The GeoLogic of Lorine Niedecker's "Lake Superior"

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Abstract

The GeoLogic of Lorine Niedecker's "Lake Superior"

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As a student of geology, I attuned my eye to the exactitude of observation required to convey the history of a place. My interest in the poetic work of observation led me to Lorine Niedecker's "Lake Superior." In that poem, historical, folkloric, and scientific knowledge crop up alongside the poet-speaker's primary thoughts and perceptions. Observation becomes an artifact. Such encapsulated perceptions broaden the viewpoint through which one human might understand geologic time.

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1. Rock as Relic

In every part of every living thing
is stuff that once was rock

In blood the minerals
of the rock[1]

October 2007; Catskill, NY. On a grey morning, I shivered beside a highway. My left hand pressed a clipboard against my ribcage while my right worked out how to hold a pencil with gloves on. In front of me, my professor, Tekla, held one hand to the brim of her hat, squinting against the drizzle. Over the passing waves of traffic, she said, "Every rock tells a story."

There are clues in every crystal, whether cooled from an igneous melt at the base of the crust or metamorphosed under the heat and pressure of a rising mountain range. Every grain of sand compressed in a convergence of continents, every fistful of crystals drawn up through a volcano's crater, is marked by what made it. Something brought it here. Something else will wear it away. As students of structural geology, our goal was to figure out what happened and how.

In earlier, introductory, geology labs, I learned to identify cut and polished mineral specimens. Armed with a hand lens and porcelain plate, I logged each one's color, streak, luster, hardness, density, and crystal habit. How many cleavage planes? You have to know the contours of fractured edges: discern the differences between translucent crystals. I wrote my notes out longhand, in charts that I would use to memorize each mineral's characteristics.

Minerals are the crystal building blocks of rock. Every rock is a relic: a prior version of a particular place, encapsulated. It's preserved only by change. Every geologic inference must be based in observation. It's different from the other sciences like, say, chemistry, where hypotheses are tested through experimentation. Geology is more like history or archaeology, in which the data collection is a process of searching through incomplete artifacts, then extrapolating their broader terrestrial context.

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[1] Niedecker, Lorine. "Lake Superior." *Lake Superior: Lorine Niedecker's Poem and Journal, along with Other Sources, Documents, and Readings.* Seattle: Wave Books, 2013. Print. 1.

As I assimilated this geologic way of thinking, my eye became attuned to the exactitude of observation required to convey the history of a place. My interest in the poetic work of observation led me to Lorine Niedecker.

Lorine Niedecker was a poet devoted to precise observation. Aside from a few months in New York, Niedecker spent her life in Wisconsin, primarily in Fort Atkinson and nearby Black Hawk Island. Born in 1903, she spent her formative years exploring the surrounding woods and lakes. “The Brontës had their moors, I have my marshes!” she wrote[2]. Niedecker also read vast scientific, historical, and literary texts; in her poems, excerpts from sources hold a weight distinct from but equal to the poet’s primary perception. She treats them like geologists treat rocks, as pieces of concrete observation through which a narrative can cohere.

In the summer of 1966[3], Niedecker and her husband, Al Millen, took a road trip around Lake Superior. In their travels, they followed a route she mapped decades earlier in the guidebook *Wisconsin: A Guide to the Badger State*, when she worked as the research editor for the WPA’s Federal Writers Project[4]. Her poem “Lake Superior” began its development through the historical, folkloric, and scientific excerpts she accumulated in that work. Observations from each layer of knowledge crop up alongside the poet-speaker’s primary thoughts and perceptions. Observation becomes an artifact.

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[2] Penberthy, Jenny Lynn. *Niedecker and the Correspondence with Zukofsky, 1931-1970*. Cambridge: Cambridge, 1993. Print. 146.

[3] Niedecker, Lorine. “Lake Superior Country: Vacation Trip ’66.” *Lake Superior: Lorine Niedecker’s Poem and Journal, along with Other Sources, Documents, and Readings*. Seattle: Wave Books, 2013. Print. 8.

[4] Niedecker, Lorine. *Lake Superior: Lorine Niedecker’s Poem and Journal, along with Other Sources, Documents, and Readings*. Seattle: Wave Books, 2013. Print.

Not long ago, my teacher Richard Kenney asked me (along with my classmates) to "frame a good question" for his graduate forms seminar. He wrote, "let the question be not the 'smartest' question you can concoct, but rather a point upon which you're genuinely eager for more clarity."

I asked, "How does an image become narrative?"

He said, "Timing."

Image's single moment becomes narrative when a present perception is linked to another perception or situation. The 17th century haiku master Bashō used image to "perceive a natural poignancy in the beauty of temporal things…and cultivate its expression into great art."[5] In his travelogue *Narrow Road to the Interior*, he wrote,

> Spring passes
> and the birds cry out—tears
> in the eyes of fishes.[6]

The speaker begins with a statement of seasonal (temporal) setting, then makes a sensory observation: "birds cry out." The poem then pivots from an immediate experience of birdsong to a broader perception, via throwing the speaker's voice to the "eyes of fishes." The voice transitions from firsthand image to imagined panorama of narrative.

As image is to narrative, geologic observation is to inference. In geology, it's rare to receive a preserved account of the transition between discrete events. You have to piece together what artifacts remain, after the fact. The bits of environmental evidence, encapsulated in rock, supply the moments of perception that cohere into geologic history.

A sedimentary rock is a relic of a previous environment on the surface of the earth—e.g. a marsh, a tide pool, a riverbed—preserved in place and compressed until it's lithified. Regardless of the time that has passed, certain attributes offer insight into how it first formed.

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[5] Matsuo, Bashō, and Hamill, Sam. *Narrow Road to the Interior and Other Writings.* Boston: Shambhala, 2000. Print. xiv.

[6] Basho 4.

At the roadside outcrop, where crews dynamited a hillside to build this throughway, my structural geology class observed and described the strata from our present moment of stillness. Each rock unit had a name and agreed-upon characteristics, but our teacher Tekla withheld those. The act of designation taught us the attention necessary to document each unit's multiple instances. We sketched the vertical extent of each bed, scale bar in the bottom corner. We measured the clasts and named mineralogy, matrix, sorting. As we began to document the smattering of data, we were careful not to transform observation into inference too quickly .

Niedecker's "Lake Superior" begins fully invested in the act of documenting geologic phenomena. Its first section offers a sibylline statement that instructs the reader how to read the poem—and how to use an image to infer a greater terrestrial circumstance:

> In every part of every living thing
> is stuff that once was rock
>
> In blood the minerals
> of the rock[7]

According to the law of conservation of mass, what once was and what now is comprise a whole. Arrangements can change, but no one *thing* of any *mass* can be created or destroyed. The word "stuff" underscores the seeming simplicity of Niedecker's logic while clearly rendering the physical world on which her poetic eye is focused. The connection between earth and human is rendered through concise and evocative diction.

The "stuff that once was rock" pervades other living and nonliving things on earth, just as minerals that exist in rock also exist in blood—"blood" that is nonspecific, but which, coming from the human poet-speaker's point of view, I understand to be human. Human perception foregrounds human impact. Blood foreshadows the history of European colonialism that torqued the lake's trajectory from an ecosystem that developed over millions of years to human-manipulated passageways constructed in mere centuries.

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[7] "Lake Superior" 1.

Niedecker's restrained, precise fragments conjure both the particular and the universal through her deliberate omissions of dates, periods, rhetorical transitions. What gets pieced together is the sparse language that indicates a lake (and thereby the earth) which is constantly in flux, changing over a timeline the human eye cannot witness. Niedecker's work, then, is to transform what occurs on a geologic timescale into momentary images in language that humans can comprehend. How does image become narrative? From the speaker's seeming stillness, the poem projects its discretely documented images into the maelstrom of time.

How does art create narrative motion from a collection of images? In the essay, "Sorting Facts, or Nineteen Ways of Looking at Marker," Susan Howe examines documentary filmmakers' use of such jittery motion. She examines how Chris Marker's documentary film essays use the experience of immersive, sensory images. In Chris Marker's film essays, fragmentation is crucial to the narrative. Still shots are placed in collage with moving images. His film *Sans Soleil* opens with a scene of Icelandic children at play, then cuts to black leader as a voiceover describes the volcanic eruption that occurred just after that film was shot[8]. The voiceover describes the images themselves, then their relation to historical events. In that move, Howe identifies the carving out of particular images that Marker performed. The demarcation of clear, sensory images creates a sense of experience in the viewer. Howe writes, "Accelerated motion, recalled from a distance of constructed stillness, can recuperate the hiddenness and mystery of this 'visible' world[9]." The carefully-chosen juxtaposition of details can create epiphany without needing to name it as such.

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[8] Marker, Chris, Argos Films, and New Yorker Video. *Sans Soleil.* New York: New Yorker Video, 1982. Print. International Cinema.

[9] Howe, Susan. *Sorting Facts; Or, Nineteen Ways of Looking at Marker.* New York: New Directions, 2013. Print. New Directions Poetry Pamphlets. 10.

Documentation is the first task of both art and science, and the fixation on documenting the moment of sensory perception extends across forms. Niedecker's fragmented form is evidence of her devotion to sensory perception. By eschewing terminal punctuation and arranging her sections outside of chronological order, Niedecker asks her reader to puzzle out the relationships among the poem's imagistic fragments. Observation becomes an artifact, fully dependent on the reader's own perception rather than interpreted for the reader by the poet.

The second section of "Lake Superior" enters a specific moment in the physical world.

> Iron the common element of earth
> in rocks and freighters
>
> Sault Sainte Marie—big boats
> coal-black and iron-ore-red
> topped with what white castle work
>
> The waters working together
>   internationally
> Gulls playing both sides[10]

Niedecker describes what she witnessed through the car window, her sections bridged by "iron." Here, again, is iron. Here again is an element locked in the crystal structure of a mineral, metonymy for earth and all the processes (human) life depends on, the still image carried over. After the first couplet's transitionary nod to the unity of iron, Niedecker's verse turns like haiku from a general condition to a concrete, sensory scene. The leap from general to particular is also an example of Howe's "[a]ccelerated motion." Through this sharp imagistic stillness, Niedecker opens the reader's eyes to the "hiddenness and mystery" of time.

Time progresses down the page and back in time through the fragments the poet writes. "Elements for awhile before we again become, if we ever do, another mass. Time is nutting [sic] in the universe," Niedecker wrote in a letter to Louis Zukofsky[11]. Iron is a cipher for industrial frameworks, a benchmark in the timeline of (human) development, the foundation of the upper Midwest's twentieth century commerce. In its journey from compound to compound, iron's essential qualities remain, a contagious magic that transports the reader through time. What was once rock, then steel blade, then human blood remains iron.

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[10] "Lake Superior" 1.
[11] *Correspondence* 134.

Sault Sainte Marie, however, is one physical place, a town in Michigan with a dam between Lake Huron and Lake Superior. There, Niedecker watched ships lifted and lowered through locks across the U.S.-Canada border. Niedecker writes that she saw "big boats/ coal-black and iron-ore-red." Such ships she casts as fortresses, with "castlework" colored white like the "gulls" flitting from Canadian to American sides of the dam. Extracted iron is "common," diction that recalls "stuff" in rocks and freighters (in the structure of their steel hulls as well as inside cargo holds). Color and chemical element echo across objects. Each brief line is an evocative sonic experience, from the staccato "big boats/coal-black" to the wispy breath of "what white castlework." Like glittering specks of mica in a rock, these sound effects refine the reader's understanding of the place.

Through those locks, Lorine and Al watched the human-made machinery float giant freighters full of mineral wealth from extraction to refinery. Within the poem's strategic assemblage of still images, Sault Sainte Marie becomes a formal gateway from Niedecker's embarkation in timelessness to her explication of particular intersections of historical, personal, and geologic time.

"Coal" and "iron-ore" are rocks extracted from their natural environs, now in transit toward a human-designed fate. Dusty cargo rubs off on its vessel, and the two acquire a visual likeness. The way the wealth travels may change, but wealth maintains its earthy roots. Lumber or coal lump, it was all just "stuff," once was something else. "And for two centuries fur, principally beaver, was the accepted currency[12]."

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[12] "Lake Superior Country: Vacation Trip '66" 9.

Niedecker's journals show vast research for this poem, and indicate moments in which she uses archival language as artifact. Such encapsulated perceptions broaden the viewpoint through which one human might understand geologic time. Even Niedecker's use of the three-word name "Sault Sainte Marie" stands out in relation to the spare diction around it—it introduces a proper noun as an artifact of observation. Niedecker's use of proper nouns is part of a systematic attention to language gleaned from source material. Within her fragments, she sutures source material like crystals in a rock, accumulating greater meaning from the historical contexts behind borrowed words.

In Sault Sainte Marie, the freighters' purpose is profit. The essential purpose for human destruction of the land is the pursuit of wealth. Motivation for humans' pursuits throughout this land become a motif around which Niedecker's fragments cohere. The third section turns to another visitor:

> Radisson:
> "a laborinth of pleasure"
> this world of the Lake
>
> Long hair, long gun
>
> Fingernails pulled out
> by Mohawks[13]

The third section departs from its focus on iron without abandoning the idea of image as stillness amidst constant flux of time. In the 17th century, the French *voyageur* Radisson entered what he documented as a "laborinth of pleasure," wholly ignorant of its native inhabitants (though he apparently knew enough to bring "long guns"). The single word "laborinth" resonates across time through its rhyme and its clearly archaic spelling. It's quoted, set apart as borrowed language. Later, Niedecker does the same with another excerpt from Radisson, describing the canoes' "white Seder" (cedar). Each quotation recreates the perception of the original document and the hand that produced it.

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[13] "Lake Superior" 2.

Susan Howe regards the selection of documents as a crucial creative choice in Chris Marker's work. "Documents resemble people talking in sleep. To exist is one thing, to be perceived another[14]," she writes. Niedecker's use of source material attempts to both show the existence of the documents and their lived history, as well as to perceive them as the poet.

Radisson's name is his quotation's attribution. It stands up in a single-word line demarcated with a colon, cueing the quotation to act as a script. His words come to life in the poem through the rhyme between Niedecker's placement of "Radisson" and his word "laborinth." That echo carries his notation into Niedecker's pursuit of a poem existing in geologic time. "—People of all nationalities and color have changed the language like weather and pressure have changed the rocks," Niedecker wrote in her road trip journal[15].

Niedecker does not use Radisson solely to show her attention to artifact. The third section introduces a contained narrative that shows the mortal stakes of human exploration. The first line's soft sound of "'pleasure'" rocks in sonic dissonance with the final couplet's harrowing "Fingernails pulled out/by Mohawks." Such bald treatment of human violence succeeds because the "world of the Lake" is rendered through Niedecker's clear-eyed observation. Without comment or embellishment, Niedecker illustrates the paradox between Radisson's gruesome death and his delight at the natural riches through wide-spaced, spare lyricism. Contradictions like irony, paradox, and oxymoron create an acceleration in the poem's temporal logic. In Howe's understanding, such instances would be a clear acceleration. Time's acceleration, and even its progression, encounters a glitch, highlighting its constructed quality within the poem. "[O]xymorons parody habitual thought patterns while marking a site of convergence and conflict: split-repetition, acceleration, reverse motion[16].” What happens to the image’s narrative when time skips? In what present does the poem exist?

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[14] Howe, Susan. *The Quarry*. New York: New Directions, 2015. eBook. loc 751.
[15] "Lake Superior Country: Vacation Trip '66" 11.

Radisson enters from his historical world, in language from his personal journal. Language, like rock, carries its meaning across time. Poet Adrienne Rich wrote, “I choose to sieve up old, sunken words, heave them, dripping with silt, turn them over, and bring them into the air of the present[17].” Observation, via first-person or archival image, becomes an artifact. “Lake Superior” sieves up sources’ diction and enmeshes it with proper nouns, names of minerals, and geologic truisms to draw attention to what changes and what remains the same.

> Through all this granite land
> the sign of the cross
>
> Beauty: impurities in the rock[18]

The poem’s fifth section returns to the first’s timeless vision of the earth, but it focuses on the “granite land” rather than “every part of every living thing.” The word “rock” feels familiar in my mouth—my lips pucker, then the round vowel drops to the back of my throat. *Click*, tongue against palate. My muscle memory stretches to subsume “beauty: impurities” into the metonymy of rock which is already iron and blood. Forces of nature destroy records; historical unconformities undermine history. What rock remains is all we have to go on. Throughout shifts in perspective from poet-speaker to oracular geologic voice, the very word “rock” persists: same diction, same terminal position in the line and section.

In geologic maps, units of granite are peppered with small + signs: one “sign of the cross” across Lake Superior’s time. Niedecker read such maps when she worked on *Wisconsin* and first read the geologic stories embedded in the maps’ symbology. In this “granite land,” the “sign of the cross” is also the crucifix carried by the missionaries who travelled to this wilderness to convert indigenous souls to Christianity. Though many didn't survive long, their names still stick to the land they travelled like crosses through granite and iron through earth.

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[16] Howe 9.
[17] Rich, Adrienne. *What Is Found There*. New York: Norton, 1994. Print. xv.
[18] “Lake Superior” 2.

Many of the places that Lorine and Al passed through on their road trip acquired their current names from the people who passed through. The poem's seventh section is the first to have a subtitle, which is itself a proper name, "*Joliet*," another French explorer.

Joliet

Entered the Mississippi
Found there the paddlebill catfish
come down from The Age of Fishes

At Hudson Bay he conversed in latin
with an Englishman

To Labrador and back to vanish
His funeral gratis—he'd played
Quebec's Cathedral organ
so many winters

Within this trajectory of exploration, names' provenance reveals the effects of human incursions into the lake. Joliet and others left their names behind in the landscape through which they travelled, like dissolved mineral oxides dripping across rock units. Each name's etymology tells a story: the scientific "Age of Fishes," the folkloric "paddlebill catfish" and "gratis," the European place names "Hudson Bay" and "Quebec" that erased or augmented the Native American names (like Mississippi) that came before.

The section returns to Niedecker's sibylline voice through the first strophe's subjectless fragments. They mythologize Joliet's journey, and the poem takes on a more overtly human epic. Each explorer's death is played out on the page, each body surrendering to the place from which it hoped to profit. Marquette's "bones of such is coral," in section six, returned to the earth which created them. The mineral mélange is the true stillness to which human bodies return after their brief life. The earth changes over time, but its processes are continuous and unsympathetic to living things.

2. A Line of Melody

In geology, the first field skill is mineral identification. You have to learn the difference between quartz and calcite long before you begin to draw maps or stratigraphic sections. I spent plenty of hours with my mineral tray, turning each sample like a prism in the light.

In poetry, the first field skill is sound play. You learn to listen to words and deploy their music to evoke feeling.

"Writing occurs which is the detail, not mirage, of seeing, of thinking with the things as they exist, and of directing them along a line of melody," wrote Niedecker's friend Louis Zukofsky[19] in February 1931 issue of *Poetry*. As "Lake Superior" charts its course through still moments in time, Niedecker's music provides the "line of melody" that turns text into poetry. She actively chooses which lexical artifacts to extract from the lithos of archive and creates a new perception through its sonic assemblage.

In his essay "Sincerity and Objectification: With Special Reference to the Work of Charles Reznikoff," Zukofsky set forth an "objectivist" poetics through a close reading of three of Reznikoff's short poems. He wrote that the Reznikoff's spare verse "involves the process of active literary omission and a discussion of method finding its way in the acceptance of two criteria: sincerity and objectification."[20]

After reading that issue of *Poetry*, Niedecker wrote to Zukofsky, beginning what would be a lifelong correspondence. "Lake Superior," written more than three decades later, embodies a focus on Zukofsky's methods of "sincerity and objectification." She writes the "detail" of her observations, then compresses and inflects them "along a line of melody."

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[19] Zukofsky, Louis. "Sincerity and Objectification: With Special Reference to the Work of Charles Reznikoff." Poetry 37.5 (1931): 272–285. Web. 273.

[20] Zukofsky 273.

"I call poetry *factual telepathy*" writes Howe[21]. Through their musicality, Niedecker's facts incite an emotional melody, one kind of telepathy, in the reader. Her arresting sounds encapsulate particular moments within the poem's own time. Sound itself becomes a stillness that lives within the poem. Some sections' soundplay is largely interior, while others transcend their fragmentation.

I first read "Lake Superior" six months before I began this essay. Since then, its opening section has been echoing through my mind:

> In every part of every living thing
> is stuff that once was rock
>
> In blood the minerals
> of the rock

Those four lines have looped while my arms have wheeled through laps in the indoor swimming pool. They have hammered along while I've counted my bike pedals' cadence up a hill. In moments of physical motion and vacant thought, the words fall in and repeat. It's not that their substance is particularly new: I have known the facts of minerals' passage from rock to living thing since earth science lessons in middle school. Rather, it is the particular way in which Niedecker arranges these nineteen words to connect the vastness of "every part of every living thing" to the particular universality of "blood" that pulses through my own body.

In her journal, Niedecker wrote, "A rock is made of minerals constantly on the move and changing from heat, cold and pressure…The journey of the rock is never ended. In every tiny part of any living thing are materials that once were rock that turned to soil…Your teeth and bones were once coral…Every bit of you is a bit of the earth and has been on many strange and wonderful journeys over countless millions of years."[22] Her journal catalogues a paragraph-long list of the ways in which rock changes into things that we recognize as other than rock, then back again. There is an intimacy in her private “you.” That intimacy carries through “Lake Superior” even though personal pronouns are omitted for poem’s the first half.

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[21] Howe 7.
[22] "Lake Superior Country" 7.

From that list, Niedecker made “active literary omissions.” She extracted and compressed the lines that echo in my mind. Other items from this list make it in to other moments in the poem, connecting fragments in a unified thought of “many strange and wonderful journeys.”

Poetry’s first field skill is sound play. Though I often mark out a poem’s meter as I first read it, only now have I stepped back from this maxim’s trance to scan it. In doing so, I see why it persists in my memory:

˘ / ˘ / ˘ / ˘ / ˘ /
In every part of every living thing
˘ / ˘ / ˘ /
is stuff that once was rock

˘ / ˘ / ˘ ˘ (or ˘ / ˘ / ˘)
In blood the minerals
˘ ˘ /
of the rock

Unlike the vast majority of Niedecker’s work, the first line of “Lake Superior” embarks in iambic pentameter. Niedecker’s lines rarely exceeded eight syllables; as such, this start sounds significant to a reader familiar with her work. With four one-syllable words and three two-syllable words, Niedecker sets out in the definitive cadence of the English line. The meter beats like the heart’s love-dove, the breath’s inhale-exhale, my stride’s one-two on the sidewalk. A seasoned scanner of English-language poetry feels it.

Niedecker does not dwell in the first line’s pentameter. The second line remains iambic, but it stops short at trimeter, leaving the first line’s grandeur—“In every part of every living thing”—hanging over it like a cliff. This metrical cutoff is one kind of “active literary omission,” a decision to encapsulate a particular stillness of time. Such omission continues with the second strophe’s elision of any verb or any particular kind of blood[23]. The imagination required to transplant the verb "is" isn't difficult, but it primes the reader for further syntactic leaps as the poem moves on.

The second strophe applies the first's overarching treatise to one physical thing, though it remains a general one. Its meter begins with the same regular rhythm, but its cadence then becomes less clear. The first four syllables scan as iambic, but the rhythm of the word "minerals" isn't set. It could be two syllables, *MIN-rals*, stressed-unstressed, or *MIN-er-als*, with an extra *er* in the middle. Niedecker's short, fragmented lines offer a spaciousness that inclines me to dactylic *MIN-er-als*. The transition from iambic to irregular occurs inside the first, stressed syllable of "minerals."

From that moment of instability, the section launches into a final pyrrhic foot that propels the sentence over the end of the line, falling into the prepositional phrase "of the rock." In the initial position of the line, "of" probably accepts a tiny stress, but "rock" holds the ending's gravity of a full stress in itself. All sentences in "Lake Superior" omit ending punctuation, and in this first section that means the word "rock" is left to bear the pressure of each strophe's ending, without the help of a terminal dot. The geologic forces linger in each of these sentences' endings, with the "rock" to stand in for all that has come before and will come again.

At the structural geology field trip outcrop in upstate New York, our sketches and descriptions made for one way of knowing what happened there. But just as sound adds melody to Niedecker's visual perception, geologists also move beyond superficial sketches to more complex manners of observation. Susan Howe, in her attention to documentation, notes that facts can only go so far in showing the complexities of a historical narrative. "Facts are perceptions of surfaces," she writes[24].

The roadside view of the outcrop offered a surface: a cross-section in two dimensions. In a geologist's eye, two dimensions must be observed and documented exhaustively: structures like mud cracks and ripples, clast mineralogy and size, cement composition. Beyond that surface, though, lies the story of how these rocks came to be arranged as we observed them to be.

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[23] Zukofsky 273.

[24] Howe 32.

I am writing about a scene I barely remember. Eight years after, I mostly recall the methodology of geologic knowledge, not the particular surfaces I saw. I write what I do remember of the roadside, the undivided two-lane highway, and the two outcrops on opposite sides of the road. "Make eye contact with drivers before you cross," instructed Tekla.

I do remember one unit, a sandstone. We call its varied color (indicating mineralogy) "poorly-sorted," its texture "fine-grained" (meaning it contained clasts of less than three millimeters each in diameter). Its slim layers of sand were marked by faint slashes across the rock, known as "cross-beds:"

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 ////////////////////////////////////////////
/////////////////////////////////////////////
/////////////////////////////////////////////
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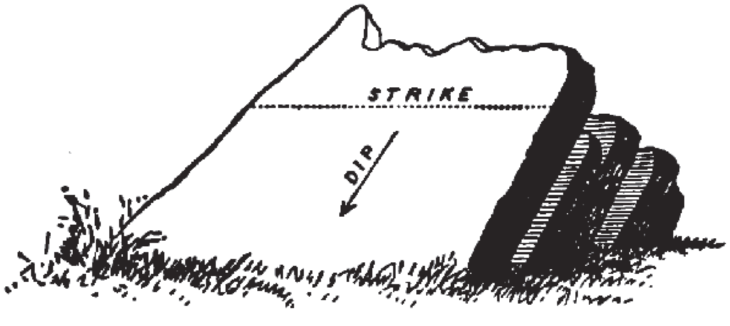
The outcrop's cross-sectional view looks just like that. In top view, the slash marks are a series of lines across sand—ripples, from another angle. From those structures, we could infer an environment from which it came. Ripples like this demonstrate deposition amidst a unidirectional current, such as a riverbed. Other structures provide further guidance: sedimentary structures like mudcracks also designate which way was up when the rock's sediments were first laid down. Each artifact presents its own constructed stillness.

A sedimentary rock is a relic of a previous environment on earth's surface, preserved in place and compressed until it's lithified. River sand, deposited and buried, gets covered over by something else and pressed into stone. One of the governing principles of geologic observation is that sedimentary rocks are assumed to have formed along the earth's surface, unless proven otherwise.

The Principle of Original Horizontality makes a "constructed stillness" of the rock (then sediment) at the point of formation, allowing geologists to measure change over time[25].

If you're looking to learn the tectonic history of this piece of earth from the outcrop, you have to project beyond the visible. To know how these units behaved behind our two-dimensional window, we had to gesture toward the unseen third dimension. Strike and dip are the coordinates that define a rock's deviation from a fully-horizontal rest against the crust. Like the sound effects of Niedecker's verse, strike and dip indicate a process of change which the rocks have passed through to reach their current position. The process might be one of descent due to burial, then rise with overlying units' erosion. It might show pressure along an axis that shows a broader trend of tectonic movement. The changes might have involved processes of pressure and temperature that began to alter the rock's mineralogy through metamorphosis. To determine any of this, you must first take the strike and dip to find out where the rocks reside now.

Strike and dip are measured using a specialized compass, an instrument patented in 1894 by a geologist named David W. Brunton, according to Brunton Outdoor Group which owns the patent today. We structural geology students refer to it as a Brunton and take care not drop it.



[26]

Strike is the horizontal orientation of a bed. Imagine the circle around which a compass needle spins: a rock unit can be oriented anywhere along that disc. To measure strike, I held the instrument's edge along the bedding plane and gently adjusted the compass's orientation until the bubble in a disc-shaped chamber sat in the bullseye position. I logged the strike alongside my sketch of the unit on my clipboard. Strike falls between 0 and 360 degrees.

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[25] Howe 10.

[26] Geikie, James. *Geology*. London and Edinburgh: W. & R. Chambers, 1883. Print. 33.

Dip is a bed's vertical tilt. To measure it, I turned the Brunton perpendicular to the strike and turned a knob that leveled a bubble in a tiny green tube—don't forget to adjust the declination for latitude. Strike is harder to measure accurately than dip, and falls between 0 and 90 degrees.

If two neighboring rocks share the same strike and dip, it's safe to say they formed continuously, then deformed together. If not, or if the border in between the units shows scars from erosion, the rocks' timeline contains an unconformity, a break in time. Geologists don't leave unconformities unexplained.

In a poem, a continuity in time is only a perception as such. The poet is always omitting in order to render a sequence of events or images on the page. The rhythmic fragments of "Lake Superior" accentuate the fractured nature of constructing any kind of history. By jumping from specific moments to maxims by which the earth is shaped, Niedecker enacts the way in which the mind understands the tilts and jolts of time. Even the prophetic, seemingly timeless geologic moments in "Lake Superior" contain some bit of constructed temporality. History is always altered in its journey from image to narrative.

When Niedecker connects one fragment to another through syntactic methods, she defamiliarizes the very nature of one event existing in a single time. The poem's sixth section begins with a conjunction, a clear connection to the human travel that has preceded one explorer, Marquette, through the landscape. By beginning both strophes with "And," Niedecker gives a sense of circularity, that these events have happened before and will happen again.

> And at the blue ice superior spot
> priest-robed Marquette grazed
> azoic rock, hornblende granite
> basalt the common dark
> in all the Earth

And his bones of such is coral
raised up out of his grave
were sunned and birch bark-floated
to the straits[27]

Alongside the syntactic circularity, rhyme and diction tilt the section toward a sonic echo. The word "spot" carries the assonance of "rock," while "priest-robed Marquette" (a French fur trader) carries on the "sign of the cross," that represented the rock granite before. All is not what it seems: just as rock units are deposited, lithified, and then deformed, Niedecker creates images of picture and sound, then recasts them. Marquette's "grazed" touch returns the poem to the rock itself, "azoic," Greek etymology, "without life." Again, the "common" -ness of rock: created and re-created in every context of earth. In her journal, Niedecker wrote "Your teeth and bones were once coral;" here, she recasts that universal observation to tell Marquette's tale[28].

Marquette's bones present another paradox, another glitch. They are biologically-generated minerals, like coral, a rock made by the calcite bodies of marine invertebrates. And yet, some human(s) devoted to Marquette's memory "raised" (rhymes with "grazed") those blocks of apatite "out of his grave" on the lake to transport them back to his home. The body is a vessel for the human soul, a remnant of the person. The rhyme connects another sense of the paradox in which the fall of death becomes the rise of a memory, a legacy, and even a history.

Observation becomes an artifact. The long-dead explorers whose records Niedecker follows, whose names are spread across this land, are part of the memory of the place. A name, an image in language, is projected across time through the stationary place it marks. Through the name, the artifactual language itself, Niedecker charts the lake's history.

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[27] "Lake Superior Country" 3.
[28] "Lake Superior Country" 7.

On geologic timescales, the notions of naming and individual identity seem farcical. Yet, we poets and readers are human. Despite the earth's challenges, we hope to continue to live here amidst all this instability. We come up with names for what we see: "hair" and "gun" are as important as "iron" and "mineral."

3. The Human Unconformity

Human perception necessarily forefronts human impact when looking at earth history. "Lake Superior" seeks to see the earth and its inhabitants through a geologic lens. In his introduction to Virgil's *Georgics*, David Ferry writes "They are all creatures together, all readers of signs, and signs themselves, and all of them are going to suffer the storm's coming on[29]." Virgil's Roman treatise on farming and animal husbandry treats all "creatures" as subjects in a world governed by natural laws that Jove's thunderbolts exemplify. Niedecker's time-traveling journey through what was once called "America's/Northwest" establishes the earth itself as the governing force, all rocks and creatures subject to its forces of destruction.

In Virgil, David Ferry names a collective "they" that feels the impact of the "storm." Though Niedecker places her subjects in context with geologic time, she uses human-scale stories to evoke earth's mortal forces.

After seven fragments in which the speaker avoids any self-reference, the eighth section of "Lake Superior" concludes a list of mineral names and attributes with two personal pronouns: "you have been in my mind/between my toes/ agate". The poet-speaker enters in a moment of direct address to a rock. Niedecker's language has performed that address at many points in the poem thus far, but this particular, transparent moment of revelation foregrounds the poem's containment within human perception. The details have been chosen and arranged by a human mind.

That transparency makes the next section all the more stunning in its vision of ultimate erasure, a human-caused extinction:

Wild pigeon

Did not man
maimed by no
stone-fall

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[29] Ferry, David. *The Georgics of Virgil.* New York: Farrar, Straus and Giroux, 2005. Print. xii.

mash the cobalt
  and carnelian
    of that bird[30]

Geologic language ties this animal-focused section to the rest of the poem, aligning this "living thing" to the "cobalt/ and carnelian" color names extracted from rock. After a title that alludes to the Passenger Pigeon, a species famously wiped out by American westward expansion, Niedecker frames its demise as a question. "Did not man," she writes, hedging her observation. She makes the (already-proven) accusation by way of rhetorical anthypophora, in which the implied, shared cultural knowledge of extinction, outside of the poem, answers Niedecker's question. Like the fragmentation, the question requires the reader to connect observation to inference.

In 1947, not long after Lorine Niedecker worked with ecologist Aldo Leopold on *Wisconsin: A Guide to the Badger State*, he wrote the essay "On a Monument to the Pigeon." The essay is a conservationist's earth-empathetic reaction to human hypocrisy: a monument, erected to commemorate the thing that humans themselves had driven to extinction. He wrote,

> To love what *was* is a new thing under the sun, unknown to most people and to all pigeons. To see America as history, to conceive of destiny as a becoming, to smell a hickory tree through the still lapse of ages—all these things are possible for us, and to achieve them takes only the free sky, and the will to ply our wings[31].

The industrial revolution just two generations prior to Leopold and Niedecker was the beginning of much of the destruction that has resulted in today's imminent threats to human civilization. Niedecker lived in a time when human-caused extinctions were first coming into social consciousness. Both writers use understatement to invoke the reader's emotional investment in the moment of ecological loss. In Niedecker's geologic paradigm, an extinction is a moment of forgetting. Susan Howe writes,

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[30] "Lake Superior" 4.

[31] Leopold, Aldo. "On a Monument to the Pigeon," *Lake Superior: Lorine Niedecker's Poem and Journal, along with Other Sources, Documents, and Readings*. Seattle: Wave Books, 2013. Print. 73.

> Writing this essay I have no clear idea what value there can be in a fragment of concrete reality in itself multiple and always at the mercy of a national and personal identity. The real time of emotion isn't musical time or background noise of civilization or continuity of exposed film. You can always tell memory, not the coverings it closes first[32].

At the outcrop, the rocks in front of us were changing even as our pencils scratched across our Rite-in-the-Rain notebooks, like "Wave-cut Cambrian rock/ painted by soluble mineral oxides[33]". Minerals leach into raindrops, then wash downstream. What's left behind starts to look different. We do our best to document our perception of the process. What appears static is simply moving on a different timescale. We look at the roadside outcrop as a stationary object, but it, too, is in flux. In other places along this highway, swaths of nylon netting restrain pebbles and cobbles that might otherwise cascade into the path of our carbon-spewing vehicles. Years later, I would visit the Oregon Coast and see tsunami warnings alongside extravagant bluffside homes.

In any outcrop, there is visible evidence of rocks' weathering, a process that begins as soon as any rock reaches earth's surface. Cooling from a melt, an igneous rock fractures from contraction. Ice and acid rain enter cracks, weathering it into a hash of dusts and crystals. Water-soluble iron leaches out of ground-up basalt, becoming nutrient for the flora still rampant in this outcrop's region of upper New England. The hillside of sugar maples still tinting a mid-day sunset. Oak trees, skunk cabbages, ostrich ferns. Acorns to fatten squirrels' cheeks: what grows on top walls off what lies beneath.

Sometimes, whole units erode away during periods of uplift. Mountains build and crust rebounds. Bits of rock can slough off in earthquakes: fault planes form. Between the units whose break from a continuous sequence is clear, we mark unconformities. Geologists don't leave unconformities unexplained. In the stratigraphic column, they draw a sinusoidal boundary between units to indicate the intervening unknown.

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[32] Howe 30.

[33] "Lake Superior" 5.

Unconformities can happen in moments of hiatus between depositions. They can occur when erosion shears off tops of deposits. Faults and folds stretch and bend amidst mountain building. From clues around the unconformities, we piece together what might have been inserted or erased. The cross-sectional sketch has to become a bird's-eye view map. A map, like a cross-section, only shows two dimensions, but the two together should offer a clear view of the outcrop's units and the hill they were a part of. We had to project along the invisible z axis.

"You have to see in three dimensions," Tekla said,

In Structural Geology, that meant understanding the physics of it all: how do rocks move around in space, over time. The farther we progressed, the more certain I became that my difficulty with spatial reasoning would keep me from an advanced career in structural geology. But something of that inquiry, that act of observing what stands in front of me to tell a story of what has happened before, has stuck.

I have become less interested in coming up with the explanations for deviation than finding expression for dissonance through poetry's song. Niedecker's dissonance between fragments, across rhymes, and through memory perform that expression in a way that transcends the region and time to implicate all of the earth. In the second-to-last section "Lake Superior," Niedecker writes,

> The smooth black stone
> I picked up in true source park
>   the leaf beside it
> once was stone
>
> Why should we hurry

Home[34]

She sees "stuff that once was rock" everywhere, playing out in particulars across earth's time. Instead of using the word "rock," so often repeated before, she shifts to "stone" to rhyme with "Home."

I can't remember how that roadside outcrop resolved; I believe there was some sort of upside-down fold. After four hours or so determining strata and their boundaries, then measuring their strike and dip, we had to drive the three hours back to school. Niedecker, at the simultaneous end of the road trip and the poem, does the same; near the end of her journey is a "hurry/Home."

We took our maps and cross-sections back to the lab, then spent the next week carefully redrawing them on vellum. Then came the narratives—well, lab reports—drawn from the images of the rock. There was a definitive level of knowledge that could be gleaned from our data. We had to write out, in chronological order, exactly what the evidence showed, along with likely ranges of dates. Each estimate had to be rendered exactly and substantiated; there was little space for speculation.

The geologic record would not contain the evidence of Niedecker's final section: a lapse in human memory.

> I'm sorry to have missed
>   Sand Lake
> My dear one tells me
>   we did not
> We watched a gopher there[35]

The human mind's station on the earth is unprecedented. Niedecker situates the end of the poem within the construction of that mind. By negating the speaker's recollection, the beloved's corrective observation hovers, with the reader unsure whether to give it credence. Memory's omission of a rodent and a generic-sounding lake suggests other omissions that the human poet must have forgotten, flaws in the narrative's telling.

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[34] "Lake Superior" 6.

[35] "Lake Superior" 6.

I am interested in finding expression for dissonance through poetry's song. The human mind contains little comprehension of the geologic time scale. In poetry, the glitches and hiccups between timelines enliven geologic time in a way that maps and cross-sections cannot. The poet, then, might make her own way of reading time, constructing its juxtapositions for a human species with limited time left on the earth.

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