Translating Encounters with Stone

Investigating Rubbing as an Ecological Method of Inquiry within Architectural Material Studies

by
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Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Abstract

This thesis situates the practice of rubbing within the context of an immediate geological feature in Southern Ontario, the Niagara Escarpment, as a site that is admired for its natural and productive qualities. Adverse to extractive and consumptive attitudes about geological expression, I engage in a discourse that centers nuanced encounters and temporal spectrums at the scale of the hand. Over the span of four seasons, I conduct multiple rubbings along the cliff face informed by multisensorial instincts as observation and inquiry. Allowing my sense of touch and curiosity to guide me, I open myself to an ecological dialogue with the material of stone through listening to the interactive elements. Temperature, humidity, and weather movements are captured within the rubbing process. Traces of flora, human markings, and rock deposits are captured within the paper and resultant rubbing.

I navigate the Niagara Escarpment through memory, exploring rubbing sites through personal landmarks integral to my understanding of the importance of forming interspecies relationships. Adapted from the practice of Chinese rubbings, I choose to experiment with the technical and affective elements of this rubbing process to exercise my observational lens. I explore ideas of placemaking through my intention to reconcile with my heritage and the landscape that is formative to my perspectives on materialism and my approach to spatial expression.

Translating Encounters with Stone encourages the observation of interelemental exchanges with rock to decentralize acts of human-led practices. In doing so, this act provokes a case for immersive non-human led practices of material engagement. As an approach to reconciling ecological intimacy within a society of stone, rubbing acts to strengthen the environment-human relationship in the natural and built environments we engage.

Acknowledgments

I would like to express my gratitude for the opportunity to do research on the land that has nurtured my growth and the land which has provided me with such rich encounters and interspecies relationships I have developed thus far in my life. I have been fortunate to experience the land and its offerings while doing research along the Niagara Escarpment. As I consider future engagements with this land, I thank the human and non-human protectors and caretakers who share their knowledge and land stories.

To my supervisor Dr. Anne Bordeleau and committee member Rick Andrighetti for your support and patience throughout the thesis process.

To Alec Cooper, I would like to thank you for the endless support and care throughout my graduate studies. Your enthusiasm and encouragement have been motivating since the beginning. I appreciate all our shared encounters with the escarpment, and I look forward to all our future adventures on rock.

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Preface

My perspective on representation and methods of inquiry within architectural representation are informed by my personal experiences and education. Although the latter has provided me with the basis to pursue this profession, my personal experiences have allowed me to approach topics in architecture through an alternative lens. As a Chinese adoptee I was involuntarily removed from my 'homeland' and raised in Southern Ontario by my adoptive family. I am forever grateful to grow up in Canada and appreciate the opportunity it has provided me; however, I had a difficult time navigating the Canadian landscape as a Chinese adoptee growing up in a transracial household.

Subconsciously, this research aims to mend my relationship with the landscape I was raised by and my detached heritage. The Niagara Escarpment provides landmarks that situate my childhood memories; space where I learned to appreciate the plants, animals, and climate through intimate connection. The transference technique I use within this thesis is derived from the practice of Chinese rubbings. The decision to choose the Chinese method of rubbing is multifaceted as it allows me to engage in a process that supports my intentions in exercising my observational lens. I experiment with my perspective through this method of inquiry to strengthen my understanding of materialism, expression, and environmental intimacy in architectural representation and design.

The Niagara Escarpment is the geological spine that situates my understanding of place on this landform, labelled as North America. This vibrant cuesta contrasts the flattened landscape

of farmland and cityscapes that make up the Southern Ontario landscape. Along the 725km ridge, it has been quarried to build colonial settlements, as well as, admired for its raw beauty. Policy has shaped the form of the escarpment since the colonization of North America, slicing the landform to conform to anthropocentric ideologies. Due to my perspective as a person whose life course was shaped by the One Child Policy* in China I feel as though I can relate to this landscape which I am studying in this thesis.

The landscape has grounded me in my surroundings. The Niagara Escarpment has acted as a steady force within my experiences, however, in perspective of the geological timescale my experiences feel obsolete -a singular point in time that has an insignificant impact. The impacts of the Anthropocene can also be interpreted as a minute period framed within the geological time scale. However, the physical impacts of anthropocentric actions are extensive. These reflections on time is one factor in developing the documentation process of rubbing within the architectural discourse.

Through my experience with architectural education, I have learned about the importance materiality has within spatial interpretation. Drawn towards the qualities of stone, I have decided to study this material and its qualities further. Rather than focusing on the implications of the Anthropocene on the material history of stone, I frame this research on the importance of developing environmentally intimate connections through engaging practices as a mediation for future assemblages. That said, I am not a geologist, nor professionally trained in the art of

Chinese rubbing, but through understanding the importance of time, scale, observation, and representation I engage in this research with an enriching perspective that can contribute to ongoing discourses about materiality and expression.

Personal identity is intertwined with the landscape and surroundings in which we are raised, and I have attempted to understand my perspective and place in Canada through the process of Chinese rubbings I undergo within this thesis as a method of material documentation. The alternative lens I have developed through an 'outside' mentality allowed me to challenge the Eurocentric systematic academia I was brought up in. Until now, I was silent about my hesitation towards standardized practices, but this thesis project has given me the opportunity to challenge what a non-standard practice can encompass and explore non-standard methods of representation.

** The One Child Policy forcibly limited families in China to keep primarily one child to curtail the rapidly growing Chinese population.*

01 Introduction

What does it mean to be part of a society of stones?

In three parts, this chapter reflects on the significance of stone temporally and ecologically in consideration of its many physical forms in the natural and built environment. In the first part, stone is expressed as a living structure, foundational in our understanding of time and shared existence as humans. Following, the human umwelt is addressed as a critical understanding in the selection of a multi-sensorial analysis approach. The proposal of a rock-human assemblage through a multi-sensorial engagement process ensues, introducing rubbing as a drawing typology within architectural material expression.

The Vitality of Rock and Stone: Material Agency and the Non-Site

Rocks and stones offer insights to concerns beyond human consideration, especially in the context of the modern built environment. The diverse material compositions of different rock types nurture growth and supports ecological communities. Through the qualitative analysis of limestone this research argues that we -an ecosystem of interspecies relationships- inhabit a living structure of a society of stones. Consequently, the examination of the outward surface of rock through environmentally intimate practices can improve our design relationships and coexistence with rock and stone matter. This thesis frames a material-driven approach to architectural design as an ecology of material, rock-human-nonhuman, assemblage.

In awareness of the human-centric methods of material analysis, stone matter is central and the integrity of collaborative interspecies and multisensorial is the focus of this investigation. Throughout history, humans have codified nature by burdening material objects, such as rock and stone, with anthropomorphic characterizations.[1] The issue in projecting the human ego through a zealous anthropocentric lens is that it negates the fundamental power and vitality of rock.[2] Rather than imposing an anthropomorphized identity, analysis through an ecological lens that recognizes the potential agency of rock challenges notions of human-centered design.

A critical distinction between rock and stone outlines the foundation for investigation. Implied within the terminology, rock describes the assemblage of minerals and stone matter, whereas a stone is a formed and moveable.[3] An Aristotelian understanding would identify the rock as meaningless and

1. Kelli Robertson, *Animal, Vegetable, Mineral: Exemplary Rocks* (Washington: Oliphaunt Books, 2012), 92

2. Jane Bennett, *Vibrant Matter: A Political Ecology of Things: Neither Vitalism nor Mechanism* (Duke University Press, 2009), 64

3. Kelli Robertson, *Animal, Vegetable, Mineral: Exemplary Rocks* (Washington: Oliphaunt Books, 2012), 96

formless until given life by transforming it into a stone -naturally or through the act of stereotomy.[4] Rock matter is a catalyst for observing anthropocentric ideologies and challenging the imposed material narrative by human desire. As an exercise to reposition the narrative of the limestone rocks that are acknowledged within this work, the approach to designating a site result in a non-site distinction because of two interwoven factors; physical scales and temporal scales of observation.

The physical attributes of rock, and the formations of stone matter we engage with are direct consequences to the passing of time. Stephen Jay Gould describes that, "nature is bound by culture and time," and that human interactions with rock are a small fragment in time in contrast to the existence of the rock we engage with.[5] However, the intensity of the physical impact human intervention has caused surmountable destruction over a short period of time. Overtime, human nature has proven itself as a mechanical force, comparable to the machine that is the earth.[6] As human intervention expands, the physical scales of engagement with the material of rock spreads into forms of composite to bouldering mass.

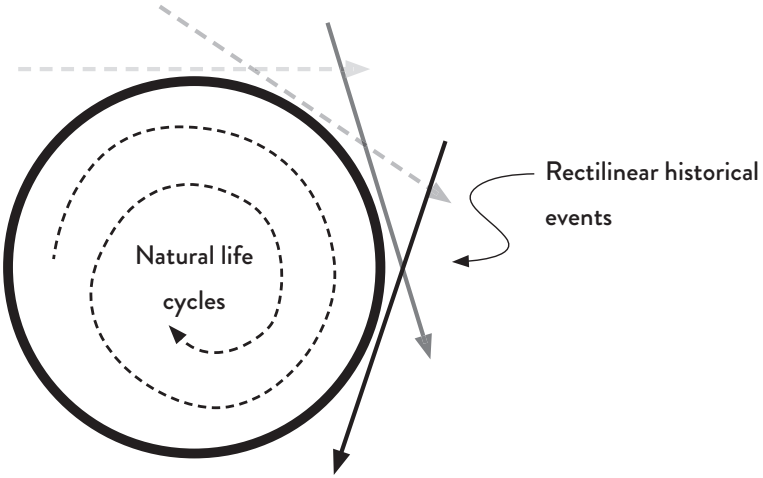
The analysis of the changing forms of rocks demonstrates cyclical changes in time and provides metaphoric explanation for understanding beyond basic human interpretations of time. The Anthropocene is temporally tangential along the cycle of the Earth's cyclical frames of time. The temporal relationship between humans and rocks is described through the concept of "Time's Arrow and Time's Cycle", where time's arrow expresses singular moments in time that occur along the cyclical path

4. Ibid, 96

5. Stephen Jay Gould, *Time's Arrow, Time's Cycle* (Cambridge: Harvard University Press, 1987), 11

6. Ibid, 65

Overlapping Time Scales
Shifting perspectives of time through "time's arrow, time's cycle"



Uniformitarianism

Time is endless,
nature is endless

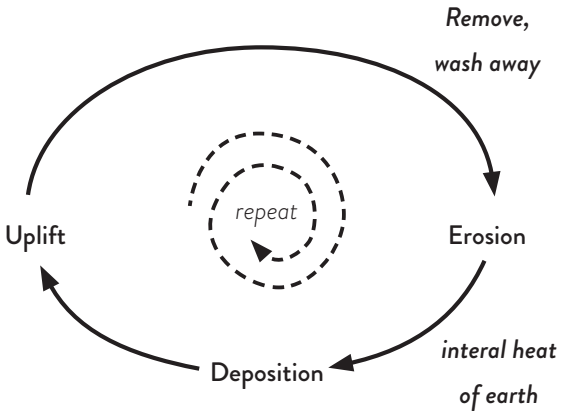


Fig. 1.1 Illustration of the theory of "Time's Arrow and Time's Cycle". Made by author.

of a temporal constant.[7] For instance, each geological epoch exists for a fragment of time, providing a basis for intersecting ecological histories to take place. Gould describes time's arrow as an irreversible consequence and that each moment in history is distinct and singularly directional, and in contrast time's cycle is nondirectional and repeats.[8] Observing rocks is a key to understanding the coexistence of the two time scales by patient and direct interaction.

7. Ibid, 11

8. Ibid, 65

Physically, the correlation of rocks in the built environment and natural environment are distant. Through an approach of designating the area of interest within this research as a non-site, the focus of the observation considers the immediate material form(s) as the situating space for investigation. This scale proposes a direct physical experience between the human and rock. As illustrated, the rock interacted with are limestone fragments located as part of a section of the geological cuesta of the Niagara Escarpment, interrupted by political borders and boundaries, positioned as northeast edge of the Michigan Basin. Beyond, these rocks are part of larger geological masses that come together to form the structure of the earth. Through imposed architectural material legacy, the intimate material relationship with rock lacks ecological empathy.

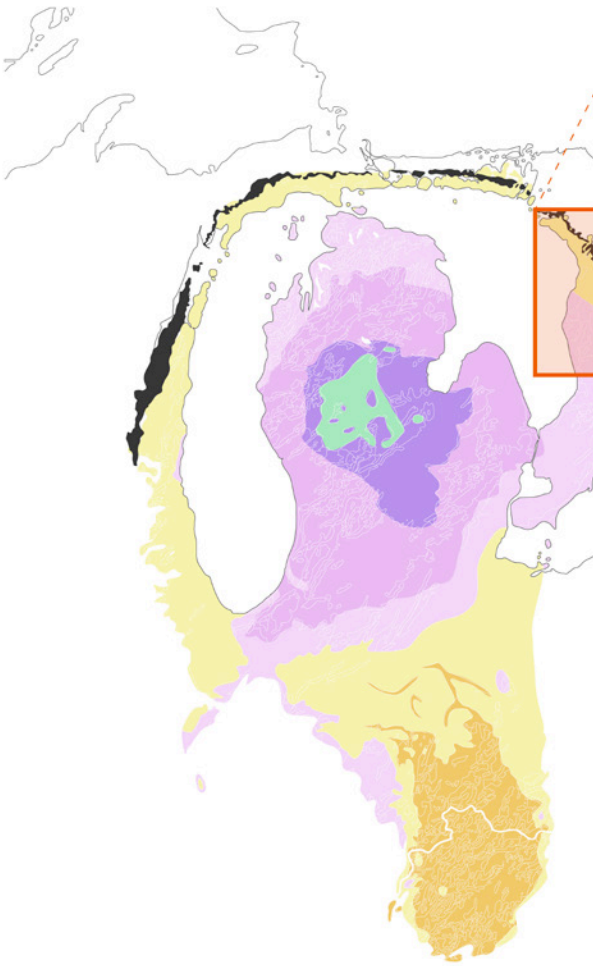
This thesis conceptualizes the non-site as a network of spatial fragments used to understand matter through interwoven and nonsequential temporal narratives. Regarding the subject of rock matter, geological and anthropocentric time cycles are presented through two types of non-sites; the enduring non-site and the ephemeral non-site.

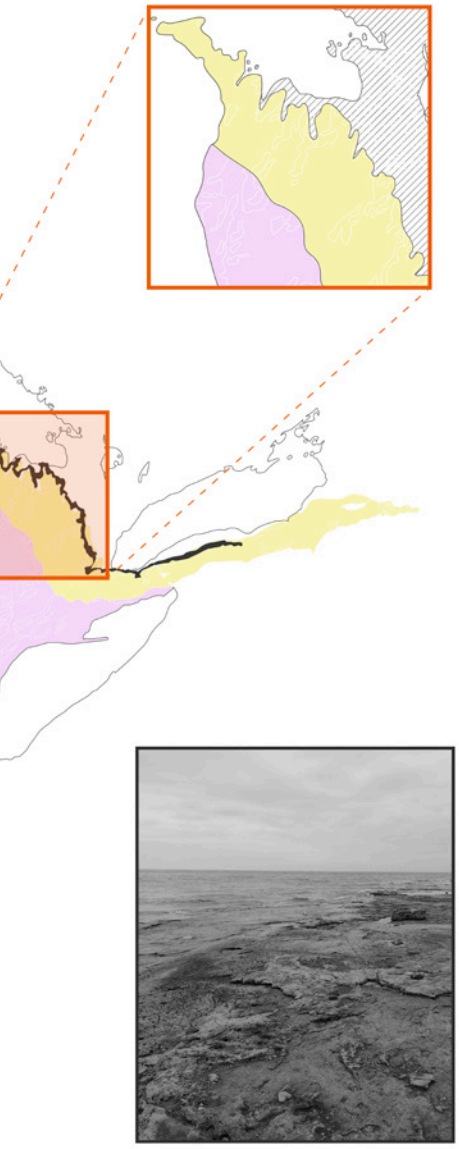
The physical scale of inquiry of limestone matter positions the space of encounter as the enduring non-site, as it describes the existence of the material over periods of change and transformation. Encompassed within the description of the enduring non-site is the proposal of the material of rock as a dynamic form that exists in natural and built environments simultaneously. Robert Smithson describes the theory of non-sites as a physical metaphor that can represent an existing site without a recognizable resemblance.[9] The composition of rock fragments captured within rubbing drawings and the resultant imagery is another space of inquiry as the non-site. The mobile quality of the drawing and the imprinted physicality acts as a manifestation of the essence of the material history.

The ephemeral non-site distinction exists between the interaction of the rubbing process and the subject matter of the rock. Time scales are paused and positioned linearly along tangential cycles at the scale of the human documenter. Intuition and instinct are needed to interpret the individual rubbing fragments which counters the idea logical map and drawing.[10] The rubbing drawing as a non-site is pure expression of the material without representational interpretation, which is metaphorically significant as a space that allows for material agency.

9. Robert Smithson, *A Provisional Theory of Nonsites,* (University of California Press, 1996)

10. Ibid.





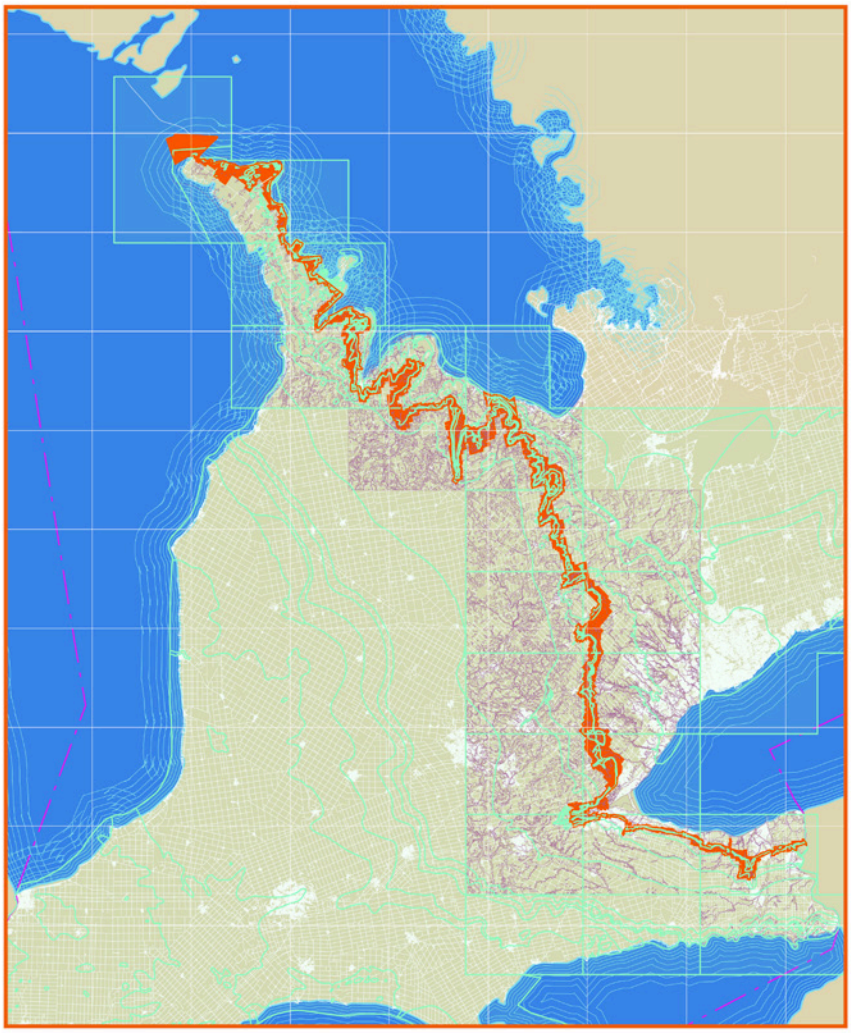


Fig. 1.2 Illustrated maps of the physical and temporal scales of investigation. Made by author.

Encounters with Rock through a Multi-sensorial Approach

The way we discern our everyday encounters is directly correlated to our senses. Our understanding of the human senses has expanded since the Aristotelian classical description of the five senses; to smell, to see, to touch, to hear, and to taste.[11] However, our sensorial experiences are much more complex and diverse. Standardizing the human experience into these five categories limits the diversity of possible encounters and neglects the uniqueness of individuals range and mobility of each sense.[12] Humans are multi-faceted beings that are able to distinguish our surroundings and adapt when prompted. Nonetheless, humans are predisposed to rely on selective senses and criticize alternative approaches to understanding the environments we expose ourselves to. The implementation of standardized practices fosters ableist perspectives that scrutinize the other and limits the bounds of our umwelt.[13] Standardized forms of architectural production have limited our capabilities to design empathetic spaces that consider diverse human, non-human, and material abilities. By exploring a non-standard method of drawing and material analysis, alternative sense dependency offers new sensory experiences. The explorative behaviour enacted within this thesis values the sense of touch as translation between the textural qualities of limestone rock and human cognition.

Sensory terminology is shared flexibly across literal and figurative feelings when engaging with the human body within the rubbing process. The act and feeling of touch are a collaboration between the hand and the eye. Through the topographical transitions for the drawing, texture is captured two-dimensionally and three-dimensionally. The eye

11. Steve Draper, *How many senses do humans have?* (University of Glasgow, 2019)

12. Ole Moystad, *Cognition and the Built Environment* (New York: Routledge, 2018), 16

13. Ibid, 30

Fig. 1.3 Diagram of all the human senses and their intensity based on the diagram, “Making sense of the senses” by Steve Draper (2005).
Made by author.

distinguishes the nuanced textural shifts through the inking, while the hand is able to make contact with the embossed contours. Similarly, the verb, "to listen" is used to encompass the symphony of senses that work together that make the rubbing process instinctual.

How do we engage sensorial narratives that intertwine to create a diverse world. What is a multi-sensorial encounter? How do we document a multi-sensorial encounter? The human umwelt is shaped by the built environment and in turn the environments we inhabit reflect our sensorial navigation.[14] The human sensorial encounter is typically dominated by sight narratives, making visual forms of communication standard practice. Our affinity for sight-oriented sensorial navigators give us an ecological bias that influences our interpretation of the materials and organisms we engage with. I choose not to turn off one sense, but rather enhance the intent of another. Touch is applied as the dominant sense within this work, and sight acts supplementary. The approach to multisensorial analysis enacts an ecological response to material driven design.[15] The assemblage that I arrive to within this body of work addresses human and rock relationships that are founded on multi-sensorial encounters that emphasize texture and touch. When we choose to express non-standard architectural productions, we choose against the conformity of standardizations within the practice and social normative.

14. Ibid, 39

15. Lorraine Code, *Ecological Thinking* (Oxford: Oxford Unviersity Press, 2006), 26

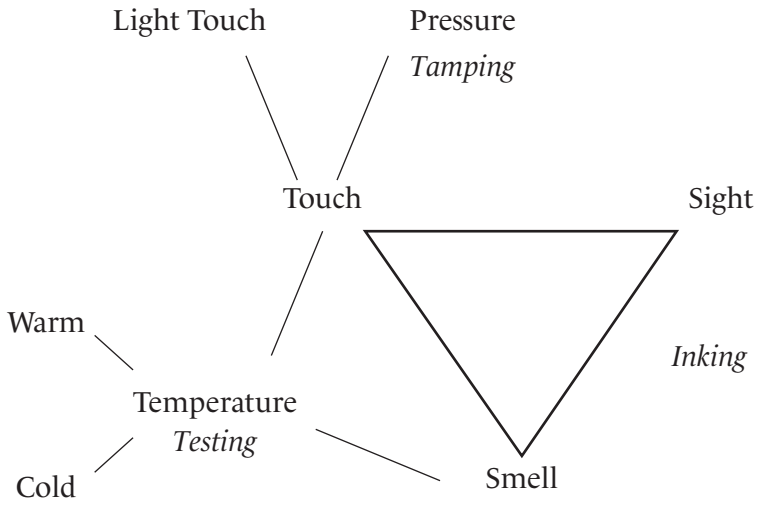


Fig. 1.4 Diagram of the proposal of a multi-sensorial drawing approach. Made by author.

The Rock-Human (and Non-Human) Assemblage

The objective of this thesis is to situate a practice of rubbing within the socio-material research of rock and stone that fosters an explorative method of inquiry to establish material reciprocity between sites of extraction and material manipulation for architectural design and construction.

I purposefully choose to engage with the Niagara Escarpment in Southern Ontario in fragments on a weekly basis for the documented duration of a year, with the intention of forging environmentally intimate relationships by listening to the rock at the scale of the hand. I translated my experiences through

rubbing drawings, a method of investigation that emphasizes a practice of listening through touch. This thesis argues that encounters with stone at the scale of the hand is necessary in architectural design, and that rubbing is a practice that explores physical manifests that engage ecological thinking within architectural research.

The narrative of stone as transformative foundational matter provides a framework for questioning the function of architecture and its role within the relationship between humanity and the Earth within the Anthropocene epoch. The actions taken to represent the relationship between stone and human is in service of contextualizing the building material of stone through affective expression to conceptualize a future for the form of the material in the built and natural environment. Although I may strive to represent the observation of the human-stone relationship as equal for both actors, I must retain that this project only serves a human understanding and of nature, through a human lens. Hannah Arendt states that since nature is ever-present, its existence isn't reliant on human remembrance, "The works of human hands owe part of their existence to the material nature provides and therefore carry within themselves some measure of permanence, borrowed, as it were, from the being-forever of nature."[16] As I take on the position of the observer and documenter, it is integral that the method of analysis acknowledges the position of the human hands as the tool of observation. The method of observation is equally the tool of documentation as direct translation.

16. Hannah Arendt, *The Human Condition* (The University of Chicago Press, 1958), 140

Inviting external and non-human controlled elements into the frottage process proposes a degree of irrationality to the understanding of geology and the earth. James Hutton undertook his observations to understand the processes of the earth and establish rational theory to describe it.[17] Gould describes Hutton's fieldwork within the condition that, "humans have a deep desire to understand time and the universe – through sequences of time."[18] Using the sequence of time understood by the theories Hutton developed, I will use frottage as an irrational form of observation that provides insight into understanding limestone multi-sensorially. I ask, how does one visualise the condition of the human-rock relationship that is observed and experienced through touch, temperature, and time?

17. Stephen Jay Gould, *Time's Arrow, Time's Cycle* (Cambridge: Harvard University Press, 1987), 77

18. Ibid, 85-86

The parameters I have determined within the development of the rubbings is that the human and limestone material are addressed as equals within the scope of the project. Other biotic and abiotic elements are invited within the process as influencers within the condition in which the rubbing takes place. I refer to the community of observers together as agents of transformation during the documentation process. The observations highlight the ecology that takes place at the site of material origin and the connections and networks that are developed between these aspects.

The fundamentals of architectural drawings are imperative for an architectural student and practitioner to understand within this field as a key communication tool. As a critical visual language, drawing becomes second nature and in the

educational text, Architectural Drawing: A Visual Compendium of Types and Methods, the author describes, "Drawing is a process that progresses from seeing to visualizing and, finally, expressing."[19] Within this thesis work, the process described by Yee is explored as one fluid process where the visual expression is conducted through tactile observation – seeing through touch and touching as drawing. Rather than a sequential process, this form of irrational observation works as a holistic method of drawing spatial experiences through direct material expression. This type of representation translates the qualities of material expression into a unified human experience, therefore, embodying materialism as the reality of drawn space.

19. Rendow Yee, *Architectural Drawing* (New Jersey: John Wiley & Sons, 2013), 3

Organized into three parts, this thesis addresses the cultural and performative aspects of rubbing as a non-standard form of architectural inquiry to investigate the material of limestone through an ecological lens. As the chapters progress, the act of rubbing is explored physically through environmentally intimate approaches to define a basis for this practice. Beginning with the history of rubbing as inquiry, I transition into a physical discourse between the human and rock through the act of rubbing as a multi-sensorial process that builds a diverse relationship with rock beyond the built environment.

The first chapter, **The Evolution of Rubbing as Inquiry**, examines historical applications of rubbing to provide context for this approach in architectural inquiry. Reflections on the historical development of rubbings identify this technique as a method for disseminating knowledge between communities

of peoples, an artform that establishes agency through consciousness, and as a practice of preservation. The language of rubbing is analyzed in order to define the conceptual and functional background for the practice that is established within this research.

The second chapter, **Notes on Rubbing**, outlines the craftmanship of rubbing and the process undertaken to apply approaches of embodied cognition that advocate for multi-sensorial interactions between co-makers and materials.

The third chapter, **A Compendium of Rubbings**, describes a chronological sequence of explorative encounters, establishing common elements between fragmented sites through a catalogue of rubbings. Field entry logs provide insight to the context of the abstract nature of the rubbings and come together as a series of material-land stories communicated through textural drawings. Key co-makers introduce themselves in the process and span across varying timescales identify themselves within the encounters and offers diverse narration.

Fig. 1.5 Photograph of rubber tamping demonstrating one of the human-rock encounters by the author.

02 The Evolution of Rubbing as Inquiry: Developing the Language within the Practice

The drawing typology of rubbing is inherently objective, providing a space for dialogue between human and non-human interrelationships to form. Adopting conceptual aspects of historically developed forms of rubbings situates the proposal of an ecologically based practice within an active space of inquiry. How can we employ our understanding of transference drawings to create a space for a rubbing as inquiry method within the architectural discourse?

Rubbings, frottage, transference drawings, impressions. There are many similarities across these multifaceted drawing practices that have formed throughout history both functionally and technically. The formal qualities of the resultant images of each of these practices are the same; a 1:1 scale translation through direct contact between the human documenter, their tools, the plane of transference, and the object or material. For centuries, rubbings have been exercised as a technique for documenting stories and disseminating knowledge.[1] Within the last century, rubbing has taken on new and exploratory art forms as a method for material and self-expressions. In this chapter, the study of the progression of historical and contemporary rubbing practices will provide insight into the explorative application of rubbing as inquiry within this research. The conceptual application within each practice is equally important as the technical method of rubbing. Both will be investigated within this chapter to develop the framework for the rubbing practice undergone within this thesis.

First, the establishment of the Chinese rubbing process will be considered as a basis for the formal technical qualities that this practice has developed. The evolution of the practice by the Japanese angling communities in the form of gyotaku printing will be investigated further as it considers the growth of the practice from documentation to artform. In contrast to the Japanese and Chinese practices of rubbing, the artform of frottage was integral to the development of the connection between the human subconscious and the material world.[2] As an explorative practice, frottage and rubbing are intuitive processes that connect contemporary researchers and artists

1. Kenneth Starr, *Black Tigers: A Grammar of Chinese Rubbings* (University of Washington Press, 2008), 6

2. Allegra Pesenti, *Apparitions* (New Haven: Yale University Press, 2015), 12

with the matter in which they study. Contextualizing these practices of transference drawing compose the proposal for ecological rubbings as a method of inquiry within architectural material representation.

Fig. 2.1 Photograph of a rubbing drying after inking by the author.

Chinese Rubbings: Knowledge Dissemination and Technological Advancements

The first documented application of rubbing was in China, concurrent with the invention of paper as a deployable medium with the functional purpose of disseminating knowledge through writing and drawing. Prior to the introduction of paper, written drawings and stories were site specific, carved into monolithic stone elements. The act of rubbing allowed for the stone carvings to be copied and distributed while maintaining the integrity of the inscriptions, providing a framework for disseminating knowledge and stories to large unconnected groups of people transcending major geographical distances.[3]

The practice of Chinese rubbings is functional and technical, developed with thoughtful intention for the practical purpose of sharing knowledge in physical format. The precise replication techniques are conducted in one of two methods: a dry or wet technique.[4] Traditionally, the Chinese method of rubbing is conducted using rice paper and ink or charcoal in an indirect method where the transference is done in the same orientation and not mirrored since most early rubbings involved a textual element.[5] Described as a gentle artform, the act of conducting rubbings is an intricate, delicate, and responsive practice that is site and object dependent. The adaptable quality of the transference drawings has provided a method in which the technique has been continually developed throughout time.

The practice of Chinese rubbings expanded its use overtime as a method to capture the likeness of three-dimensional objects and sculpted drawings. The dissemination of art and literature through rubbing is a precursor to the development of the printing press and modern techniques of print media.[6]

3. Kenneth Starr, *Black Tigers: A Grammar of Chinese Rubbings* (University of Washington Press, 2008), 18

4. Ibid, 34

5. Pearce, Nick., and Jason. Steuber. Original Intentions : Essays on Production, Reproduction, and Interpretation in the Arts of China (Universrity of Florida Press, 2012), 223

6. Ibid, 231

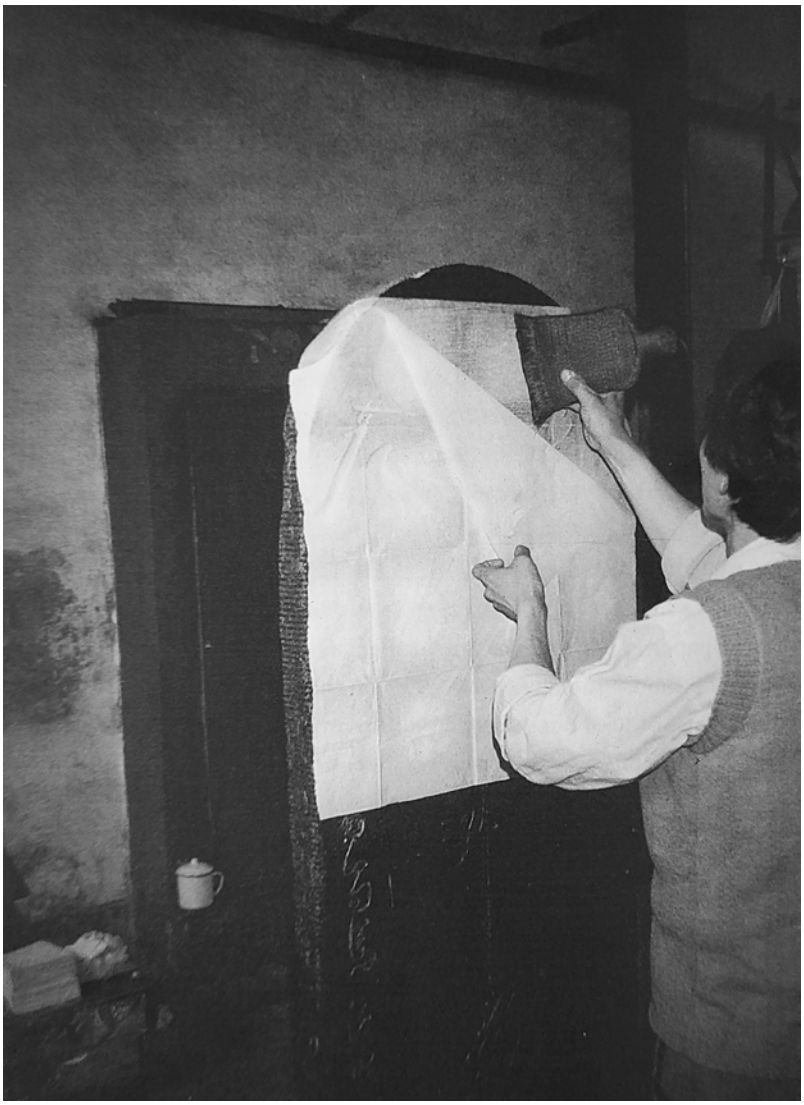


Fig. 2.2 Photograph of a rubbing artist wetting paper and placing on host object by Kenneth Starr (1987).

Fig. 2.3 Photograph of a rubbing artist inking a wetted and tamped paper with dabbers by Kenneth Starr (1987).

Unlike the coldness of the printing press, the slowness of the process through the traditional tools for rubbing invites a secondary dialogue between the person enacting the rubbing, the information being shared and the recipient of the rubbings over temporal scales of evolved tradition.

7. Yoshio Hiyama, *Gytoaku: The Art and Technique of the Jpanese Fish PRint* (Seattle: University of Washington Press, 1964), 7

8. Yoshio Hiyama, *Gytoaku: The Art and Technique of the Jpanese Fish PRint* (Seattle: University of Washington Press, 1964), 15

Gyotaku: Community and Cultural Documentation through Japanese "Fish Printing"

The practice of gyotaku is a form of nature printing that emphasizes interspecies connection through a multi-sensorial documentation approach between coastal angling communities in Japan and diverse aquatic ecosystems. Adapted from the practice of Chinese rubbings, multiple individuals across Japan adopted the process as a method for chronicling angling histories.[7] Coastal communities gravitated towards the functional application of transference drawings and expanded the process from one based in replication to a practice that incorporates artistic expression.

Two main method typologies define the practice of gyotaku, which include an indirect and direct rubbing approach.[8] The direct method involves inking the fish and transferring a

mirrored image, in comparison to the indirect method which transfers the direct orientation of the fish onto the paper.[9] Encompassed within the realistic aspect of the fish rubbings is a chromatic element through the addition of coloured ink can be introduced to the image to accurately document the characteristics of the rubbed subject. The addition of colouration to the rubbed imagery suggests an artistic interpretation of the fish's likeness based on the visual perception of the rubbing artist.

As required by the subject matter, the 1:1 scale translation of the gyotaku is a key aspect of the impression. Replicating the image of the fish without interpretation provides a drawing platform that is accurate and precise in the direct representation, and

9. Yoshio Hiyama, *Gytoaku: The Art and Technique of the Jpanese Fish PRint* (Seattle: University of Washington Press, 1964), 36

Fig. 2.4 Gyotaku print of a Gulf Flounder by the artist Christopher Dewees.

further translation to generations of viewers. Rubbing, in the context of gyotaku is a process that enables quantitative data within the qualitive properties in this drawing typology that is not present in traditional forms of representation such as drawing, photography, and painting. Embedded within the rubbing captures the experience of the aquatic life and the human rubber through subtle textures in the plane of paper and highlighted through the inking process.

The relationship between the fish and human exists beyond the rubbings. A cross-cultural experience is shared between angling communities through this practice. The gyotaku fish print memorializes the life of the fish and the nourishment, educational and sustenance, it shares with the artist.

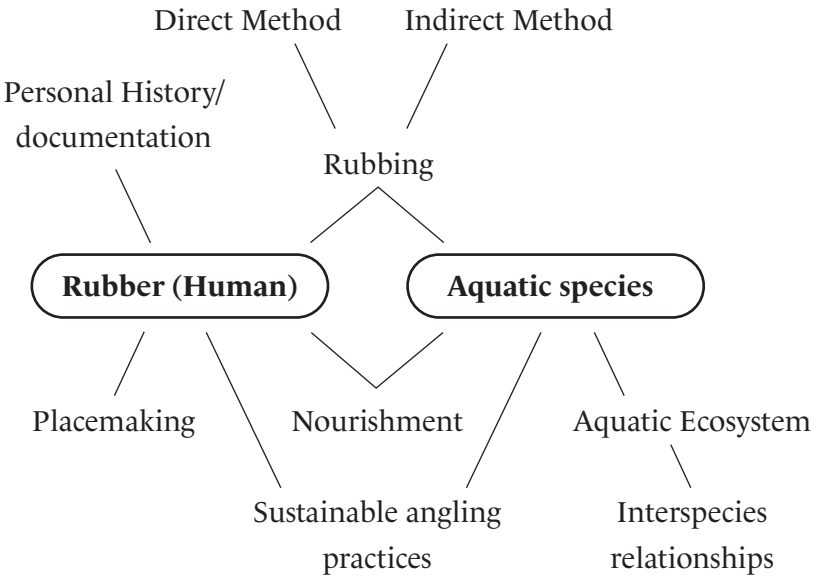


Fig. 2.5 Illustration of the gyotaku fish printing process. Made by author.

Surrealism and Frottage: A Practice of Agency and Consciousness

The practice of rubbing as drawing is an artform that gains value from its dichotomy between replication and expressive interpretation. Frottage is an artistic method the arose from material experimentation during a period of psychological intrigue and heightened surrealism.[10] The origins of frottage are rooted in the automatism ideologies of the surrealist artist Max Ernst as an exploration of materialism and the human subconscious.[11] Heavily influenced by the works of Sigmund Freud and Andre Breton's work in the Manifesto of Surrealism, the concept of automatic drawing employs methods of free association and unconscious physicality.[12] Rubbing as frottage offers awareness to the practice of approaching material as co-maker within the drawing process by allowing the textural aspects to direct the conversation between human and material.

Ernst's practice incites instinctive physical and mental qualities through its reactionary procedure. Typically performed with dry mediums, the frottage drawings that were produced during this period acted as material and psychoanalytical experiments.[13] The purpose of frottage drawings composes rubbed textures to create an image to render unconscious thought. He created imaginary imagery through realistic textural translations composed together to ground his hallucinatory entities. As a response to the metnal and cultural experiences during the post-war period, he describes his frottage drawings to define a new kind of natural history to commute with nature at this time.[14] Reconciling with nature through this method provides a space to heal and ground mentally and physically through the process based in practices of automatic thought. Ernst believed that the most important concern is to balance

10. Allegra Pesenti, *Apparitions* (New Haven: Yale University Press, 2015), 15

11. Werner Spies, *Max Ernst Frottages* (Thames and Hudson, 1969), 11

12. Ibid, 9

13. Allegra Pesenti, *Apparitions* (New Haven: Yale University Press, 2015), 14

14. Werner Spies, *Max Ernst Frottages* (Thames and Hudson, 1969), 15

Fig. 2.6 Still from "Texture Tile: Ernst" (02:45) demonstrating Max Ernst's rubbing process.

controlled and uncontrolled activity to ensure clarity. Through the involvement of uncontrolled factors within frottage, such as the other textural and material co-makers, the psychological ecosystem between sentient and non-sentient beings cooperates together to produce the rubbing drawings.

Henri Michaux is a French surrealist artist who evolved a method of frottage as a method to connect with a parallel reality to express alternative temporal scales.[15] Expressing explorative practices of automatism through writing and rubbing drawings, Michaux incorporated acts of material motion to capture essences of unidentifiable creatures he called apparitions.[16] The performance of frottage physically captures memory in time and through placemaking. The material and spatial influences

15. Allegra Pesenti, *Apparitions* (New Haven: Yale University Press, 2015), 15

16. Ibid, 15

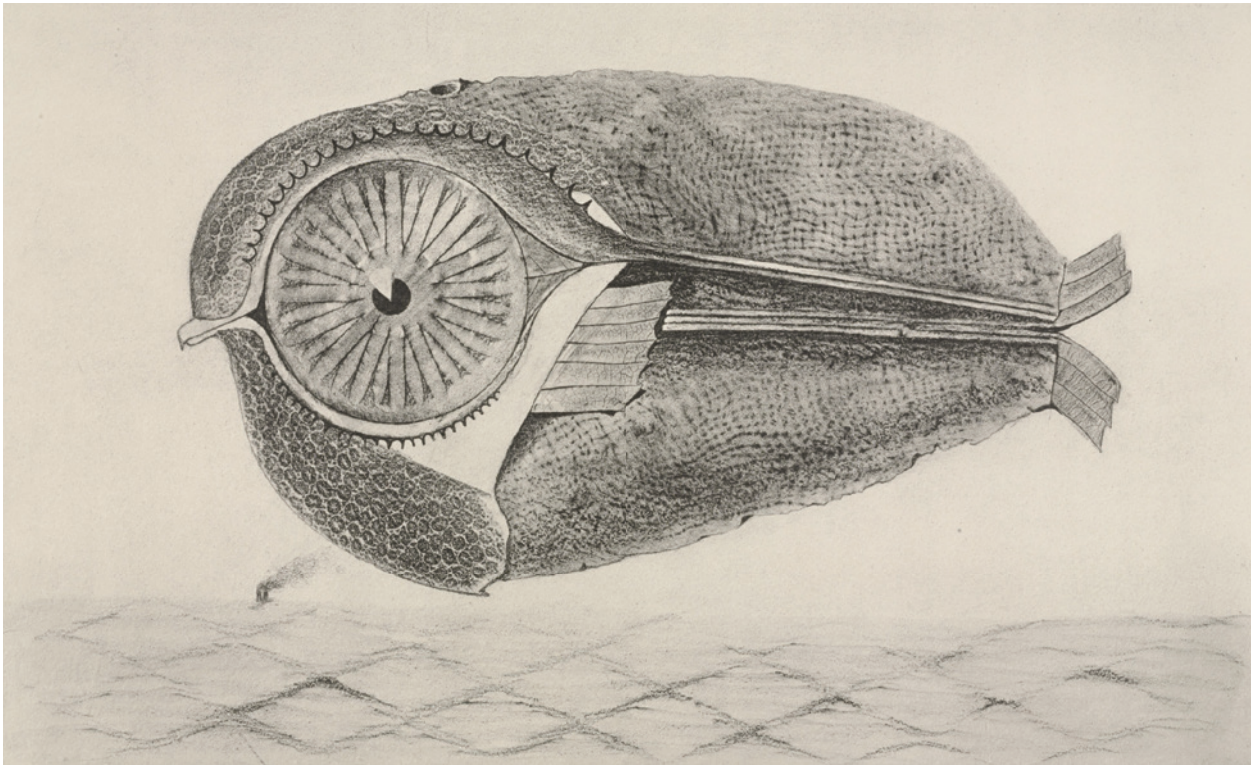


Fig. 2.7 Max Ernst. The Fugitive (L'Évadé). 1925.

directly impact the result of the work embedded within the paper plane.

Material investigations through frottage provokes the reality of human-material relationships to develop memories through textural inquiry that exist subconsciously. The process is transformative and engages a series nuanced gestures to create a collage of material histories.

Contemporary Practices of Rubbing: Beyond Artistic Expression

In regard to contemporary practices of rubbing, the comparison between the works of Merle Greene Robertson and Masao Okabe showcase rubbing as a method for preservation that works within temporal and geographical scales.

Transference drawings have remained a relevant form of expression as an exploratory art form and method of historical documentation. Merle Greene Robertson is an artist and academic who employed the practice of rubbing within her archaeological work in Guatemala and Mexico documenting ancient Mayan monuments. The rubbings Merle Greene and her students conducted resulted in a significant body of work that has contributed to understanding Mayan culture.[17] Merle Greene's practice is an example of the adaptiveness of rubbing as a documentation due to its ability to adapt to specific site requirements and environmental conditions.

Her development of rubbing techniques were derived from Chinese rubbing techniques and adjusted to meet the specific site requirements and conditions.[18] In her autobiographical documentation of her life and work, "Never in Fear", Merle Greene outlines the two techniques she developed to accommodate different environmental and material conditions.[19] Both techniques used one-meter by two-meter sheets of heavy rice paper arrayed and adhered in place with duct tape over the rubbing surface, then wetted with wide brushes and tamped with handkerchiefs or washcloths.[20] Depending on the technique chosen for each site condition, either a thick sumi ink or oil paint were used to conduct the "revealing" stage of the rubbing process. Merle Greene and her team constructed

17. Merle Greene Robertson, *Merle Greene Robertson's Rubbings of Maya Sulpture* (San Francisco: Pre-Columbian Art Research Institute, 1993), 3

18. Ibid, 6

19. Merle Greene Roberston, *Never in Fear* (Pre-Columbian Art Research Institute, 2006), 50

20. Merle Greene Robertson, *Merle Greene Robertson's Rubbings of Maya Sulpture* (San Francisco: Pre-Columbian Art Research Institute, 1993), 7

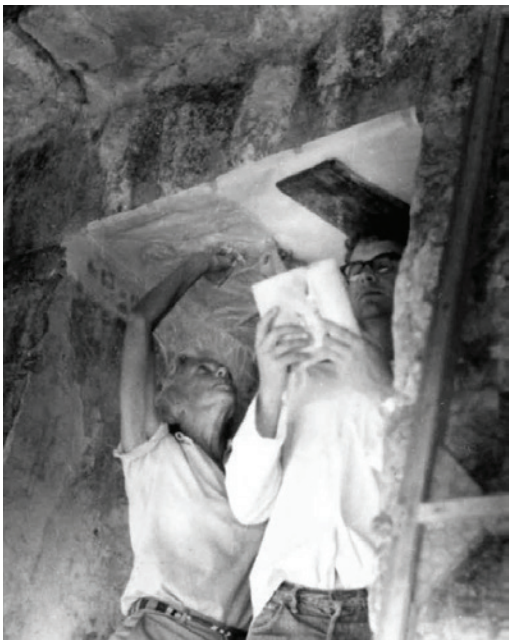


Fig. 2.8 Photograph of Merle Greene Robertson and Waldemar Sailer conducting rubbings in an enclosed space by Merle Greene Robertson.

Fig. 2.9 Photograph of Merle Greene Robertson wetting paper on Maya sculpture in preparation to rub.

their own versions of dabbers -traditionally used in Chinese rubbing practices-, for the inking process made from cotton balls wrapped in silk. Regarding the oil paint method, Merle Greene and her team would spread a thin layer of oil paint on a tin sheet and use their thumbs to press the ink into the rice paper. Merle Greene describes that the process, "took forever as thousands of thumb prints were necessary to complete just one monument. If done correctly there will be no ink on the back side next to the stone using either method."[21] This was a crucial aspect in the process as the preservation of the stone carvings themselves was highly important. Where photography would not be able to pick up small details in the aging and eroding stonework, the rubbings captured slight topographical details not visible to a camera lens or eye. Merle Greene describes some of the

21. Merle Greene Robertson, *Merle Greene Robertson's Rubbings of Maya Sulpture* (San Francisco: Pre-Columbian Art Research Institute, 1993), 7

Fig. 2.10 Photograph of Masao Okabe rubbing bark of tree.

rubbing sites as difficult to access, such as being tight spaces to work in or not exposed to natural light. Photography would not be an appropriate medium to capture the monuments due to the amount of equipment necessary. Therefore, Merle Greene Robertson innovatively applied the practice of rubbing through her artistic background as a method for documenting historical material.

The contemporary Japanese artist, Masao Okabe, employs the techniques of rubbing to document the temporal relationships between human intervention and the natural environment. His approach through rubbing is experimental, and he challenges the participatory relationship between the material environment and human actor.[22] Okabe translates

22. Museum of Anthropology. *A Future for Memory: Conversations with Masao Okabe and Chihiro Minato.* Youtube. May 18, 2021.

spatial expression within a thoughtfully considered time frame through the performance of his work. He centres his work along fluid timescales instigated by explosive and singularly massive events. He captures rhythmic patterns of time that are initiated by a single event that ripple into spatial and material reactions over a flexible duration of time.

Modern printing, embossing mechanisms and techniques are synonymous with contemporary practices of rubbing. In some cases, such as print media, the machine replaces the hand, yet knowledge and stories can be disseminated to a vast and diverse audience. In contrast, modern printing block formats embrace the tools as part of the body and focus on the connection between the material and artist. The disassociation of intimacy between the rubber (printer) and the material, embraces capitalism through influence by quantity.

Defining the Practice

Defining the different methods of rubbing provides an alternative drawing framework that can engage an environmentally intimate practice within architectural representation through material relationships. Examining the intentions of the history of rubbing practices through physical engagement develops the rationale in which the practice is evolved for the purpose of material inquiry.

Chronologically, the basis for rubbing as inquiry is established through the study of Chinese rubbing techniques as a technical method of documentation. Then, instinctually through the act of rubbing, a transition towards a process that embodies modern ecological philosophy through the principles of Japanese Gyotaku is integrated. Similar to the relationship between the angling communities and aquatic bodies in Gyotaku, a material-based society between rock and human actors is forged through the rubbing process. Surrealist materialism ideologies are introduced by embracing an automatism lens by the human actor. Expression through randomness gives agency to the host material object as the essential actor within the process and dictates the outcome within the recording of natural histories through materialism.

Fig. 2.11 Photograph of an inked rubbing drying on site by the author.

Rather than rubbing as reproduction, rubbing is a form of qualitative documentation. The rubbing process focusses on capturing a particular state in which the rock existed at a singular moment in time. As a continuation of the discourse on rubbing as a method of inquiry, the practice explores the concept of an ecological rubbing through its tactility and relationship to the material. The 1:1 scale fragment composes the translated rubbing at the scale of the landscape as projection. The resultant rubbings are depicted as a hyper realistic approach to representation and conjointly as a textural abstraction. The subject matter is composed in a manner that finds a common ground between the scales in which the human actors and the material actors exists.

The rubbing practice defined within this thesis addresses a drawing practice that engages the human as a multi-sensorial figure as co-maker alongside the host material object and other interelemental and interspecies exchanges. The drawing plane is an ecological stage where the interacting organisms and materials are studied and documented through a resultant rubbing drawing.

Therefore, this drawing process revitalizes a mutual relationship between a building material and designer by addressing each participant as a co-maker and co-designer in co-existence through rubbing. The terminology of an ecological rubbing is defined within the process adapted from the diverse backgrounds of rubbing practices, as well as, explorative nature of the documentation method.

Fig. 2.12 Conceptual diagram outlining the practice of ecological rubbings. Made by author.

03 Notes on Rubbing

Deleuze identifies the milieu as the spatial setting for ecological relationships to take place.[1] In this chapter, the process undergone in the milieu acknowledges an ecology of agents of transformation that participate as equals within an exploratory and intimate process. The complexities of these interrelationships are expressed through simplistic visual imagery, rubbings, but are abundant in textural sensory nuances.

Establishing the Process

This thesis explores the potential for a tactile driven design process through a multi-sensorial observational methodology rooted in the practice of transference drawings through rubbing. Capturing texture through rubbing is investigated as a method that engages temporal scales through material expression. The choice of representation through rubbing is selected for two main reasons; the qualitative aesthetic properties and the immersive approach that addresses the object being documented as part of the artistic process as co-maker. The transference drawings that are conducted for this research are not purely imitation, nor interpretation. Rather, these images are the results of listening to the land through touch as a process of repositioning the human scale through social-placemaking.[2]

1. Lorraine Code, *Ecological Thinking* (Oxford: Oxford Unviersity Press, 2006), 27

2. Anna Lowenhaupt Tsing, *On Nonscalability* (New York, 2019), 145

Fig. 3.1
Photograph of the tamping process on site by the author.

Rubbing is contextualized as analysis through a method of casting with paper and ink. Similar to the process of casting in traditional wet mediums (concrete, plaster, and clay), casting in paper engages an immediate temporal scale between the object being casted and the human casting the object. This chapter details the tool construction and sequential process of rubbing derived from the traditional Chinese rubbings practice as the tools, sequence of operations, and materials are informed by the rubbing techniques outlined in Kenneth Starr's, "Black Tigers: A Grammar of Chinese Rubbings". There are two main categories of rubbings that are described in Chinese rubbing practices; dry rubbings and wet rubbings.[3] The latter is explored within this thesis due to the malleability of the paper to capture the textural forms three-dimensionally. The qualitative aspects of rubbing as inquiry within this research focuses on the ecology between the material and human co-makers that embrace nuanced and subtle interactions.

3. Kenneth Starr, *Black Tigers: A Grammar of Chinese Rubbings* (University of Washington Press, 2008), 33

The Tools of Translation: Crafting the Rubbing Instruments

The initial stage of engaging in a rubbing practice involves crafting the tools necessary to conduct the rubbings as they are not conventional analytic instruments. The traditional tools include hake brushes, dabbers, and tamping brushes.[4] Similar rubbing practices adopted from Chinese rubbings use identical or modified versions of the tools with alternative naming conventions. Acquiring the hake brushes and adequate tamping brushes is required as the first step in developing the toolset required.

4. Kenneth Starr, *Black Tigers: A Grammar of Chinese Rubbings* (University of Washington Press, 2008), 43

Fig. 3.2
Photograph of the author applying a wax coating to cotton cloth as part of the dabber construction.

Fig. 3.3
Photograph of the layered pieces of silk and cotton cloth during dabber construction by the author.

Fig. 3.4
Photograph of all the dabbers constructed by the author.

The next phase involves taking on the role of crafts(wo)man; constructing, altering, and testing the dabbers needed for analyzing the rock through rubbing. The dabbers link the relationship between textural physicality of an object and the visual image of the resultant rubbing. In preparation to construct the dabbers, I reference the second chapter of, Black Tigers: A Grammar of Chinese Rubbings, where Kenneth Starr outlines the recommended material composition of a dabber and its desirable form. Filled will cotton and pliable wood the dabber acts like the palm of a hand, pressing the ink into the casted washi paper.[5] During the construction phase, I crafted seven dabbers of varying sizes, referencing the size of the head of the dabber relative to different aspects of my hand. Richard Sennett describes all tools of a craftsperson to be an extension

5. Ibid, 55

of the intelligent hand, and so through the construction of the dabbers I capture the intent of the human maker, humanity, in the necessity of the tools to perform the rubbing process.[6] The human co-maker is reliant on the tools required to engage in the rubbing process and is synonymous to the aspect of touch within the rubbing process. Beyond the craft of the rubbing instruments as a tool of translation, the act of rubbing is a translational crafted practice.

6. Richard Sennett, *The Craftsman* (Richard Sennett, 2008), 151

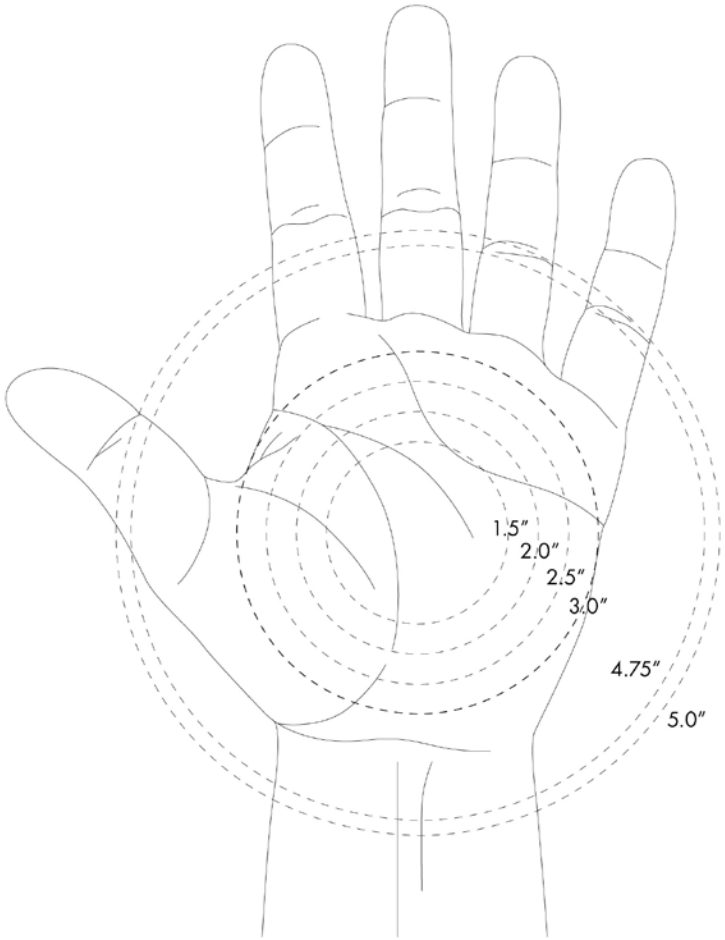
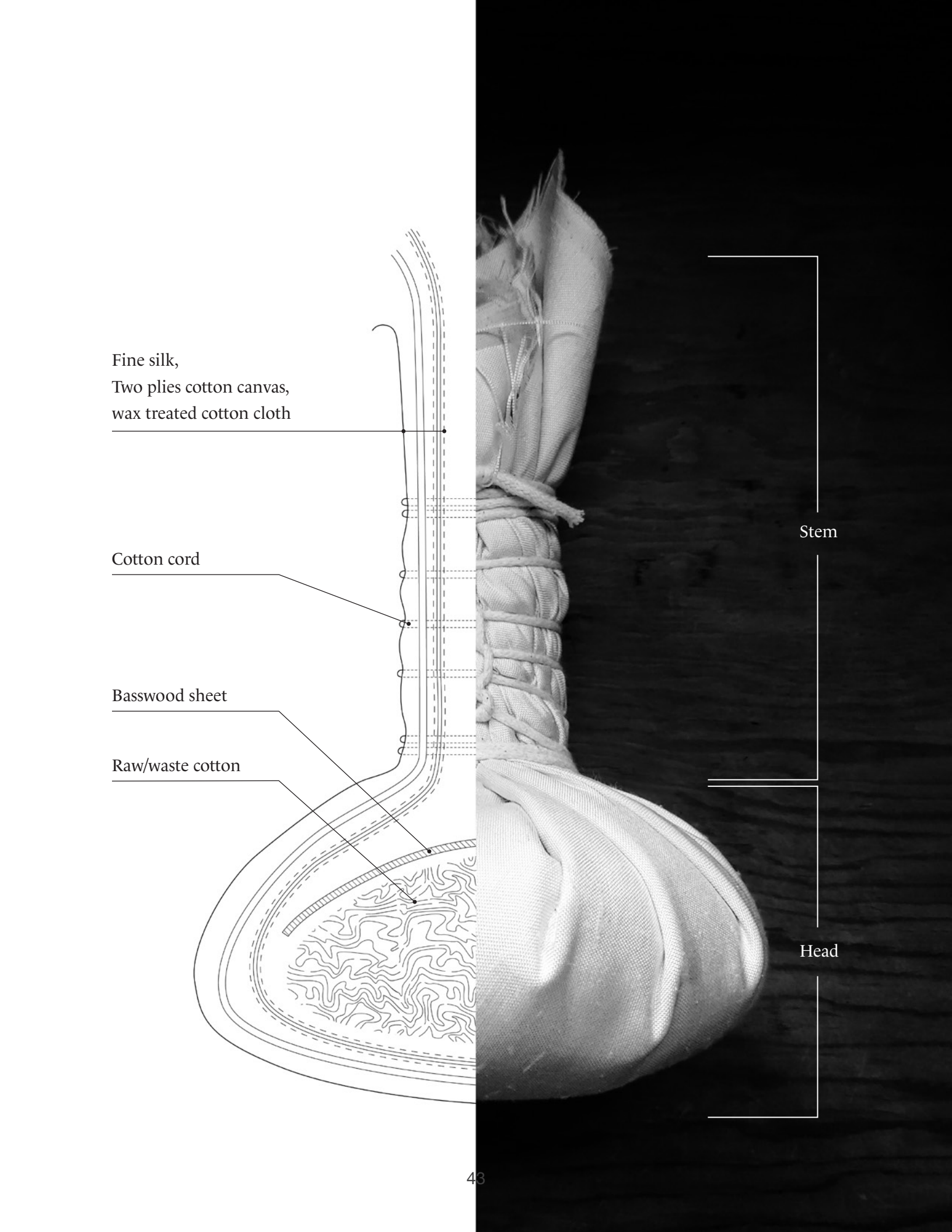


Fig. 3.5
Diagram of the dabber proportions in comparison to the hand size of the author (Left).

Fig. 3.6
Diagram and photograph of the dabber construction by the author (Right).


Fine silk,
Two plies cotton canvas,
wax treated cotton cloth
Cotton cord
Basswood sheet
Raw/waste cotton
Stem
Head

The Invitation: Choosing a "Host" Object

Within the rubbing process, the object selected for rubbing is defined as a "host" object by different practitioners of diverse rubbing backgrounds.[7] Identifying the object that is being rubbed as the host proposes that the human rubber is invited into the process as a non-central participant who is not in control of the process. As the rubber, I understand that by engaging in the rubbing process I am accepting the responsibility of an invitation by a host object. Throughout this investigative practice I am in constant appreciation of the host object, its surroundings, and the other agents of transformation that take part in the rubbing process.

The practice of rubbing is procedural and requires that each phase of the process is conducted sequentially in order to produce an adequate rubbing. Starr outlines the Chinese rubbing process by first describing the preliminary conditions in which a host object is selected based on two criteria. The primary criterion is that the host object must be of cultural esteem, "the intellectual or aesthetic value of the inscription or pictorial," and the secondary criterion regards technical functionality.[8] Stone carvings, tablets, and other calligraphic inscriptions are historically typical determinants for host objects, and this thesis challenges the perception of what a culturally significant object is. By choosing a "natural" object, I make a conscious decision that a naturally occurring object has cultural significance.

7. Kenneth Starr, Black Tigers: A Grammar of Chinese Rubbings (University of Washington Press, 2008), 34

8. Ibid, 59

Fig. 3.7
Photograph of two rubbings air drying after the inking process by the author.

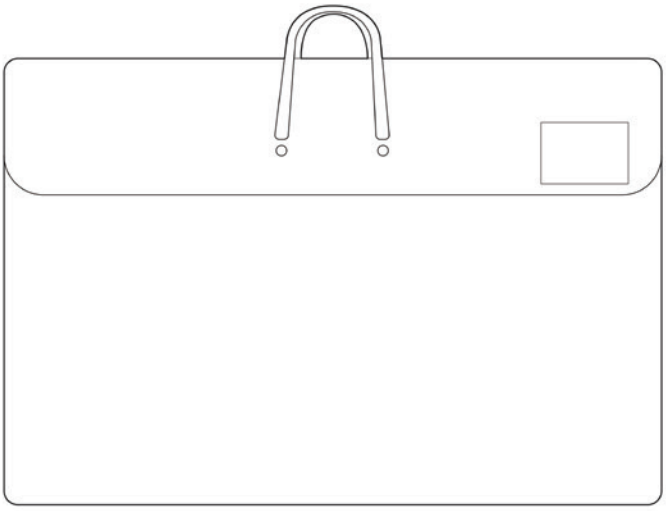
Choosing a site to rub: Approaching the rock

Whenever I approach a potential site for rubbing I bring a large satchel for carrying papers and potential rubbings, as well as, a backpack with the necessary tools for the process; tamping brush, ink plate, ink, hake brushes, water bottle (if there is no natural water in proximity), dabbers (of multiple sizes), pre-cut pieces of rice paper, and a small towel (for cleaning the dabbers and ink plates). As the rubbing process desires drier weather conditions, I try to do the rubbings on days with no precipitation.

I don't enter the site with expectations or goals for rubbing as it is dependent on the experience of each site encounter. Once I make visual contact with the rock, I begin with a one hour or longer hike around that area to situate myself on site and identify any significant textures in the rock that intrigues me to rub it. After finding an area to rub, I sit down in the general vicinity and take a closer look visually and tactically. Before I start the rubbing process, I give thanks to the rock, surrounding elements, and the landscape.

Fig. 3.8 ►
Drawing of all the field materials used by the author during material site visits for rubbing.

A	*Paper satchel*
B	*Rice paper sheets*
C	*Waterbottle*
D	*Hake brushes*
E	*Notebook*
F	*Backpack*
G	*Ceramic bowl*
H	*Tamping Brushes*
I	*Writing instruments*
J	*Ceramic plate*
K	*Sumi Ink*
L	*Cloth towel*
M	*Ruler*
N	*Dabbers*



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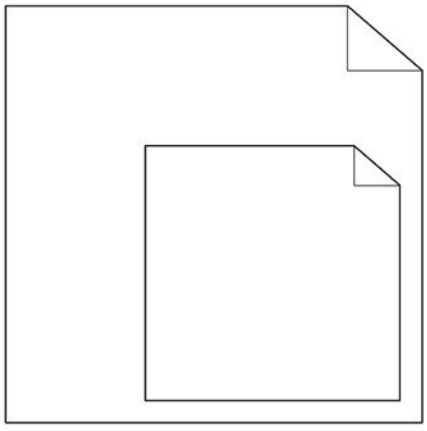

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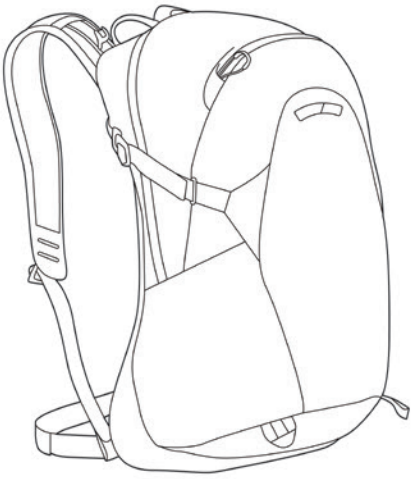

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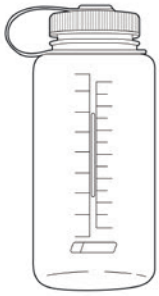

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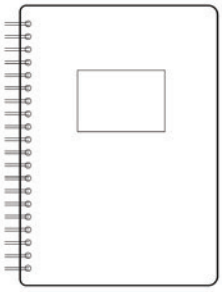

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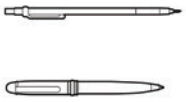

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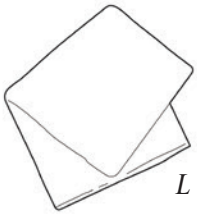

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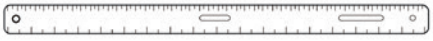

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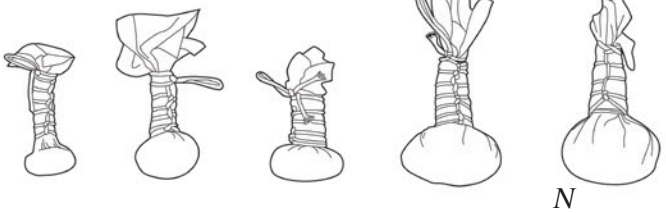

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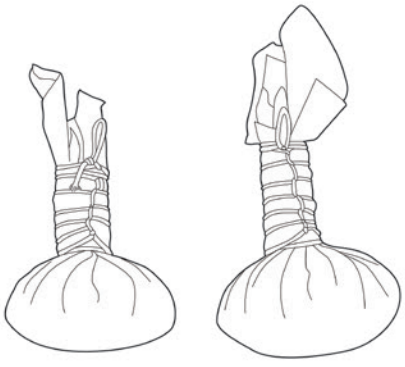


Composition: Framing Textural Dialogue

The paper is the space where the transference drawings translate the textural information from the rocks. In the art of Chinese calligraphy, the paper is the most important aspect of the craft and one of the "four precious" components – paper, ink, inkstone, and brush.[9] Similarly, the type, texture, and weight of the paper is critical for conducting Chinese rubbings. Rice paper is a commonly used paper for wet rubbings and is selected as the paper type for these rubbings for its absorptive properties and fibrous strength. Two plies of paper are initially applied to the desired area for rubbing before being wetted. A third, and occasionally a fourth, ply is layered on the rock during rubbings of deeply textured areas.

Uniformity is established across the rubbings by working with an aspect ratio of 1:1 for all the rubbings. The dimensions of the paper are either 18"x18" or 11"x11" which is predetermined by the available lengths of rice paper rolls available. For host objects that extend beyond the limits of the picture window, several sheets of paper are arrayed across to fully cover the desired rubbing surface area. Although the dimensions are limited by commercial availability, the scale of the square compositions frame the area being rubbed cater to the human participant's intimate readability of the rubbings.

The aesthetic and qualitative elements within the compositional component of the work dictate the resultant rubbings in contrast to the technical composition. Gilles Deleuze outlines the aspects of aesthetic composition in contrast to the technical composition and identifies it as, "the work of sensation".[10] The ephemeral qualities of aesthetic composition provide a

9. Kenneth Starr, *Black Tigers: A Grammar of Chinese Rubbings* (University of Washington Press, 2008), 36

10. Gilles Deleuze, *What is Philosophy* (Columbia University Press, 1991), 192

framework for the translational aspects of material topography through the rubbings through the autonomous selection of textural surfaces during the rubbing process. Capturing a dialogue between the material and human co-makers is written through the textural sensation embedded in the fibers and composition of the plane of paper.

Fig. 3.9
Photograph of a wetted sheet of rice paper embossed on a boulder during a material site visit by author.

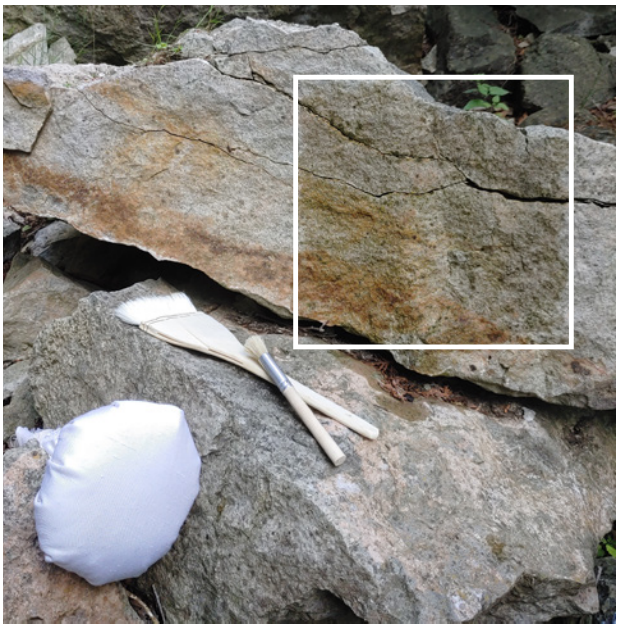


Fig. 3.10
Annotated photograph of a moistened boulder after the rubbing was finished and removed during a material site visit by author.

The Process

Wetting: Initiating the Process

Once the first two plies of rice paper are applied to the rock surface, a hake brush saturated with water – typically fresh water from the nearest natural water source- is swept across the paper surface with a soft pressure. Immediately, the paper absorbs the water and becomes translucent, and the dry rigid form of the paper becomes loose and fluid. At this time, air bubbles appear between the two wet layers of paper and the process of tamping begins.

Tamping: Revealing the Texture

A rigid short-bristle round brush is used for tamping. Tamping is a process that involves pressing the rigid brush into the paper in a quick rhythmic action to form the paper around the rock texture. If any rock breaks through the surface of the paper this step is repeated with additional layers of paper, up to a maximum of four plies of rice paper.

Forming: Casting in Paper

The porosity of the limestone affects the time needed for the paper to dry after the wetting and tamping processes. Before inking, the paper needs to become rigid while containing a minimal amount of moisture. A desirable state of the paper is identified by placing the palm of a hand on the paper to detect a cool damp temperature and visually inspecting the opacity of the paper. The intimacy of the relationship between the co-makers, the rock and the hand, is significant during this part of the rubbing process because the physical connection between these two agents incites the next step: inking.

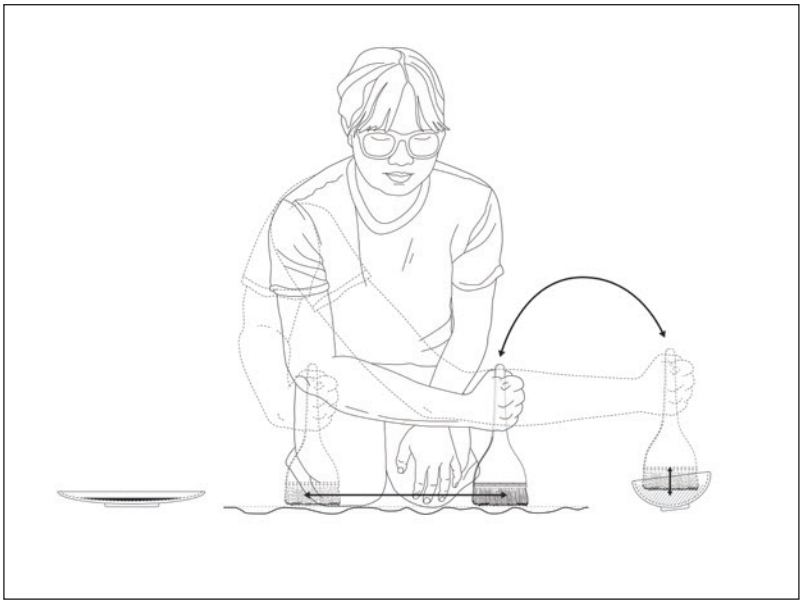


Fig. 3.11
Diagram of the wetting motions during the rubbing process by the author.

Fig. 3.12
Diagram of the tamping motions during the rubbing process by the author.

Inking: Visually revealing the texture

Revealing the texture of the rock imprinted on the paper through the inking process is the most exciting part of the rubbing process as a sight dependent actor. One teaspoon of sumi ink is poured onto a flat ceramic surface and rubbed in a circular motion with a dabber. The dabber absorbs the ink and is then introduced to the surface of the paper in fast pulsating stipples. The semi-dry paper absorbs the ink from the dabber and the texture of the rock becomes visually translated onto the paper surface. The inked areas reveal the positive relief aspects of the rock texture, and white represents the negative space. The dabber never extends onto the rock and a white ¼ inch border loosely frames the rubbing on the paper. This decision accommodates the "leave no trace" concept upheld by human actors in order to preserve and protect the natural environment.

Drying: Casting space and time

The inked paper is left on the rock surface until it is completely dry as a process of embossing the texture of the rock into the paper. The paper naturally releases itself from the rock as it dries, flaking off the rock like it is shedding its outer skin. The dried and inked paper acts as a 1:1 cast of the area that is rubbed and can be interpreted from both sides of its two planes. One side of the plane [contains] an inked translation of the material, and the other side transfers material remnants into the fibers of the page.

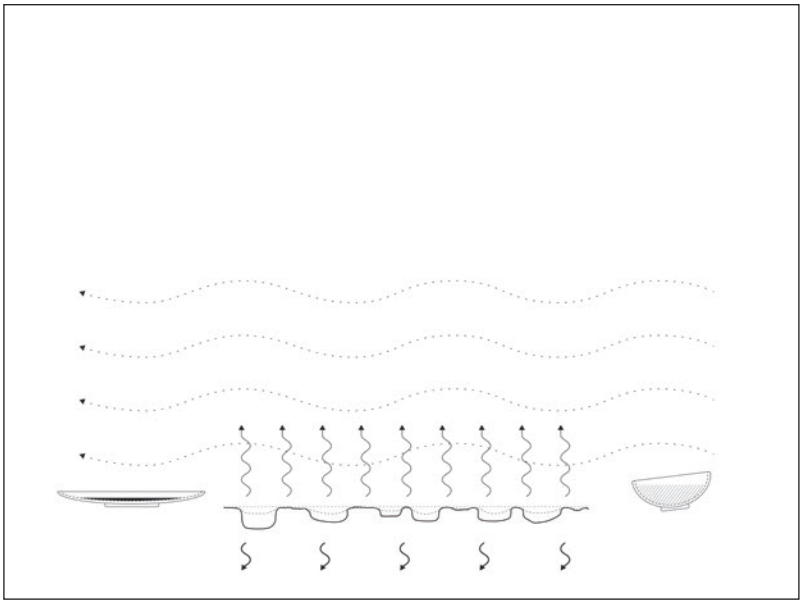


Fig. 3.13
Diagram of the drying time lapse during the rubbing process by the author.

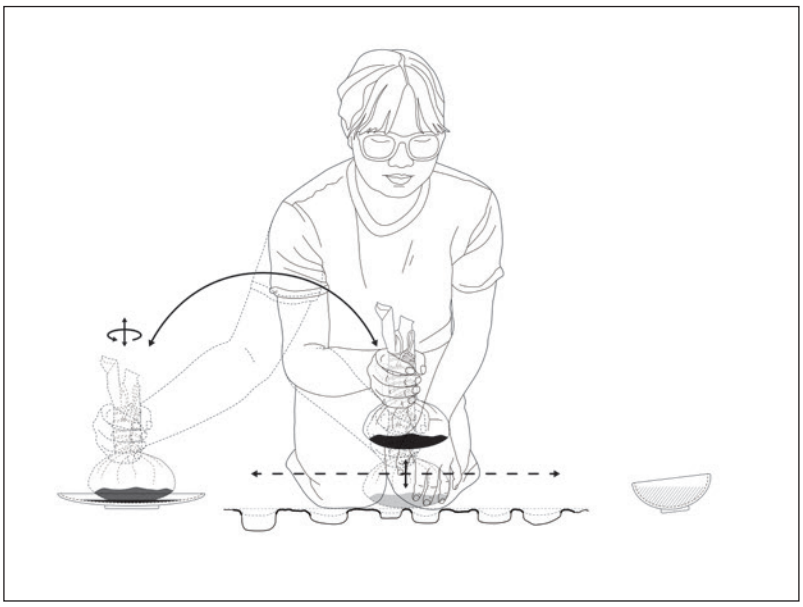
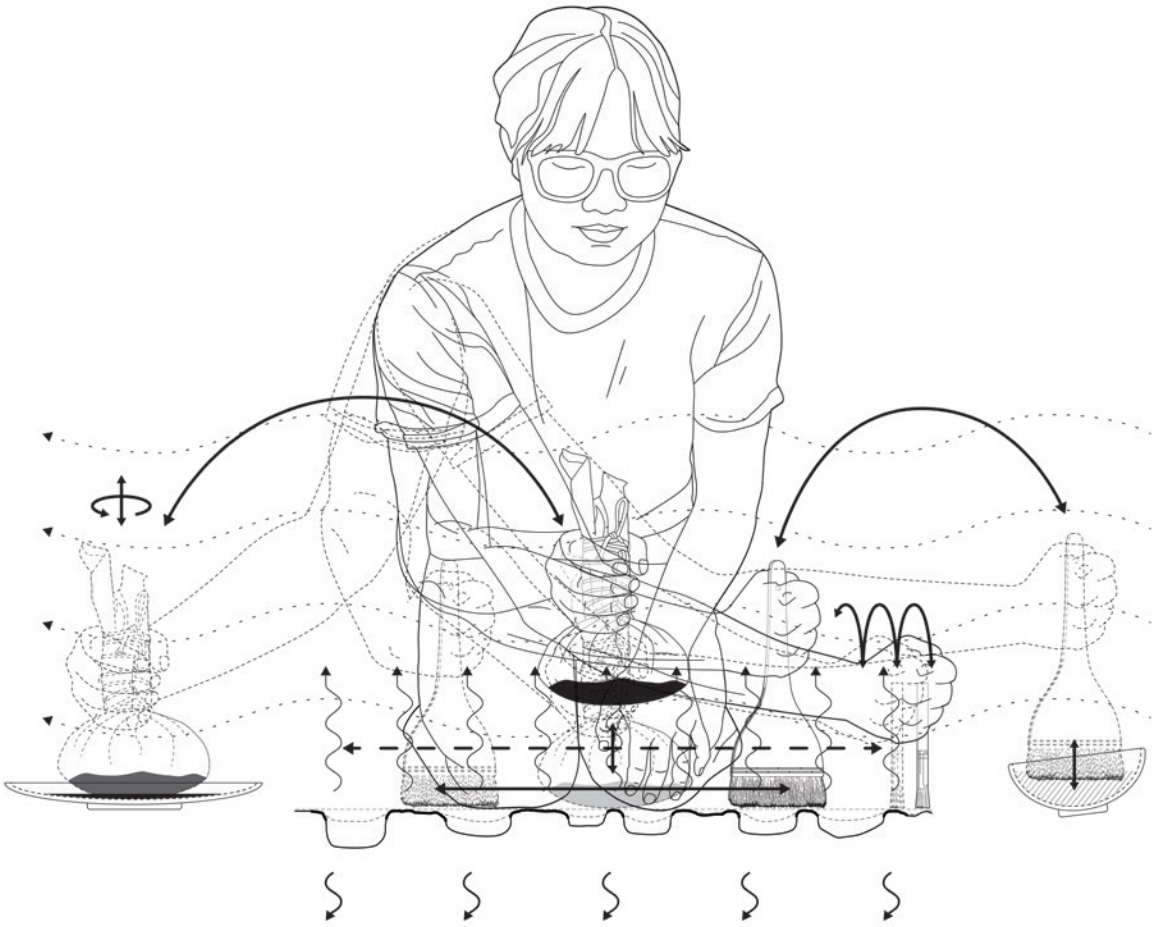


Fig. 3.14
Diagram of the motions of using the dabber during the rubbing process by the author.

The rubbing process takes on the role as a translator between non-human and human agents interacting on the site. This became more apparent as I engaged different locations along the escarpment to rub. When I first endeavored with rubbing sections of the escarpment, I anticipated engaging with non-human agents directly through the process. However, after repeated encounters, I embraced the nuanced relationships of the human and non-human interactions and define this modified process of Chinese wet rubbing as ecological rubbings.

Fig. 3.15
Diagram of the time lapse of all the steps to the rubbing process coming together by the author (Below).



The concept of ecological rubbings allows for an intimate relationship to developed to be established between the environment and material as co-maker during the rubbing process. This process practices slowness and challenges the scalability of material expression as a counteraction towards fast-paced, large-scale material extraction. This method changed in which I engage with material matter in the natural environment, thus changing my relationship with materiality in the built environment.

Fig. 3.16
Photograph of wetted and tamped sheets of paper on the cliff face of the Niagara Escarpment during a site visit by the author.

Fig. 3.17
Photograph of inked sheets of paper on the cliff face of the Niagara Escarpment during a site visit by the author.

04 A Compendium of Rubbings: A Series of Textural Translations

"This is not the place
Of departure.
The event is invariably
Prehistoric.
The five senses register
A vague roulette to it all.
A map
With
No
Corresponding
Geographical
Landmarks "

Christopher Dewdney, A Paleozoic Geology of London, Ontario: Coelacanth, 1973

Through the peripatetic nature of the analysis typology, I found myself experimenting with how I would document my field work. As I conducted my field day entries, I organized the accounts into four parts. First, I describe my intentions for the day and how I, as one of the agents of transformation, was feeling about the rubbing objectives. Next, I wrote observational notes about the surroundings, weather, and any encounters with non-human collaborators during the rubbing process, which help me adjust the process at each site. As I move between fragmented locations around the Niagara Escarpment, I piece together a textural map, not bound to geographical coordinates, developed from the multi-sensorial experiences captured within the rubbing and field journal entries. The site selection is not linear, it is spontaneous. Grand geographical scales are not critical within the body of the work as it is chosen to document at the scale of the hand through the rubbing process.

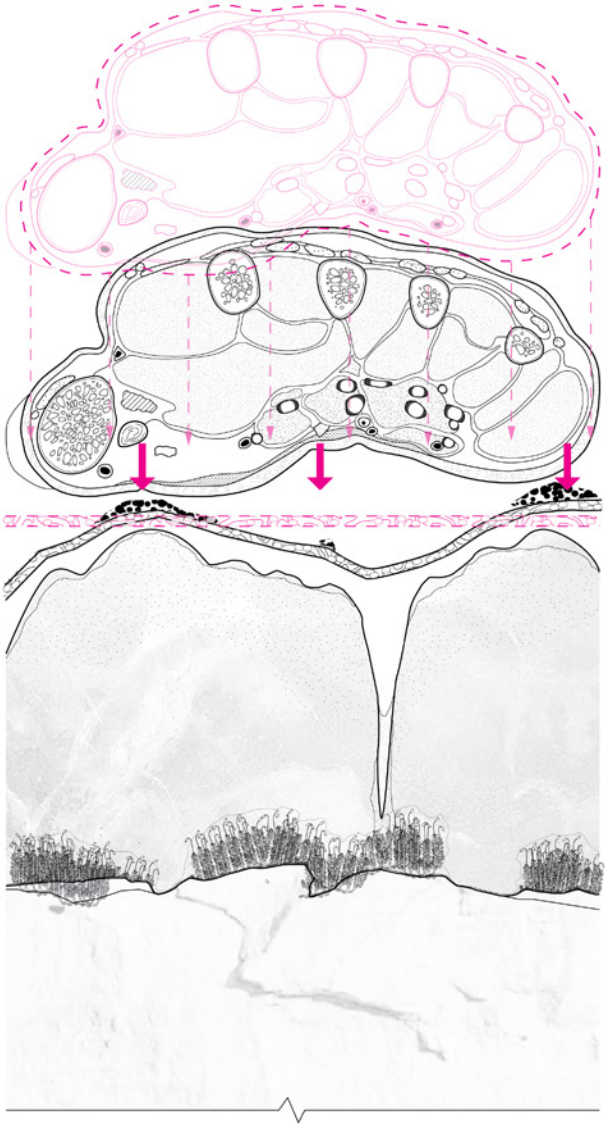


Fig. 4.1 Diagram of a hand-paper-host physical relationship.
Made by author.

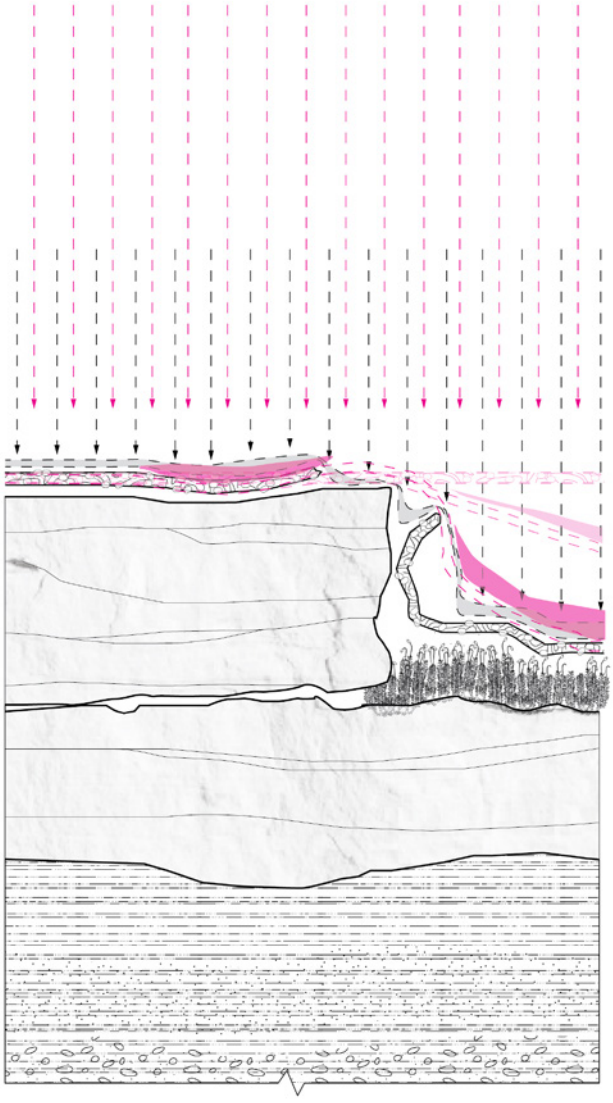


Fig. 4.2 Diagram of a water -paper-host physical relationship.
Made by author.

Day 01. Familiar Experimentations

The rubbing explorations I did today as aspirational experimentations. Today was about listening to the limestone to develop a discourse with the material as co-maker with the intention that it would inform my contribution to the rubbing process over the next four months.

Today, I visited a section of the escarpment that is foreign to me. It was an intentional decision to visit a part of the escarpment I haven't touched as I want to emphasize my position within the relationship with the cliff as visitor and guest. Upon arrival at the designated site for the day, I walked around the base of the accessible cliff line along the dampened moss-covered talus, observing my surroundings, the plants, insects, and the condition of the rock. The rock was relatively damp as it has rained recently, and the forecast predicted more rain to come later in the afternoon. The transitionary season of spring was apparent by the moist air, soil, and rock, and signs of growth was vibrant across the budding flora.

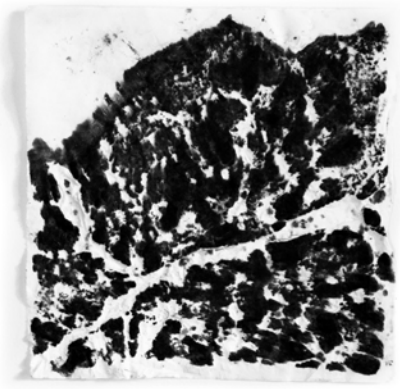
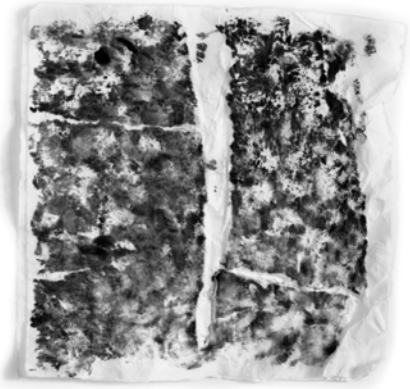
Fig. 4.3 Photograph of four rubbings drying on site by the author.

After I decided on a reasonable area to comfortably begin the rubbing process, I was overcome with an anxious warmth and trepidation while setting up my tools. Why am I doing these rubbings, and what is the purpose of studying the material at this scale?

I started my first rubbing at ten in the morning, laying two-meter-long plies of rice paper across a flat surface on a boulder that appeared to have sheared off the cliff sometime in its' past. After gently pouring water from my water bottle into a bowl, I use the largest hake brush to sweep across the paper. As the paper became soaked in water, the fibrous plane loosely molded itself to the rock texture. Tempted to transfer the typography of the rock in more detail, I began tamping the paper after ten minutes which resulted in the paper to become a translucent pulpy mess and I stopped tamping to allow the paper to dry longer. The damp conditions and porosity of the limestone meant the drying process would take more time than anticipated. Mosquitos flocked around me and the moistened paper, so to avoid the irritating insects I paced around the site for thirty minutes. When I came back to the rubbing set-up, the paper was opaque, and tamping was more successful. The paper tore in a couple deeply textural areas, so, I layered two more plies of paper, wetted, and delicately repeated tamping over the surface. Once the paper started to dry solid and flake off the rock, I poured a couple tablespoons of ink and picked up the second largest dabber. Before applying the dabber to the paper, I realized, I poured too much ink. This was a good lesson regarding the amount of ink needed to do the rubbings. Once

the dabber absorbed the ink, I started to dab the paper, first slowly, but quickly I increased the pace and I was encapsulated in a rhythmic motion moving across the paper, up-and-down, left-and-right. Visually, the texture appeared onto the page while dabbing the ink. Extracting the paper from the rock was satisfying, the same feeling as pulling a concrete casted from a securely sealed mold.

For the next three hours, I rubbed various fragments across the cliff face and the resting boulders. Conducting each rubbing made me more efficient in conducting the next, and I developed a firm base for future rubbing site visits. Engaging with the rocks through a tactile language (rubbing), I became aware of my surroundings multi-sensorially; auditorily, I would hear hissing coming from the cliff face, my skin sensitive to the microclimatic temperature changes, and through scent I could detect my proximity between the exposed rock versus the flora enveloped rocks and soil. At four in the afternoon, it started pouring heavy rain and I hastily packed all my tools and paper and sprinted away from the site. Reflecting on the rubbings in the dryness of my home that evening, most of the papers lost their three-dimensional castings and the two-dimensional ink translations blurred through the plies of paper. After today's experimentations with rubbing with the limestone, I was enthusiastic to plan my next day rubbing along the escarpment.



01	02
03	04
05	06

Day 02. A Multi-Maker Collaboration

A decently early start to the day appeared promising as I packed up my paper and tools in anticipation for a full day of rubbing. The morning air was cool, and my skin tingled from a strong breeze that crossed Georgian Bay. Typically, the drying duration takes thirty minutes to fifty minutes, so I was optimistic that the wind would aid in a generous assemblage of rubbings due to quicker drying times.

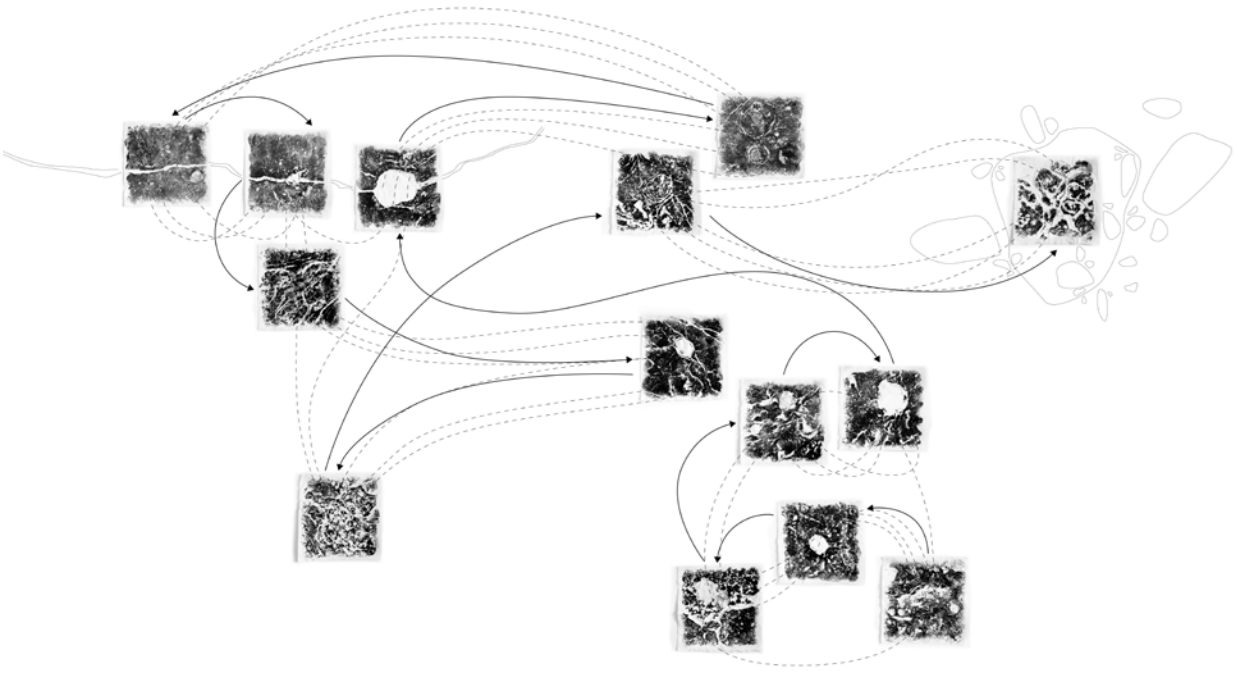
After my initial site hike along a tree-shaded pathway, I exited the trail along a break in the tree line towards the exposed rock. A majority of the site was covered in smooth fist-sized rocks, however, along the southside of the cove the cliff edge emerged. Large slabs of limestone extended out of the calm azure water. Entranced by the rising and falling water against the limestone slabs, I decided to focus my rubbing efforts on capturing the swirled engravings that have been eroded into the limestone from this natural process.

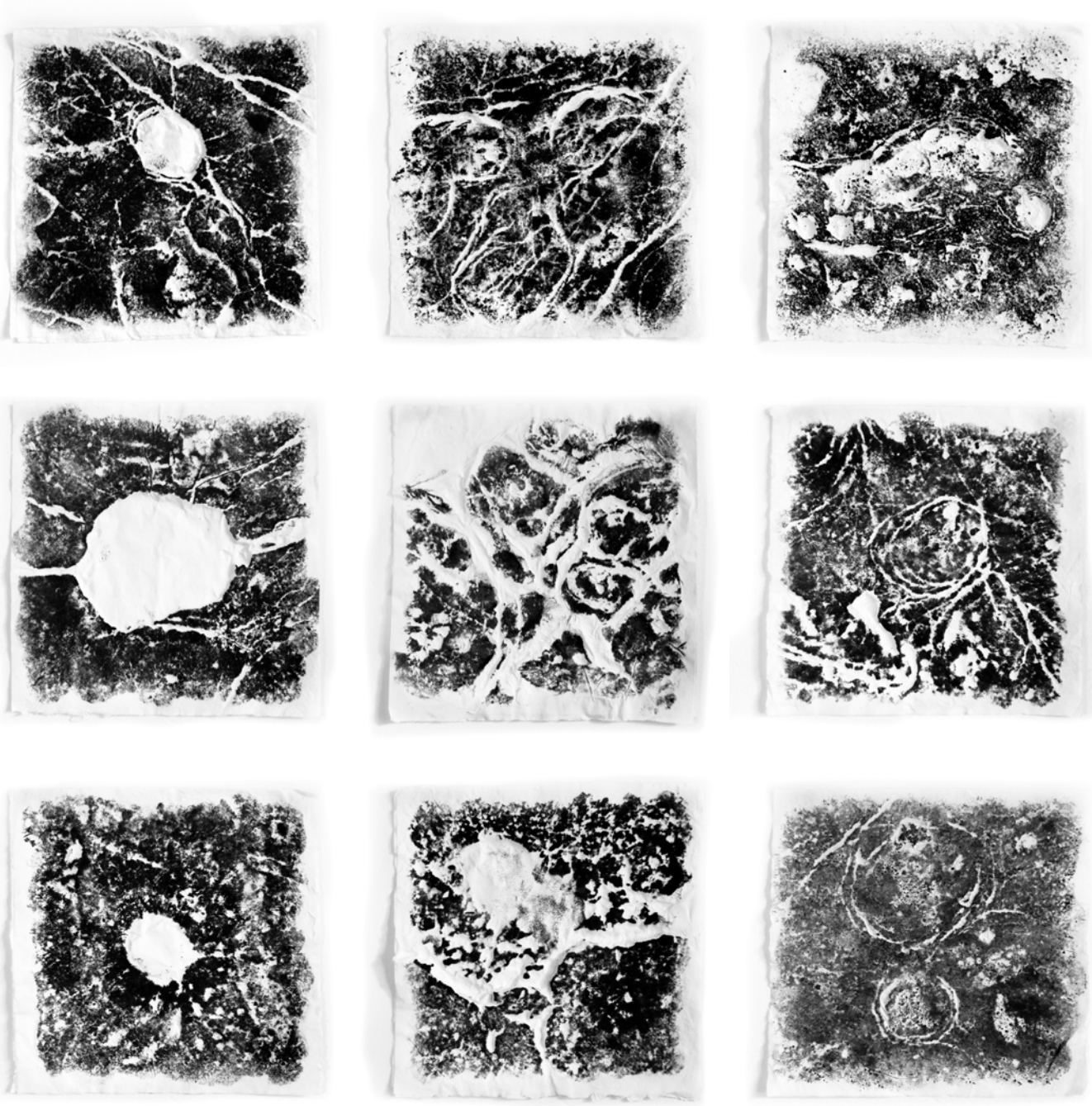
Figuring out how to do rubbings of the damp, water covered conical fractures impacted the majority of time I had that day. Walking further along the limestone slabs deemed promising as I encountered more conical fractures that were partially exposed and dry. I immediately sat down at this location to do the rubbings for the day. The bodily and material positions were contorted while conducting these rubbings; I was sat in the water in order due to the downwards angle of the limestone towards the water and I collected small pebbles to upright my materials and tools.

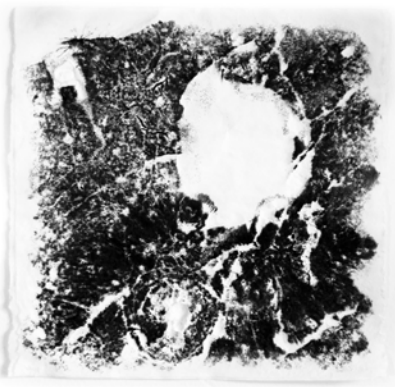
Fig. 4.4 Diagram of the movements between rubbings on day 02 capturing the physical and temporal relationships between the process.
Made by author.

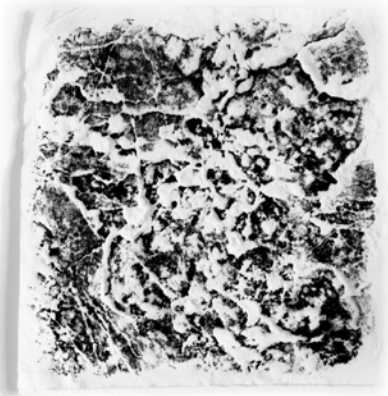
The wetting process was the simplest task during the rubbings as I was able to collect water from my immediate position (from the Georgian Bay). As hypothesized, the drying times were quicker than my previous outing, however, the rhythmic rising and falling water kept a steadily wet bottom edge of the paper. As I inked the paper, the bottom edge blurred and did not reflect the texture visually nor dimensionally.

For the duration of my encounter that day, I rubbed other formations along the water edge, exploring ways of incorporating the moving water as the wetting process. Rain clouds rolled over the cove, which was my signal to leave. Enthused by my decision to listen to the wind and sky; I left the site just as rain droplets started to envelope the rock in a blanket of water.









17	16	07	15	14
12	20	19	10	11
08	09	13	18	

Day 03. Situating Myself as Human Co-Maker

With the opportunity to spend three days on the Bruce Peninsula, I wanted to take advantage of the time to do as many rubbings as I was capable of.

With three rain-free days on the Bruce Peninsula to do rubbings, my first intention was to engage with the rock in a range of different environments. Secondly, I desired to experiment with the rubbing process to the greatest extent.

On the first day, the sky was vibrantly blue sectioned by streaks of white clouds. The exposure of the sun warmed the surface of the rocks, contrasting the cool air as a result of the proximity to the Georgian Bay. A flat bed of rock initially intrigued me; its openness felt as though it was an invitation to explore. For context, this bed of rock has been covered by the Georgian Bay for at least the last three years, however, due to the annual water levels being lower compared to years past this section of limestone was exposed.

I felt thankful that I was able to explore this section of limestone through rubbing. This opportunity felt precious, and I decided to spend three days rubbing this site. The formations that intrigued me initially were fist-sized circular, shallow indentations caused by movements of water and sediment, and breaks in the surface layer by large rocks and ice flows. Thin, long cracks emerged from some of these holes, shooting out like preserved streaks of lightning captured in the rock.

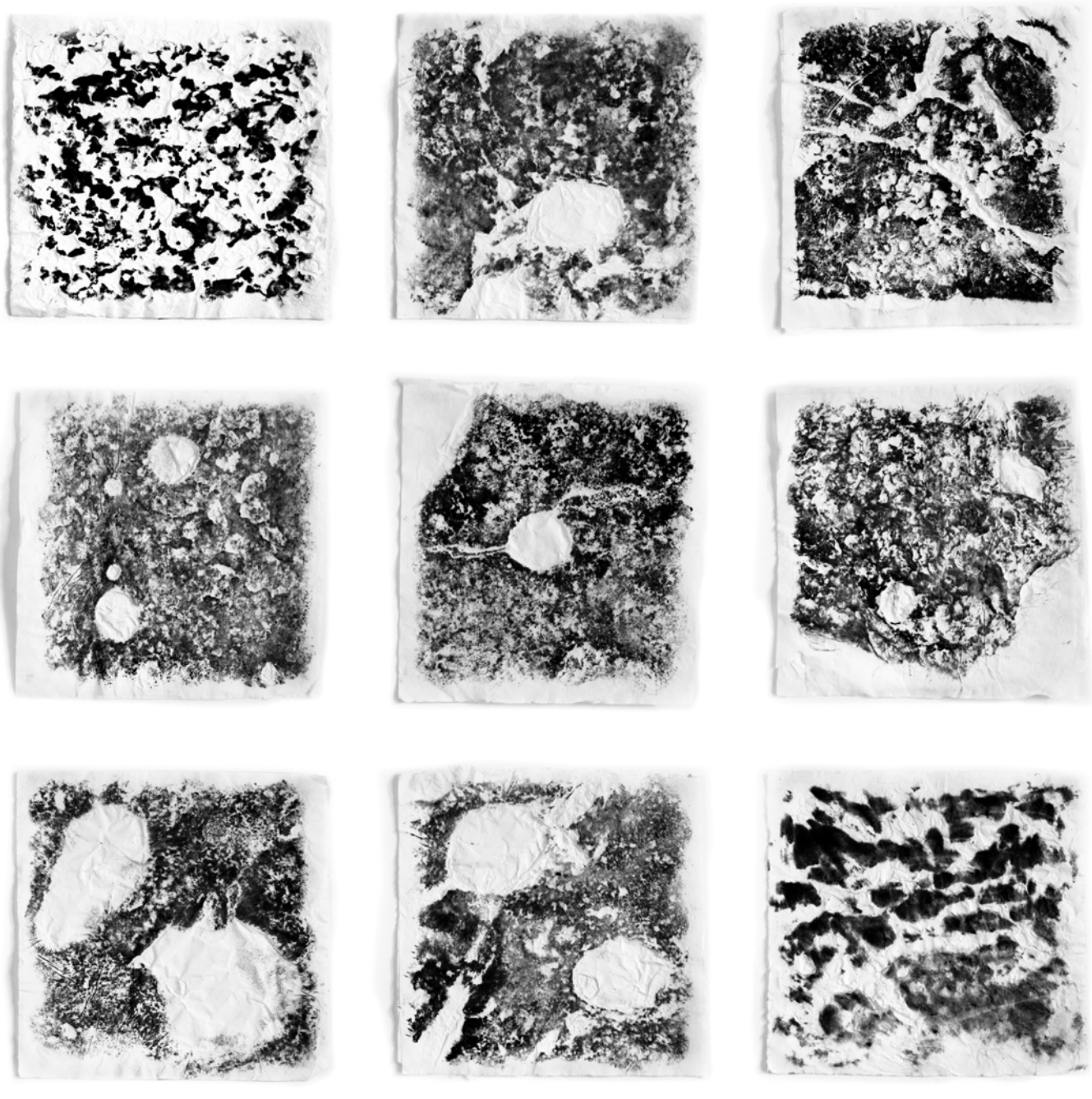
Since my rubbing efforts were focused on the ground plane, I gathered smaller rocks to assist holding down the paper to

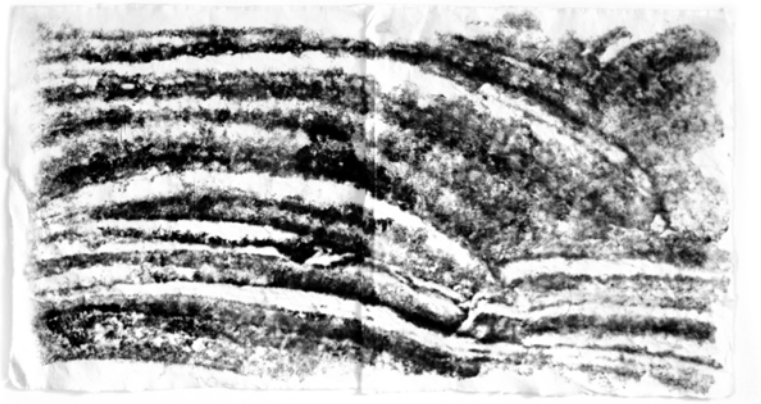
Fig. 4.5 Photograph of a tamped sheet of paper air drying before inking on site by the author.

Fig. 4.6 Photograph of two inked rubbings air drying before inking on site by the author.
Made by author.

frame the areas where I chose to rub. The rock formation selections were chosen spontaneously guided by unconscious wandering and the rock itself. Due to the dry conditions the rubbing process was quick and smooth. I was able to move between multiple rubbings in a rhythmic dance across the flat limestone bed.

Having started early in the morning around eight o'clock in the morning, I ended the rubbings for the day around four in the afternoon. I arrayed all the rubbings inside during the evening to reflect on each aspect of the rock and each story within the geometries of the rubbings.





29	22	27	31a	31b
21	25	28	26	
23	24	30		

Day 04. Explorative Inquiry

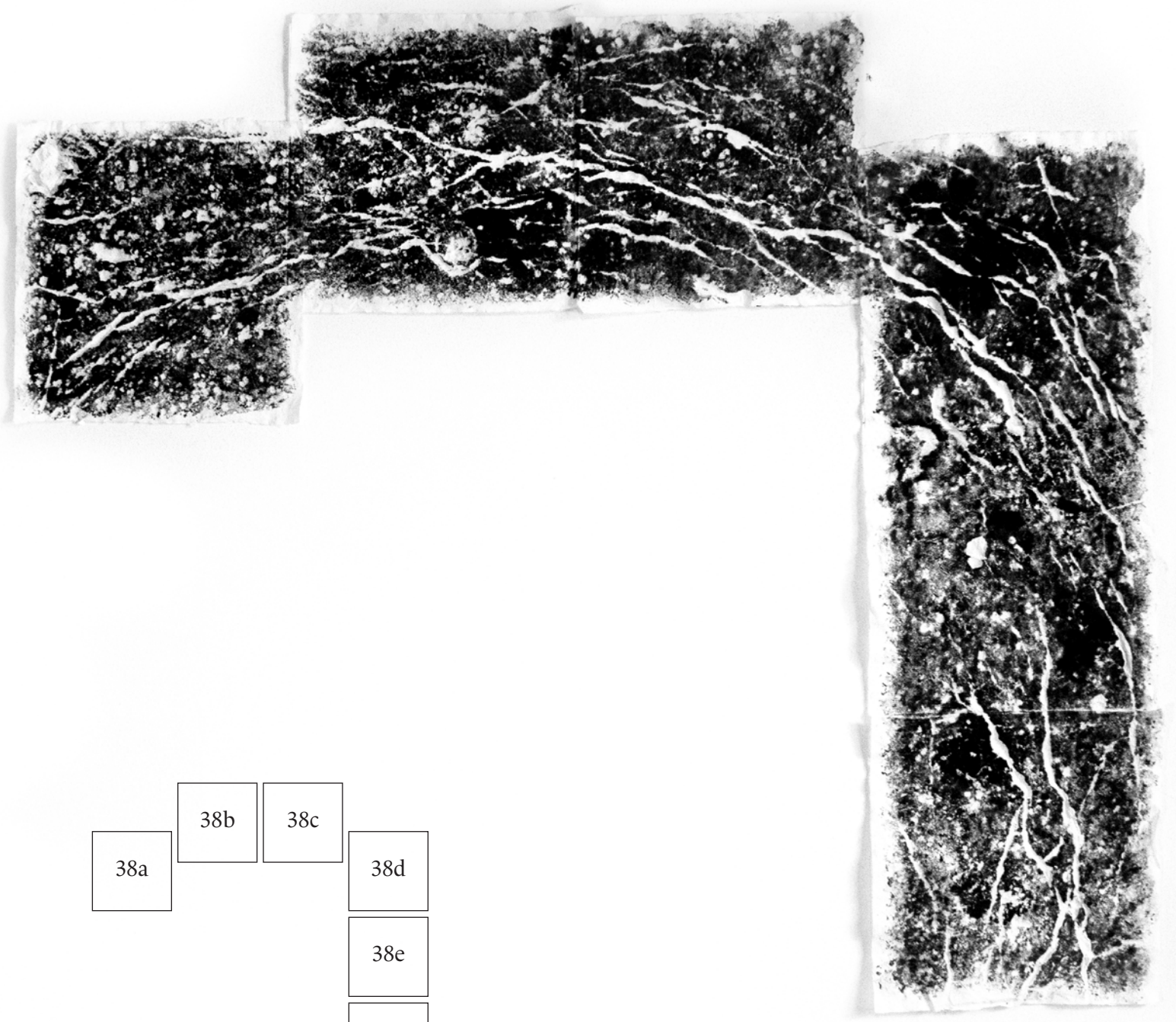
Excited by the day previous, I decided to continue rubbing along the exposed area as yesterday with the intention of capturing vertical sections of limestone. How does the water in all its forms affect the structure and shape of the rock?

A short, half-meter vertical division frames the bay and expresses the boundary of vegetation along the top section of rock. Captured within this aspect are varying densities of layered rock textures, which became my focal point for the day. Comparing the faces of the boulders to the cliff-face, I drew some similarities in their textures and erosion.

Rubbing vertical sections are initially more difficult than the horizontal rubbings as the paper does not lay flat against the rock until adhered by the wetting process. The rock assists in laying the paper as I am able to strategically use the textured areas to grasp onto the paper and hold it in place. Once the paper is tamped onto the vertical section, it becomes a second skin, or shell, that hugs the rock until I, or the wind, delicately relieves it from the surface. In this sense, the rubbing process felt more like traditional wet casting compared rubbing shallow horizontal sections.

Fig. 4.7 Photograph of three inked rubbings air drying before inking on site by the author.
Made by author.

While exploring the edge, I was increasingly more intrigued by the vegetation growing on the tops of the rock. Inspecting different areas of growth, I noticed that a lot of the moss and soil was inhabiting small, deep holes in the rock that looked like a large sponge. In order not to disturb the flora, neighbouring rocks with the similar sponge-like formation presented themselves as suitable to rub. Rubbing this textural area was the most difficult as the topology caused the wetted paper to tear during the tamping process in the deep concentrated cluster of holes. Additional plies of rice paper and a more delicate tamping process were adjusted for capturing this area of rubbings.



38a 38b 38c 38d 38e 38f

34	33
36	35
37	32

Day 05. Identifying Commonalities

Today, on the Bruce Peninsula I wanted to take the opportunity to capture more exposed sections of rock that I had on my first day along the flat bed of limestone. The sky was no longer the same vibrancy as it was prior, and the wind appeared to have picked up speed. The water splashed violently against the rock as the waves grew larger throughout the morning.

With a short window of time to conduct some rubbings, I focused my efforts on two sections; vertical boulder faces and shallow details in the horizontal surface near the edge of the water. As I had experience rubbing in both areas, I was able to smoothly engage in six rubbings in a timely manner. The rushing wind aided in the drying process; however, it was hard to focus on a rhythmic pattern of movement because of the loud waves.

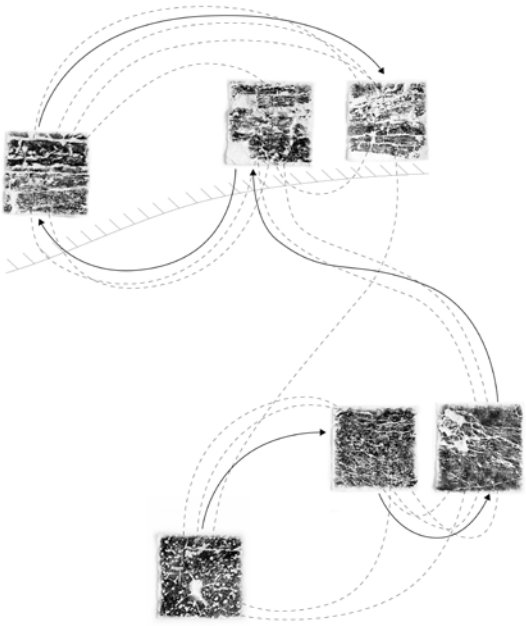
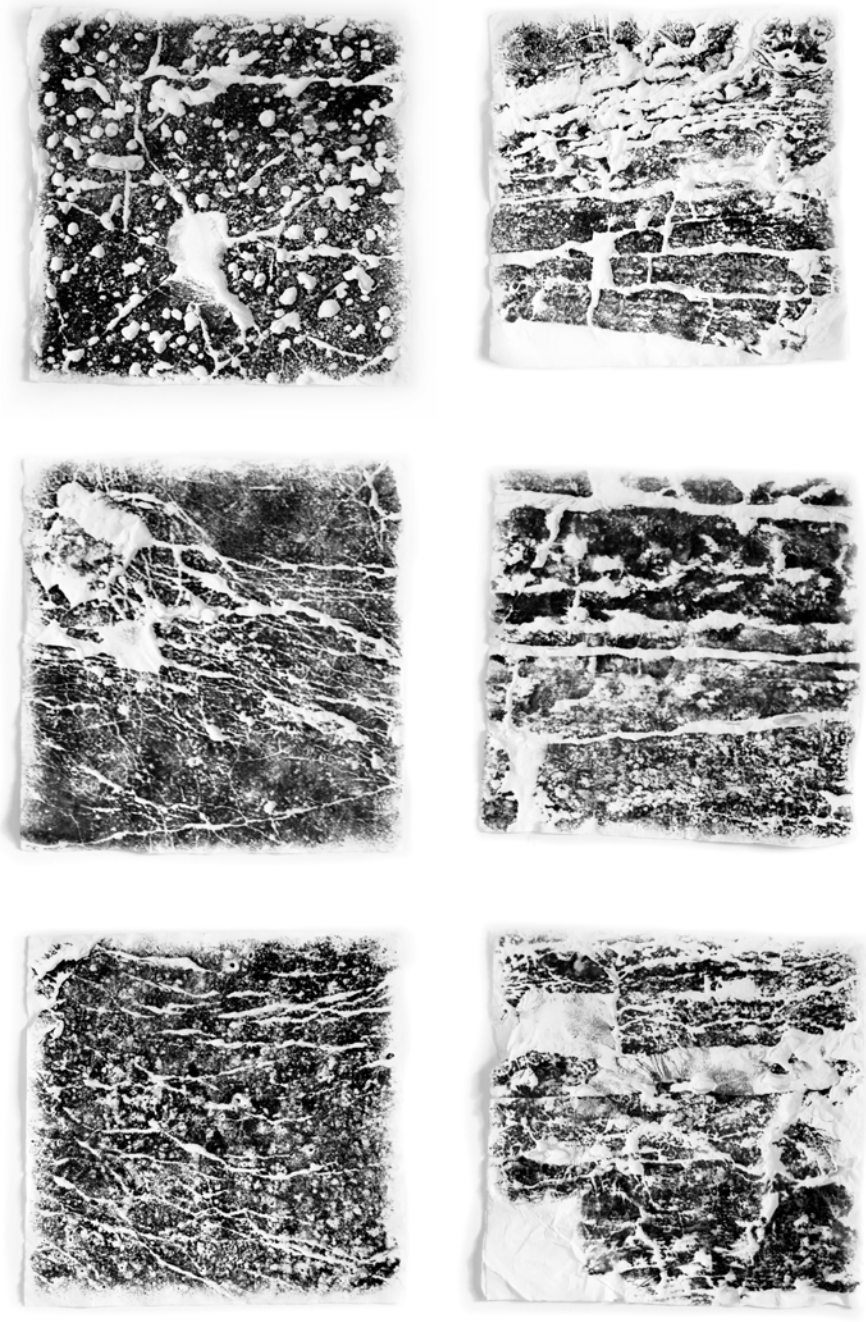
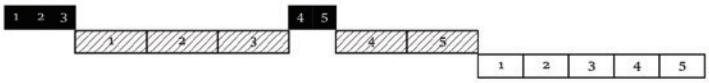


Fig. 4.8 Diagram of the movements between rubbings on day 05 capturing the physical and temporal relationships between the process.
Made by author.

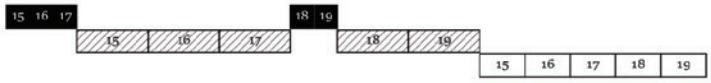


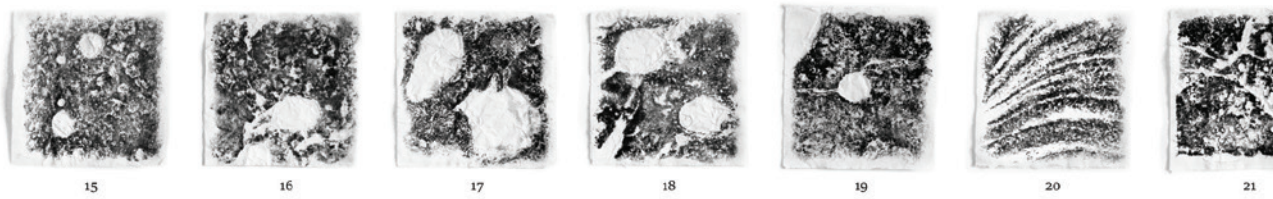
39	44
41	43
40	42

Day 02

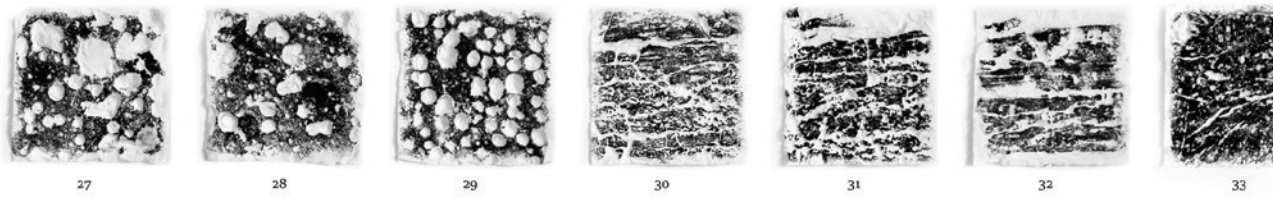


Day 03

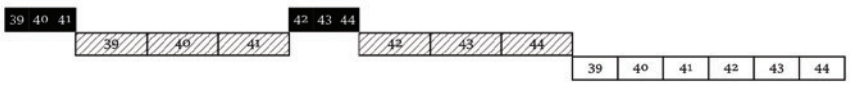


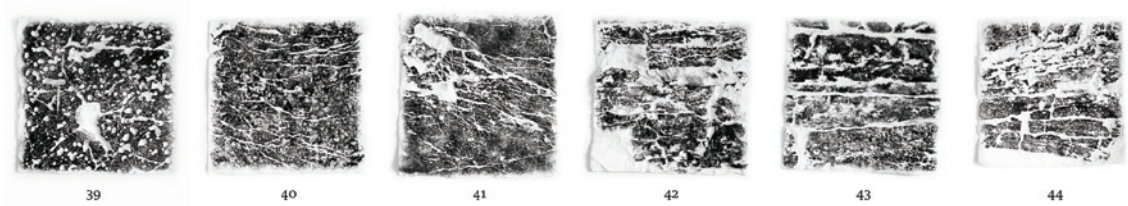


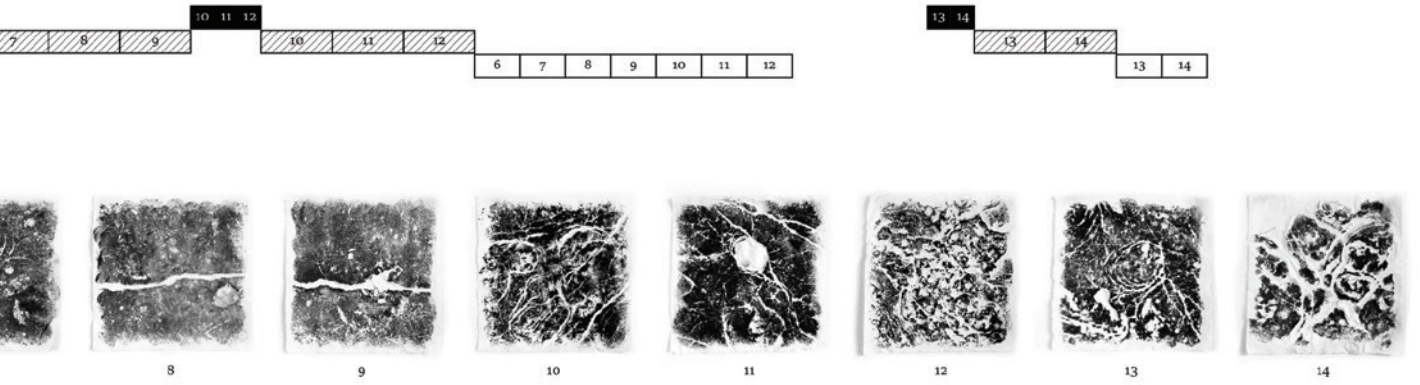
Day 04

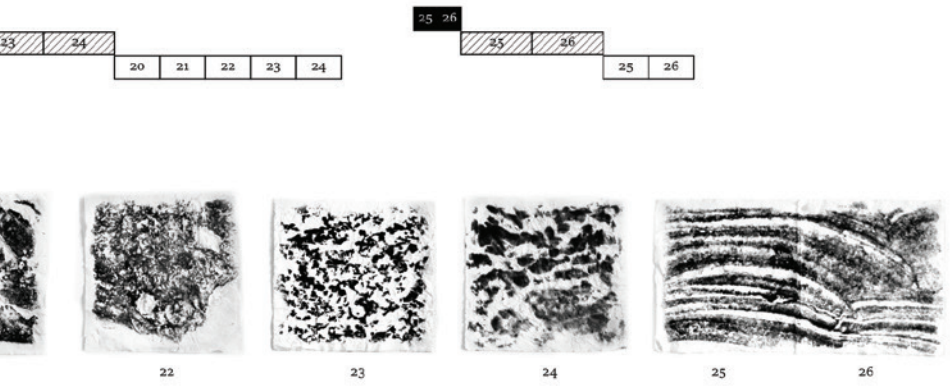


Day 05









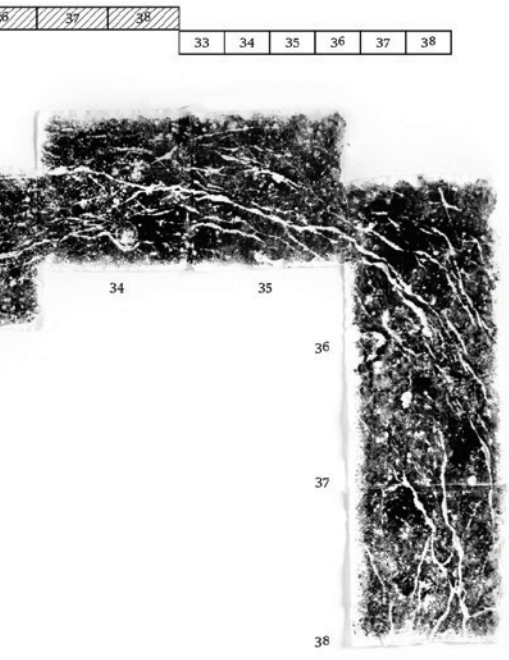


Fig. 4.9 Diagram of the timeline of the rubbing process. Made by author.

Afterthoughts

As I reflect on the days engaged in the rubbing process, I recognize water as an unanticipated co-maker and collaborator. Over various time scales, water introduced itself to the collaboration forefront as an obvious force of nature. During the rubbing process, water presented itself as an initiator, saturating the paper to cast the topography of the textural rock in preparation of tamping then inking. During a reflection period, I identified commonalities across the different rubbing exercises by categorizing them based on the type of fractures and forms. The physical aspects in the rock express the temporal erosion of the converging matter between rock and water. Distant time scales presented themselves in linear fractures within the rock, as well as, through the potholes of various depths. On a shorter and technical time scale, the passage of rain affected the moisture of the paper fibers and drying duration as the permeable rock absorbed the rainwater. By conducting the rubbings through the lens of an observer, I let the intimacy of the direct contact with the rock inform my decisions responsively in an active assemblage. The vibrancy of all the agents within the rubbing process created a space for an ecological dialogue to exist within the rubbings. The rock forms translated material knowledge through a lived experience by all the collaborators through a material-cultural study.

05 Conclusion

"If fossils are the three-dimensional, physical memories of the mind of evolution, then living fossils are both memory and resurrection. There is poetry here. Since the Muses are the daughters of memory, limestone must be soaked with inspiration."

Christopher Dewdney, The Soul of the World, 163

How can the study of building materials through a non-standard method of inquiry affect the way we design and engage with these materials in all facets? This thesis began with the desire to reconcile the human-material relationship within society and connect with a building material, stone, beyond the built environment. In response to the development of human history founded on practices of extraction this research takes a moment to reflect on past material exploitation to remedy the relationships with matter we interact with outside of consumptive practices. By engaging with the material of stone at the scale of the human hand, I develop a multisensorial relationship with the material through the practice of rubbing. The rubbings I conducted over the last year were direct translations of my intimate encounters with the material of stone, where the scale of my hand converged with the temporal scale of the stone's past and present conditions.

The approach to rubbing as inquiry is directed by my personal encounters within the socio-political urban and natural fragments along the landscape of the Niagara Escarpment. By framing the aspects of the escarpment at the scale of the hand through a non-standard method of inquiry, I reposition the attitude towards materiality away from a capitalist lens and towards an intimate multi-sensorial viewpoint. My intention of the material research is to understand the material in its "natural environment" in order to develop a stronger understanding in how the material can be experienced in the built environment. However, during the process of rubbing I began to understand that by differentiating the space of existence as "natural" and built" I ignorantly misinterpreted the material world as divided

rather than evolving. In the essay, "Clearing the Ground" Robert Ingold argues that, "the source of the problem lies, once again, in the slippage from materials to materiality. It is this that leads us to suppose that human beings, as they go in and out of doors, live alternatively on the inside and on the outside of a material world".[1] Defining this distinction within the experimentative process of rubbing provides me with the lens to identify multispecies relations that I would not have considered otherwise.

1. Robert Ingold, Being Alive: Essays on Movement, Knowledge and Description (Routledge, 2011), 29

An overwhelming aspect of the rubbing process addresses the actions of agency and consciousness stimulated through the experiments with rubbing. Integrated within the qualitative aspects of the rubbings, multi-species collaborators embed their knowledge directly into the ink and paper. The act of noticing through intimate connections during the rubbing process allows for a slowness to be introduced into analysis and design. Therefore, through the exploration of applying rubbings the potential for this method of inquiry within architectural research can encourage a multispecies and multisensorial architectural attitude.

While the practice of rubbing is explored from a viewpoint of an ecological lens, the practice has the potential to evolve into a physical practice of ecologically based pedagogy. Each rubbing approaches an intuitive nature within the process guided by the participatory conditions that the rubbing platform contributes. The presence of emerging ecologies identify themselves through the interactions between the various agents of transformation that engage within the rubbing practice. Each rubbing is unique

and captures a singular instance that considers the onsite exchanges between species, organic matter, climate, and time. The exposure gained through each rubbing is an opportunity to learn directly from the material through intimate interaction. Approaching rubbing as an environmentally intimate practice develops a foundation that can inform the way we design with natural materials beyond a structural and functional level. The rubbing practice and resultant imagery can provide insight into an alternative way to design with materials, and in this case stone, affectively.

As supplementary to our representational methods of materials and space, rubbing provides a platform for focusing on textural depiction. The textural qualities of rubbings inform the way in which the material is used to express a space affectively through the three-dimensional qualities of the drawing. Rubbing drawings can aid architectural representation by sharing the effects of time on a material through the capturing of physical occurrences within the rubbed imagery. The study of materials through this drawing method connects the built and non-built environments through a common lens and uses the scale of the hand as a reference point between diversely scaled spaces.

In conclusion, this thesis explores the concept of using a multisensorial method of investigation to conduct qualitative material research by casting in paper and ink. This work subverts the capitalist gaze that encircles modern human-material relationships by engaging in a slow practice that focuses on human scale sensations and environmentally intimate exchanges. The history of rubbing practices provides a

solid foundation for the technical framework of the ecological rubbings developed within this thesis work. Through the act of rubbing material histories and human intuition coalesce to inform a method to engage in environmentally intimate encounters.

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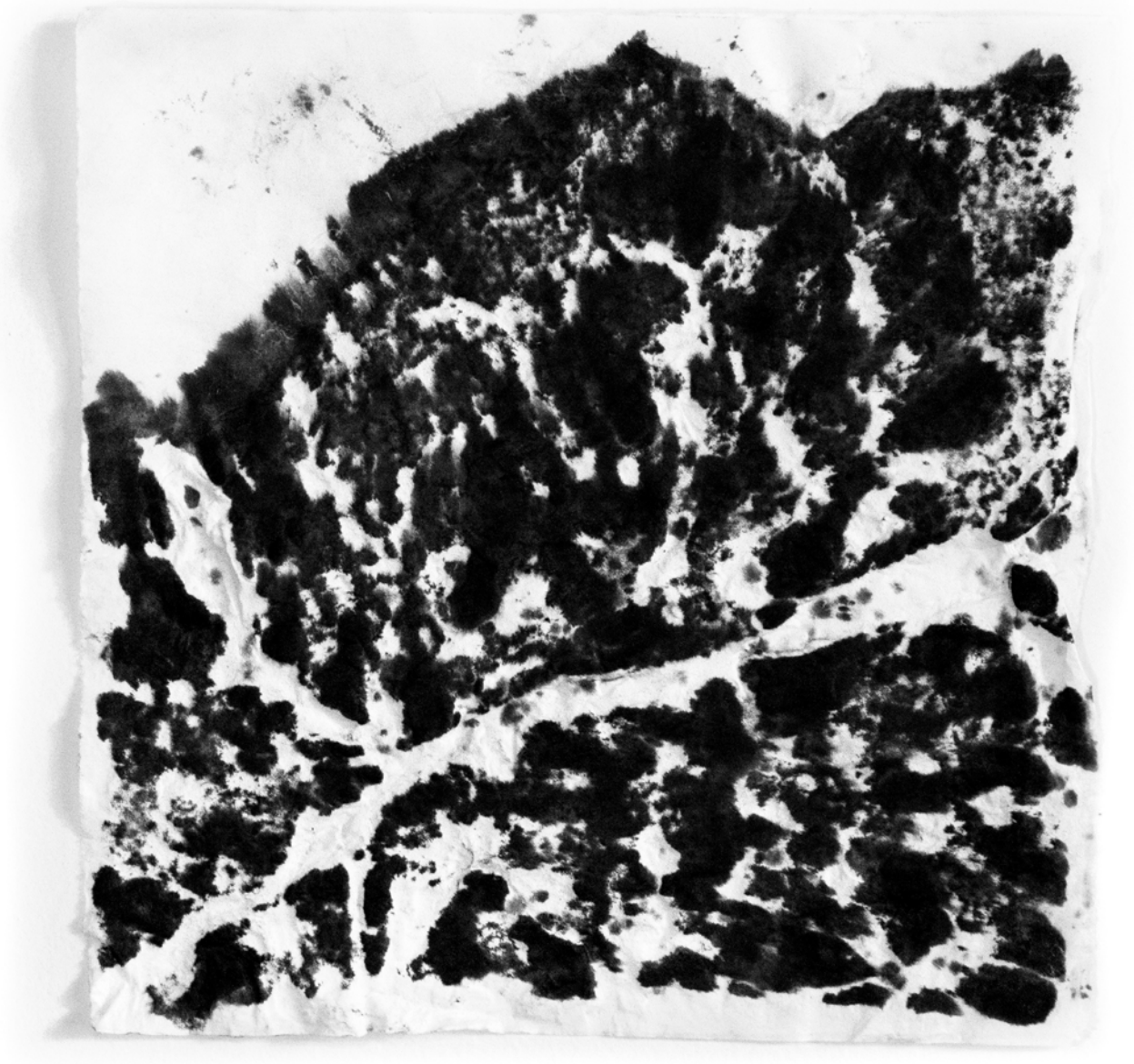
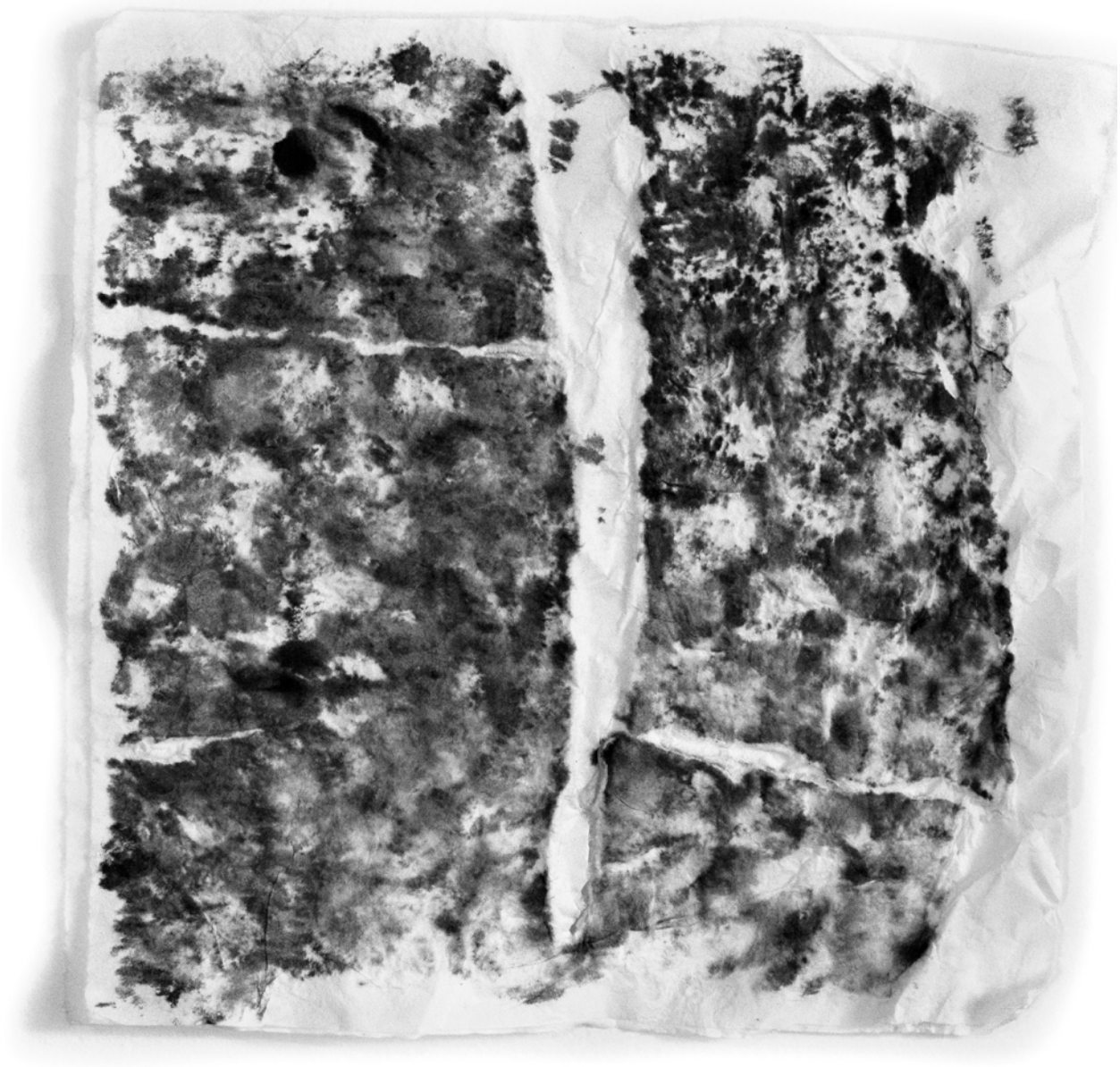
Appendix: Rubbing Images

As documented in the chapter section, ***A Compendium of Rubbings: A Series of Textural Translations,*** the rubbings are physical topographical translations composed onto square rice paper sheets. Through the act of rubbing the resultant images are interpreted three-dimensionally and visually through the embossing and inking process. Here, in the appendix, the physical rubbings are presented at half scale* to express the details that are not visible in Chapter 04.

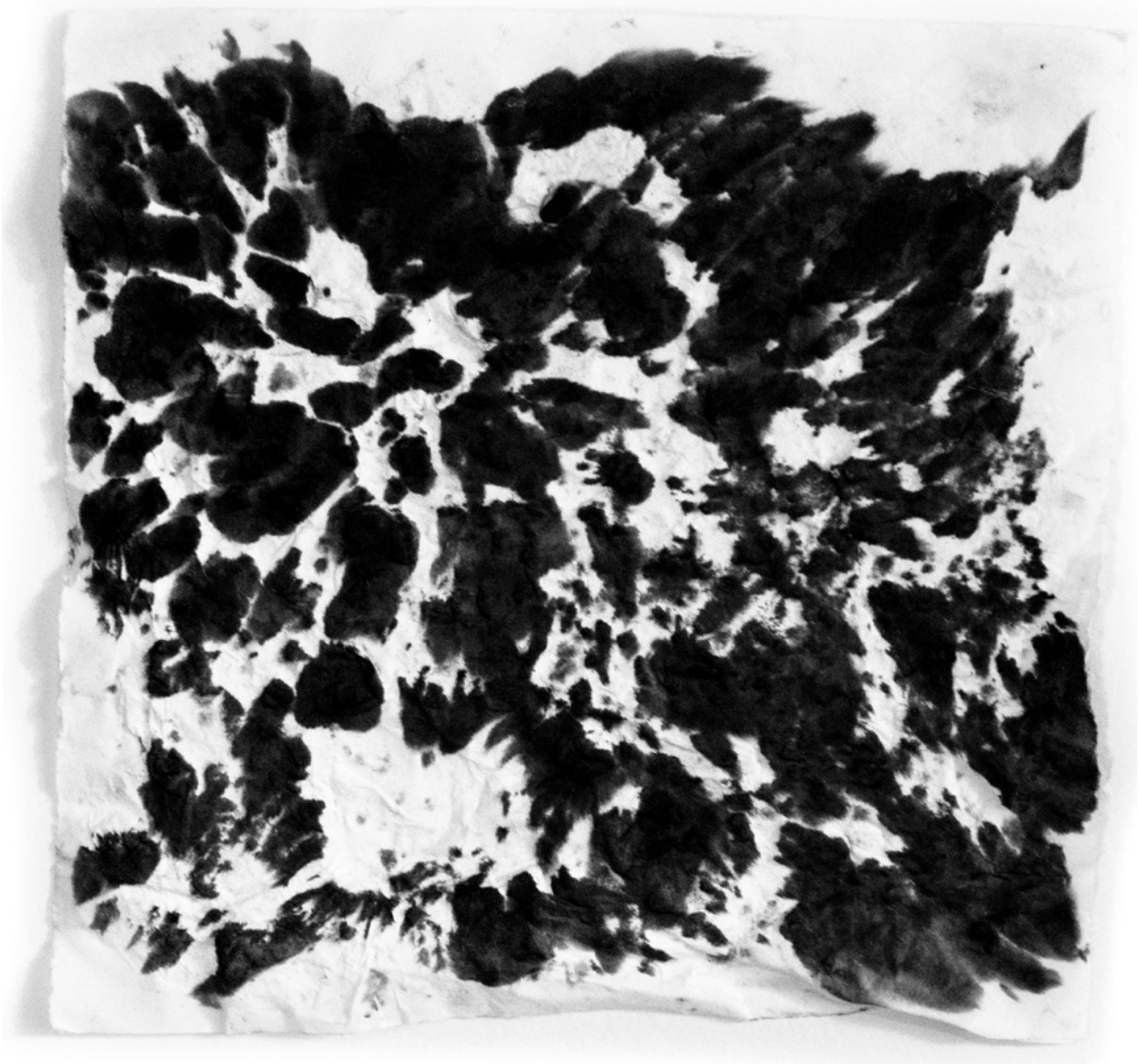
*Rubbing 31a-b and 38a-f are presented at smaller scales.



Rubbing 01: Kelso Boulder Edge, ink on paper, made by author, 11 June 2022



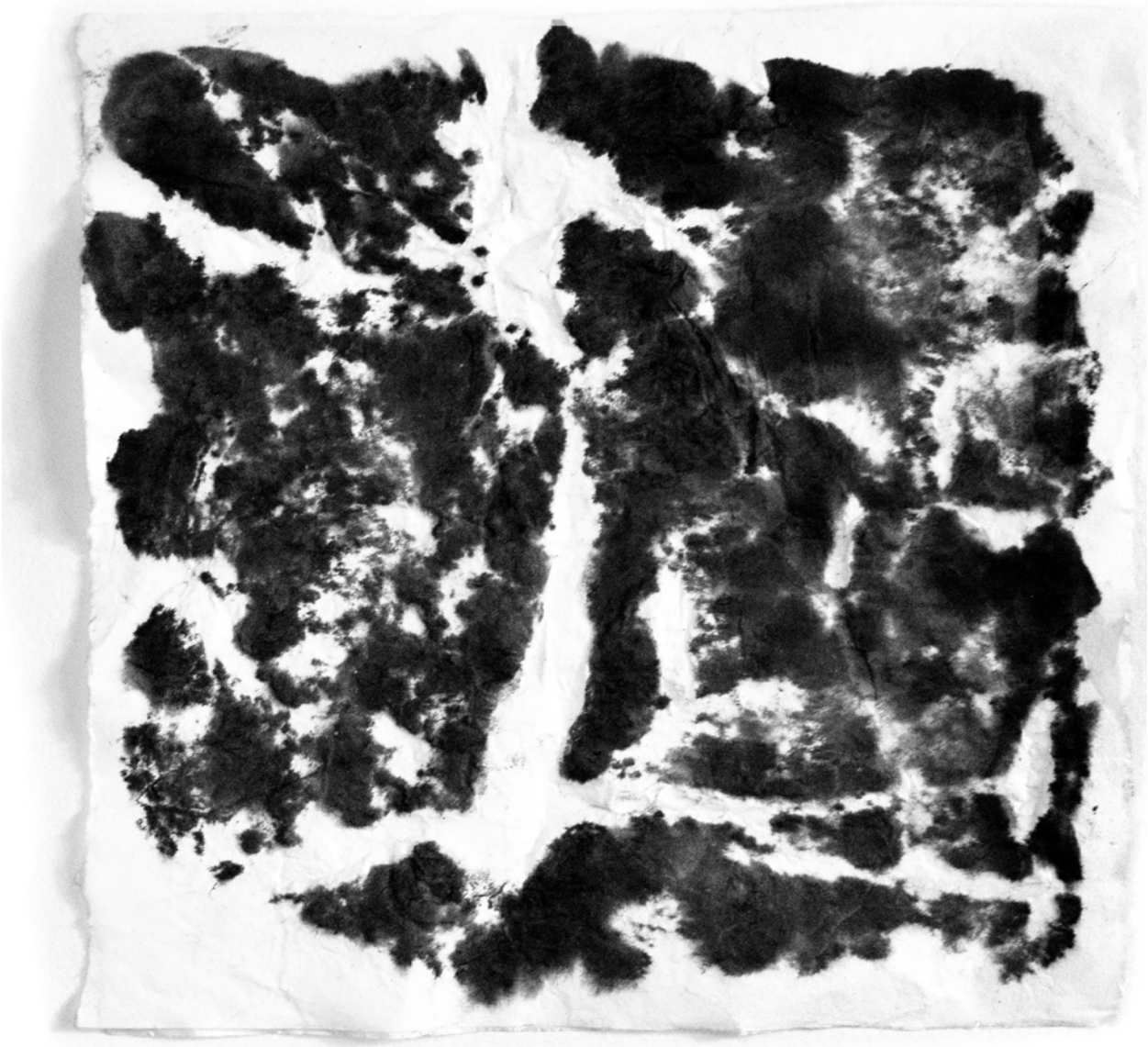
Rubbing 02: Kelso Cliff Face,
ink on paper, made by author,
11 June 2022



Rubbing 03: Kelso Boulder Face, ink on paper, made by author, 11 June 2022

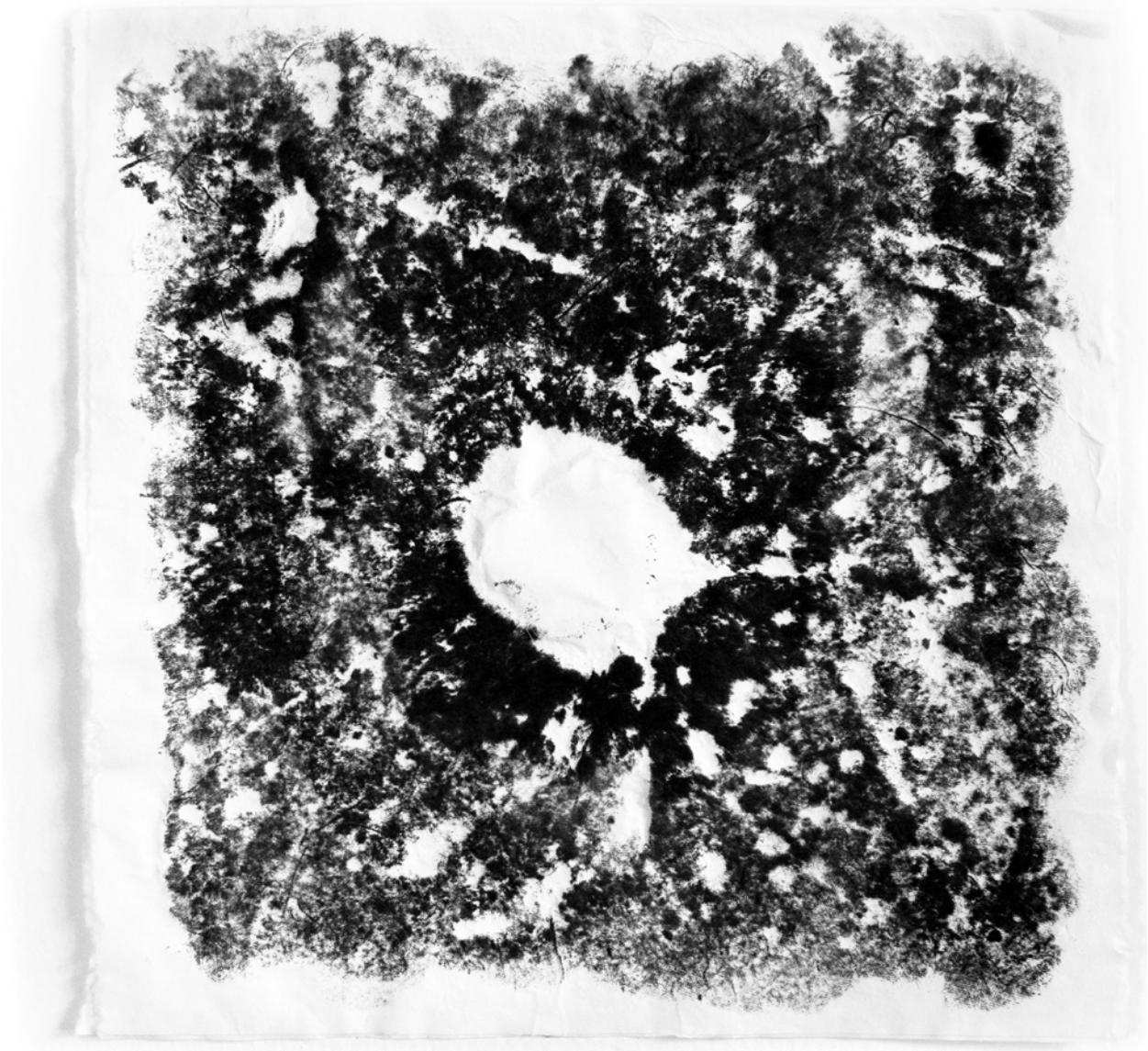
Rubbing 04: Kelso Cliff Face Base, ink on paper, made by author, 11 June 2022

Rubbing 05: Kelso Boulder Face, ink on paper, made by author, 11 June 2022



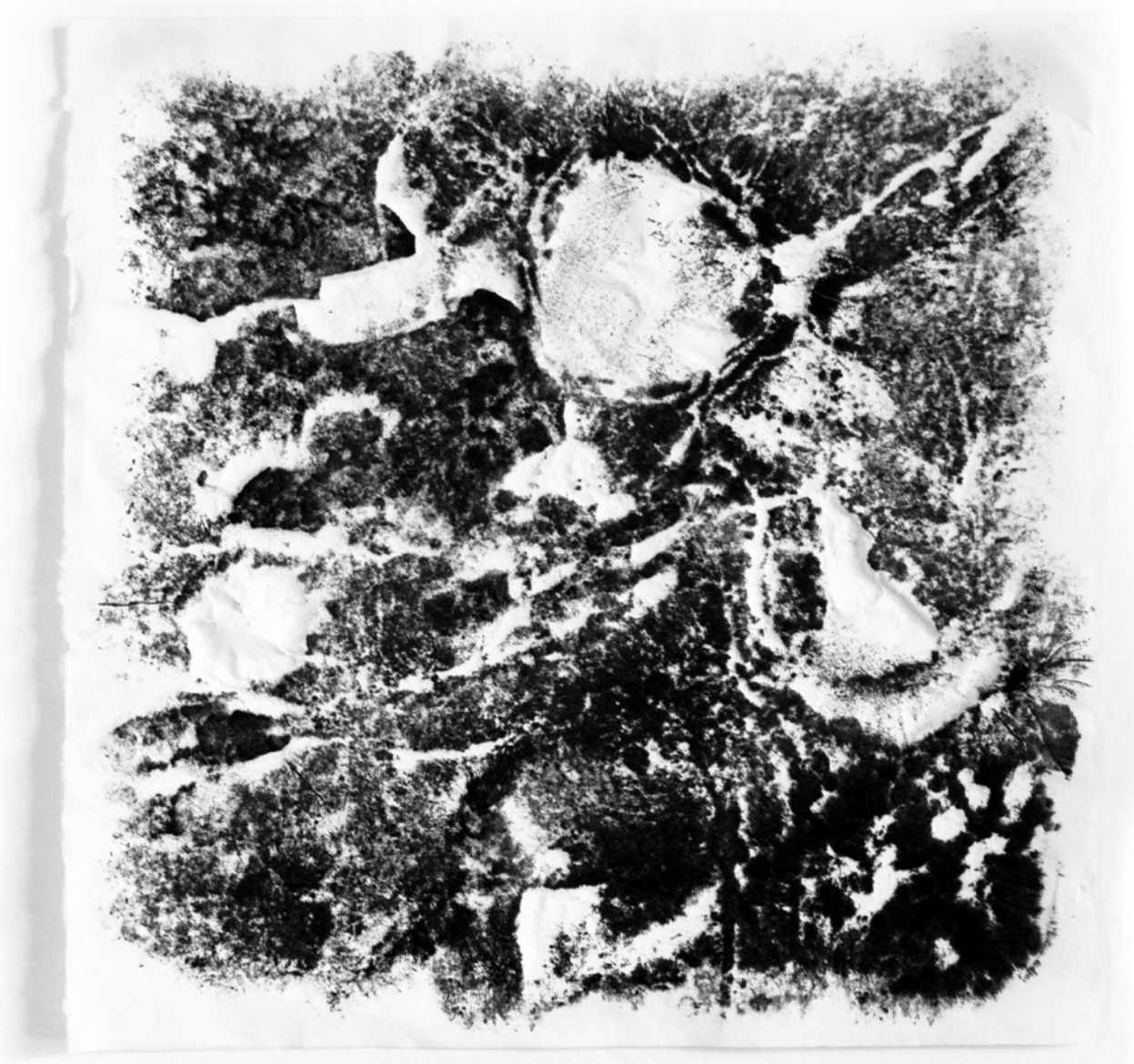
Rubbing 06: Kelso Cliff Face Base, ink on paper, made by author, 11 June 2022

Rubbing 07: Bruce Peninsula
Lake Erosion, ink on paper,
made by author,
27 June 2022

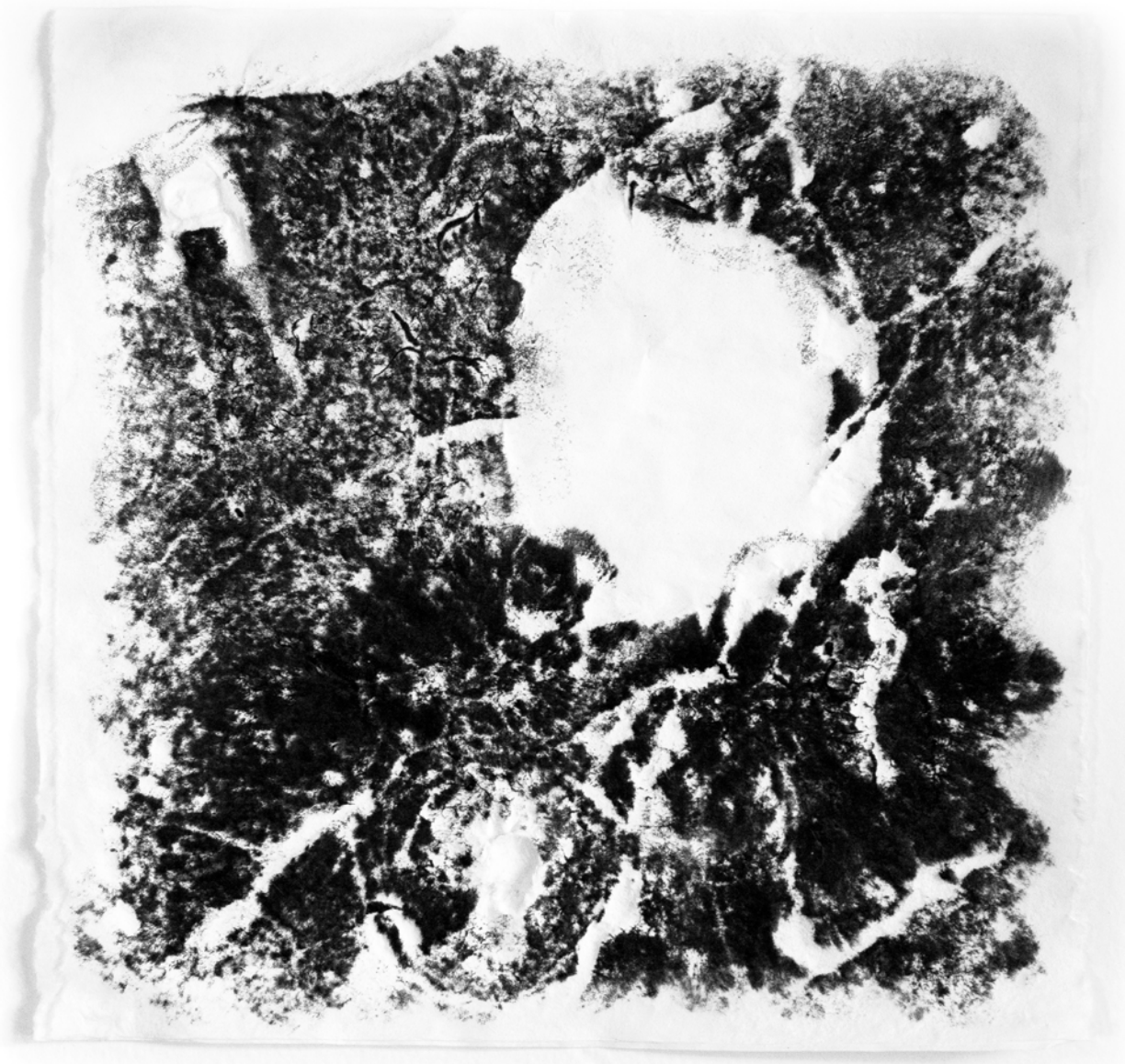


Rubbing 08: Bruce Peninsula Lake Erosion Pothole, ink on paper, made by author, 27 June 2022

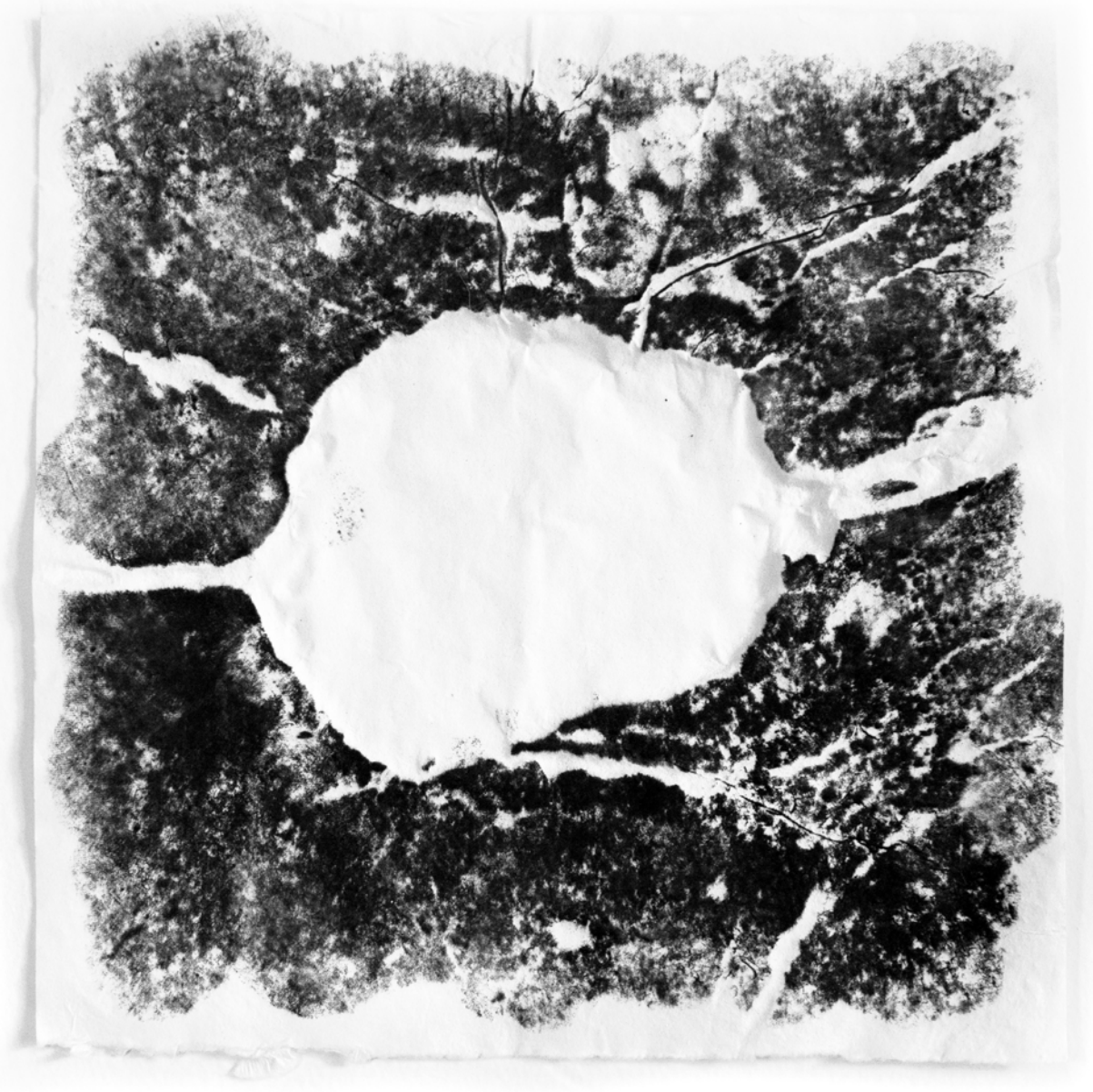
Rubbing 09: Bruce Peninsula
Lake Erosion, ink on paper,
made by author,
27 June 2022



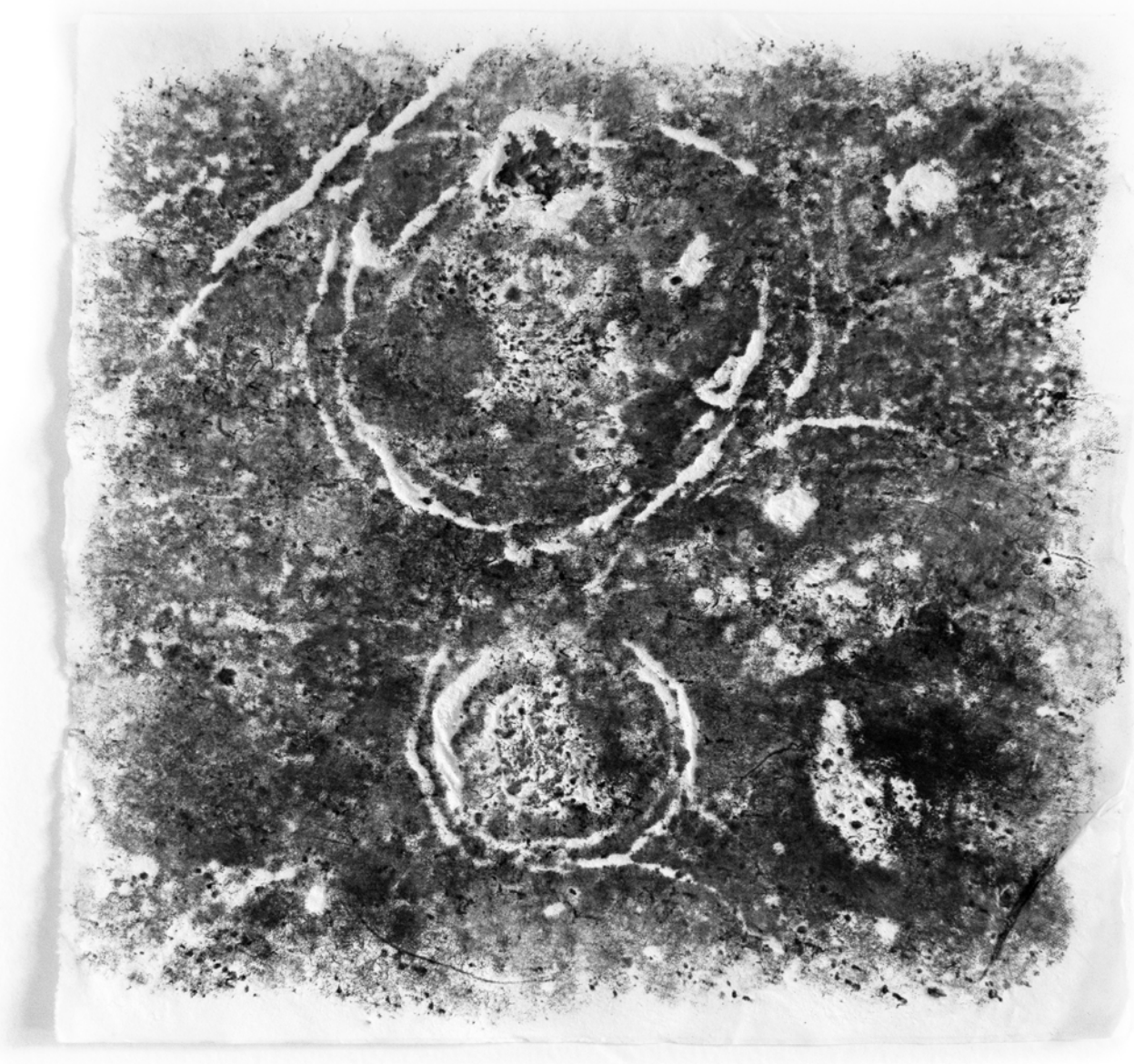
Rubbing 10: Bruce Peninsula Lake Erosion, ink on paper, made by author, 27 June 2022



Rubbing 11: Bruce Peninsula Lake Erosion Pothole, ink on paper, made by author, 27 June 2022



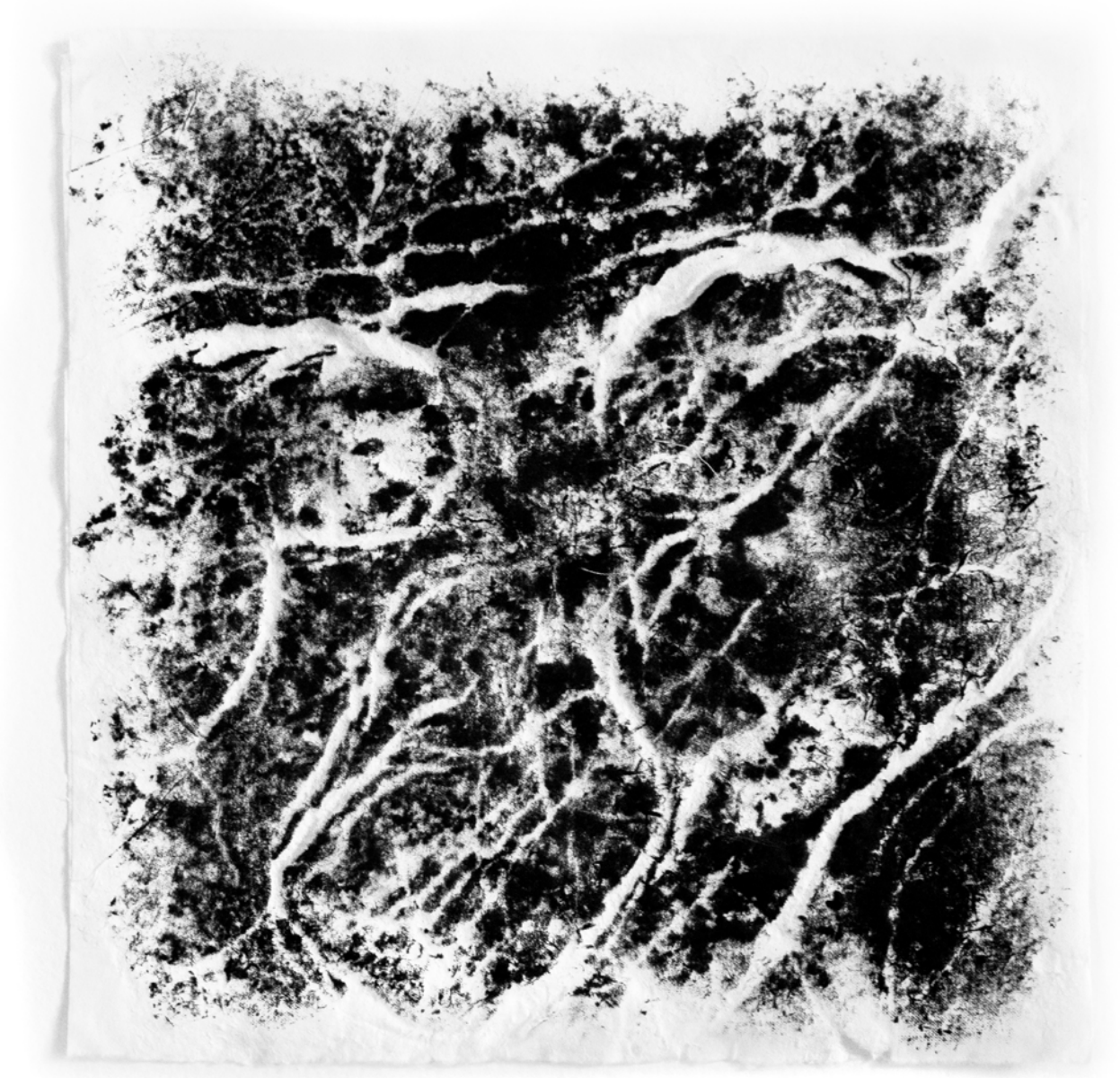
Rubbing 12: Bruce Peninsula Lake Erosion Pothole, ink on paper, made by author, 27 June 2022



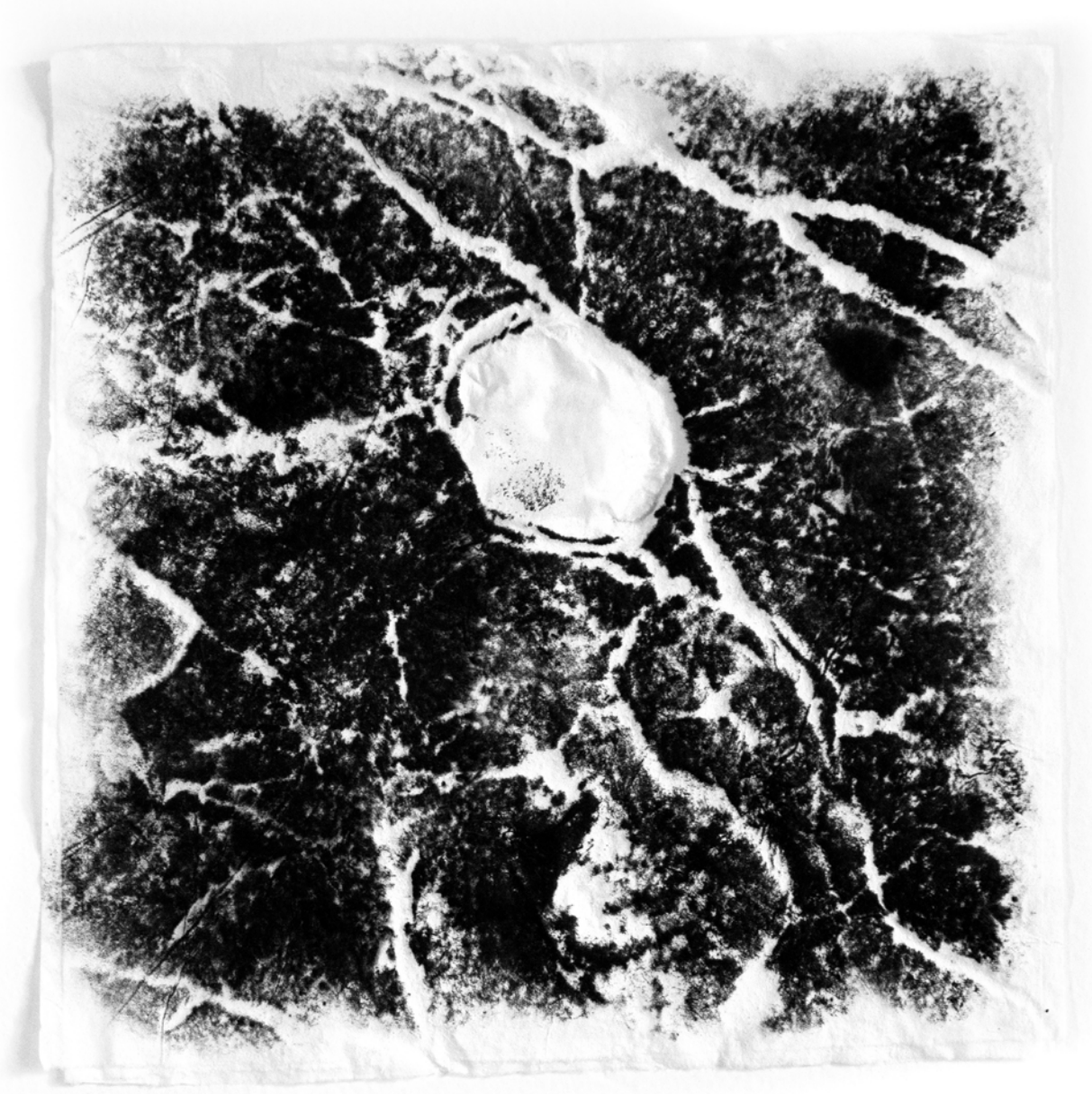
Rubbing 13: Bruce Peninsula Lake Erosion Swirls, ink on paper, made by author, 27 June 2022

Rubbing 14: Bruce Peninsula Lake Erosion Linear, ink on paper, made by author, 27 June 2022

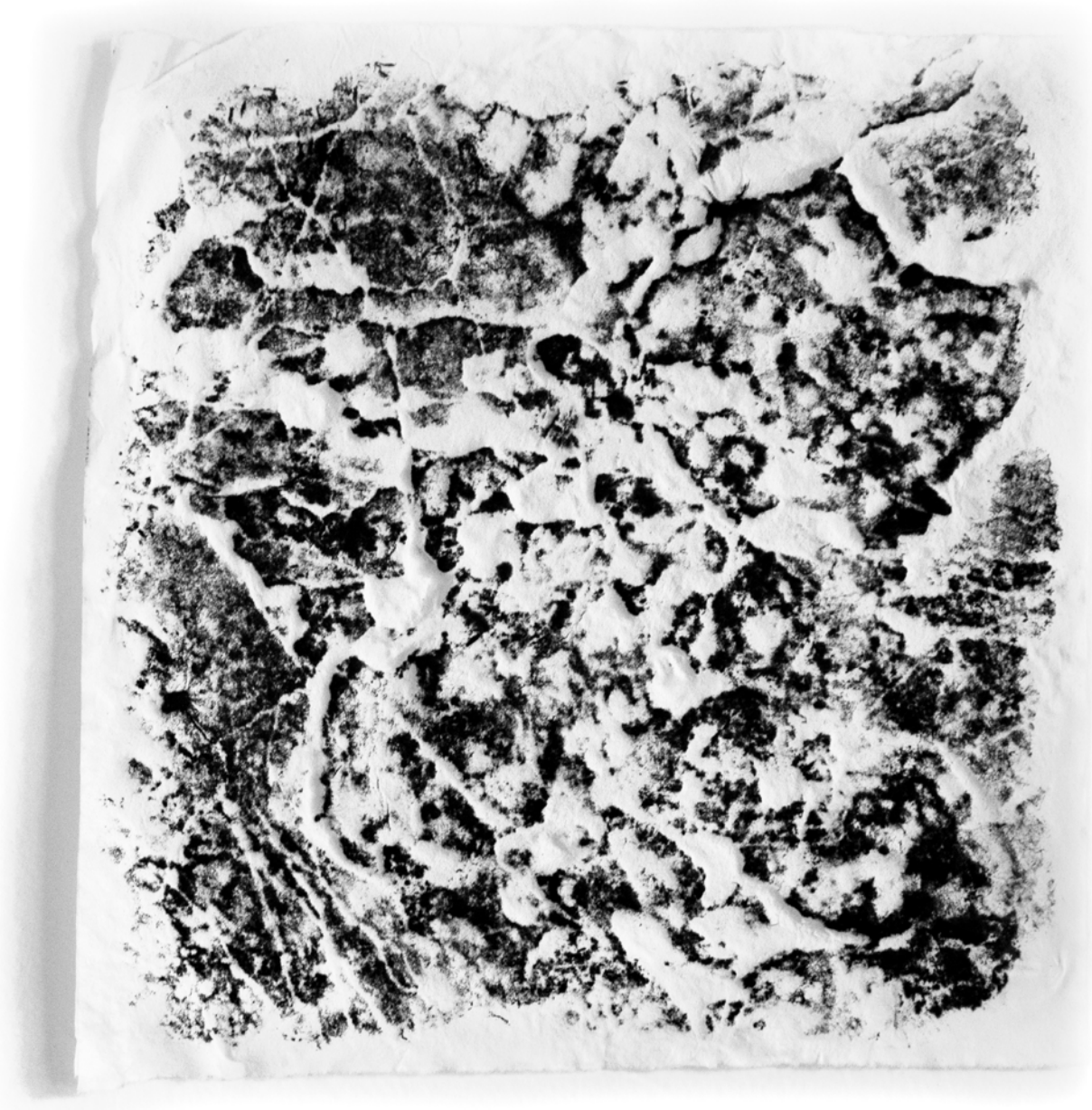
Rubbing 15: Bruce Peninsula Lake Erosion Linear, ink on paper, made by author, 27 June 2022



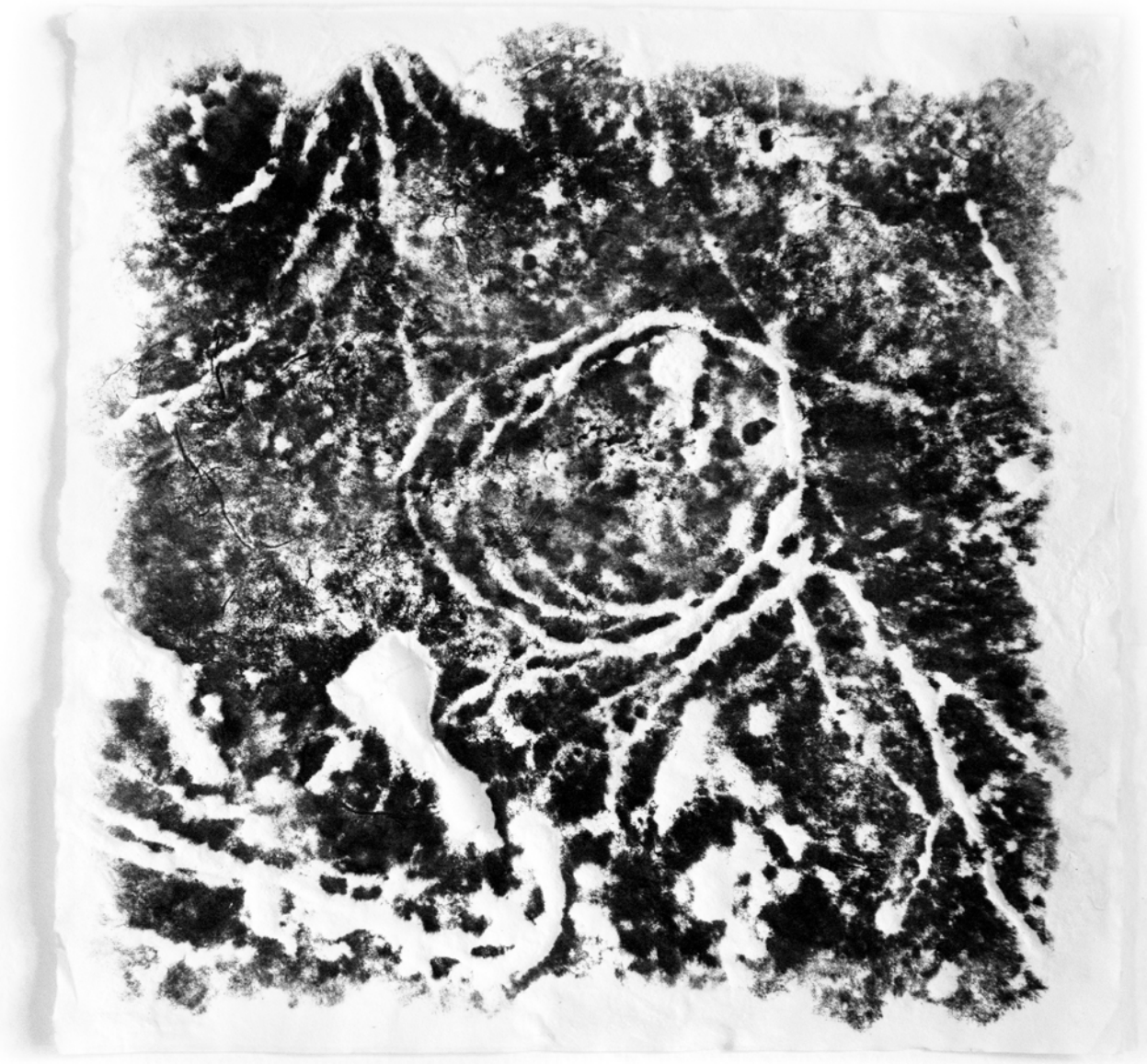
Rubbing 16: Bruce Peninsula Lake Erosion Swirls, ink on paper, made by author, 27 June 2022



Rubbing 17: Bruce Peninsula Lake Erosion Pothole, ink on paper, made by author, 27 June 2022



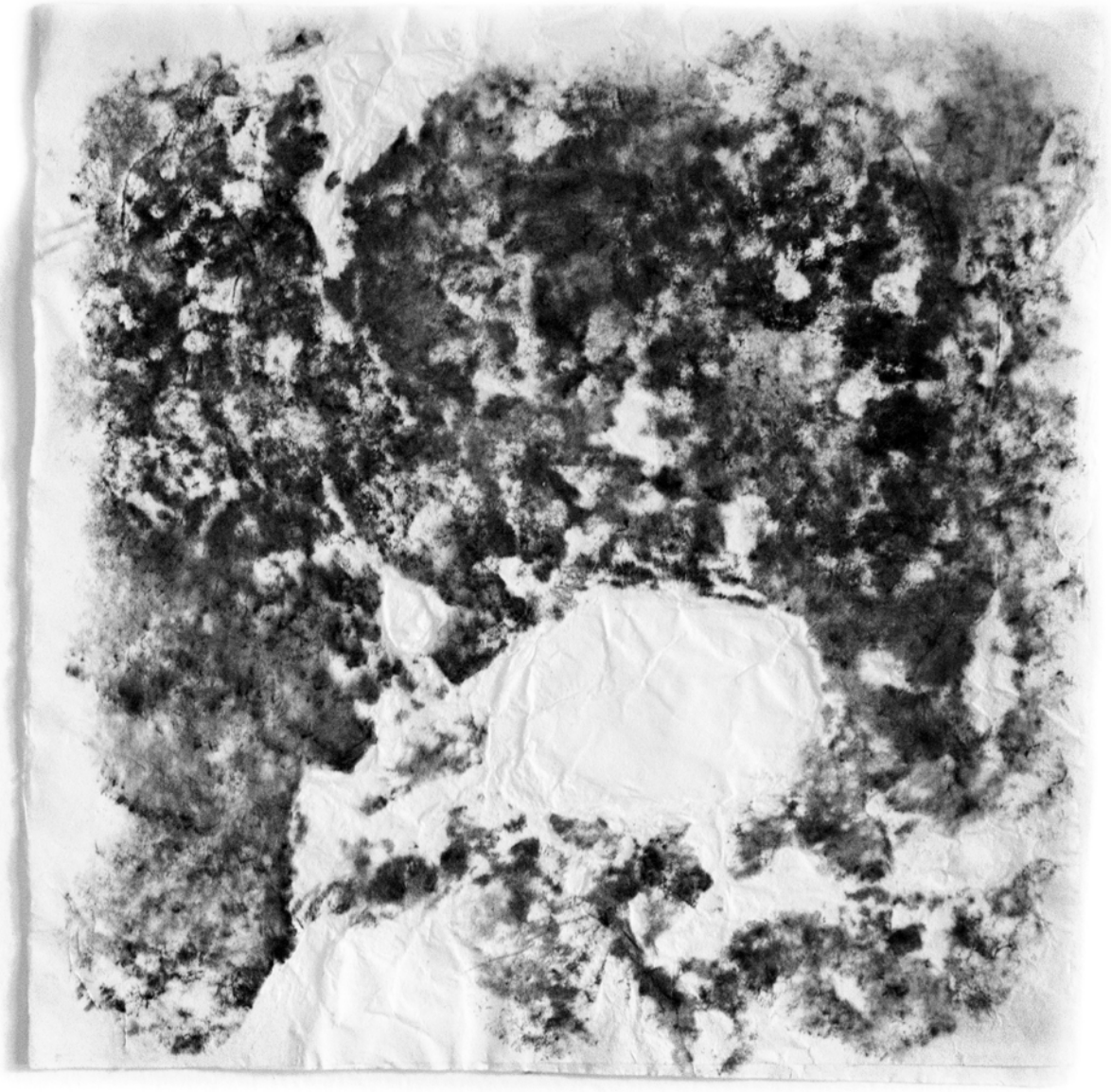
Rubbing 18: Bruce Peninsula Lake Erosion Fractures, ink on paper, made by author, 27 June 2022



Rubbing 19: Bruce Peninsula Lake Erosion Swirls, ink on paper, made by author, 27 June 2022

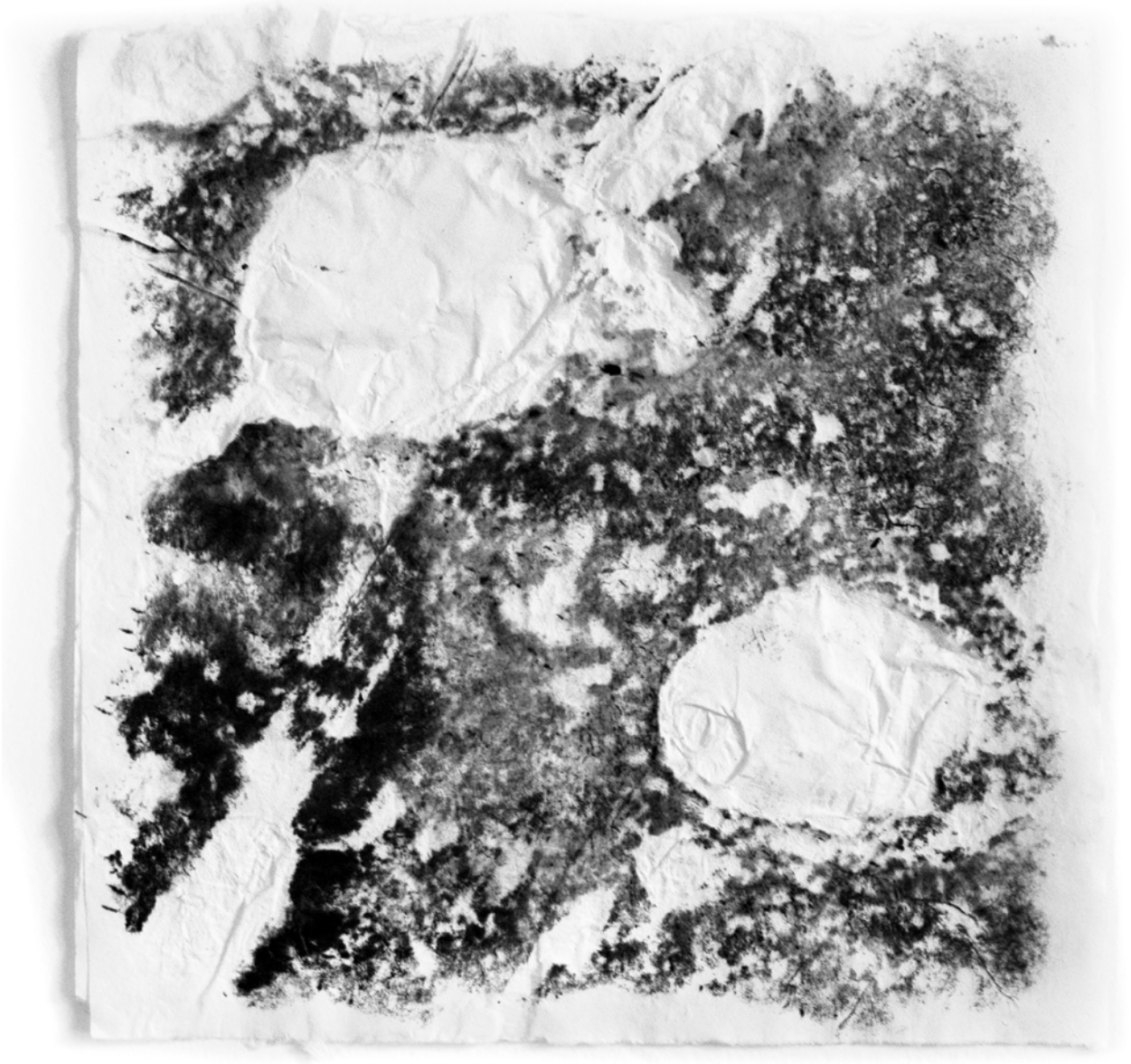
Rubbing 20: Bruce Peninsula Lake Erosion Fractures, ink on paper, made by author, 27 June 2022

Rubbing 21: Bruce Peninsula Holes, ink on paper, made by author, 28 June 2022



Rubbing 22: Bruce Peninsula Pothole, ink on paper, made by author, 28 June 2022

Rubbing 23: Bruce Peninsula Potholes, ink on paper, made by author, 28 June 2022

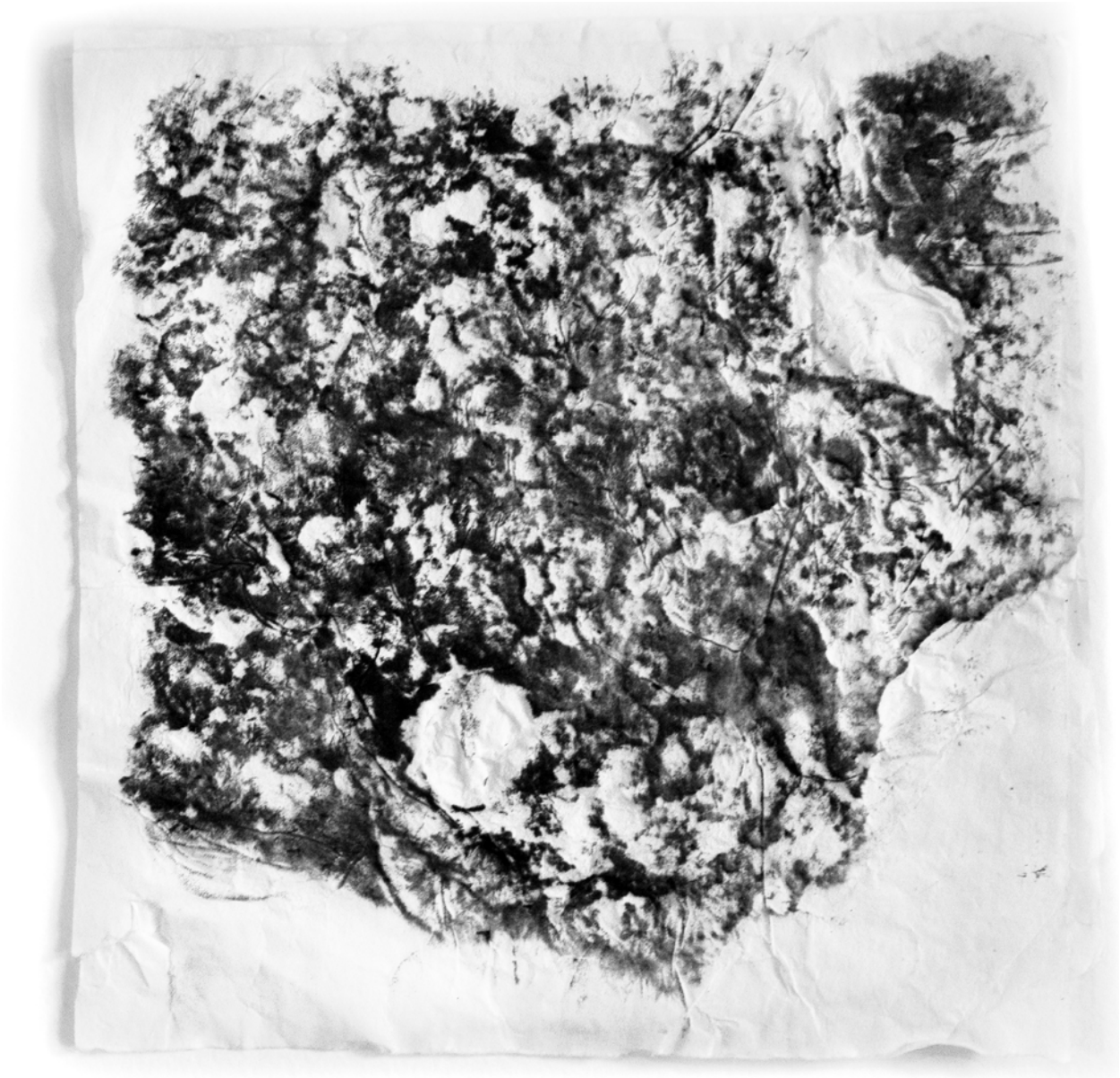


Rubbing 24: Bruce Peninsula Potholes, ink on paper, made by author, 28 June 2022

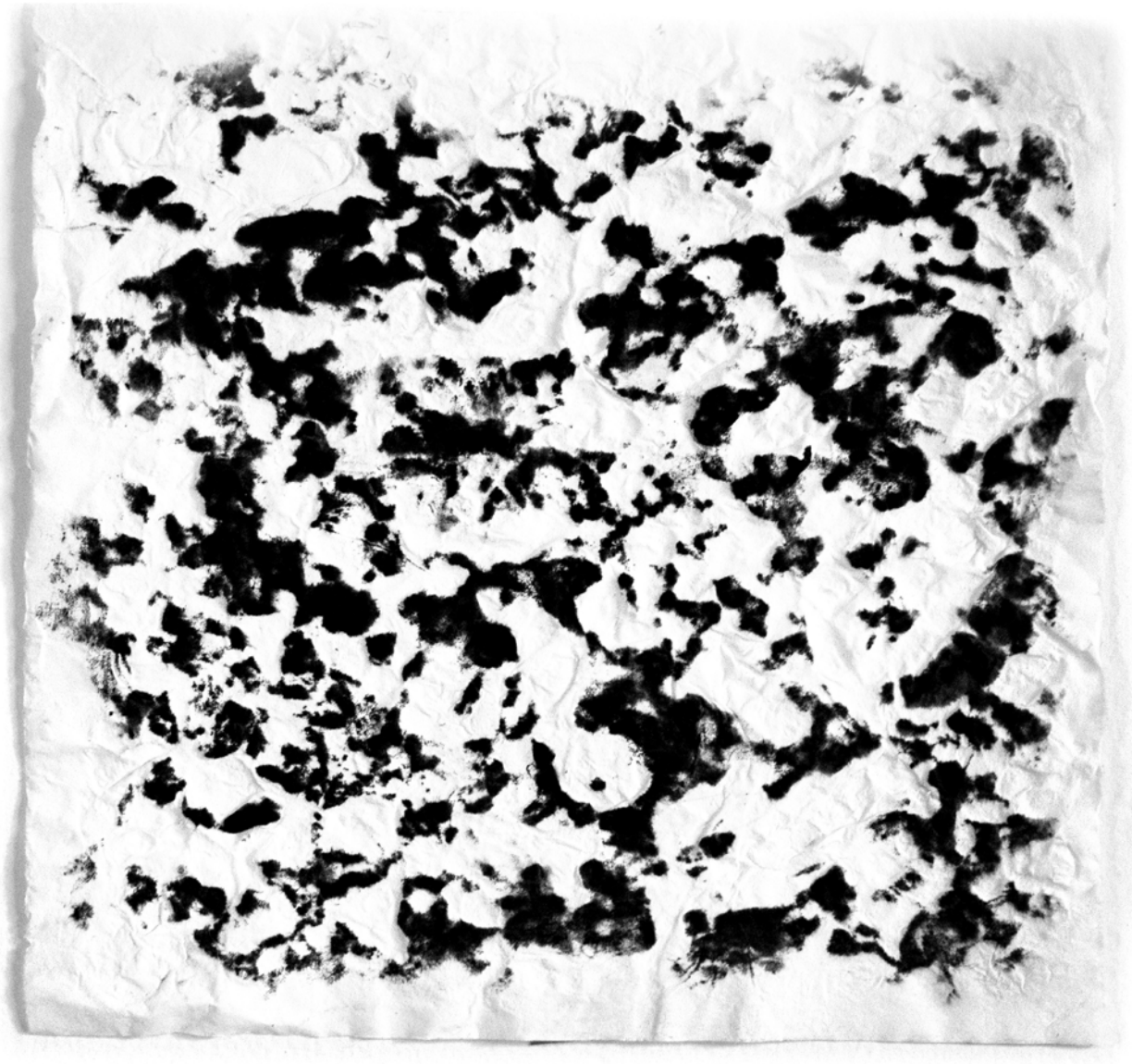
Rubbing 25: Bruce Peninsula Pothole, ink on paper, made by author, 28 June 2022

Rubbing 26: Bruce Peninsula Conical Erosions, ink on paper, made by author, 28 June 2022

Rubbing 27: Bruce Peninsula Fractures, ink on paper, made by author, 28 June 2022



Rubbing 28: Bruce Peninsula
Boulder Edge, ink on paper,
made by author,
28 June 2022

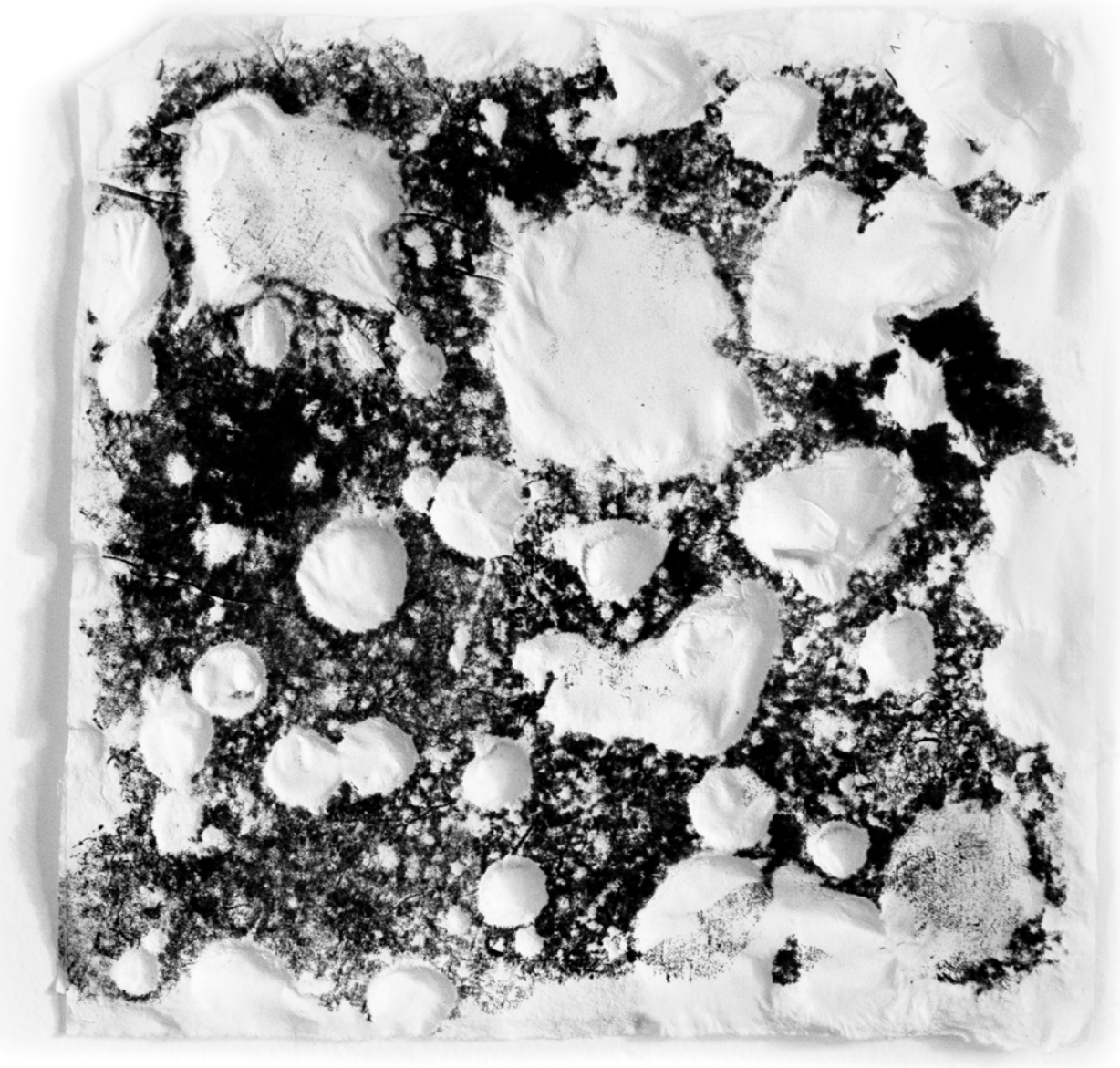


Rubbing 29: Bruce Peninsula Boulder Face, ink on paper, made by author, 28 June 2022

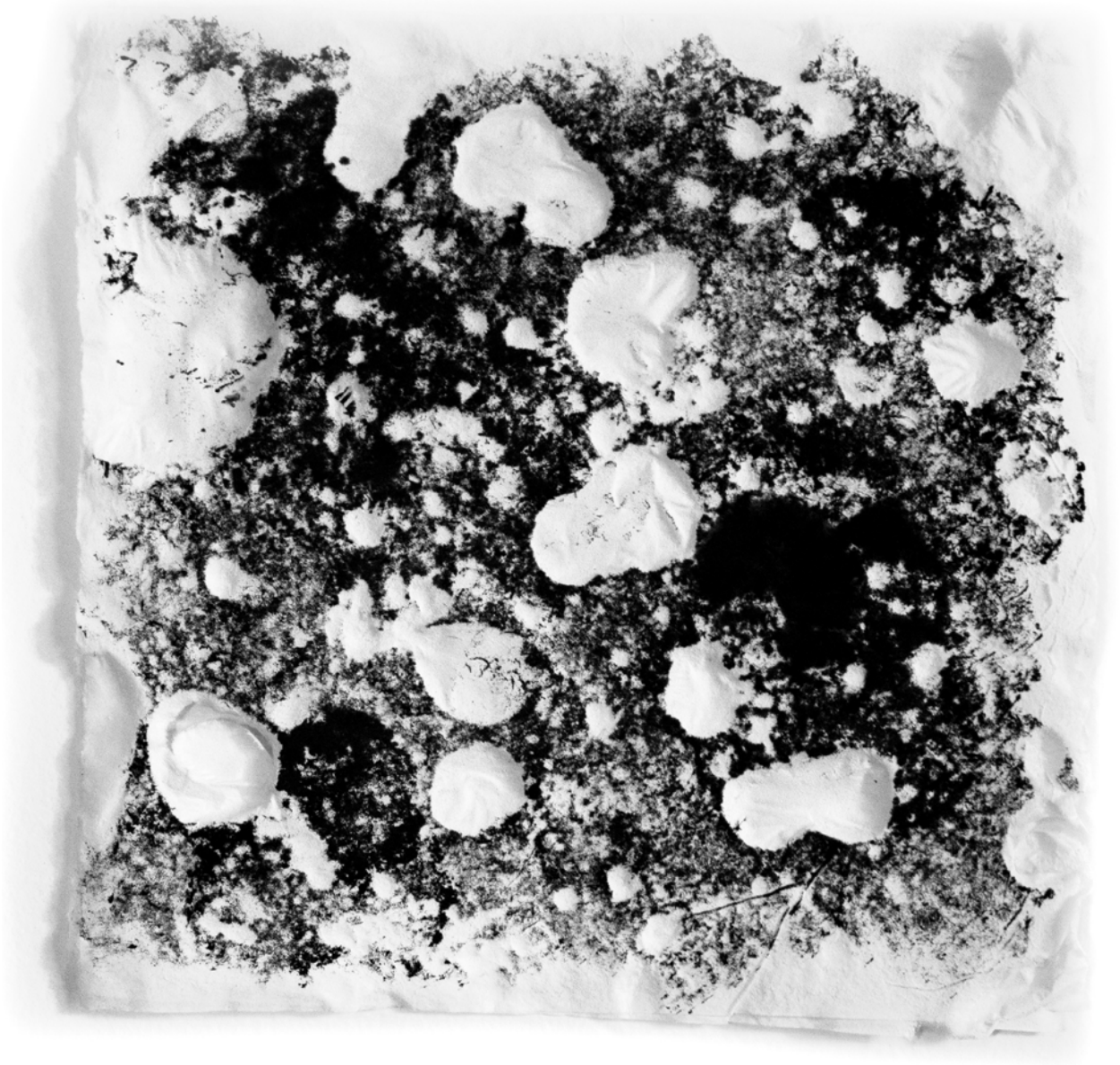
Rubbing 30: Bruce Peninsula Boulder Waters Edge, ink on paper, made by author, 28 June 2022

Rubbing 31a: Bruce Peninsula Conical Erosions, ink on paper, made by author, 28 June 2022

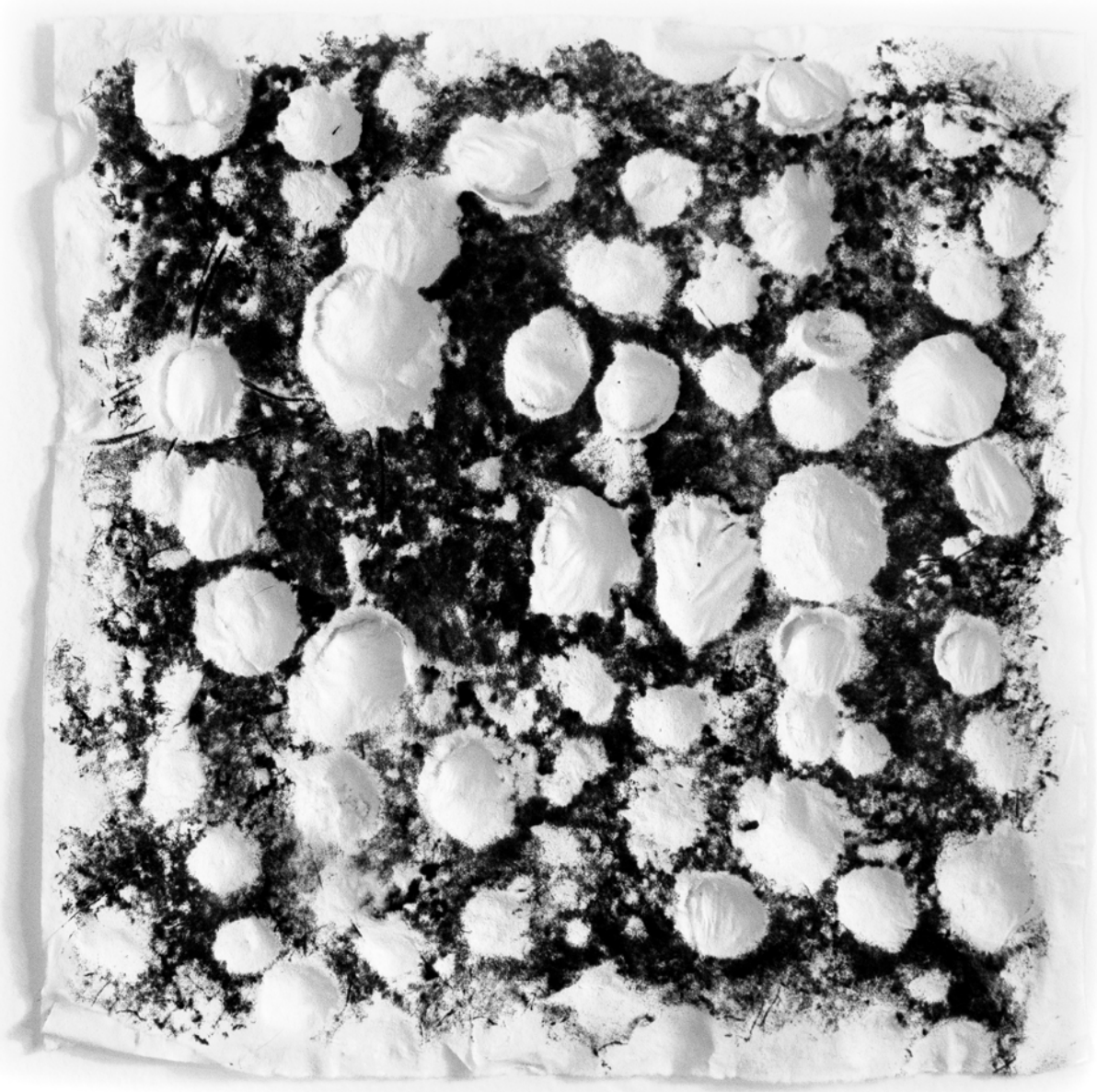
Rubbing 31b: Bruce
Peninsula Conical Erosions,
ink on paper, made by author,
28 June 2022



Rubbing 32: Bruce Peninsula Holes, ink on paper, made by author, 29 June 2022



Rubbing 33: Bruce Peninsula Holes, ink on paper, made by author, 29 June 2022

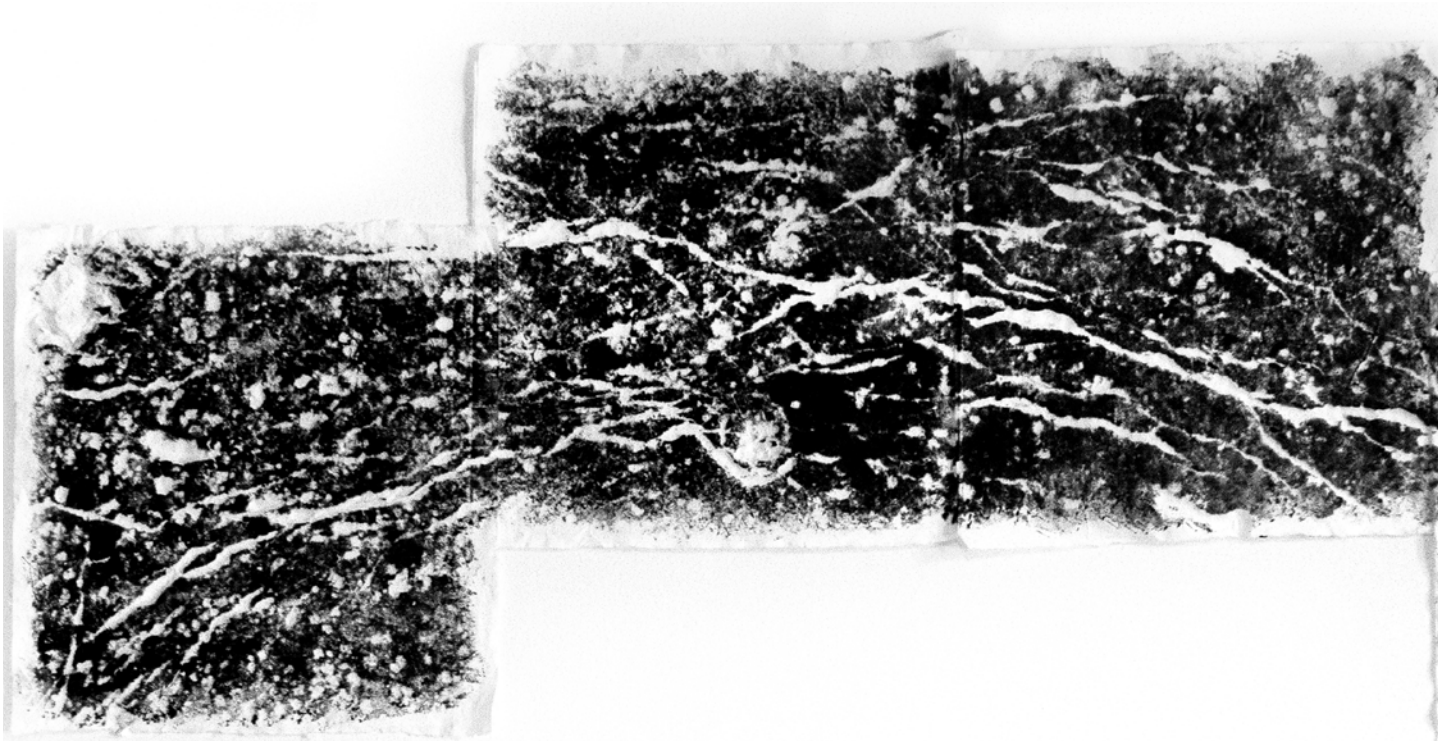


Rubbing 34: Bruce Peninsula Holes, ink on paper, made by author, 29 June 2022

Rubbing 35: Bruce Peninsula Boulder Face, ink on paper, made by author, 29 June 2022

Rubbing 36: Bruce Peninsula
Boulder Face, ink on paper,
made by author,
29 June 2022

Rubbing 37: Bruce Peninsula Boulder Face, ink on paper, made by author, 29 June 2022



Rubbing 38a: Bruce Peninsula Lake Erosion, ink on paper, made by author, 29 June 2022

Rubbing 38b: Bruce Peninsula Lake Erosion, ink on paper, made by author, 29 June 2022

Rubbing 38c: Bruce Peninsula Lake Erosion, ink on paper, made by author, 29 June 2022

Rubbing 38d: Bruce Peninsula Lake Erosion, ink on paper, made by author, 29 June 2022

Rubbing 38e: Bruce Peninsula Lake Erosion, ink on paper, made by author, 29 June 2022

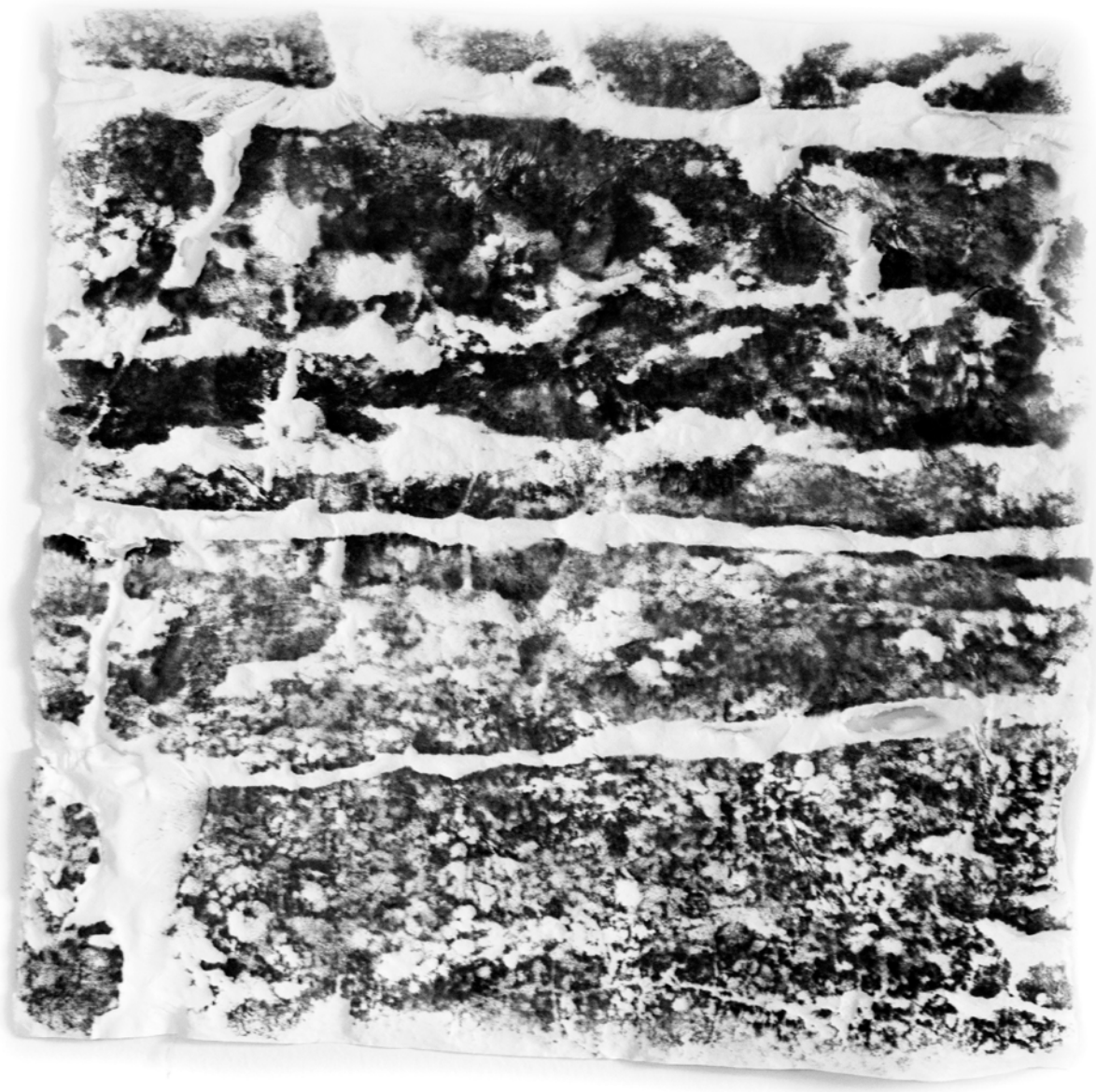
Rubbing 38f: Bruce Peninsula Lake Erosion, ink on paper, made by author, 29 June 2022

Rubbing 39: Bruce Peninsula Holes, ink on paper, made by author, 30 June 2022

Rubbing 40: Bruce Peninsula Linear Fractures, ink on paper, made by author, 30 June 2022

Rubbing 41: Bruce Peninsula Linear Fractures, ink on paper, made by author, 30 June 2022

Rubbing 42: Bruce Peninsula Cliff Face, ink on paper, made by author, 30 June 2022



Rubbing 43: Bruce Peninsula Cliff Face, ink on paper, made by author, 30 June 2022

Rubbing 44: Bruce Peninsula Cliff Face, ink on paper, made by author, 30 June 2022