Brittle Star Intra-action: A/r/tographic Research and Diffractive Movement

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When focusing on varying philosophical frameworks, the debates of the relative qualities of each different perspective continue to be significant forces shaping the future of educational research. We are currently teaching a course on theoretical frameworks in educational research, Michele as a teaching assistant and Valerie as a professor in her first teaching experience with this course. While we do understand that each philosophic perspective is not mutually exclusive, in our teaching, each is presented with its varying views on reality, and knowledge and their assemblages of ontology, epistemology and methodology. We believe that philosophical frameworks are useful ways of thinking about broad areas of scholarship and interpreting those areas is an important way of understanding research literature.

We have been wondering however, what more it is that the existence of art and art practice might offer in relation to traditional overviews of research perspectives. In particular we have been considering a/r/tography and what it might offer beyond current categorizations of philosophical perspectives within which we have been engaging graduate students. In this short paper, we will offer some beginning thoughts regarding the potential that art might contribute to theoretical perspectives and how feminist physicist Karen Barad's theory of new materialism helps to articulate a research perspective that might be flexible enough to work with art practice, in ways that do not perpetuate meanings that become stabilized structures on which to ground knowledge claims and aim instead to practice a rethinking of the nature of being itself.

In our teaching, we have found that diagrams and charts which others have offered in various texts and handbooks on educational and social science research to be invaluable.

Pulling together vast traditions of research and practice into a format that provides a brief snapshot is extremely helpful in delineating some of the history of research and where one might engage their own interests and study. For example, inserted below, is a chart with a few summarizing adaptations from Denzin and Lincoln's (2000) *Handbook of Qualitative Research*.

Epistemological perspectives in research	**Positivist**	**Interpretive /Constructivist**	**Critical**	**Postmodern/ Poststructural**
Purpose	Predict, control, generalize, how to know that we know	Describe, understand, interpret	Change, emancipate, empower, how can we use our rational capacities to remake the social and political world?	Deconstruct, problematize, question, interrupt
Types of Research	Experimental survey	Phenomenology qualitative	Feminist, critical race theory	Poststructural, postmodern, postcolonial, queer theory
Understanding of Knowledge/Reality	Objective, external, out there. Knowledge can be known	Multiple realities depending on our particular contexts.	We can't just privilege one reality, or one way of making knowledge	There is no certain knowledge or way of knowing

Figure 1. Chart is adapted from Denzin & Lincoln (2000). p.116. *Sage handbook of qualitative research.* Thousand Oaks, CA: SAGE

Where does arts based research situate in this chart? One could argue that it is possible for research with art to fall within any of these categories depending on what one makes of, or with, art. In this view Bronwyn Davies' (1997) observation of humanism being central to research is evident. She writes that humanism "signifies something that is everywhere and always the same. It is a condition, timeless and localized" (p. 24; p. 32).

A human centered understanding locates itself in qualitative research by assuming that people who speak from a conscious center give researchers rational coherent meaning that serve as data for analysis and interpretation. Researchers are in charge of art's potential.

	Ontology	**Epistemology**	**Methodology**	**Values**
Arts Based Educational Research	Reality is reinterpreted and reconfigured through work of art.	Knowledge, represented through a work of art, results from careful reflection upon and recasting of qualities experienced by the artist into a form that is unique	The inquirer considers if a particular work invokes the audience to question educational settings, events and issues.	Inquiry is an act of personal judgment rather than one of seeking a final truth.

Figure 2. Table 3-1. Overview of a philosophical analysis of perspectives (detail only). P. 47. Paul, J. (2005). *Perspectives in Educational Research.* Upper Saddle River, NJ: Pearson Education Inc.

In James Paul's (2005) overview of philosophical perspectives in education and social science research (above), we offer just one part of the chart that focuses on Arts Based Educational Research. It is included as one of nine philosophical perspectives, gaining its own category and status in Paul's rendition. In this view art based educational research "represents knowledge through works of art resulting in careful reflection and recasting of qualities that reinterpret and reconfigure reality through forms that are unique" (p. 47). While this seems helpful and beneficial in terms of advancing research based in some form of art practice, it does not seem to delineate arts based educational research as research that achieves what Nigel Thrift, in his study that attempts to broaden the horizon of the politics of everyday life, calls a "diagnosis of the present which is simultaneously a carrier wave for new ways of doing things" (2008, p. 2). Nor does it address life as based on and in movement and the accompanying evolution of movement as an enhanced attractor for more movement.

While we have not yet completed a full search into the ways in which arts based educational research is situated within other philosophical/theoretical diagrammatic frameworks of educational research it seems that the full capacity for research that engages art does not seem to be comprehended in renderings we have found. If and when arts based educational research is included as a philosophical or theoretical framework, how *might* it differ from other perspectives? What does art do that changes both the purpose of research as well as understandings and experiences of knowledge and reality?

Consider with us, some of the powerful claims that have been written about what art does particularly in relation to how it reorients one's entire sense of both reality and knowledge, as well as its connectedness to the researcher in a very material and physically reciprocal way:

> Art brings back out that all form is necessarily dynamic form. There is really no such thing as fixed form – which is another way of saying that the object of vision is virtual. Art is the technique for making that necessary but normally unperceived fact perceptible in a qualitative perception that is as much about life itself as it is about the things we live by. Art is the technique of living life in – experiencing the virtuality of it more fully, living it more intensely (Massumi, 2008, p. 7).

Living art involves more than just helping us to cognitively let go of systems of identification and categorization; it seems that Massumi's description of art literally catches the researcher up in its vitality as part of its unfolding composition. Peter de Bolla (2001) explains, "What I am trying to direct attention to is a peculiar feature of artwork, its "art-ness" rather than a feature of my response. The difficulty here is that such a feature of the work is only visible to me in my response" (de Bolla, p. 135) and beyond what is visible to me, art keeps some of its knowledge and makes it available to others. In relation to our response to art, Elizabeth Ellsworth (2005) writes, it (our response) "constitutes the material of the art-ness of an artwork" (p. 23). There is no possibility here of standing at a distance from the workings and practice of art; our response is part

of the constituting of art's generative energy. Rita Irwin (in Irwin & de Cosson, 2004) argues that "art, research and teaching are not done, but lived" (p. 33).

Simon O'Sullivan (2002) warns that art is "dangerous: a portal, an access point, to another world (our world experienced differently), a world of impermanence and interpenetration, a … world of becoming (p. 128). Art opens us up to the non-human universe that we are part of" (p. 128) and it is an immanent connection to the world through our responding and resonating with reality around us. Timothy Morton (2013) argues for more entangled ecological relationships in which aesthetic events are opportunities to relate to the nonhuman, reinforcements of the gaps that bring us into intimacy with strangers, opportunities to practice what we are not and to connect fragility with other fragility.

Many academic arguments have been written that include the importance of art in and as various forms of emergent research methodologies and we are certainly learning from these. What we glean from the preceding quotes, however, is that a practice of art in research has potential for shifting relationships of ontologies, epistemologies and methodologies in ways that implicate the self as a more entangled part of an ever-changing universe. With this thinking, we are wondering, if it is even possible to address arts based educational research or artful research, and in particular a/r/tography, in the context of the traditional charts that both students and ourselves seem to find helpful – or whether this is too much of a reduction in the integrity of what art does in research. If including arts based educational research in these taxonomies is too reductionist, in what alternative way might we provide visually, its relation to other overviews of philosophies of research?

A/r/tography is of particular interest to us in the ways in which it not only encourages interference but is constructed from an intentional internal intra-action that renders its architecture one of continual reconfiguration. Ability for research emerges in the midst of the co-construction of practices and people. It engages research subjects in varieties of relational living and expectations of open-ended becoming rather than solely into their

representational value. Rita Irwin is most often associated with the development of a/r/tography and we've noted that early influences in her scholarship reveal her interest in research that does what art does. One of the things that art does is to offer a shareable reorganization of experience that "renders complex the apparently simple or simplifies the apparently complex" (in Irwin & de Cosson, 2004, p. 31). Art, in her opinion, is considered in intimate connection with potential for variation.

In her collaborative study during the 1990s with a variety of indigenous peoples around the world, Irwin and her colleagues found that traditionally art was never separated out from life:

> In fact, there was no word for art in any of their languages. At, land, cultural performance and daily living were connected and celebrated. Art, as a conceptual category was created first in a non-indigenous ideology and subsequently brought to bear in a western European understanding of indigenous beliefs…. It was instead, more appropriate for participants to speak of art in terms of spirituality, the essence of life, the pulse of creation making, something practiced in communal evocation of knowledge and considered a means of passing on and renewing collective knowledge from one generation to another. Art was embedded in the performance of culture, something to be made of the body; it was part of sensitizing oneself to change by seeing oneself implicated in the lives of others. (Triggs, in Carter & Triggs, p. 5, 2018).

Even before the development of a/r/tography, Irwin's work focused on the practice of the self in flux, a self already underway but also a self still to come and the self to come as one emerging in the midst of other relational movement. Rather than addressing the subject through critique or narrowly defined language Irwin engaged art based research in its potential for sensing the extra-linguistic forces that strike the body as it practices its events of both slipping out of, and cultivating new expressions of moving selves. In a/r/tography the subject emerges in its research, in its taking in of what it is not, as it remakes itself. This focus invites a more relational way of practicing the self. We feel that it also has potential for shifting humanist traditions lingering even in postmodern

frameworks of research and offers alternatives to the symmetry evident in representational and reflective modes of research.

Based on Michele's recent doctoral dissertation studies in a new materialist framework, and Valerie's work on the materiality of aesthetic practice, we attempt to provide more specific provocation for art's contributions that challenge humanist conceptions of research. Drawing from Barad (2007), we engage her example of the Brittle star to briefly consider what its diffractive and intra-active movement might help us understand about a/r/tographic practice in ways that give more expansive credit to art's generative and propulsive nature in relation to other forms of research. We feel that we need an aesthetic practice based framework that questions the solidity of the world in terms of ontology, highlights its fragility and mutability and knowledge making practices that may not include humans at all, and does so in ways that are not separate from the materiality of ethical response that does not premise human control, nor does it allow for the human to be free of responsibility. Currently, we engage in this deliberation, in particular, with hopes of gaining ideas to add to the helpful diagrammatic overviews and charts of theoretical frameworks in research that currently exist.

To obtain the photographs of Brittle stars we worked with Michele's daughter Mackenzie Sorensen-Woods who is currently in her last year of an undergraduate Marine Biology degree at the University of Victoria. The Brittle Star is an echinoderm sea creature, which means it is from the family of marine animals with five point symmetry and hard spiny covers. Brittle stars are related to starfish but are more delicate with arms branching off from the central disc in such a way as to make the arms quite mobile. What makes the brainless and eyeless Brittle Star fascinating is that its skeletal system is also its visual system which means that the Brittle Star's skin sees (Barad, 2007). Barad explains that it is as if tiny lenses are built into the Brittle star's body as the architecture of its body has the capacity to reconfigure its body and the boundaries of its environment.

Figure 4. *Brittle star*. Mackenzie Sorensen-Woods, Photograph, Victoria, BC. 2018

Particularly interested in the Brittle star's capacity to see from a 360 degree view, scientists liken the species to the pixelization process of the digital camera (Barad, 2007). The Brittle star creates images through the absorption of light which corresponds to its nerve bundles, enabling it to see all around its environment and protect itself from danger (2007). It even has the capacity to shed its segments and upon shedding, regrows them. These are embodied practices of intra-activity, however embodiment is about more than the human body moving through places. Barad argues that "embodiment is a matter not of being specifically situated in the world, but rather of being *of* the world in its dynamic specificity" (Barad, 2007, p. 377).

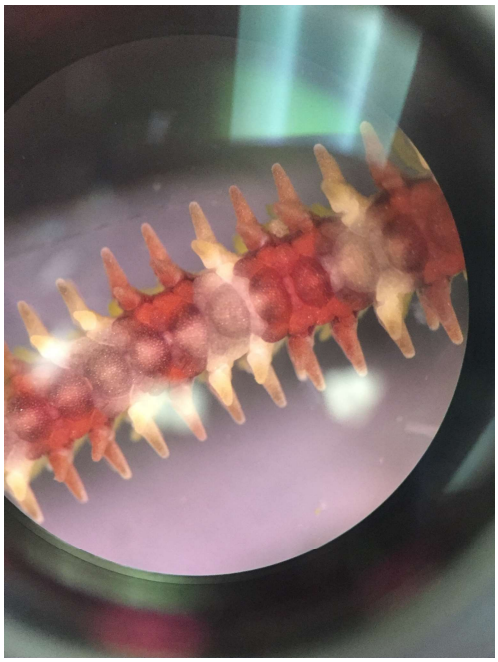

Figure 5. *Brittle star*. Mackenzie Sorensen-Woods, Photograph, Victoria, BC. 2018

Intra-activity suggests the mutual constitution of integral agencies, the mingling of people, things, places. However intra-activity is different than interactivity because the emphasis is on being in the midst of action and through being in the midst, entities co-construct different ways of relating. Ability to act emerges from within intra-action and separate phenomenon are made and unmade through intra-actions and although we are separate we are not separate. Through embodied practices of intra-activity, the Brittle star "differentially responds (not simply in the sense of responding differently to different things that are out there) but in ways that matter" (Barad, 2007, p. 233). In other words it is not just reflecting on needed response, it is remaking itself in alignment with the interference that it is encountering. The Brittle star bears evidence of the difference that difference makes. What Barad suggests is that the Brittle star comes to know through its body and is differentially constituted in relation with its environment. In other words, the constitution of the Brittle star is an indeterminate and relational practice. The Brittle star is not only living in the ocean, but is *of it* in the sense that it spatiotemporally reworks its bodily boundaries (Barad, 2007).

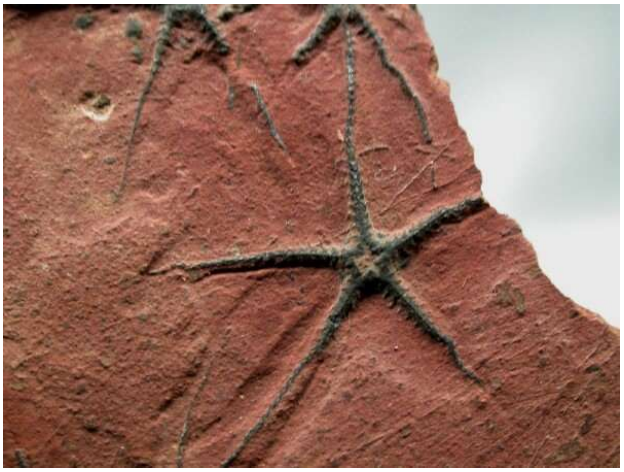

Figure 6. *Brittle star death assemblage*. Available: http://www.fossilmall.com/EDCOPE_Enterprises/echinoderms/echinoderm-64/echinoderms-64.htm[i]

We consider a/r/tography to be a research practice that engages art in order to accomplish more intra-activity and in fact, we think that a/r/tography might be seen as a derivative of brittle star thinking/ moving. Intra-action involves movement that Barad describes as diffractive. It is common educational practice to use optical metaphors in describing matters of epistemology and methodology. However, while both reflection and diffraction are optical terms, diffraction is also a useful concept for understanding what reflection does *not* do. Distinguishing between the optics of reflection and diffraction also highlights the difficulties inherent in theories of representationalism which continue to be prevalent in qualitative methodologies.

Barad explains that the study of optics is divided into two categories: classical and quantum. In classical optics one method of investigation involves geometrical optics which is an approximation tool for studying configuration of lenses, mirrors or prisms. While it is focused on where light goes or what it can be made to do, on or through various optical instruments, light's nature is of no real concern. Its reflective work is a short cut way of deriving correct results in experiments when the wavelength of light is smaller than other dimensions in the experiment because in these cases, light starts to adhere more in the "normal" arena of direct visualization (StackExchange, Physics).

There are important difficulties when the optics of reflection is engaged as a theory or method of knowing. Representationalism purports that knowers make representations that attempt to mirror reality and as such, knowledge, or art is a reflection of reality. To achieve most accurate reflections, some philosophical frameworks are concerned with subtracting the influence of the knower in the production of representations and this theory is based on the same understanding in which reflection is used to accurately provide information on what another course of action might provide. Reflecting, however, invites an illusion of essential and fixed positions, a sameness that finds sustenance in homogeneity. In reflection, light is considered a tool but not an object of inquiry and the nature of light is not considered as important as human rational thinking.

Diffraction highlights that reflection does not use the full theory of physical optics which involves light as well as its interactions with matter, where alternatively, diffraction is an active agent of change that can be mapped for locating its inhabitants, and their movement. Diffraction involves processes of changes in direction precipitated by passages around obstacles, through openings or past edges and maps difference in accordance with the apparatus used. It also maps the differing of the difference as it continues to evolve. It also maps what has not been measured and it includes the measuring in its subsequent differing, meaning that the apparatus augments does not disentangle the phenomenon under observation and instead is part of enacting a contingent resolution of the ontological inseparability within the phenomenon.

Barad (2007) further elaborates the concept of diffraction as a scholarly approach, arguing for a diffractive method that makes visible the entanglements of scientific practices and the social. To translate this to social science and educational methodology, diffraction does not assume that there is an unproblematic self that we can simply represent and instead emphasizes difference and entanglement. According to Barad (2007), "diffractive methodology is respectful of the entanglement of ideas and other materials in ways that reflexive methodologies are not" (p. 30). Diffraction *includes* disjunction and interference, necessitating continuous displacement and conveying the

indeterminacy of any attempt of capture. Drawing from diffractive movement, the challenge in educational research, is of course, to build similarly for continuing modulation as is evident in our example of the art of Brittle star body architecture.

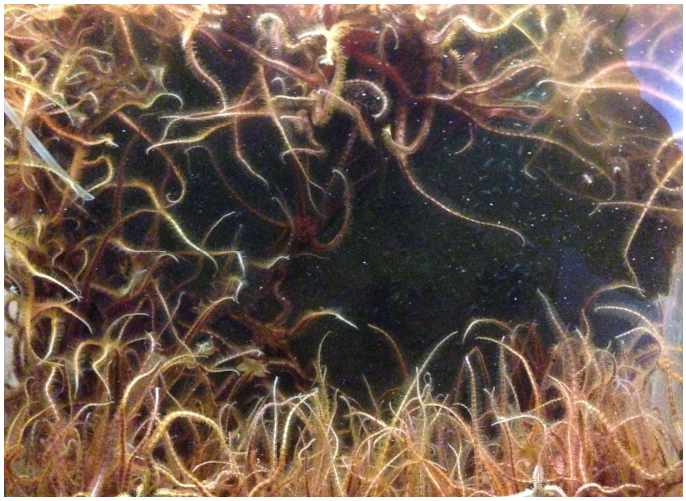

Figure 7. *Brittle star*. Mackenzie Sorensen-Woods, Photograph, Victoria, BC. 2018

Although the Brittle star does not travel in group-formation, it is an example of a species that marks difference from itself through bodily space-time reconfigurings or matterings (Barad, 2007). It is an agentive force that does not foresee its relations yet responds with its self-prosthetic apparatus to work with the constraints and conditions of the oceanic environment, and without human intervention. Simply put, the Brittle star unfolds future possibilities of being via its being; it moves in the realm of potential and becoming in relation that cannot be predetermined.

Barad's (2007) example of the Brittle star serves as a matter of practices that make a qualitative difference in the world. Difference in this sense is not about othering or separating out but more about responsiveness in a felt relationality with continuous variation. We need practice-based theoretical architecture for research invitations that offer opportunities to witness the malleability, fragility and reconnectivity of our identified human limits. As with the Brittle star, new problems to be solved emerge literally and materially as effects of mutual engagement. Barad describes Brittle stars as examples of diffraction whose bodies bear witness of the worlds they have evolved to

live in, bodies that both reveal and enable techniques and knowledge for movement. Brittle stars have coevolved in concert with their technical practices and environments: agency does not preexist and responsibility is distributed rather than caught in loops of linear cause and effect.

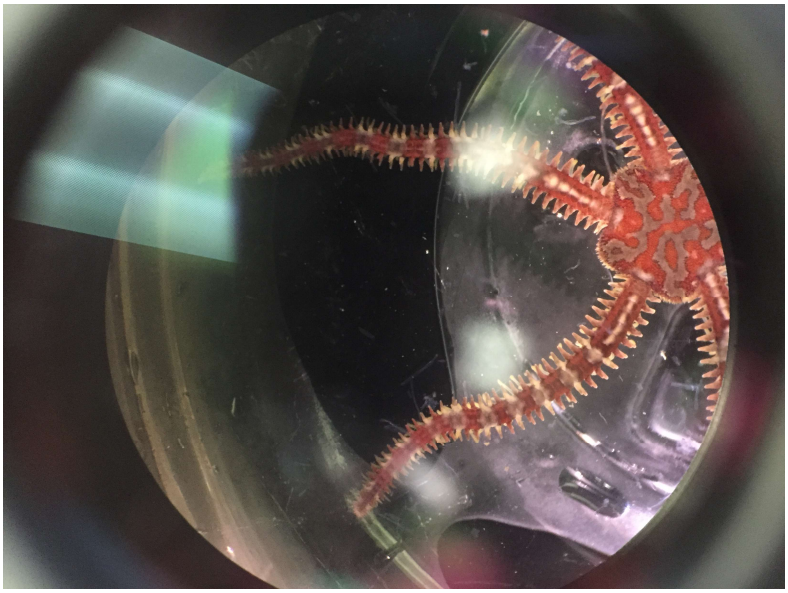

Figure 8. *Brittle star*. Mackenzie Sorensen-Woods, Photograph, Victoria, BC. 2018

Returning to Lincoln and Guba's chart, we take the liberty of adding an additional column at the far right (Aesthetic / Ecological) and at the bottom (Criteria). The descriptions in the far right column attempt to delineate art as entering into reality and not only expanding what is possible but also reinventing human sensoriums (Thrift, 2008), as bodies, research perspectives, and other responsive and fragile infrastructures add to themselves and experience themselves, as variable.

The bottom row in the adapted chart addresses the changing criteria that differentiates research beyond standard criteria of probability, plausibility and possibility and introduces research that is attuned to the feel of new forms of vitality, including that of the researcher (see full discussion on the criterion of potential in research in Triggs, O'Donoghue, & Irwin, 2014). Massumi differentiates possibility, which is a variation that is implicit in what something can be said to be when it is idealized, from potential which

is the immanence in a process that is "the still indeterminate variation, underway" (2002, p. 9). Potential situates everything as secondary to the movement of practice and rather than derived knowledge, ascertains research as the feel of new forms of vitality.

Epistemological Perspectives					
	Positivist	**Interpretive /Constructivist**	**Critical**	**Postmodern/Poststructural**	**Aesthetic/ Ecological**
Purpose	Predict, control, generalize, how to know that we know	Describe, understand, interpret	Change, emancipate, empower, how can we use our rational capacities to remake the social and political world?	Deconstruct, problematize, question, interrupt	Create opportunity for responsive assemblages that move, feel, think.
Types of Research	Experimental survey	Phenomenology qualitative	Feminist, critical race theory	Poststructural, postmodern, postcolonial, queer theory	Arts based, diffractive, Practice-based
Understanding of Knowledge/Reality	Objective, external, out there. Knowledge can be known	Multiple realities depending on our particular contexts.	We can't just privilege one reality, or one way of making knowledge	There is no certain knowledge or way of knowing	Every movement adds to actual reality and generates new potential
Criteria	Probability	Plausibility	Possibility	Possibility	Potential

Figure 9. Chart with authors-added adaptations. Original chart in Denzin, N. K. & Lincoln Y. S. (2000). *Handbook of Qualitative Research.* Thousand Oaks, CA: Sage, p. 114.

The Brittle star's ongoing research involves responding to other practices: tidal fluctuation, other sea life and the movement of the ocean floor. It responds to gravity's propulsion of what is up and what is down. It accelerates into quick transfers that could mean the difference between continuing and disaster. It mixes and remixes dynamic and static elements in endless variation. It is not enough for the brittle star to prevail against its environment but its research infrastructure must stream its environment continuously through itself. The Brittle star especially needs to be able to generalize this knowledge to each part of its body without allowing it to regroup at any time. The art of the Brittle star acts effectively as a substitute for ontology and the events of this practice provide habitats for diverse formations of living. Unable to exist by engaging only with what is currently possible, the Brittle star re-invents itself by its responsiveness to what it is not.

Figure 10. *Brittle star*. Mackenzie Sorensen-Woods, Photograph, Victoria, BC. 2018

A/r/tography aligns itself, for us, most clearly with this elemental legacy of art, one that indigenous artists and scholars seem to have maintained a sensitivity to. Intra-active and diffractive procedures and techniques of expression must sense pure potential in the art of the Brittle star. Thrift (2008) calls for practices that do more than "simply squeeze meaning from the world" (p. 5) and instead, acknowledge the necessity of a "presence that escapes a consciousness-centered core of self-reference" (p. 5). He claims that

sometimes we need to feel the things of the world next to our skin; in the case of the Brittle star, this would be the feel of the world next to its seeing skin, its hard spiny cover and its mobile arms. We see a/r/tography as a derivative of planetary evolutionary movement and we look forward to discussion on ways we might offer research perspectives and diagrammatic charts beyond current delineations.

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[i] In this image of a Brittle star fossil, we were surprised to read the scientific description of it as a death assemblage, a description that acknowledges for us, its responsiveness and connectibility even after death as well as its bodily evidence of the worlds that it evolved with and in.