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Review of Laura Otis, *Membranes: Metaphors of Invasion in Nineteenth-Century Literature, Science, and Politics.*

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Laura Otis, *Membranes: Metaphors of Invasion in Nineteenth-Century Literature, Science, and Politics*. Baltimore: Johns Hopkins University Press, 1999. 210 pp. ISBN 8801859964.

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Beginning with its introductory story and continuing through its final gestures, Laura Otis' *Membranes* is concerned—almost obsessed—with difference, similitude, and the boundary between them. Their intricate connection, which serves as the thread that links this wide-ranging investigation, is captured immediately by Otis' initial narrative. In the Stryker laboratory, while witnessing an experiment studying the interaction between the eye and the brain, Otis appreciates the necessity of change and differentiation in order for vision to work. Neurons fire in direct response to movement—whether vertical, horizontal, or diagonal—but vision cannot happen without the borders and differences through which one object is distinguished from another. As a student of literary theory, Otis again recognizes the necessity of difference in linguistic systems, where meaning emerges from the comparison and differentiation of words and ideas. Whether the scientific study of vision or the philosophical investigation of language, Otis concludes, difference is the common denominator: "Like our visual system, we create meaning only through the differences we perceive and the boundaries we believe are present" (2). Ironically, while her experiences in both classrooms underscore the vital role of difference in the production of knowledge, they simultaneously highlight a similitude that invites the disciplinary border-crossings that Otis' investigation enacts. The necessity for difference, in other words, provides a common ground upon which Otis constructs a provocative argument for the fundamental similitude that it masks.

With this focus on borders, Otis first attempts the very difficult task of constructing and articulating her own limits. For the majority of the book, she is able to strike a crucial balance between respecting the boundaries she has established for herself and exploiting the diverse possibilities that her focus invites. Focusing on the nineteenth century, Otis uses this common discourse of borders and difference to link scientific, literary, and cultural concerns. Thus, *Membranes* is interdisciplinary in a number of ways. It deliberately chooses to investigate figures who cross disciplinary boundaries in their own education and writing. In four of her six chapters, Otis discusses "author/scientists" who were actively engaged in scientific, political and literary endeavors. Disciplinary borders, then, are crossed first not by Otis, but by the figures whose scientific, political and literary accomplishments provide the basis for her own interdisciplinary investigation. As a result, Otis avoids the common assumption that interdisciplinary scholarship is a recent invention that contemporary writers achieve by crossing the boundaries that have historically divided scholars. Instead, Otis challenges the viability of these boundaries not only as she crosses them, but as she argues that crossings were negotiated throughout the nineteenth century. In doing so, she not only bridges literary, political and scientific discourses, but also links them to contemporaneous economic, psychological, and social concerns.

In her first chapter, Otis examines the broad social and political implications of scientific advancements in both germ and cell theories. Echoing Michel Foucault's *The Birth of the Clinic*, Otis identifies the "Individual" as the focal point at which these various discourses would converge during the nineteenth century. With a growing focus on "the cell as the locus of disease

and on the microbe as its cause" (8), scientists re-located their gaze from external environments to the internal space in which cells exist and interact. While miasma theory located disease with vapors that circulated within particular environments or amongst certain people, germ theory allowed disease to penetrate the body and, thus, threaten its borders. Otis charts this crucial shift from miasma theory to germ theory by reviewing the contributions of an array of scientists, including Robert Boyle, Antoine Lavoisier, Xavier Bichat, P.J.F. Turpin, and Theodor Schwann. The thoroughness of this exploration sets a benchmark that Otis continues to meet throughout her study. Her discussion of Rudolf Virchow and Robert Koch, for example, which occupies the remainder of her first chapter, allows Otis to expose essential links between nineteenth century science and politics. By examining Virchow's dual rise as prominent scientist (he taught pathological anatomy and published *Cellular Pathology* in 1858) and an influential politician (he was appointed to the Berlin City Council in 1859, elected to the Prussian House of Representatives in 1861, and served in the German Reichstag from 1880-1897) Otis identifies the cross pollination of scientific, political, and social discourses. This link is pushed further with the discussion of Koch, whose contributions to bacteriology not only influenced the scientific community, but also made him a vital part of Germany's imperial mission. With frequent travel to Africa between 1890 and 1910, Koch performed a crucial role for the German government as it established and maintained its growing empire. When asked to put his scientific work on microbes, germs, and disease to use, Koch, like Virchow, crossed disciplinary boundaries as he assumed responsibility for maintaining the health of Germany by protecting individual and national borders.

After establishing these initial links between science and politics, Otis moves in subsequent chapters to incorporate literature into her study. Beginning with S. Weir Mitchell, in chapter two, Otis focuses on author/scientists whose education and professional lives invite the cross-disciplinary perspective she assumes throughout the book. In the case of Mitchell, Otis connects his medical training and his familiarity with mesmerism and hypnosis with his literary interest in human will, the boundaries of individual identity, and the influence of external forces upon the mind. As a proponent of cell and germ theory, Mitchell believed that individual health depended upon protecting boundaries and resisting negative interactions. As Otis reviews Mitchell's literary works (including *Doctor North and His Friends* and *Constance Trescot*), she concludes that they "compliment his scientific ones in presenting the independent, controlled, semipermeable individual as the healthiest living unit" (54). At the same time, both his scientific and his literary works were deeply informed by his political beliefs; whether it is "unruly mobs and uncontrolled riots," "unchecked emotions," or "the chaos created by bacteria," Mitchell emphasizes the need for social, psychological, and scientific control.

In her third chapter, Otis considers Spanish Nobel Prize winner, Santiago Ramón y Cajal, whose scientific, political and literary works are also linked through their common concern with patrolling borders. Like Mitchell, Cajal draws direct parallels between the cell and the self, arguing that the health of both depends upon resisting outside influences. After outlining his scientific training and accomplishments, which eventually earned him the chair of histology and pathological anatomy in Madrid, Otis makes impressive connections between this work and several of his short stories, including "For a Secret Offense, a Secret Revenge," "The Fabricator of Honor," "The Accursed House," and "The Corrected Pessimist." With each discussion, Otis supports her claim that for Cajal, "science and art were one" (83). From the need to defend

oneself against invisible threats to understanding individuality as a characteristic shared by the cell and the human being; from a concern with how separate cells and distinct individuals connect to the common threat of infectious bacteria and dangerous ideas, Cajal's stories dramatize his scientific concerns. In this chapter's conclusion, Otis incorporates Cajal's political philosophy into her discussion of his scientific and literary accomplishments and, in doing so, links him to previous chapters: "As in Virchow's and Mitchell's writing, references to the way the body is 'governed' betrays the scientist's own political stance" (86) These works, in other words, rely on common metaphors of borders and their crossings to link scientific investigations of the cell, literary representations of the individual, and political debates over class difference, political structures, and national identity.

While for Cajal, cellular regeneration provided a model for re-invigorating Spain in the face of its imperial decline, Arthur Conan Doyle emerged as a defender of England's borders as her imperial identity reached its zenith. As this continued expansion strengthened the British Empire, it also left it vulnerable to foreign germs and ideas. For Otis, Sherlock Holmes is England's answer to the growing need for an "immune system," responsible for "identifying and neutralizing living threats to society" (91). As in previous chapters, Otis begins by discussing Doyle's medical career, underscoring his contribution to protecting the British Empire from foreign threats by joining in efforts to fight bacteria in the African colonies. In the remainder of her chapter, Otis considers how Doyle continued this patriotic mission through his Holmes stories by creating a defender of England's borders at the very moment that germ theory and imperialism highlighted their vulnerability. Like the "author/scientists" discussed in previous chapters, Doyle is concerned both with protecting the nation (here England) against the invisible threat posed by bacteria and using bacteria as "a metaphor through which once could articulate fears about all invisible enemies, military, political, or economic" (94). If physical boundaries between individuals could no longer prevent infection, the national boundaries that divided countries could also be violated. Despite its attempt to control the direction of imperial influence and, thus, protect its own borders, England was increasingly confronted with its own permeability and vulnerability. In her detailed discussions of *The Sign of Four* and *A Study in Scarlet* and shorter references to innumerable other stories, Otis supports her claim that Holmes "is an imperial knight who serves his empire through his enhanced vision" (98). This "unveiling" makes Holmes a national hero as he "alleviates not merely the hygienic but also the social and economic fears of middle-class Victorians" (111).

While Holmes offers a fictional representation of efforts to protect borders that were made vulnerable by scientific, economic, and political changes during the nineteenth-century, Arthur Schnitzler, for Otis, "is a figure whose works illustrate particularly well the late nineteenth-century tension between the desire for boundaries and the consciousness of openness" (120). As germ theory and colonialism demanded a new conception of selfhood that could exist despite the permeability of its borders, creative writers explored "the consequences of basing personal identity on divisions that did not actually exist" (120). Like Mitchell, Cajal, and Doyle, Schnitzler studied both germ theory and hypnotism but, according to Otis, "took this evidence of human permeability not as a challenge demanding counterattack but as an invitation to revise strained notions of human identity" (120). After discussing Hippolyte Bernheim's theory of universal suggestibility, Otis explores its impact on scientific and popular attitudes towards hypnotism as well as on Schnitzler's medical and literary work. His interest in hypnosis as a

medical treatment strengthened his view that "the psyche had no real barriers to suggestion and was in essence an open system" (127). As with germ theory, the growing debate over hypnosis underscored "an individual's vulnerability to infection" and, consequently, influenced a society in which "physicians and governments waged campaigns against infectious diseases, especially syphilis" (127). Diseases, their causes, and their treatments, in other words, jeopardized social, economic, political, psychological, and sexual boundaries. In the remainder of this chapter, Otis convincingly argues that both the threat and the possibilities of these transgressions became a central concern in Schnitzler's fiction. While her initial discussions of "The Sensitive One" and "Lieutenant Gustl" advance this argument, her reading of *Reigen* offers her most convincing evidence. Linked by their mutual vulnerability to disease in a sequence of sexual encounters that only the audience fully realizes, Schnitzler's characters dramatize an "open system of circulation" (136) in which "biology mocks the social devices through which difference is established" (137). Social differences, in other words, disappear when confronted by the reality of biological sameness.

After focusing on "scientist/authors" in the four preceding chapters, Otis decides in her final chapter to cross one of the boundaries that has framed her investigation by discussing Thomas Mann, who "never studied medicine and did not come from a medical family" (149). As a result, she is forced to justify this decision by using the unconvincing example of shared tiger imagery in Koch, Doyle, and Mann to argue that "the culture of European imperialism offered its language and mythology to artists and scientists alike" (149). Despite this obvious point, the metaphoric link between science and literature forces Otis to speculate about Mann's familiarity with the scientific concepts she finds in *Death in Venice*. Much of this chapter, therefore, is consumed with justifying a link that had served in previous chapters as the starting point for more complex explorations. While her reading of *Death in Venice* is compelling, it forces Otis to retreat from the more interesting cross-disciplinary discussions found in previous chapters in favor of a more traditional literary analysis coupled with recurring attempts to credit Mann with a scientific knowledge that can no longer be assumed. Assertions like "Mann's biography confirms his ongoing concern with disease and psychology" (150), "Mann's preparatory notes for *Death in Venice* reveal a genuine interest in bacteria" (151), "it is very possible that Mann read Koch's report" (152), and "[i]t is very likely that Mann knew of Pettenkofer's daring experiment" (154), underscore a shift in focus that ultimately changes the kind of investigation Otis offers in this final chapter. Perhaps because her previous chapters begin to push cross-disciplinary scholarship beyond a dependence on metaphorical links (like the common metaphor of the tiger that subsumes the final section of this chapter) or speculative assertions concerning what a particular author might or might not have read or studied, her final discussion of Mann reads like a retreat to a more familiar disciplinary terrain. Ironically, it is at the moment when her impressive work throughout the book renders her own disciplinary borders most vulnerable that she seems ready to re-establish them.

In her conclusion, "Identity in the Age of AIDS," Otis attempts to contemporize her discussion by considering how the "membrane" metaphor that linked science, literature, and politics in the nineteenth century continues its work in the late twentieth century. Perhaps predictably, she uses contemporary debates about AIDS to demonstrate our own obsession with social and sexual borders. While this discussion is enticing, it reads more like the introduction to a different, though equally fascinating, book. Given the broad range of material covered throughout

Membranes, one might prefer a conclusion that draws together the compelling strands that connect its diverse chapters. Although Otis makes an effort to highlight these connections at the beginning of each new chapter, these moments, while suggestive, seem incomplete. It is left to the reader, in other words, to bring together her separate explorations and to consider the overall impact of her analysis. In her final gesture, Otis returns to the scientific models that motivated her study, suggesting that while cell and germ theories reinforced nineteenth-century concerns with social, political, economic, and national borders, in the late twentieth century, biology offers the neuron, with its "dynamism and plasticity, [its] ability to form new connections and associations" (174). Can the neuron, she asks, provide the new metaphors for a twenty-first century society focused not on difference, but on "celebrating global connectedness" (174)? Despite this optimistic gesture, Otis' own thorough analysis of the crucial role of difference in constructing and maintaining cultural and disciplinary borders, coupled with her own retreat when these borders were most vulnerable, seem to challenge the viability of this twenty-first century scenario.