

## Practicing the Rock: Field Experience and Diffractive Thinking

## Vivenciando Newfoundland: experiência de campo e pensamento difrativo

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### Abstract:

This paper presents some beginning experimentation with understanding diffraction versus reflection in relation to our interest in the teacher education field experience. We share images and inquiry from a month-long field experience in Newfoundland, Canada, where we inquired through immersive practices into diffractive thinking and what this might actually contribute to the “field” of teacher education pedagogy. We draw on feminist and physicist, Karen Barad (2007) who emphasizes practices of diffraction rather than more familiar practice of reflection, highlighting the necessity of mapping not just difference but also the effects of difference including its potential for other movement. Many arts practice-based theorists and scholars from a variety of interdisciplinary perspectives are now turning towards the material world as a source of explanation and inspiration. Timothy Morton (2012) describes the work of art as tuning to the depth of the physical waves of the fields in which we are unavoidably inside, and then, attuning to our tuning. This is a shift from practices of reflection in teacher education that situate changing selves only as social definition and role, to one that might augment more participatory and sensitive field-oriented contributions.

### Keywords:

New materialism; Aesthetic; Geologic time; Poetic response; Subjectivity; A/r/topography.

### Resumo:

Este artigo apresenta algumas experiências iniciais com a compreensão da difração versus reflexão em relação ao nosso interesse no campo da experiência na formação de professores. Nós compartilhamos imagens e investigações de uma experiência de campo, de um mês, em Newfoundland, Canadá, onde investigamos por meio de práticas imersivas o pensamento difrativo e o que isso realmente pode contribuir para o “campo” da pedagogia da formação de professores. Nos baseamos na feminista e física, Karen Barad (2007), que destaca mais as práticas de difração do que as práticas de reflexão, mais familiar, ressaltando assim a necessidade de mapear não apenas a diferença, mas também os efeitos da diferença incluindo o seu potencial para outros movimentos. Muitos teóricos e estudiosos das Investigações baseadas nas artes, derivados de uma variedade de perspectivas interdisciplinares, agora estão se voltando para o mundo material como fonte de explicação e inspiração. Timothy Morton (2012) descreve a obra de arte como sintonizando nas profundezas das ondas físicas dos campos em que estamos inevitavelmente dentro e, em seguida, alinhar-se a a nossa configuração. Esta é uma mudança das práticas de reflexão na formação de professores que situam a nossa mudança apenas como definição e função social, para uma que possa aumentar as contribuições mais participativas e sensíveis ao campo.

### Palavras-chave:

Novo materialismo; Estético; Tempo geológico; Resposta poética; Subjetividade; A/r/topografia.

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Using new materialist thinking, and in particular the work of Karen Barad, we (two teachers of teacher education) recently engaged in a month long study – a field trip – in order to experiment with what Barad calls a diffractive research methodology. We are interested in initial Teacher Education practicum experience, often called the field experience, and in particular, we are trying to understand Barad’s ideas of diffraction and what they might offer to a/r/tographic research as an alternative to current methods and focus on reflective practice. While reflection provides a semblance of the self that has already happened so that it can then be improved upon, diffraction is a process that does not displace the same everywhere. Instead, with diffraction it is largely unknowability that regenerates the self; difference emerges in emergent interference and cannot be separated from the observation or a measurement of this difference. Even while this division renders a form of knowability, it also makes more unknowability. Diffraction seems to divide the self in relation to its movement into what it is not.

We chose Newfoundland and Labrador, Canada as the site for our diffractive study, for pragmatic reasons: Michele had made a commitment to return her mother’s ashes to Greenspond, an island now connected by a causeway, on the northeast coast of Newfoundland and Labrador.

Because of our interest in practicum experience in teacher education, we decided to extend the trip to a full month in order to provide time for study and full immersion in the field experience. Before embarking on further research in the coming year, with co-operating (mentoring) teachers and student teachers in K-12 field experience settings, we wanted to begin with an inquiry of sensitizing ourselves to how the world addresses us, realizing that anything that is measured or observed in research and learning cannot be separated out. As Deborah Britzman (2017) reminds us, there is no transference-free zone. Barad argues that the materiality of the field, its physical as well as discursive forces, shape our methodological engagements. "Fieldwork is an affective event where the materiality of the field rises up to meet us, rubs up against us, pushes back on our interpretations" (Childers, 2012).

The forces of the materialities of the field where life is lived and practical work is accomplished are constitutive of our work as teachers and as researchers. Field experience has the potential to disturb clear partitions of activities, spaces and identities. Jacques Rancière (in Rancière and Rockhill, 2004/2013) explain how aesthetic work in which one attends to what is not directly visible through that which is, disturbs clear-cut rules of representative logic that call into question not only the borders between visibility and invisibility, perception and imagination, knowing and acting but also the boundaries between art and other activities. We felt that we could not practice a sense of self unless we began to challenge the division between active understanding and passive sensibility by recomposing relationships between doing, making, being, seeing and saying. We wanted to sensitize ourselves diffractively, as entwined within histories of that with which we were unfamiliar. We wanted to experience the shifts that Barad claims are significant in moving away from habituated ways of thinking in which we reflect on the world from a fixed outside position to instead, a way of understanding the world from within and as part of it. We share a number of these shifts in this visual essay and we return to our work as teacher educators in the concluding portion.

Newfoundland is sometimes called "The Rock" because its coastline consists of jagged rock rising dozens of metres out of the North Atlantic Ocean. Newfoundland provides easy access to an extraordinary variety of rock types formed over time and in a wide range of conditions. We understand our experience of "practicing of the rock" to involve feeling the physical forces of a place, by walking, giving time to letting impressions accumulate in the midst of registering differences (Kruse & Ellsworth, 2010) in image, text or conversation. It meant moving in and through a place to sense how geologic forces large and small might continue to affect and compel us. We wanted to get a sense of how it is not just words that are fluid but also the inhuman forces within the self with self-organizing powers of their own.

Realizing that we are caught ourselves, in intersecting phases of movement in both geologic time and remembered time, Michele wrote extensively about the self, and how it is unexpectedly made in the remnant evidence of other encounters of being at one's limit. Her field notes express some of the ways in which she grapples with the unknowability and incomprehensibility of the past. We intersperse her personal writing with our new geologic knowledge of the place we were immersed in, in order to share moments where natural and human forces play out, as Jamie Kruse & Elizabeth Ellsworth (2007) describe, to experiences of intensity and where our next moves were tentative and uncertain. The field notes and the factual information are not isolated objects. Our hope was to get a sense of field practice that is intensely embodied but which also attempts to take the focus off of human-centered fixed roles (such as that of co-operating teacher, student teacher, faculty advisor, etc.) and instead, attends to things that might usually be missed. We were interested in how we might move in our own field experience through our partial knowing, engage our senses and study and make things shareable for others in ways that are hopefully more poetic than definitive.



*Field Note: June 1*

*St. John's is one of my happiest childhood places. St. John's is one of my unhappiest childhood places. I am submersed in The Rock; everywhere the Rock touches me as I move through it and yet, I am independent of it. My experience of the rock continually breaks itself up into itself, in a practice of grief. It's been 9 years since my mother's death, 29 years since my previous return home. Many things have happened since. Today, as I fly into St. John's, I realize it's the first time since I was seven that I am arriving in daylight. I was too young to have reveled in the beauty I observed today, through the spaces of the women's hair beside me as we descended into the Torbay Airport. Today I see the way you rise out of the Atlantic Ocean, Newfoundland, to welcome me. As I feel you, I know how hard it will be to leave you again.*

Generally, the initial teacher education field experience in its methods of reflective practice, professional development, research and policies suggests that becoming a teacher is contingent on the human subject acting upon certain contexts and generating self-referential knowledge. Reflection however, contributes to thinking in forms of straight wavelengths and fixed entities. It premises individuality.

Understood as a constructivist and representational process for attending to educational practice, reflection involves reviewing what has been done and how new learning might be applied to next situation.

Reflexivity, on the other hand, draws from refractive movement where light hits a surface and changes direction. People are positioned and repositioned in social settings structured by gender, class, race, age and other characteristics. Both reflection and reflexivity are approximation schemes for studying various methods. Neither pay attention to the materiality of light. Neither response to movement, as Karin Murriss notes (2015), needs to know if light is a particle or a wave - or anything else. Both treat light as if it were an abstract notion.

Diffraction is a technical concept from physics and refers to the patterns made when waves of any kind including water, sound or light, pass over an edge or aperture or when two waves interfere with each other, thereby bending, interfering, spreading and propagating beyond human control (Barad, 2007).

Diffraction not only offers an intensified awareness of our ecological entanglement to light; it is itself an entangled phenomenon. In classical physics, things could be either waves or particles. Particles were localized and existed in particular places and times. Alternatively, waves are disturbances and can occupy different places at the same time. Drawing on the research of scientist Neils Bohr, Barad explains the evidence of how what is observed changes in relation to the method and strategies of the observation. The measure or the decision, the body with which we make sense of something becomes part of what is measured. It seems that what is in the world and what we know about things in the world are not different things. Furthermore, much of reality moves on beyond our measure of it, unknowable.

Barad (2007) argues for a social science methodology that creates diffraction patterns and we took this opportunity to experiment with what these might be. Diffraction, according to Barad, must be mapped. It is a practice of the potential that lies adjacent to current practice, is sensitive to ways in which our participation includes our strategies and perceptions that are supported by certain types of knowledge, and acknowledges that seemingly immaterial things like thoughts have a vitality beyond our interaction or beyond any human interaction. We wondered, however, how we might produce a diffraction pattern when the dividing line between knowing subject and the world is removed, leaving a picture of reality that cannot be visualized because we are immersed in it and never able to separate out from it, or see all of it.

We speculate that a diffractive response might involve the practice of sensitizing ourselves to being subverted by the unknowable, rather than trying to hold on too tightly to what we think we know. Practicing the rock involves practicing what we are not. We are not the rock. Can we, however, attune ourselves to it? In considering this question, Timothy Morton (2013) makes reference to Kant who argued that aesthetic experience is an attunement. Morton argues, however, that he does *not* attune. Describing a particular song that captures him, Morton writes that instead, *the song* tunes to him: “pursuing my innards, searching out the resonant frequencies of my stomach, my intestines, the pockets of gristle in my face” (p. 30). The more than human; in our case, the rock, tunes to *us* and we respond. All life-forms, Morton (2013) argues, are poems about nonlife. With receptive bodies, we may be able to practice meeting the rock halfway, as it attunes to us.



Newfoundland is renown for its outcrops, which are events of the coming out of bedrock; people travel from around the world to witness the exposures of rock and time that allow geologists to construct a history of the earth. Practicing the instability and the unknowability of the rock has a way of reminding us that we are part of vast temporal and spatial dimensions that completely unsettle our understanding of reality and of how to co-exist with one another.

*Field note: June 1*

*I cried the moment I laid eyes on this magical place today. I prayed that God would give me the strength I do not have, to return here with some sort of grace. I have prayed for some sense of resolution and at my age, it seems weird to be seeking that and not something else.*

*Time will tell. I am here to return my mother or what I continue to think represents some of her. To see family I have not seen for 26 years or longer and to meet some for the very first time. Last night I wondered why I did this and why we did not go elsewhere, to a place without so much emotion and without so many conflict filled memories.*

*Why do I have this sense of nostalgia; why here and why now? Why did I not defy my mom's wish to have me come here and spread her ashes? This place is filled with memories that are steadfastly open and raw, some 30 year old memories, others 40 years old.*

One thousand million years ago, According to In Martha Hickman Hild's (2012) field guide called *Geology of Newfoundland*, 1000 million years ago, all that existed of Newfoundland was the granitic rock on what is now the east side of The Rock. It is the little bit of Newfoundland that has always been attached to what is now the continent of North America. Hild explains that as recently as 1960, most geologists believed that the Earth's crust was static and its continents fixed. The geologic evidence assembled from Newfoundland geologists helped to dramatically shift ideas of a fixed earth, towards an understanding of plate tectonics.

Hild explains that through a variety of continental collisions, all of earth's landmasses were at one point surrounded by a single worldwide ocean and through the middle ran a mountain belt, now part of the Canadian Shield. Because of continued rifting and movement, cracks appeared in the large landmass and filled with hot lava from beneath the continent. Rift valleys formed and widened. Seawater flooded in and a new ocean opened, now called, the Iapetus Ocean. In the quiet shallows of this vast sea, a carbonate platform accumulated and for many years, the tectonic peacefulness of the shores of this new continent allowed new life forms to evolve in the ocean.

On the outcrops of rock, with close observation, one can see the ancient granitic rock which is now part of the north end of the Appalachian Mountains. Hild describes the granite as having wispy bands of grey across a lighter, pinkish background. The pink crystals of potassium feldspar in the granite provide the colour. Granite's radioactivity (emission of energy in the form of particles or waves) is crucial for the earth's system: it drives continental drifts, ocean spreads and plate tectonics. We too are radioactive: vital entities recreated by the energy of instability.

*Field note: June 3*

*I have always loved science and if it were not for love, or the love of love, I would have likely become a doctor (now my aim is to become a doctor of another sort). Because of my love of science, I have had cause to consider it in relation the creation of the self. For me it is interesting to playfully consider the self as a cell. The events of the cell cycle of most organisms are ordered in dependent pathways in which the initiation of later events is dependent on the completion of early events. In eukaryotes, for example, mitosis is dependent on the completion of DNA synthesis. However some dependencies can be relieved by mutation, suggesting that the dependency is due to a control mechanism and not an intrinsic feature of the events themselves. Control mechanisms enforcing dependency in the cell cycle are called checkpoints.*

*Elimination of checkpoints may result in cell death, infidelity in the distribution of chromosomes or other organelles, or increased susceptibility to environmental perturbations such as DNA damaging agents.*

*It appears that some checkpoints are eliminated during the early embryonic development of some organisms: this fact may pose special problems for the fidelity of embryonic cell division. Could the mutation be love? Could the love of a mother be the thing that interrupts the creation of the self? Does it move the making of the self beyond the known and predictable, make it more vulnerable? At the limits of movement in any field, love may be the only credible explanation.*

According to Hild (2012), about 470 million years ago, plate tectonic movements changed directions and the ocean that had been created began to close. Some of the ocean floor wrenched upwards and left huge stacks of oceanic rocks on top of the bedrock. Lower slices contain ocean sediments and upper slices contain ocean crust and mantle. The mantle is the part of the earth that we usually think of as lying between the crust and the hot core of the earth; it is usually solid but at high temperatures becomes instead, a viscous fluid. As tectonic plates separate, the hot mantle can be pushed to the surface of the earth.

The Tablelands in eastern Newfoundland reveal some of the “most extensive, pristine outcrops of mantle rock in the world” (Hild, 2012: 74). The brownish orange rock, called peridotite is the dominant rock of the upper part of the earth’s mantle and is chemically unstable at the earth’s cool and damp surface.

Hild explains that “water seeping into the cracks is slowly changing peridotite to serpentinite (the green rock), in turn altering the water chemistry” (2012: 74) to make it as alkaline as household bleach. The small pools in the Tablelands are currently the subject of intensive research. Despite the harsh conditions, they contain microbial life forms. Understanding how these life forms survive and what they live on, might provide, Hild claims, answers to understanding the origins of life. Those who study them are interested in how the life forms survive and what they live on – relational practices of the rock that may help humans in the future.

Engaging one kind of field experience through another is something that a/r/tographic practice has long claimed, in the field of education (see for example: Irwin and Cosson, 2004; Sullivan, 2010). A/r/tography (artist, researcher, teacher) is a form of research that disrupts linear logic and engages the learning of one practice for the augmentation of another.

Researching, artmaking, and teaching are “not done, but lived” (Irwin in Irwin and Cosson, 2004: 33).



Attending and responding to the world is part of the making of the self and the classroom is not the only location for teachers to live a curriculum of life. Any field is a field of experience. Rather than bringing already-determined theories to light, attending to raw presence of the Newfoundland rock compelling our footsteps or perhaps a classroom of children compelling our prepared lessons in unexpected ways undermines any rational sequencing of events. Practices and procedures co-exist and intermingle and reality plays itself out in the way in which new forms of visibility undo given orders or relations and establish other networks and relations.

When the Iapetus Ocean was still opening and its stable continental margin was free from crustal upheaval or volcanic activity, plate tectonics had positioned this region near the equator where expanses of warm ocean supported many new life forms.

Thrombolites are one of these new life forms and they can be seen here at Flowers Cove on Newfoundland's east coast. Thrombolites are limestone mounds - marine life, formed by colonies of ocean-dwelling microbes. They were microbial communities that photosynthesized through carbon partitioning, remnants of life at a limit point. When alive, they were probably in deeper water so that the water just covered their broad flat tops, but now they are completely exposed at low tide.



*Field note: June 7*

*Last night, we met 3 cousins, one aunt who does not want to be called an aunt, and one cousin's partner. I have been so nervous about meeting them and in the end they are lovely, warm, kind and open people who were very easy to spent time with. They told me that my father was a kind and gentle man and that each of them had lots of care and respect for him. I liked hearing the stories of how generous he was. I, of course, had my own experience that was also real but hearing these things made it easier somehow. They said that after my mother left him, he was broken. These stories seem to mark him a kinder soul than the one I have created in my mind.*

*The next day we had dinner with my Uncle Ches and his new friend Louise. My uncle used to stand in for things that required a male presence when I was young and had no dad to do these things.*

*We recounted old times and then talked about the present and it felt good to not be locked in a past. I feel myself gradually letting things melt inside and I am letting myself feel the feelings that I remember that used to allow me to stand confidently and without shame. Something like balance, which I have been missing for years.*



*Field note: June 10*

*Today was the day that we were in Greenspond to return mom's ashes home. We met the oldest resident of the village, my great aunt Gladys who is 97 years old. What a beautiful and lovely woman she is: funny, kind, caring and such a delight to spend time with, before bidding a more formal goodbye to mom.*

*After visiting Aunt Gladys, we went to a gazebo on top of the hill. The wind was blowing a tremendous gale. I read a tribute that I had written for my mother. Part of it reads:*

*As I release these remnants of you, I'm not letting go, but instead returning fragments of you to your birthplace so that symbolically and as actual matter, you may find peace with a place that I believed you loved more than you know. I will hold you in my heart until we meet again.*

Traveling to the south of Newfoundland, dodging potholes as we drove, we arrived at the Conne River area, a zone made up of leftover bits and pieces of the ancient Iapetus Ocean. Resistant siltstone and easily worn shale are part of the ocean sediments. But there are also some volcanic layers here.



## Field note: June 22

*After years of believing my dark skin revealed an Italian ancestry, I discovered that much of my history had been hidden. My family has recently found that my maternal great-grandfather Ambrose McCarthy was a guide on the Conne River and that he was a Mi'kmaq Indian. We traveled to Miawpupek First Nation where we were welcomed by Chief SaqamawMi'sel Joe who told us that one of the reasons that he returned to Conne River was to prove to his father that he could survive on his own.*

*He shared recent experiences of walking an ancient trail from the Conne River to St. John's in order to listen to the earth, to remember his people's navigational abilities, and to feel the old pathways come up into himself. He feels his greatest contribution to his community has been in the field of education where teachers are now reviving student interest in Mi'kmaq culture.*

*Later, thinking about my great grandfather and his unknown contributions to the community as a river guide, we sat on the sun-warmed rocks and felt the flow of the river with our feet. We discussed Morton's (2013) writing about the art of life having a pudency, a modesty that will not... refuses to be... exposed.*

*I remember my first arrival to Newfoundland and Labrador when I was 7. It was daytime when I arrived and it was the first time I met my mother's mother. She presented me with one single red rose. My grandmother McCarthy was beautiful, calm, and tranquil. My own mother was such a contrast. It makes me wonder what happened to make Grandma McCarthy so serene and my mother so - not serene.*

We end our field notes with the Avalon Peninsula – the west side of Newfoundland, on our way back to St. John's. The Avalon zone, according to Hild (2012), formed part of a small continent called Avalonia. Due to plate tectonic movements that broke up the earth's one large landmass millions of years ago, crustal fragments of what is now the Avalon Peninsula underlie other rocks all over the world.

In the Avalon Peninsula, we encountered an area called Mad Rock, which is part of a group of sediments that were deposited following the abrupt end of the Gaskiers Glaciations period. The photograph below is of the Three Sisters: jagged and austere.

The greenish rock is particularly hard, because of its high content of volcanic ash. The rocks were deposited by currents carrying heavy loads of sediment and they mark a period of very rapid evolution because of the wild climate fluctuations of this era.

Our month-long field trip was filled with many opportunities for repositioning both in our walked pathways and in emotional labour. One of the most intense impacts of our inquiry involved opportunity to take seriously our inseparability from the materiality of the field. While much research is predicated on separation being foundational, connections between nonhumans and humans cannot be explained away. Instead increasing sensitivity is an opportunity to recompose the landscape of the visible and the invisible, and the relationships between making, doing, being, seeing and saying. Furthermore, in responding to current ecological theories that grapple with a tighter imbrication of the human and the nonhuman, the making of one's sense of self is an ongoing measure that needs attention. In field experience, rather than the human being in control, it is largely nonhumans who are dictating the experience. In any event, we are entangled with unactualized potential of histories, the ripples of which, are in the midst of change. Our poetic response is one that must be practiced. A diffractive process in a field experience might ask for example, what else might be made of what we thought we already knew about ourselves given that we are in the midst of a world increasingly breaking with the categories that define what is considered to be obvious.

Dividing the self in relation to being addressed by the world in its midst, is a practice that has significance for teacher education in ways that we hope to explore more fully in the future. In the meantime, we suggest that field notes, rather than reflections, might be a useful addition to pre-service teacher field experience. These notes might be more of a geologic wilderness guide into which they write themselves. In written reflections, students are often expected to provide rational explanations for behavior or for what "should" have been done, or for what they may have missed. Rather, when asked to linger with the places and moments that present themselves student teachers may feel opportunity to notice how any moment, and literally every thing, becomes increasingly populated with natural forces, human histories and contemporary interests adding to reality an ever-more-drastically collective ecology of being increasingly-different together (Kruse and Ellsworth, 2010). Kruse and Ellsworth argue that as creative responses to geologic time and force become more common, human capacities to design, imagine and live in relation...will grow" (Kruse & Ellsworth, 2011, back cover). These capacities seem particularly relevant to what we hope teacher education students might achieve.



Our visual essay is a way of sharing our grappling with what a diffractive methodology might involve as we continue to inquire into what new materialist thinking offers to the field experience of initial teacher education. As educational practice responds to

the necessity of global human existence predicated on these very responses, we need works of art, as Morton (2013) argues, that fold description and implication for social existence together. We need to find ways of sensing that our practices are submersed in vast continuities that are very literally before and beyond us and we need to find ways of making something of the unknowability that makes us. We hope to continue our study and practice of diffractive mapping in hopes of feeling increasing sensitivity to an existence other than human-focused individuality. We are enthusiastic about responding to Kruse & Ellsworth's challenge for artists to "use art to attempt to discover ways that give ourselves and others lived experience of what exceeds us, instead of ignoring, 'taking a break', or leaving it to those who come after us to address" (2010, *Tangents of Co-existence*). Kruse and Ellsworth argue for allowing "seemingly mundane activities to become occasions for one's brain/body to inhabit and connect, on a daily basis, with the vast evolutionary processes that have been in play long before human life on earth" (10.30.2013).

Because we are no longer able to think history as exclusively human, our impressions and our images are footprints of what is more than us, distorted by our own movement. Our situatedness anywhere is divided; it is as Morton writes, "an uncanny place to be" (2013: 5) because there is no outside to make of it. Reflective practice seems to function within the language that everyone thinks they understand. If we try to determine next steps with these measures, we will eventually succeed in becoming our descriptions while most of reality will have already moved on.

Newfoundland is a great place for a field experience with its evidence of dramatic collapse and burial, tectonic collisions, markings of a diversity of life forms, unbroken records of millions of years of sediment accumulation, rare geologic formations, tectonic unrest, and evidence of a powerful moving world. We anticipate, however, that these can be found and practiced in all field experiences, including those of initial teacher education.

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