

Review: Hybrid Nature: Sewage Treatment and the Contradictions of the Industrial Ecosystem

By Daniel Schneider

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Sewage treatment plants are essential to cities. They address waste problems and ensure healthier urban populations and spaces. In *Hybrid Nature*, Daniel Schneider shows that they have broader ramifications. He argues that sewage treatment plants in eighteenth- and nineteenth-century Great Britain and the United States were industrial ecosystems, combining natural and artificial processes and environments to produce resources for human consumption. Schneider also illustrates that they were ripe with environmental, labor, social, economic, and legal contradictions that shaped cities and humans' views of nature. In doing so, he explores the transformation of sewage and weaves a narrative about changes in society and human attempts to make sense of a world where technology and nature blend together.

Schneider focuses on the interactions between nature and industry within sewage treatment plants. He details how city engineers utilized biological processes, including activated sludge and the septic tank, to create ecosystems that treat sewage and transform it into a useful product. At the same time, they simplified and intensified the processes in the name of control and efficiency, and the biological components of sewage treatment increasingly resembled manufacturing procedures rather than nature. In other words, Schneider says sewage treatment plants and the broader industrial ecosystem developed through both naturalization and denaturing.

Sewage treatment plants also put a spotlight on broader contradictions and conflicts characterizing cities and industrial ecosystems. Schneider shows how nature became a source of political, social, and economic contention. Public and private interests clashed over attempts to patent biological sewage treatment processes. Educated professionals squared off against sewage plant operators with hands-on experience for control over the labor and nature of waste management. The high price of sewage treatment forced cities to choose between producing costlier, purified sewage or less healthy, profitable fertilizer. Schneider also shows how these types of contradictions extended beyond sewage treatment plants and outside of cities. For him, the presence of genetically modified plants derived from microorganisms in sewage treatment processes, such as crops from the agricultural firm Monsanto, signal the expansion of the industrial ecosystem into the wild.

Schneider concludes his study by discussing how society comes to terms with a hybridized world where natural and artificial landscapes appear nearly indistinguishable. Recent court rulings in San Francisco attempted to legislate the difference between natural and artificial to better qualify wildlife for the Endangered Species Act. Political battles erupted in the Pacific Northwest in the 1990s over salmon protection and perceived distinctions between wild and artificially hatched fish. Schneider points out that society creates these hybrid forms of nature, but still insists on viewing them as "twin poles of natural and artificial" (p. 229). By accepting hybrid nature, he says, humans can better utilize the power of industrial ecosystems and confront their issues.

Utilizing correspondence, court proceedings, and a host of newspapers and technical journals, Schneider tells both a human and scientific story. He shines when detailing the professional and legal conflicts of scientists, engineers, and municipal officials. The voices of engineers in Philadelphia and operators in Milwaukee connect sewage treatment processes to broader political and labor developments, making *Hybrid Nature* particularly worthwhile for urban scholars. Schneider's use of technical jargon and focus on unpalatable material might not appeal to the general public. Discussions of things like flocculent sludge and oxidation-reduction are sometimes difficult to comprehend. Yet he tempers this by writing in a

straightforward style and using numerous illustrations of tools and products that offer chances to visualize sewage and its impacts. Ultimately, Schneider shows that sewage treatment plants are multidimensional, and important for understanding other complex places and landscapes.

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