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Susan Squier's Epigenetic Landscapes: Drawing as Metaphor

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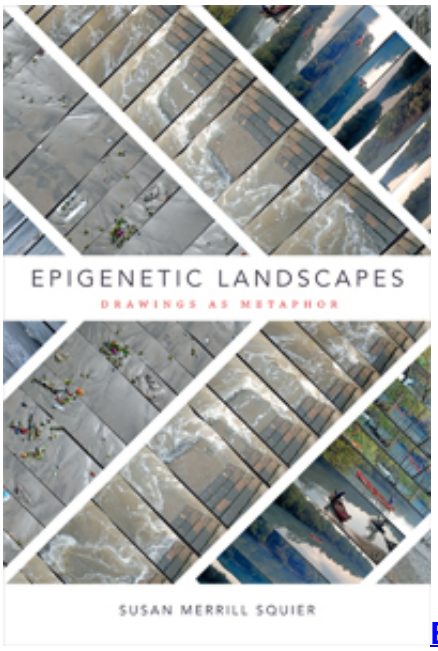
By Rebecca Rahimi



Epigenetic Landscapes: Drawing as Metaphor

Susan Merrill Squier

Duke University Press, 2017. 280 pages

Susan Merrill Squier's *Epigenetic Landscapes: Drawing as Metaphor* is positioned at the intersection of biological systems and art. Squier is a professor of Women's, Gender and Sexuality studies whose research examines how culture, art and comics influence medicine. The book consists of an extensive biography and history of Conrad Waddington–the biologist often credited with laying the conceptual groundwork for epigenetics–and his three formulations of the epigenetic landscape. Squier's text largely serves as an analysis of how images associated with the epigenetic landscape can be reimagined and understood as revealing knowledge not only regarding the life sciences, but the entanglement of art and science as informed by feminist epistemology.

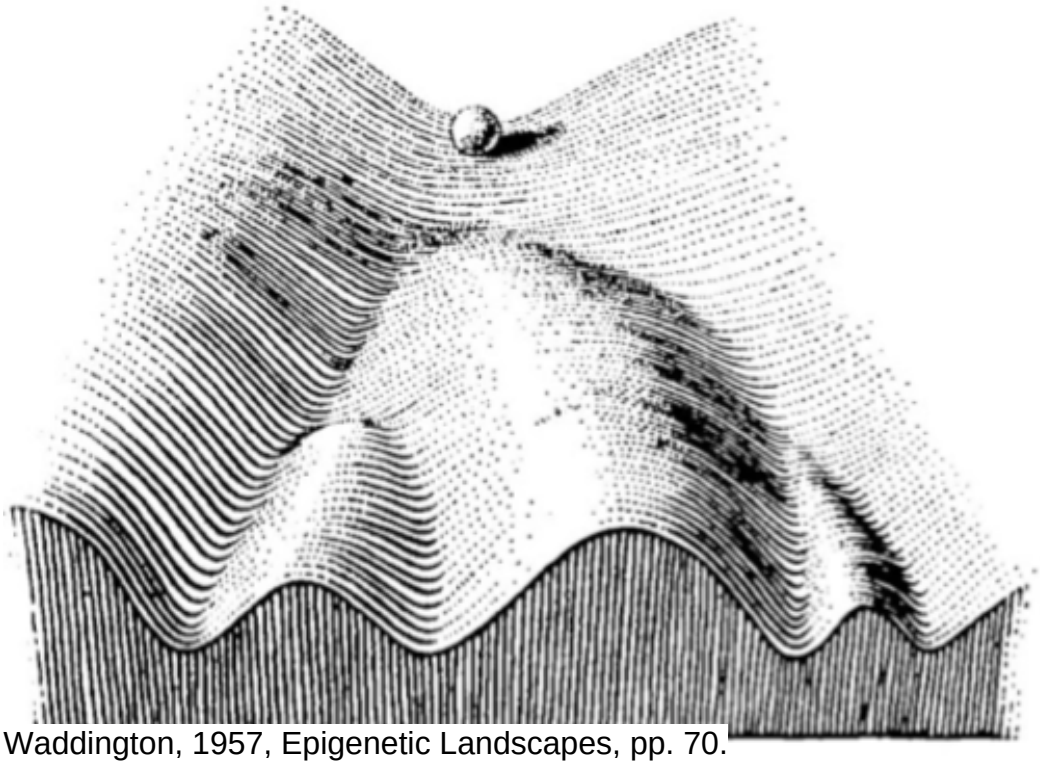
By incorporating scholarship from various disciplines, Squier critiques the modern-day narrowing of epigenetics in order to argue for an epigenetics of the past, one that encourages ambiguity and questioning. In doing so, Squier looks at how epigenetics can be used in analyzing biological notions and understanding the development of knowledge in several other (humanities and social science based) fields. By scrutinizing the history of the epigenetic landscape and by integrating a multidisciplinary perspective, Squier successfully argues against epigenetic determinism and reductionism; in doing so, she reintroduces the concept through an unexpected and humanities-based lens. Unlike today's molecularized understanding of epigenetics, Squier's exposition of epigenetics, which showcases her sensory-laced descriptions and inclusion of the arts and feminist epistemology, mirrors the vibrant and well-rounded approach first taken by Waddington.

Waddington's first landscape is the river, drawn by John Piper, an artist and friend of the scientist. Chapter One centers on the initial formation the river, and how cultural events lent themselves to Waddington's interest and creation of the epigenetic landscape. Waddington and Piper were both interested in the "connection between the movement of time and changes in the landscape… for Waddington, the challenge was epistemological: he wanted to find a way to link embryological development to hereditary transmission through the representation of temporal processes in a visual form" (25). Affected by the perturbations and chaos resulting from World War II and the Blitz, the men turned towards images of realistic and contextually comprehensible landscapes–leading to Piper's illustration of the river. Waddington collaborated with Piper to create a drawing that broke free from the narrowness and complexity of the language associated with biology and instead made clear "the connection between the movement of time and changes" in both the landscape and in gene expression itself (25).

Waddington, 1940, Epigenetic Landscapes, pp. 23.

The book's fifth and sixth chapters expand on Waddington and Piper's river in applying notions of movement, time, and changes in outcome to the materiality of landscape architecture. Squier focuses on the works of Ian McHarg–an ecological architect–and architects Anuradha Mathur and Dilip da Cunha, a pair who use the land, its ecological processes, and the cultural and social contexts that surround it in order to take a postcolonial approach to landscape architecture. One of Mathur and da Cunha's works, titled *Soak: Mumbai in an Estuary*, reworks the initial architectural design put in place for flood prevention in Mumbai–one that had continually proven ineffective. Instead, the architects visualized the city as having fluid boundaries and "temporal rhythms that structure [the land and sea territories] over time" (175). Mathur and da Cunha's model, in addition to the other examples that Squier includes, mirror Waddington's first landscape in that they quite literally work with rivers and water systems, as well as the way in which they look at the flux and blurred boundaries within the landscapes they create.

Waddington's second landscape–an embryo, fertilized egg, or ball atop a contour-riven slope–is discussed in the third and fourth chapters, both of which analyze representations of the embryo through animation and graphic medicine (respectively). As illustrated in the figure below, the embryo rests on a contoured slope, which represents "the statistical probabilities governing its development," a notion which Squier unpacks in terms of genetics (the Punnett square and embryology) as well as her overall argument (the way in which epigenetic landscapes garner development) (70).



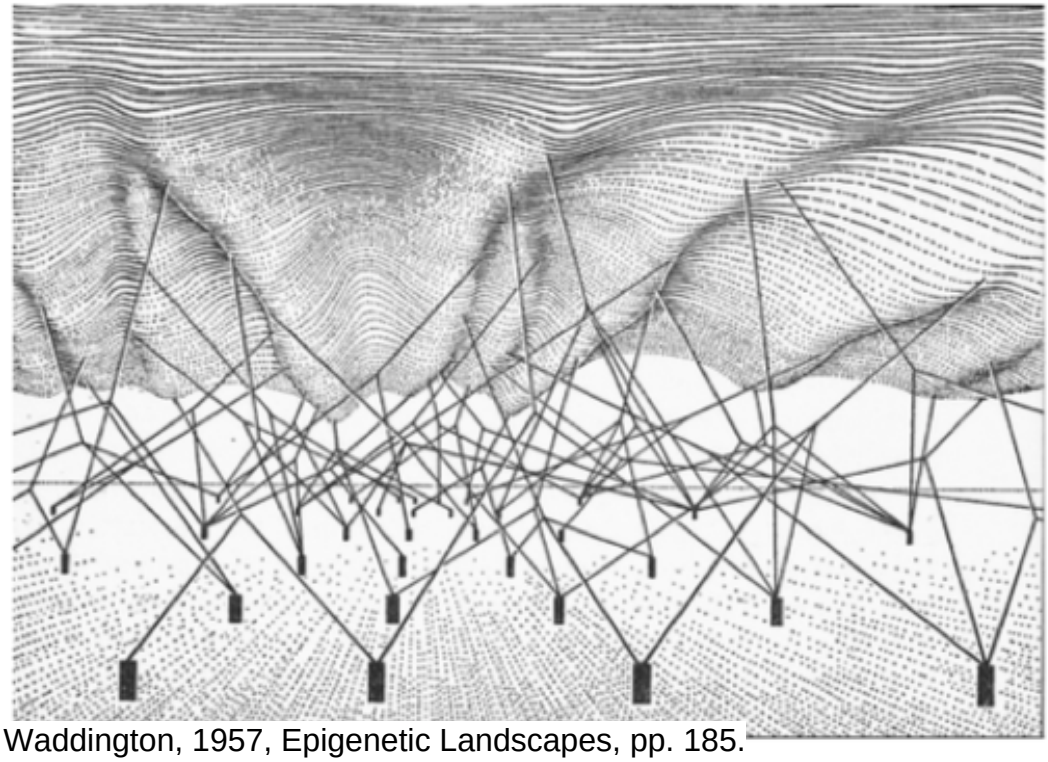
Waddington, 1957, Epigenetic Landscapes, pp. 70.

The second landscape also allows for further visual motion; while the river flows in a linear fashion, somewhat restricted by its blurred boundaries, the embryo has the possibility of rolling down any of the paths present on the hill. Squier expands on this notion of movement by labeling a genre of new visual representation, known as "graphic embryos." Encompassed in this group are animations, pioneered by Thomas von Sömmerring's "Images of Human Embryos," which stands as the first sequential (or in Squier's terms, "serial") group of images depicting embryological development. Von Sömmerring's illustrations, as well as the cartoons and comics it inspired belong to a broader category called graphic medicine.

Works of graphic medicine are visual representations of illness, treatment, and medical processes through the perspective of healthcare providers,

patients, families, and others involved in the medical realm; in turn, this can enable greater understanding of such (technical and confusing) procedures, while also allowing for an embodied and personal experience to be made social. Graphic medicine is a melding of the artistic, aesthetic and inter-perspectival aspects of Waddington's original epigenetic landscape–that which forfeits the narrowness of language in exchange for multi-dimensional and non-reductive art. Chapter Four centers on a variety of comics, including Ruben Bolling's "Bad Blastocyst" and David Small's graphic memoir, *Stiches,* amongst others. In analyzing such works, Squier demonstrates that Waddington's second landscape lends itself well to the genre of graphic medicine–despite being a static image–as it relies on imagined movement in order to convey the mutability of gene expression.

The view from underneath is Waddington's third iteration of the landscape and one that Squier places most closely alongside the humanities, as seen in her seventh chapter. This view demonstrates variability in development, but lacks movement and the flexibility (or blurring) of its boundaries apparent in the first and second landscapes. This illustration is comprised of strings which, when pulled in different directions, can affect and alter gene expression.



Waddington, 1957, Epigenetic Landscapes, pp. 185.

Following her explanation of the landscape, Squier devotes the bulk of Chapter Seven to the Art Laboratory Berlin (ALB) and its works/exhibitions in bioArt, which "exemplify the process of thinking together across different disciplines and geographic contexts about the nature of biological

development, stability during change, and variation" (191). The pairing of Waddington's studies with the ALB's installations (ranging from photos of dead abnormal frogs to petri dishes filled with a range of organic material) may seem unlikely for some; however, Squier's statement on the processes exemplified by the ALB's works succinctly explains Waddington's reasoning in having created the epigenetic landscape. Furthermore, in focusing on the ALB, Squier makes clear Waddington's claim that art and science are inextricably intertwined and that one largely informs and provides exposure to the development of the other.

Squier's Conclusion reads more like a continuing chapter wherein she focuses on the work of Anne Fausto-Sterling in applying feminist theory to epigenetics and the landscape. Fausto-Sterling creates visual representational models that depict fluidity in gender by understanding how fetal systemic development acts on one's biology. Squier writes that her reasoning in looking at different disciplines within her book, and in focusing on feminist and gender theory in her Conclusion, is to widen the scope of epigenetics and to allow for a multi-disciplinary, artful, uncertain, and curious approach–similar to Waddington's.

Squier's text provides a largely insightful, informative and enjoyable read. What I find most interesting is the way she connects the focus of her book to other concepts and fields of study–including the arts and graphics, as well as critical feminist studies. Squier's topic is undoubtedly unique, and I appreciate the clarity with which she goes about describing and integrating visual representations and the arts (performances, installations, comics, the list goes on) into the biological realm of epigenetics.

Because much of her book focuses on the history and contributions of Waddington to the field of epigenetics, the majority of the research and evidence Squier utilizes is archival research from a range of fields, including mathematics, the feminist sciences, as well as science and technology studies. Squier's work also benefits from the inclusion of profiles on other individuals and institutions in her later chapters, from architects to laboratories. However, one major disadvantage I found in the types of resources Squier uses is that it obfuscates her argument. For a text so concerned with visuals, Squier's book would benefit from the inclusion of more images, especially ones relating to landscape architecture, the ALB and gender development; the lack of such images makes it difficult for the reader to fully grasp what Squier argues for and discusses. However, despite this drawback, Squier includes conversations from a wide enough range of experts that she is able to support and bolster her arguments and in doing so, establishes *Epigenetic Landscapes: Drawing as Metaphor* as both an academic text as well as an insightful view into the remarkable melding of science and art.

Rebecca Rahimi *is a graduate student at Vanderbilt University's Center for Medicine, Health, and Society. Her research interests center on intergenerational memory, the blending of the arts and social sciences, notions of culture and storytelling in Iranian memory, narrative and music therapies, and elderly populations with Alzheimer's and dementia. As a member of Vanderbilt University's Critical Design Lab, she also pursues the exploration and layered understandings of "home" within interstitial spaces.*