens on the other side, on the digital doppelgänger? An orderly grid of images. The cold grid, famously “flattened, geometricized, ordered, it is antinatural, antimimetic, antireal” (Krauss, 1985, p. 9). The grid scaffolding of photo mosaics is but a tool to achieve the tension between the illusion of smoothness and the disruption of that illusion. Unlike the family snapshot images often used as tiles in photo mosaic practice,



175. Fraga, H. 2021. *Early version of the diptych*. [Graphite on paper, Photographic print]. Created by first doing a Rorschach-like print and subsequently replacing one half with its mirrored photo mosaic.

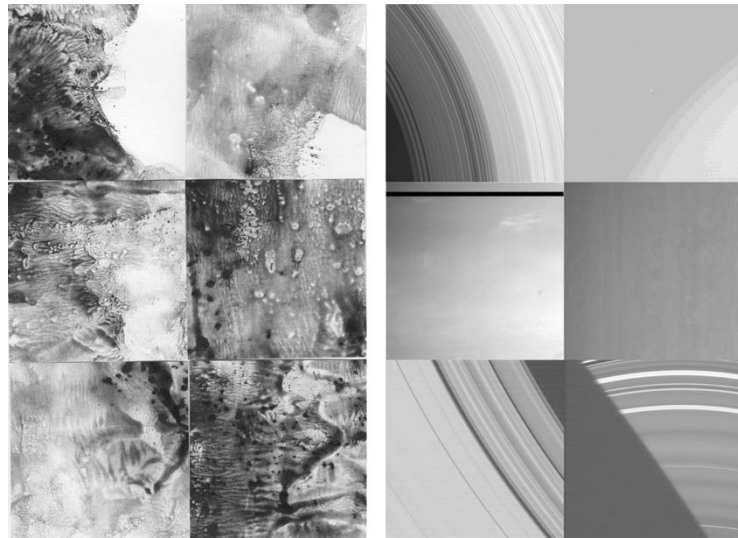


176. Fraga, H. 2021. *Close-up of previous image in the studio* [Photograph] In this early test, the two sides were taped together on the back.

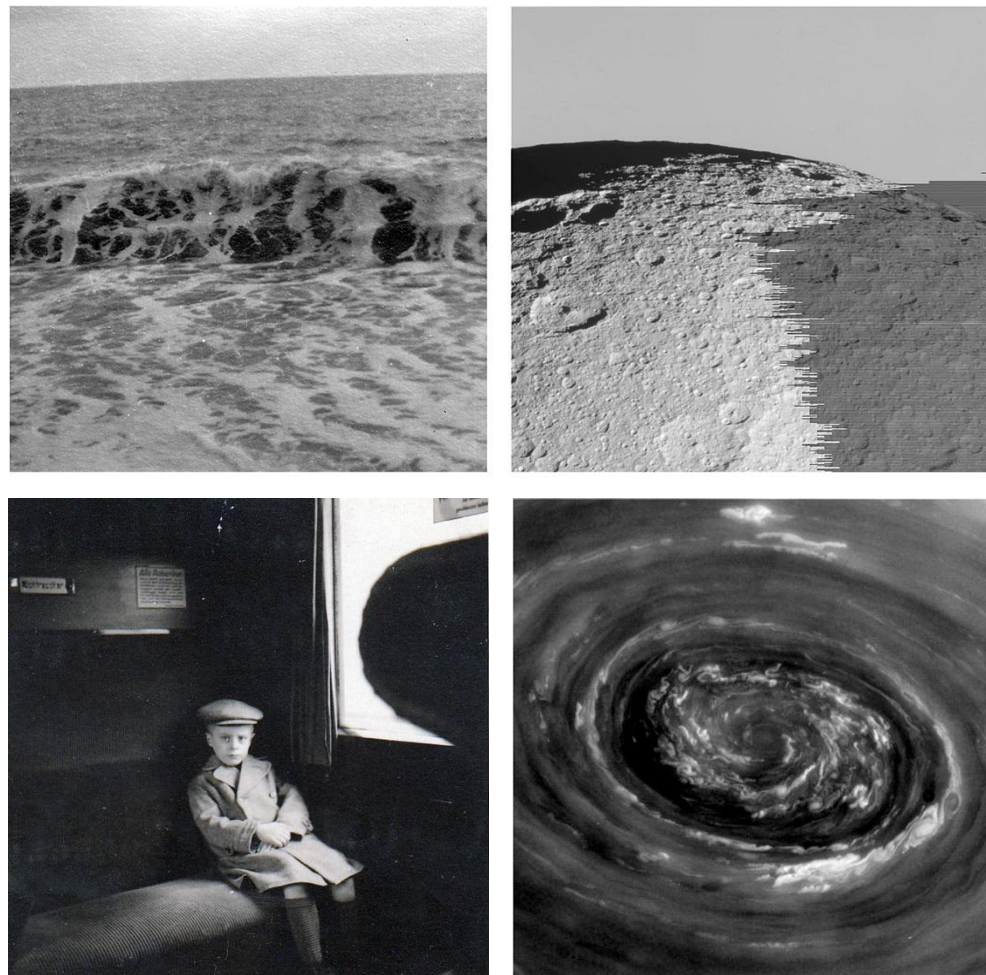
the CRIs already look like abstract fragments. Their uniformity and abstraction aid the transgression of the grid. Their edges are much less rigid than those self-contained photographs. The CRIs subvert the linearity of the grid with their own more abstract chaotic geometrical shapes, 'burning' holes or bridges across tiles.

Both processes (the drip and the grid) involve a tension between what is expected and what is unexpected. In both cases, I, the artist, do not know precisely the particulars of the final composition, only generalities. When I pour graphite dust, I know I will end up with an abstract image with denser and lighter areas, but I cannot predict or control them exactly. And I know the software will reproduce that abstract drawing so that, from a distance, they look indistinguishable. But I do not know which exact CRIs will be chosen. I become a beholder as much as a begetter of the work. The abstract target image allows for explorative contemplation and discovery, echoing my initial experience observing the CRIs on my computer. I can appreciate the CRIs as markings in tension between figurative resolution and abstract nebulosity (figs. 175-176). The presumed coolness and dryness of the objective technological image are *tempered* by their non-informational, non-figurative role as readymade marks in a decidedly abstract drawing.

The mirror format of *Saturn and Melancholy* turns one side into a lens with which to see the other. Through this double-sided lens, what seems spontaneous begins to disclose its signs of mechanistic production, and in turn, what seems to epitomise digital-mechanical reproduction begins to reveal its spontaneous generative side. The idiosyncratic nature of the fragmentary and infinitely reproducible digital is subverted by its conceptual bond to the original. Even the identifications of each side, such as original and copy (or drawing and photograph), no longer fit comfortably.



177. Fraga, H. 2021. *Pushing asymmetry by doing one-to-one photo mosaics*. [Composite Image]. On the left, a selection of six square papers made with graphite powder and PVA glue. On the right, their 'corresponding' CRIs, as chosen by the software as 1x1 photo mosaics.



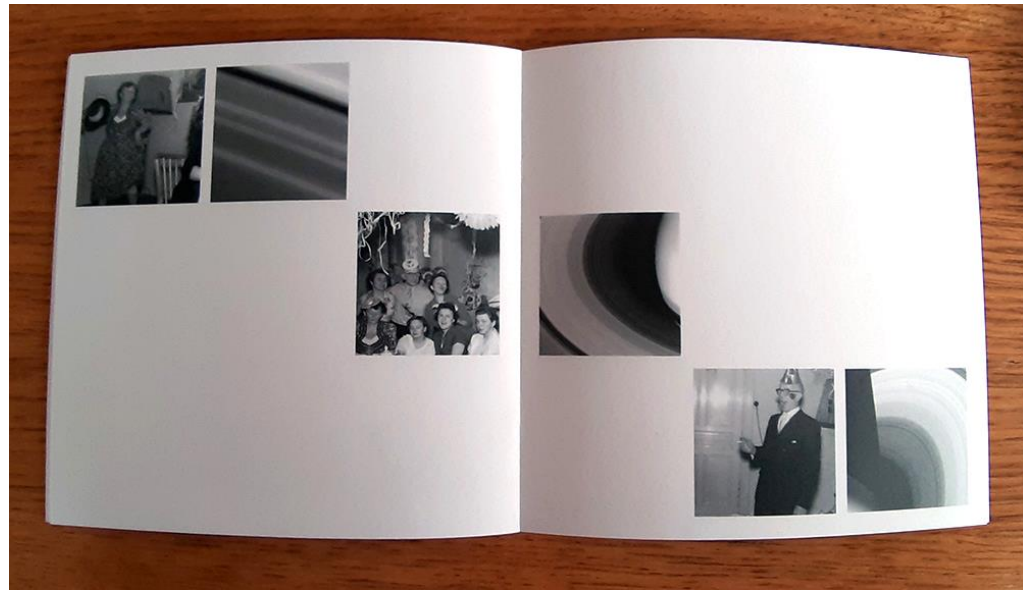
178. Fraga, H. 2021. *Pairs of CRIs and flea-market photographs*. [Photographs] These pairs were generated using the photo mosaic software

Review of Chapter

'Drawing with' both analogue and digital processes *jointly* support and complement the use of materials in an autofigurative way. In *Saturn and Melancholy*, the whole remains intentionally abstract and abstractedly intentional. The highly articulate material of graphite dust brings out the articulate potential of the CRIs and the photo mosaic process. *Saturn and Melancholy* is attentive to the fragmented raw, digital, abstract nature of CRIs as articulate digital materials. The internal fragmentation of the work, the autofigurative and abstract drawing that becomes a target image for the photo mosaic, and the overall reference to the Rorschach test. The uncalibrated condition of the CRIs results in a high degree of ambiguity about what they describe. The conventions of post-production seek to reduce ambiguity in the CRIs, to define what is noise and what is signal. Without denying that my approach is also a form of 'post-production', the practice emphasises 'staying with' or 'corresponding' with the uncalibrated. *Saturn and Melancholy* is foremost a drawing *with* things, and only a drawing *of* things after. In all the ways discussed in this chapter, the work *Saturn and Melancholy* embodies and consolidates the process of 'drawing with', marking the climatic point of this project's primary research. This climax is not the end of the practice, which continues in its unstoppable forward motion, much like scientists will still continue to process the raw data gathered by Cassini for years to come (Timmer, 2017; Colwell, 2017). And so, appropriately, this chapter concludes with a brief discussion of some incomplete experiments that point to new directions.

Informed by aspects of *Solid* and *Saturn and Melancholy*, further experiments focussed on harnessing extreme asymmetry through the photo mosaic. I purposefully made one-tile mosaics of some of my abstract drawings and of some flea market photographs I had in the studio (figs. 177-180). These experiments point towards an alternative use of the photo mosaic software as a 'randomizer' of links between two different types or sets of images. The pairs can then be further interpreted to explore the potential narratives.

Dark (Prototype) continues the strategy of combining digital and analogue means of drawing (fig. 29-30 and 181). Instead of juxtaposition, it uses overlay. A photographic print of a photo mosaic of an abstract drawing created with graphite dust acts as the backdrop for a hand-made drawing made with charcoal, graphite and ink. This drawing depicts a mysterious geometric shape, based on an anamorphic projection of Dürer's



179. Fraga, H. 2021. *A Splendor Seldom Seen* [Photograph]. A printed booklet of my pairings of flea market found photographs with CRIs using the photo mosaic software. The booklet is available online: <https://issuu.com/hondartzafraga/docs/a-splendor-seldom-seen-square>



180. Fraga, H. 2021. *A handmade drawing based on one of the image pairings.* [Pencil on paper]

polyhedron referenced in *Solid*. Anamorphism becomes a new strategy to activate the viewer's encounter with the work. As the title indicates, the piece remains a prototype for future exploration, an indication of the ongoing and open-ended nature of the artistic process.



181. Fraga, H. 2023. *Dark (Prototype)* installed at Sunny Bank Mills. [Photograph]

Chapter Six

Conclusion



182. Fraga, H. 2023. *Views of Uncalibrated* at Sunny Bank Mills. [Photographs]

The research paradigm of drawing conclusions poses a challenge for a process that is inherently ongoing. Artistic activity never reaches absolute resolutions. Each climatic moment offers a new point of departure, a path for further exploration. Artists and philosophers alike insist that art practice is an end-in-itself, artworks merely remnants of an inexhaustible process (Magee, 2018; Ingold, 2022). This tacitly open-ended quality of all art practice is more explicitly resonant here, a project with a source material that consists of raw images, pending and inviting processing. Nonetheless, this conclusion endeavours to review the myriad threads of creative exploration, critical analysis and theoretical reflection undertaken throughout this research journey as embodied in the body of works produced. In a final section, the conclusion will review the contributions to knowledge emanating from the insights gained and their implications in a scholarly context.

This project set out to study the implications of using the CRIs in drawing practice. By creating a body of artistic work in response to this source material, the research sought to offer new understandings of the relationship between drawing practice and digital materials and technologies. Saturn and melancholy are the leitmotifs in the exploration of the tensions between drawing and technology, but they are also the subject matters the research produces new outlooks on. The current state of melancholia, bewilderment and fragmentation of society is often ascribed to our reliance on technology (Bollas, 2018), and drawing is often singled out as the best artistic medium to embody *and* counter this predicament (Newman & de Zegher, 2003). Yet, these appraisals of drawing tend to rely on and perpetuate a dualism between the 'positive' aspirations and the 'negative' side effects of technology. 'Drawing with' is the research's key contribution to knowledge, as a methodological model for artistic research. The pivotal role of this model lies in how it posits drawing's relationship with technology in terms of complex entanglements rather than simple oppositions.

The research has drawn on an eclectic array of sources on drawing, digital technology, astronomy, Saturn or melancholy to situate the project's contemporary scope. The exhibition *Seeing Stars* embodies the review of practice which is expanded with an in-depth written analysis of works by Ruff, Ireland, and van Vuuren in Chapter Two. My research builds on their concerns with issues of representation and objectivity but places an alternative emphasis on the negotiation of digitality through drawing. Chapter Three demonstrates the role of drawing in my investigation as distinct from the one it once played historically in astronomy and the one it might still play within contemporary scientific query. 'Drawing with' unleashed the potential of autofigurative drawing for corresponding with digital photographic images. The process of 'drawing with' shifted the attention

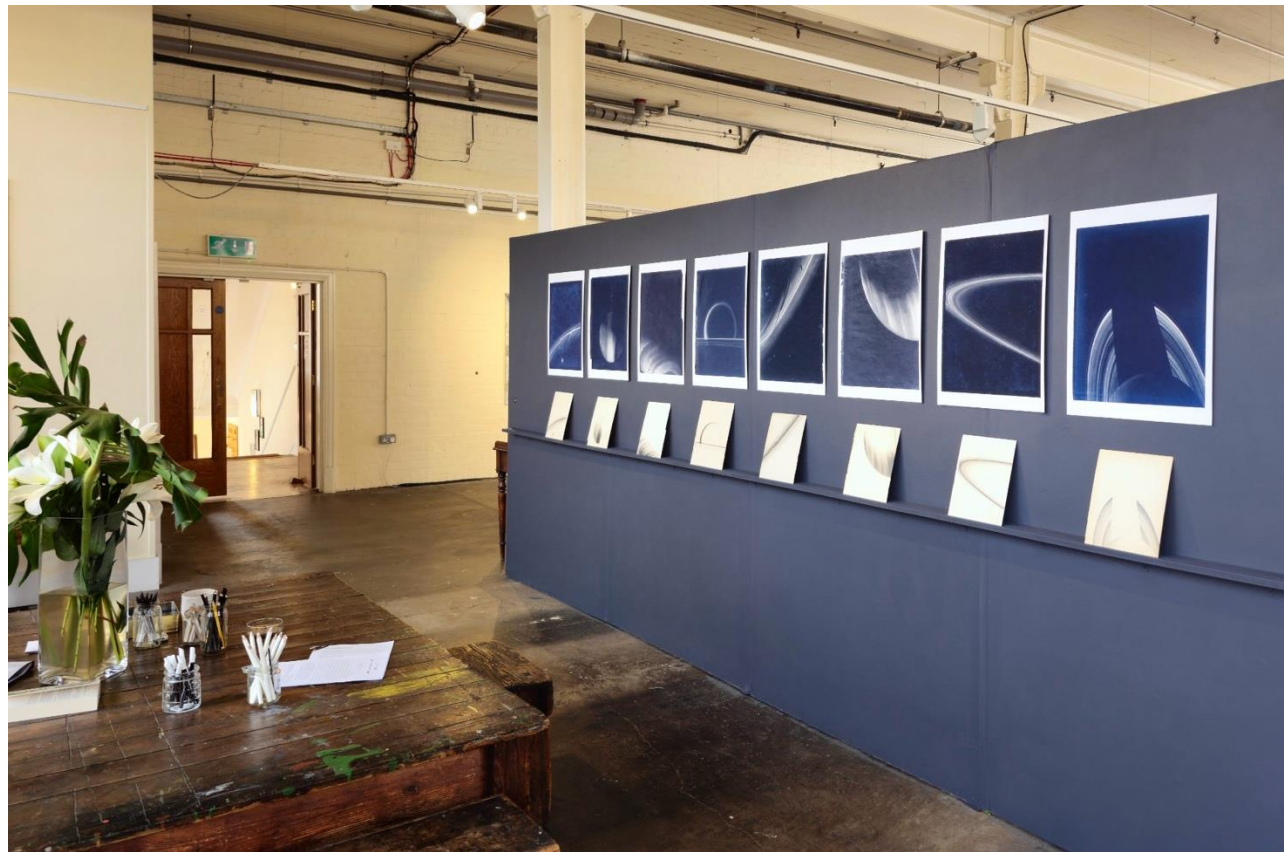


183. Fraga, H. 2023. *Views of Uncalibrated* at Sunny Bank Mills. [Photographs]

away from the 'content' of the photographic sources (the CRIs, photographs of Apollo missions or digital scans of Huygens diagrams) to the materials I was handling. Instead of highly controlled marks and labour-intensive hand-drawn copies, 'drawing with' effected a re-calibration, repositioning the splat, the accidental marks and the line as main motifs and motives for mark-making. The studio processes were propelled into an unpredicted territory, expanding my understanding of how drawing could relate to photo-digital sources.

Chapter Four substantiates my original rehabilitation of the photo mosaic as a technical support for drawing. My journey of discovery of the medium is contextualised against contemporary examples by artists like Fontcuberta or Silvers to show how my approach to this medium expands contemporary practices and conventions. Using the CRIs as a library challenges most current practices, and in turn, the photo mosaic process reframes the CRIs as abstract picture elements or marks. My works utilises a wider range of materials and formats, including multiple versions or sequences that disclose the plurality of this digital medium. 'Drawing with' demonstrates its capacity as a model to probe a medium (the photo mosaic). Current discourses on digital drawing are examined to recontextualise the photo mosaic as a technical support for digital drawing.

Chapter Five focuses on a single work, *Saturn and Melancholy*, because of how it consolidates the various analogue and digital processes of 'drawing with'. Each element of the work represents the amalgamation and refinement of strategies developed through previous works, from the title to the historical references (the Rorschach test), from materials (graphite powder, the CRIs) to techniques (autofigurative drawing, the photo mosaic). The strategy of doubling and inverting are consolidated into that of mirroring. Examples of dust in art and contemporary representations of melancholy are interwoven with theories from medicine about melancholy substances (black bile and lead) and the psychoanalytic metaphors of the doppelgänger and the mirror.

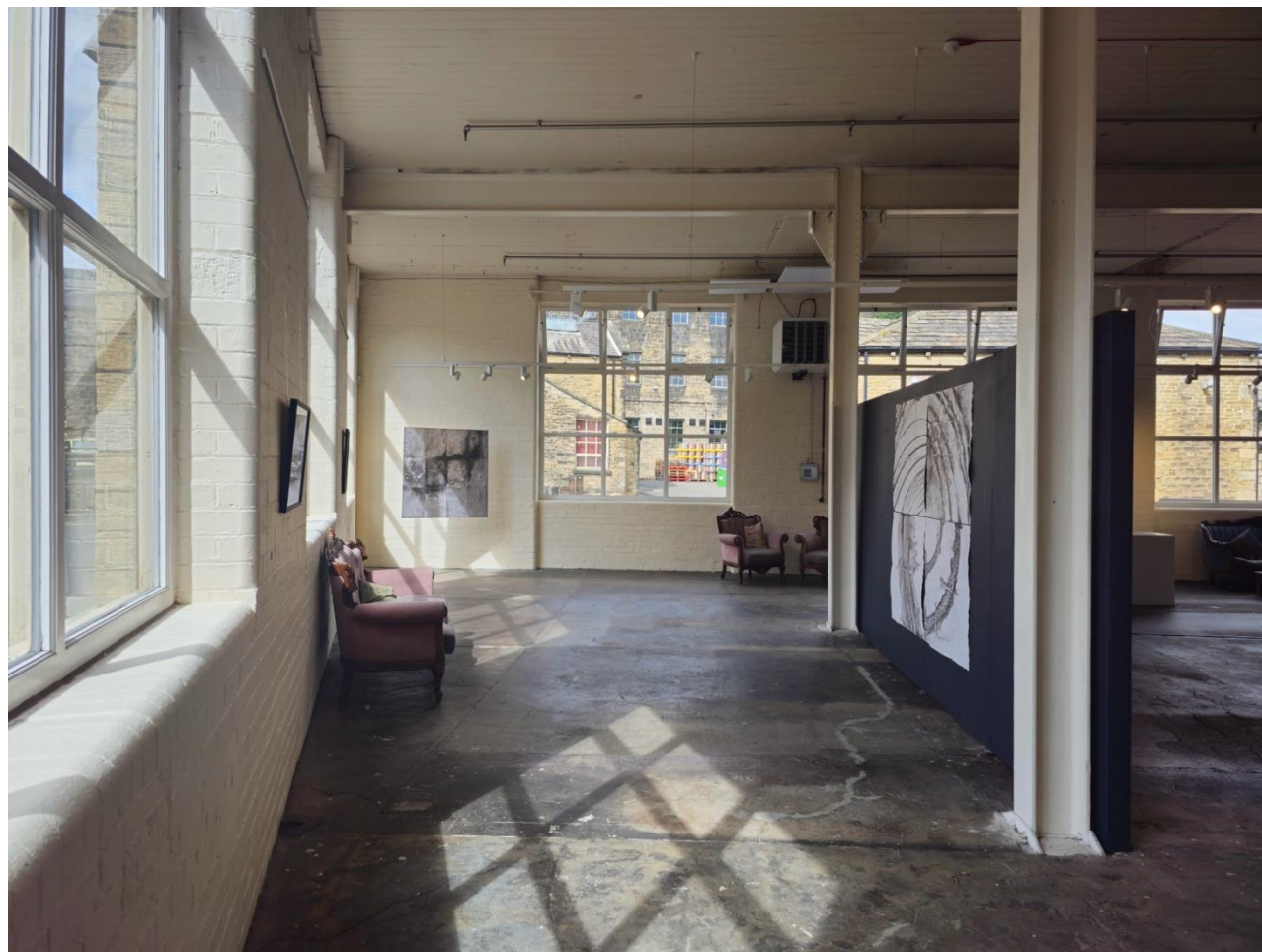


An Uncalibrated Exhibition

As discussed in Chapter Five, *Saturn and Melancholy* represents the culmination of the primary research. While this work is the distillation of the explorative process, the research's contribution reaches its fullest expression when all artworks are seen *en masse*. The public exhibition *Uncalibrated*, held at Sunny Bank Mills Gallery, July 2023, fulfilled such an encounter (figs. 182-192). Individually, each object or series addresses only aspects of the research questions. Those partial answers align when the works are together, and the insights gained through practice are best demonstrated. Experiencing all the works collectively makes vivid the spiral nature of a research led by reflexive practice that “constantly returns us to our original point of entry but with renewed understanding” (Trimingham, 2002, p. 56). We can see this in the recurrence of motifs, gestures, formats and in the cross-pollination between diverse drawing modes. Individually, works that would not be conventionally framed as drawings stretch and challenge the concept of drawing as much as conventionally drawing works stretch the definition of digital art. Collectively, the body of work upholds the prominent position of drawing in the research as both a driving method and field of study.

What *Uncalibrated* makes vivid is that ‘drawing with’ is a model that can operate with the contingencies of the digital and virtual and those of the analogue and physical materials. While nothing here attempts to dazzle with technological gadgetry or wizardry; the technologies and aesthetics deployed speak of obsolescence, nothing falls into a nostalgic fetishization of the archaic. The low-tech nature of many works echoes the low-tech (by today’s standards) of the Cassini cameras that produced the CRIs. Materials that disclose certain fragility – deteriorated, aged papers or very thin ones that wrinkle in the water-saturated drawing process – foreground the haptic qualities of drawing. The artworks stand as objects that have been visibly handled, literally touched, contrasting with the original CRIs which remained digital, untouchable.

As a quintessential element of drawing, the line acts as a mooring device for the research and a target to be interrogated. The lines in the CRIs are analogised through hand-drawn lines with a resolute fragmentation. While noticeably handmade, my marks in works from *Incognito* to *Temperamental* refuse to lean into the autographic character associated with hand drawing. *Saturnian* or *Saturn and Melancholy* showcase a complete absence of the hand in the mark-making process. Rather than attempting to calibrate the CRIs, the works seem to have assimilated the source’s uncalibrated condition. Artworks refuse to have ‘the last word’,



184. Fraga, H. 2023. *Views of Uncalibrated at Sunny Bank Mills*. [Photographs]

purposefully deterring single interpretations. Inversion and doubling, repetition and mirroring are strategies to build circuitous routes for meaning making.

In this section, I have reviewed the research goals and the artistic strategies that the practice develops in its pursuit of answers to the research questions, with the emergence of the model of 'drawing with'. In the following final section, I will review how the insights emerging from the practice contribute to knowledge in the field of drawing practice research.



185. Fraga, H. 2023. *Views of Uncalibrated* at Sunny Bank Mills. [Photograph]

The Powers of 'Drawing with'

This section reviews and reflects on this thesis' contributions to knowledge. Drawing practice research is the context this project arises from and contributes to. This is an important reminder here because, as we have seen, the artistic process has harnessed the possibilities opened by the source material (techno-scientific raw image data) and the chosen themes (Saturn, melancholy) to establish connections to fields *outside* of artistic practice research, including art history, astronomy, medicine, psychoanalysis, image studies, philosophy and history of science. However, the project does not contribute new knowledge to those fields nor illustrate their ideas.

The main contribution to knowledge of this research lies in the tailoring of a set of methods of the artistic interpretation of scientific raw imagery. This is the articulation of a methodology of 'drawing with'. The research develops 'drawing with' by elaborating on well-established bricolage approaches for artistic research, building on studies by Barrett and Bolt, Rogers, Roberts and others. Here, the bricolage approach to using what is at hand in a responsive, flexible and self-critical way is cross-referenced with ideas taken from the writings from the field of anthropology and philosophy by Ingold, Morton, Harman and Cazeaux concerning the essential roles of concepts and metaphors in artistic research and the notion of working 'with'. My development of 'with' consolidates multiple notions such as 'correspondence' (Ingold, 2021; Ingold, 2013), 'knowing from the inside' (Ingold, 2022), 'attunement' and 'being with' (Morton, 2018). The originality of my research model lies in how these multiple aspects from existing models are developed through and in relation to drawing.

'Drawing' in my model remains a fluid concept that can utilise analogue and digital means of making art.

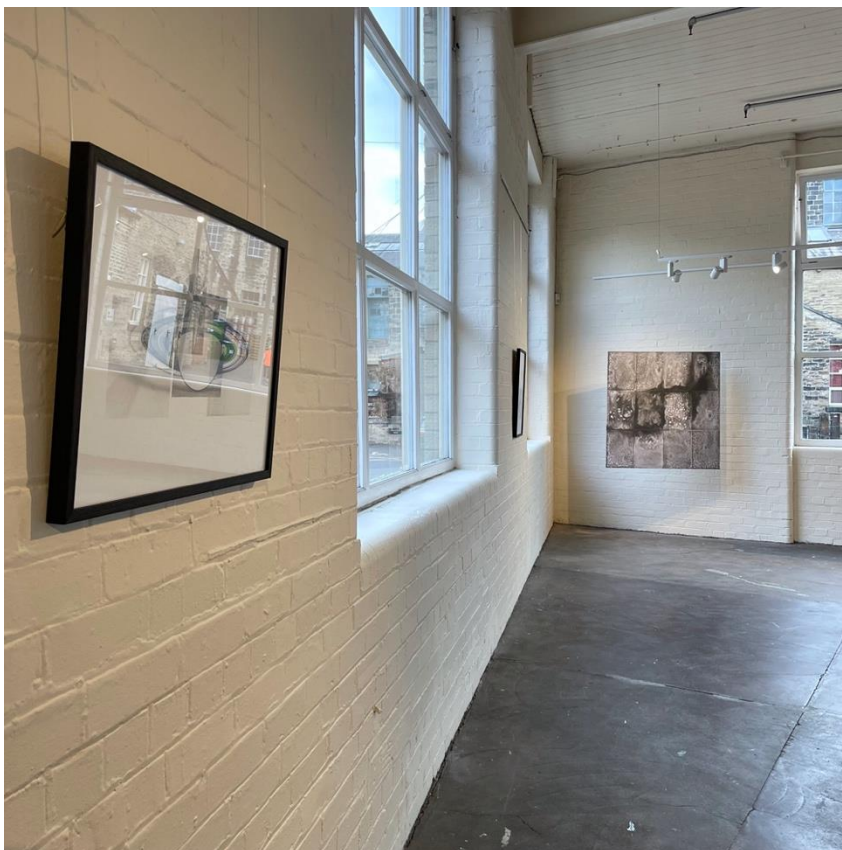
'Drawing with' becomes a framework to approach and understand the relationship between the artist, themes, materials and processes. It is through a multimedia process of drawing that 'with' is materialised. This research exists in the wake of the many writings of Krauss and Manovich regarding medium specificity and their prevailing influence on contemporary art's post-media condition. My practice is thoroughly invested in the specificities of drawing, in a conventionally understood way and in the expanded understandings that challenge those conventions.



186. Fraga, H. 2023. *Views of Uncalibrated at Sunny Bank Mills*. [Photographs]



187. Fraga, H. 2023. Saturn Head at Sunny Bank Mills. [Photograph]



188. Fraga, H. 2023. Views of *Uncalibrated* at Sunny Bank Mills. [Photographs]

The compounding of drawing methods to investigate the CRIs constitutes an original contribution to drawing research. The research puts drawing forward as an expansive method to interrogate the materiality, or presumed lack thereof, of these digital entities. In this research, practice not only shapes the theoretical framework of 'drawing with' but also demonstrates its capacity to generate new outlooks and understandings on every element of the artistic process. The implications of 'with' are revealed to be more significant and expansive than it seemed in my initial research questions, for to 'draw with' any one thing is a flawed question. 'Drawing with' the CRIs implicates 'drawing with' an ever-expanding constellation of visual references, materials, instruments and the network of conceptual interactions each facilitates.

With... Raw Images

Seeing Saturn through a telescope was pivotal for the development of the practice because of the realisation that limitations and constraints were assets, not obstructions to the emotional impact of the encounter. This realisation narrowed the research's focus on the 'rawness' of the CRIs in their own terms as digital entities deeply embedded in a complex techno-human apparatus, *beyond* their existence as digital photographs and second-hand depictions of Saturn.

The new outlook on the CRIs enabled by 'drawing with' is their reframing as 'images with' rather than 'images of'. They are images with the techno-scientific apparatus, with Saturn, with dust, with time. As 'images of', the lack of neutrality of raw data might be problematic, especially when it goes unrecognised, as 'images with', the lack of neutrality becomes an asset. Seen as 'images of' Saturn demands subjecting the CRIs to the bias of representational conventions, deciding what is noise and what signal. Seeing them as 'images with' makes those distinctions less relevant. This reframing is an original artistic interpretation of scientific raw image data that acknowledges its constructed nature without antagonism or fetishization. The practice research demonstrates the power of 'with' to move beyond description and the documentary aspect of photography. What might be an obstacle for scientific epistemological paradigms becomes a recourse for art.

The timeliness of this contribution lies in astronomy's digital turn that makes this type of raw scientific data more accessible to wider audiences (which includes artists) and less dependent on specialist software. The CRIs encapsulate digital ubiquity, but also, in their frozen state as digital relics, they embody the blinding



189. Fraga, H. 2023. *Views of Uncalibrated at Sunny Bank Mills*. [Photographs]

speed with which newness turns to obsolescence in a digital world. My research foregrounds the CRIs' character as *digital relics* by deploying digital techniques invented in the same period. As much as they preserve a moment in the past, their rawness invokes a sense of futurity, pending calibration, processing, interpretation, resolution and conversion into 'useful' information. The practice confronts the CRIs' suspended temporality with other images from the past in a way that embodies their existence in the present and lasting relevance. Goya's or Dürer's works still exist as objects in the present; as long as we continue to look at them and they continue to speak to us, they remain contemporary objects. My work does not imbue these historical references with nostalgia but with a melancholy acknowledgement of the disconnections between artistic and scientific, past and present interpretations – through the purposeful use of poor image aesthetics. If the works are about anything, they are about the experience of 'drawing with' all those things *now*.

With... Saturn and Melancholy

This investigation's contribution to knowledge lies in how the artworks produced make Saturn and melancholy, long estranged, kin *again*. The caveat of 'again' is key because it grounds this kinship within the contemporary practice concerns of this research. The research realises the reappraisal of Saturn and melancholy through establishing links between the CRIs and a wide range of imagery from varied contexts. The nebulous and abstract, fluid and constructed nature of Saturn is addressed in a way that incorporates the CRIs and the contemporary vision they represent. This research builds on other contemporary artistic approaches to astronomical imagery and themes linking techno-scientific image data to historical visions. However, this research departs from these currents by expanding the raw and digital character of the sources in relation to the subject matter. The artworks seek not to resolve or describe the relationship between Saturn and melancholy but to make it raw again.

This research asked whether melancholy holds a special significance for drawing with digital elements. The artistic strategy to favour poetic allusion over direct description has sustained melancholy as a nebulous concept and resisted definite answers to that initial question. This research offers no new definitions of melancholy. Instead, it demonstrates ways of constellating many existing understandings that coexist. One of the insights from the research is the opening to further investigation of melancholy as the condition of *all* drawing activity.

With... the Photo Mosaic

A further contribution from my research is the appraisal of the photo mosaic as a digital drawing method. As a technology for drawing, the role of the photo mosaic is equated to that of the keyboard in writing. Both are tools for assembling a whole out of a fixed set of available units. The CRIs are well suited as a photo mosaic library: a numerous collection of images, already digital and uniform. Still, they have little in common with most photo mosaic libraries, as revealed by the reviews of key artists using this technique. The photo mosaic's obsolete aesthetic of low resolution (pixelation) corresponds well with the morphological resemblance between the CRIs and the pixel. The photo mosaic repurposes the fragmentation, abstraction and repetitiousness of the CRIs, effectively articulating them as ready-made *marks*. The originality of the appraisal of the photo mosaic as *drawing* is substantiated by reviewing current discourses on digital drawing that focus on the interruption and subsequent simulation of the link between gesture and trace. The photo mosaic is shown to work *with* this intrinsic digital interruption rather than against it, disclosing its potential as a tool for digital drawing. My analogue drawings begin to develop strategies that deploy a mosaic-like structure. The gaps or interruptions generated by using multiple sheets of paper become active agents in mark-making.

In conclusion, this research contributes new knowledge to drawing research in a manifold way. On the one hand, the research widens the scope of current drawing practices that repurpose or respond to astronomical imagery and topics. More specifically, it offers an in-depth study of the process of artistic interpretation of raw images. The research demonstrates that drawing can still be a relevant category, even when it is not bound by single, graphic conventions, materials or techniques. It elaborates on concerns with medium-specificity and refines them for drawing in a way that acknowledges digital ubiquity. This research posits drawing's capacity to produce original outlooks and perspectives on techno-scientific sources without competing with scientific paradigms for interpretation. It articulates the photo mosaic as a tool for digital drawing, thus expanding the tools and formats currently being considered in the scholarship. It moves beyond current fixations with the digital simulation of continuous transmission to posit a mode of drawing that embraces the fragmentation of the digital. It produces a methodological model, 'drawing with', that other researchers can effectively shape for their own projects.



190. Fraga, H. 2023. *Close up of Dark (Prototype) at Uncalibrated, Sunny Bank Mills.* [Photograph]



191. Fraga, H. 2023. *View of Figures at Sunny Bank Mills.* [Photograph]



192. Fraga, H. 2023. *Visitors at Uncalibrated, Sunny Bank Mills*. [Photograph]

With...me

This conclusion would be incomplete without addressing how this project has transformed my artistic practice. After all, I am part of the constellation of elements in 'drawing with'. There could be no transformation without challenges to familiar ways of making. Through practice, I learned that making photorealist drawings was not the way forward because it generated no surprises and, hence, no movement forward. The CRIs compelled me to collaborate while respecting their raw character. In a photorealistic drawing, this rawness can only be skin-deep. Being responsive meant following without resistance.

It led me to the photo mosaic. It led me to draw lines for their own sake, to throw ink and powder around. For the first time ever, without supporting images. It is as if I had devoured the Cassini raw images, qua true melancholy cannibal, and they had nestled within me only to pour out again in my drawing. I had become them, and they had become me. It was not about finding a way of drawing rawness but discovering my own rawness in drawing.

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Appendix A

This appendix provides a list of all exhibitions and conferences where the research outputs have been exhibited or presented, including any awards received from WRoCAH to support this.

Exhibitions

2018. Group exhibition Cosmic Perspectives curated by Lumen Studios in London (May). Solo exhibition and public talk at Arte Santander '18 with Espacio Alexandra (July). Supported by a KEP Award (Knowledge Exchange Project) from WRoCAH.

2019. Group exhibition and public talk Envisioning Other Worlds curated by Melanie King and Martha Gray, at Bow Arts in London. Supported by a Small Award towards travel from WRoCAH.

<https://www.lumenstudios.co.uk/past/each93b2hybrwtgh7gcned92wrjkeb>

2019. Transfer Report Exhibition Beautiful Artefacts at Left Bank Leeds. Supported by a Small Award towards materials from WRoCAH.

2020. Group exhibition, Drawn to Investigate, and presenting at conference **Drawing Conversations III** at the Ruskin, Lancashire University, organised by Sarah Casey and Gerry Davies. Supported by a Small award from WRoCAH. <https://www.lancaster.ac.uk/the-ruskin/exhibitions/drawn-to-investigate/>.

2020. Group exhibition Tracing Entropy curated by Eirini Boukla at the Foyer Gallery, School of Design, University of Leeds.

2021. Solo exhibition Ghosts of Saturn at Espacio Alexandra, Santander (Spain).

<https://www.hondartzafraga.com/2021/04/16/los-fantasmas-de-saturno-espacio-alexandra/>

2021. Group Exhibition Letting it Settle at Touchbase Gallery in Folkstone. Curated by attendees to the *Drawing Correspondence* pilot programme.

2021. Online Residency. Instagram run by www.transientt.co.uk

2022. Guest-curated Seeing Stars at the Stanley and Audrey Burton Gallery, University of Leeds. Supported by a KEP Award (Knowledge Exchange Project) from WRoCAH. (Appendix A)

2022. Group Exhibition Sixty Drawings Plus Ten at The Whittaker Museum, curated by Carolyn Curtis Magri and Gary James Williams.

2023. Group exhibition Leeds Artists Show, at Leeds Art Gallery.

Other Symposiums/Conferences (not mentioned above)

2019, 2020, and 2022. The University of Leeds Annual Practice-Led Symposium, School of Design.

2019. Fifth Annual WRoCAH Conference.

2020. Drawing Research Forum, Drawing Room London.

2020. 5th Memory, Melancholy and Nostalgia, International Interdisciplinary Conference, organised by InMind Support.

2022. Circumnavigation Drawing Symposium at the Royal Museums Greenwich, produced by Drawing Correspondence (Anita Taylor, Tania Kovats and Chloe Briggs).

Other WRoCAH Awards

2021. Large Award to participate in *Drawing Correspondence* pilot programme.