

Michael Rossi  
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For a book that's so much about physical objects and processes, it's striking the degree to which *Nature's Metropolis* is also about the power of abstractions – not just words like “nature” and “city,” but also devices like measurement and standardization. Certainly, we've seen how the human perception of time is malleable. But Cronon's book turns one's attention to the role of other powerful abstractions in mediating between “first nature” and “second nature.” Indeed, I wonder where processes like measurement, mapping, and standardizing fit into the (somewhat hierarchical) scheme of his different “natures.”

For example, a prairie scoured of indigenous flora and reseeded with plants that are useful to European farmers, or a harbor dredged from the mouth of a river, or even the spinneys of trees sprouting up along property lines, would constitute examples of “first nature” turned to “second nature.” One landscape – the result of thousands or even millions of years of biological and geophysical forces – is converted by human action into another landscape, this one more sympathetic to the desires of the particular humans doing the converting. It's not a matter of natural versus unnatural, but of different sorts of interacting with nature. Following from this, Cronon demonstrates how even a big city like Chicago in the 1850s – ostensibly an entirely distinct entity from the surrounding countryside – was nevertheless inextricably linked with the very bucolic purity of “first nature.” Humans pushed nature, nature pushed back, and along the way, a metropolis congealed – viewed in this light, not such an unnatural phenomenon after all.

At the same time, Cronon calls attention to processes with a profound impact on the ways that humans interacted with landscape, but which, nevertheless, don't directly act themselves. I'm thinking here particularly of his mention of the grid system used to divvy up parcels of land in the west. On the ground in the nineteenth century, I'm certain nothing could beat a tremendous, gleaming, shrieking locomotive (or a man knee-deep in offal and pigs' blood) when it came to summing up the marvelous/terrible power of new technologies. Flying back to Boston from Los Angeles one afternoon in January, however, I can say that from the air, the miles and miles of rectangular plots of land in the middle of North America, intersected by occasional huge circles and one or two seemingly inconsequential bodies of water, seemed like perfect examples of modernism

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at its most sublime and amok. But where does this impulse – not the actual grooming of the land, but the concept of measurement itself – fit in with Cronon’s scheme of natures? Just as surely as no “nature” or “city” exists in a world without humans, what about meters? Where do units fit in to the scheme that Cronon describes? Would they be “third nature” – the nature of things that (certain) humans can’t see, but know are there nonetheless – the nature of maps and of property lines drawn where people haven’t set foot?

This line of inquiry, of course, is well outside the point of Cronon’s book; but it does speak to a sort of fungibility which seems so key to Cronon’s arguments. *Nature’s Metropolis* runs on metamorphosis: glaciers massage the midriff of North America, leaving lakes and loam and rivers, then thousands of years later, people build a city. Or, in a related process, farmers grow corn, which can then be “turned into” hogs.

Here, however, it seems that the act of measuring – or, better, agreeing on, standardizing, measurements – provides for level of interchangeability that surpasses other physical transformations that Cronon describes. Corn and hogs are convertible but different, but one mile is supposed to be just like another; one second, just like its neighbor. Though, as Cronon points out, not all squares of land are the same on the ground, on a map (of one kind, anyway), one mile looks the same as any other, mashing soil conditions, climate, infrastructure into a discrete set of variables (or, even more dramatically, since one twenty-four hour day is the same as any other, one can make a map showing topography as a function of the time it takes to travel from one point to another in different calendar years – obstacles like mountains get re-presented as days). Cronon demonstrates quite dramatically how grain can be abstracted from sacks packed by individual farmers (each with distinct qualities), to “grades” of grain of particular weights, to grain futures – slips of paper representative of measurements of particular grades of grain.

In any case, this seems important to the general inquiry of this class because including measurement as a factor in technological development blurs the line between intangible processes and tangible results. Or, to put it another way, as we talk about how technologies – railroads, grain elevators, telegraphs (in this case) – influence society, I

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wonder how seemingly basic processes of measurement and quantification fit into the picture. Just like changing perceptions of time define (in part) what managers expect of workers, how workers ought to spend their time while at work, how engineers and architects design workspaces and machines, and indeed, what a “workday” is, I wonder how considering land as a function of time or of squares on a map, or wheat as a function of weight, or – later in the Progressive Era – subjectivity as a function of statistics, defines, changes, or reorients people’s relationships with the environment around them. (Which is the more authoritarian technic – the railway or the meter?).