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In her forthcoming book *Aroused: The History of Hormones and How They Control Just About Everything* (June 2018), Randi Hutter Epstein faces a daunting challenge in charting the history of hormonal science from the late nineteenth to the twenty-first century United States. Beginning with the freak shows of the 1890s, which Epstein contends were often populated by individuals who were likely experiencing hormone imbalances or disorders, Epstein traces the discovery and wide-ranging study of hormones and their suspected roles in regulating human emotions, empathy, youth and virility, sex differentiation, growth, menopause, and hunger. Epstein's chapters begin with an anecdote and examine the hormonal science, debates, and implications behind each of these subjects, with chapters that consider particular topics within these broader categories. As the book's case study structure suggests, each of these subjects contains a universe of complexity even as the hormonal linkage runs throughout them; indexing contentious social and political debates and changes, Epstein's book faces the challenge of doing justice to these contexts that were inseparable from scientific developments while remaining focused on the science that threads these cases together.

Epstein's book shines in the author's knack for describing the molecules, cells, and chemical interactions of the body. I found Epstein's descriptions of these biochemical interactions thought-provoking and evocative; for instance, she nuances the "lock and key" metaphor usually deployed by biology teachers to describe chemical attachments (a metaphor that I immediately recalled vividly from my undergraduate biology days), which Epstein contends "falls short" of describing the dynamic and fluid nature of these interactions: while the lock and key "conjures up chunks of metal sealed together,"[1] Epstein writes that hormones "aren't so much locked but embracing in

loose sort of way, like a couple dancing. They draw together; they drift apart; they reconnect; they drift apart; and sometimes a competing hormone breaks in and knocks the other one away from its dance partner.”[2] Epstein’s description helps us appreciate the dynamic liveliness of these biochemical entities, rather than a picture of static materiality. It called to mind for me Natasha Myers’s ethnographic study of protein researchers who cultivate intimate, embodied modes of relating to their microscopic objects of study in their efforts to better understand and model them, moving their bodies, for example, to engage with, mimic, and develop a kinesthetic intuition for these molecular movements.[3] Like Myers’s scholarly research, Epstein’s creative science writing can help us consider and perhaps also relate to the dynamism of substances we might otherwise consider inert matter. In the process, these linkages also illustrate how scholarly empirical research and experiments in imaginative and popular writing can fruitfully cultivate awareness of the liveliness of our world together.

The depth of Epstein’s archival research and the wide range of materials on which the book draws also lends it historical richness that vividly illustrate the monumental shifts in scientific and medical practice over the centuries and the interpretations and debates over hormonal science that raged in particular time periods. The book draws on an impressive array of newspaper quotes and clippings, photographs, interviews with patients, scientists, and their families, legal cases, and medical and social scientific research. A photograph of jars of pituitaries taken from cadaver brains, for instance, punctuates a chapter on the beginnings of pituitary harvesting for growth hormone in the 1960s.[4] At the time, pituitaries were simply placed in a container with acetone, or nail polish remover, and could be transported and shipped freely, echoing the movement of organs and bodily substances in earlier chapters in which Epstein notes that these materials were not subject to biohazard regulations as they are now; a person could simply take an organ in a jar on the train with him to a different state, as Epstein writes one doctor did to transport a placenta to a researcher.[5] The picture of giant jars filled with pea-sized pituitaries adds a visceral quality and sense of scale to the astonishment that attends considering such different lived relations from our own to bodily materials, which could still legally circulate outside official biomedical and scientific infrastructures.[6]

Even as Epstein notes the social and political histories through which hormonal science took shape, however, I often found myself wishing that the book also more substantively developed these social and historical arcs to connect the chapters beyond their shared scientific trajectory. Contestations over animal experimentation and vivisection, eugenic questions of desirable population traits, gendered histories both of female bodies as exemplary experimental subjects and in scientific practice, and the uncertainties of treatments that rendered the population at large an experimental population, to name a few thematic trends, run throughout the book and are noted but remain largely confined to particular developments rather than interconnectedly drawn out. The chapter on the early identification of hormones from animal bodies, disproving the theory that nerves transport the signals carried by hormones, explicitly engages with vivisection; it begins with male medical students tearing down a monument to experimental animals put up by anti-vivisection activists, many of whom were women. The historical details of Epstein’s narrative suggest that complex gendered and class dynamics attended the conflict between scientific

practice and the call to seriously consider the animal suffering that was the price of scientific research; Epstein notes that working class newspapers tended to side with the anti-vivisectionists, while *The Times*, a publication with historically more conservative leanings, was “known to side with the scientists” and “called the whole affair—which included women gaining entry to a medical theater [...] sneaky and reprehensible.”[7] These complexities, however, are ultimately somewhat easily subsumed in and serve to uphold the triumph of science; Epstein writes that the backlash against the anti-vivisection movement served to unite the public and scientists in support of the emerging field of endocrinology, and though Epstein often notes the killing involved in animal experimentation involved in subsequent decades of scientific developments, these convictions are never mentioned again.

Eugenic possibilities in the role of hormones in shaping emotions, behavior, and empathy and whether hormones should be administered to shape these propensities are likewise mentioned in relation to a 1920s debate in the trial of two young boys convicted of murder but not developed in later chapters, though eugenic questions on what constitutes a desirable population remain salient to later debates about hormonal therapies, particularly in relation to sex differentiation and intersex children. Human patients who undergo treatments whose outcomes are uncertain, and the convergences and differences between hormone therapies as birth control or menopausal treatment for women versus those aimed at improving male youth and virility also call attention to nuances in an ongoing trend of human patients as experimental subjects. As this brief gloss suggests, Epstein’s book notes but does not flesh out the myriad interconnections between these deep-seated socially inflected questions and transformations that are thoroughly intertwined with and shape laboratory science and biomedical practice into the twenty-first century.

In short, Epstein’s *Aroused* makes for a thought-provoking overview of the trajectory of hormone science that is filled with colorful scientific and historical details. These details and the suggestions of the wide-ranging and contentious debates and social transformations that shaped US social relations and scientific practice, questions with which we are continuing to grapple today, will lead readers who are still curious to more fully flesh out these contexts and connections to pursue further reading elsewhere, which is also a credit to the book’s ambitious scope and project to render hormones a relevant and provocative topic of popular and scholarly consideration beyond the sciences.

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Cover image from <http://randihutterepstein.com>.

[1] Randi Hutter Epstein, *Aroused: The History of Hormones and How They Control Just About Everything*. W. W. Norton, forthcoming June 2018, 154.

[2] *Ibid.*, 154-5.

[3] Natasha Myers, *Rendering Life Molecular: Models, Modelers, and Excitable Matter*. Duke UP, 2015.

[4] Epstein, 141.

[5] Ibid., 97.

[6] Ibid., 140.

[7] Ibid., 28.