The Engineering Ideal and Its Discontents; Or, *déjà vu* for Ecologists

The engineering standpoint in biology has characteristically involved two theses (Pauly 1987). The first is that the proof of our understanding of some system is in our ability to create it. This is an old theme, stretching back at least to the “maker’s knowledge” of 17th century natural philosophers. The second is that “natural” states of nature, defined historically, should not occupy a privileged position: privileged states are those with certain functional properties, like efficiency, resiliency, and productivity. My question for this seminar is: as the engineering standpoint has grown in popularity throughout the 20th and 21st centuries, and as “nature” as a privileged state has faded away as a consequence, in what sense has our ability to interpret history faded with it?

Specifically, in the session I’m chairing, I’d like to historically situate and then discuss some of the themes raised by the evolutionary biologist Peter Grant in his 2000 paper, “What does it mean to be a naturalist at the end of the twentieth century?” Grant reflects on the future of natural history, evolutionary biology, and ecology in a world that is increasingly being engineered by humans, increasingly becoming domesticated (and this written *way* back in 2000!). His concern is about history, and about what can and cannot be learned about history from systems that have been human-engineered or altered. He writes,

> [...] we are losing parts of life’s history that would appear to be unrecoverable except, to an unknown and probably limited extent, by the process of genetic engineering referred to above (which is no cause for complacency). We are reducing the means of interpreting the history as well, to the degree that present-day natural environments provide critical information about the natural relationship between organisms and their environments in the past.[…]

An appropriate icon for this worrying trend is Albrecht Dürer’s woodcut of the Indian rhinoceros brought to Europe (Lisbon) in 1515 [see below]. Dürer did not see the animal but made the woodcut from descriptions and sketches provided to him, committing a small error in the form of a gratuitous, unicorn-like, spiral horn on the shoulders. Derivative artists made further copying errors, adding to the faithfully reproduced yet erroneous spine over the course of the next two centuries. Fortunately, the rhinoceros did not become extinct, and representations of the animal were eventually brought into line with reality.

The difficult question to answer is: How far wrong do we go in taking a human-altered environment as a proxy for a natural one and a cardboard cutout view of the natural world as exemplified, for example, by paintings of nature “in the raw” by Henri Rousseau [see below]?

Grant’s questions are an invitation to reflect more broadly on engineering ideals in biology, and to consider the epistemic, rather than just environmental-ethical, issues involved. (Given recent work in environmental history that deconstructs the idea of nature, can we even pose Grant’s questions coherently?)

Historically, Grant’s worries are nowhere near unique in spite of his pointing to then-current advances in biotech engineering, environmental degradation, and increased urbanization as causes for his reflectiveness. They are the same sorts of
epistemic issues that worried American biologists at the turn of the 20th century, 100 years before(!), especially those of the early *Ecological Society of America*, est. 1915. With the close of the American frontier and the increased rate at which nature’s “primitive conditions” were being re-engineered into domesticated spaces, these ecologists worried: what did these transformations mean for the object of study in biology? If these ecologists were still around, they’d have the feeling of *déjà vu*.

![Albrecht Dürer's woodcut of an Indian rhinoceros brought to Lisbon, Portugal (1515)](image)

*Surprised*! Henri Rousseau (1891)
Readings

Required

Recommended