

Figure 3: An inset map of the suburb community of Gresham.

maintained through de-emphasizing the city as an urban area and focusing on the abundance of cycling routes.

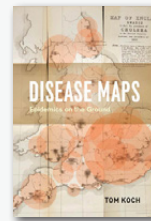
As functional as the map is, by ignoring the built environment it is also somewhat deceptive. It de-emphasizes the compactness and concentration of the downtown area and makes it seem as easy to move around there by bike as it would be in the countryside. These are high traffic areas with lots of motor vehicles and pedestrian traffic, and yet the map only shows the bike paths and roads, making it seem more open than it likely is. Another issue encountered when reading the map is the confusing map legend, which ranks the routes according to suitability levels with sub-categories within those groupings. This complexity is not a problem in itself, but the symbol color scheme does not lend itself to an intuitive hierarchy. For example, the colors used to designate the different path suitability range from purple (most suitable), to green (moderately suitable), and orange (least suitable). Using these specific hues to rank suitability is not as appropriate as a sequential color scheme would be. The reader needs to first familiarize themselves with what each line color means, and then with the order of suitability, in order to understand which bike paths are best.

The biggest problem with *Bike There!* is the inconsistent labeling of features throughout the map. There are places on the map where parks and natural areas are labeled well, and would help a biker to reach their destination, but in other places, parks and natural areas are not labeled at all, and the reader is left to wonder what is actually at that location and, if they know a park or area is there, why it was not important enough to merit inclusion. In places that do have labels, there are many instances of labels overlapping features, making them nearly impossible to read, and some instances

of labels getting cut off on the edge of the map. There are also some instances of improper label placement, which yields a weak association between the label and the feature. Granted, in some of these places the areas to be labeled are small, but with more care and attention, the map could have been more consistent, and thus more clear.

Overall, the design of this bike map serves its purpose well for commuting and recreational cyclists. It shows a vast array of bike trails in the entire region, with insets for areas of denser information. It does a great job simplifying the complexity of the Portland Metro area by excluding the built environment, and of conveying a sense of outdoor adventure, even though it may be deceptively pastoral. The map is an effective navigational tool, whether there is a set destination in mind or simply a plan to meander through the countryside. All Portland residents (and those venturing from outside) looking to explore the area by bicycle should have a copy of *Bike There!*.

#### DISEASE MAPS: EPIDEMICS ON THE GROUND



By Tom Koch. Chicago: University of Chicago Press, 2011. 330pp. 147 illustrations, 106 in color. \$45.00 Hardbound. ISBN 978-0-226-44935-7

**Review by:** Jonathan F. Lewis, Benedictine University

*Disease Maps* explains how mapping facilitated a rethinking of illness from a type of isolated individual affliction to a geographically distributed public health problem. The book's three sections ("The Idea That Is Disease," "Cholera: The Exemplar," and "The Legacy And Its Future") contain twelve chapters, with ample illustrations evenly distributed throughout.

"The Idea That Is Disease," the book's initial section, consists of five chapters built around what Koch identifies as the book's central argument: "that to understand disease and its history we need to think about *seeing* at every scale" (4, emphasis in original). While it is possible to imagine disease being visualized at local levels, such as the microscopic or a diseased body, the focus here is on mapping the distribution of individuals presenting common symptoms across cities, countries, and larger regions. It is Koch's contention that mapping creates "the context in which disease theories are proposed and tested" (4), thereby enabling

visualization at a higher level: that of how disease itself is understood.

Early in this section, Koch describes such contemporary diseases as AIDS, West Nile virus, and H1N1 influenza in order to document the vital part played by maps in understanding the spread of these illnesses, and to illustrate how maps advance visual thinking. Koch writes that “mapping is a method of assemblage within which ideas are constituted and then argued about specific experiences. . . . The map’s intellectual service lies in this conjunction of analytic presentation and experimental argumentation in a visual exposition. . . . In this way mapping produces a type of knowledge, one rooted in a relational space, which has been critical to disease studies for centuries” (13).

The author juxtaposes the 16<sup>th</sup> century breakthrough publications on anatomy with contemporaneous cartographic works: each replaced wisdom passed down from the ancient world by favoring what was actually seen over what had been read. Just as many of the new maps from Finé, Braun and Hogenberg, and Ortelius were of cities, so too the study of disease came to be centered on outbreaks in urban areas, and Koch describes how the connection of maps with specific places harmonized with the belief that diseases were inextricably linked to those places. What mapping seemed to reveal was not the introduction of infection into a fixed population, but rather the introduction of population into a fixed place where infection resided. It seemed clear that it was sites that were diseased, or were comprised of elements that activated infection among especially susceptible individuals, and that these sites, in conjunction with temperature, humidity and maybe even local geology, allowed diseases to wax and wane seasonally.

Because of the linkage between cities and disease, urban population records were quickly recognized as invaluable diagnostic tools, transforming “a clinical diagnosis into a demographic thing whose effect could be counted, year by year, in accurate records of the city, region and nation” (64). This kind of data collection began in earnest in the 17<sup>th</sup> century and matured in the 18<sup>th</sup> in response to the dominant disease of that period: yellow fever. Yellow fever’s general association with tropical climates, and with hot, humid summers in temperate regions, made explanations relying heavily on natural forces seem plausible. At the same time, however, non-medical professionals advanced the idea that, while local conditions might encourage outbreaks, diseases themselves were imported from infected areas with which

trade was conducted. Mapping was central to identifying all these factors: the geographic spaces where diseases had their origins, the trade routes of transmission, and the locales of contributing factors.

The book’s second section, “Cholera: The Exemplar” represents a thorough compilation of important cartographic efforts to advance understanding of that disease. Koch portrays each new effort at mapping cholera as identifying a particular type of the disease, differentiating, for example, one that infected British soldiers in India from another that attacked members of the indigenous population. This proliferation of choleras led researchers to assemble a wealth of data “too complex for a simple inductive argument, too vast for a simple statement. Mapping was becoming an essential medium for all these cholera, one in which tables of data were transformed into arguments” (117).

Not surprisingly, a sizable portion of *Disease Maps* examines the role played by John Snow in identifying cholera’s method of diffusion and infection. This portion of the book is quite detailed, and draws extensively from the author’s other works about Dr. Snow. Like them, these chapters describe the popular overemphasis placed on Snow’s role in pinpointing cholera’s source. Some writers have depicted Snow’s critics as hopelessly blinkered and unable to see the breakthrough he had wrought, but Koch portrays Snow as stubbornly refusing to answer legitimate and basic questions posed by his peers and lumping together data that had been collected at different levels of spatial analysis. He describes one “astonishing intellectual leap in arguing on the basis of very local, neighborhood outbreaks in Albion Terrace and Horsleydown that cholera everywhere in London, and by extension the world, was waterborne.” Koch notes that “for Snow’s contemporaries, what was significant was not the mistake in addition or his method of calculation . . . but his logic and its leap from the scale of the local, neighborhood outbreak to that of region, the metropolis at large, and cholera in the world” (152–153). Koch goes on to contrast this with the work of William Farr in collecting extensive statistics about more than two dozen different diseases. “It was in part the development of a mechanism for the collection of national health data, and Farr’s demonstration of its application to cholera, that permitted physicians to move from treating individuals to participating in the larger question of population health” (163). Farr also devised graphical representations of information: forecasts of expected incidence of disease outbreaks plotted against climatological data, coxcomb graphs of annual mortality statistics as a function

of average temperature, and a map of cholera's distribution across Britain during the 1848-1849 outbreak. "The conclusion for Farr and many of his readers was that cholera was created in a fermentation-like process propelled by the evaporation of contaminated lowland waters into the air" (180). Farr was not the only individual complicating Snow's work. John Simon carried out basic street-by-street research that Snow had avoided and found patterns of disease different from those Snow had predicted: "by 1856 Snow's views on cholera were discounted by many as obsessive; his science perceived as a matter of magisterial assertion rather than careful, factual evidentiary argument" (191). It took collaboration with Rev. Henry Whitehead, a curate whose parish lay at the epicenter of the 1854 cholera outbreak, to rescue Snow. Whitehead not only interviewed an enormous number of families living in the afflicted area, he constructed maps refuting popular misconceptions surrounding the outbreak. And while it was Whitehead's footwork that ultimately identified the index case at the center of the outbreak and an engineer's unearthing of the place where an infected cesspit transmitted the disease to the Broad Street pump, Snow's eagerness led him to publish his views on the subject before either of those events. Koch points out that, although correct, Snow's views were founded on conjecture and anticipation of corroborating evidence rather than solid research of his own. Consequently, it was not Snow's work but rather that of early bacteriologist Robert Koch that ultimately displaced miasmatic explanations for the spread of cholera.

The section's final chapter describes the pivotal role played by textbook author William Sedgwick in assembling and advancing the elevation of John Snow to the role of visionary. Sedgwick's textbooks trained a generation of epidemiologists to mimic Snow. W. H. Frost's investigative research into typhoid fever included a map, not because it revealed anything of consequence but because Sedgwick believed Snow had shown a map to be part of a credible research procedure. Frost went on to investigate other diseases and used maps to do so, despite mixed results, and through his writings helped perpetuate the mythology of Snow's contribution to epidemiology. Ultimately, Koch concludes that "science is not about being proven right *someday*. Science is about convincing a jury of one's peers of the rightness of a set of evidentiary proposition tested with a generally accepted methodology. That, John Snow did not do" (229).

*Disease Maps'* final section ("The Legacy And Its Future") contains a single chapter and a brief Afterword. In them,

Koch demonstrates the influence that the collection of data at the local level and its organization for analysis at several levels via mapping has had on thinking about one disease which has proven extremely difficult to combat: cancer. Maps assembled by a variety of cancer researchers are presented alongside the insights their creators hoped they would convey. Unlike some other diseases, which had been thought to have several varieties before being identified as being of one type, maps helped move cancer in the other direction. "What had been a single disease ... became a class of related but distinct diagnoses ... [Dr. Percy] Stocks statistically distinguished specific cancers ... within local, regional, and national populations" (259). As Farr had done for cholera, cancer's researchers generated, collected, organized, and made available to others great quantities of data. This information was employed to generate maps of the diseases' distribution, commonly in the form of atlases credited with "uncovering undetected but significant clusters of unsuspected cancer incidence" (265).

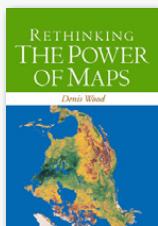
This need to see how data appear at varying levels illustrates the symbiotic relationship between statistics and maps generally, leading Koch to conclude that "[t]here is no battle between mapped and statistical data. ... Maps locate numbers that need maps if we are to transform incidence into ideas about causation. ... In the numbers and in the graphics that attempted to make sense of them it was the seeing that was a test of the knowing" (274). This will be of increasing significance in the future, as "we need to see at every scale, from that of the electronic microscope to that of the world at large. ... In this seeing we will need the mapping that has for centuries been a part of disease studies and the statistics that the map presents" (279). Throughout *Disease Maps*, the author maintains his theme of the importance of seeing at a variety of levels, marshaling evidence in his selection of maps that yielded insights into various diseases. The diversity of diseases and efforts to combat them that Koch describes, many at length, are a real strength of the book. Not surprisingly, given his earlier treatments of the subject, Koch's investigation of John Snow's role in identifying cholera's cause is extensive. Readers of Steven Johnson's popular *The Ghost Map* will find Koch's views and the data behind them a revelation. They may also see those sections as straying a bit from the detached, professional tone found throughout much of the rest of the book, with several pages employing first person singular to describe the author's frustrations with Snow and his claims. Ellipses also appear for the first time, reinforcing the less formal tone. "if the data was complete ... so be it. Let others do the detail

work; he was obliged to give his theory. Even if understandable, the result was unfortunate. Snow rushed and in his hurry chose not to carefully consider the concerns of other researchers. He knew he was right and was . . . impatient” (241, ellipses in original). This style has the effect of belying Koch’s own point about the importance of relying on the weight of evidence rather than the force of personality to overcome the objections of skeptics.

One minor criticism having nothing to do with the author should be mentioned: *Disease Maps* contains a surprising number of typographical errors, many of the sort that spelling and grammar checkers routinely flag. Nouns are missing, words are misspelled, at least one date clearly misidentified, words are reiterated within sentences, and some punctuation is missing. Though these distractions (I marked 25 overall) do not prevent the reader from following Koch’s line of thinking, they are out of character for a major university press.

Koch’s command of information is impressive: the breadth of illnesses examined, the variety of maps that generated revelations about diseases, and the depth of detail about yellow fever, cholera, typhoid fever, and cancer all produce confidence in the book’s main theme of viewing leading to theorizing and from there to knowing. *Disease Maps*’ chapter paralleling the development of cartography with that of early anatomy is both thorough and engaging as well. The book is certain to be a useful addition to collections about epidemiology and the history of public health.

## RETHINKING THE POWER OF MAPS



By Denis Wood, with John Fels and John Krygier. New York, NY: Guilford Press, 2010. 335 pages, maps, figures, notes, index. \$30.00, Paperback. ISBN 978-1-59385-366-2.

**Review by:** Russell S. Kirby, University of South Florida

*Rethinking the Power of Maps* is a substantially updated follow-up to Denis Wood’s *The Power of Maps*, published in 1992 to accompany an exhibit of the same name which he curated at the Cooper-Hewitt National Museum of Design, and which was later remounted at the Smithsonian Institution. The present volume is intended for a mass audience, yet readers with some knowledge of the history of academic geography and cartography will find several

chapters of considerably greater interest than will the general readership.

The book begins with a brief introduction, followed by eight chapters grouped into two parts titled “Mapping” and “Counter-Mapping.” Wood defines these terms in the introduction: “mapping” is used to describe the ways that maps serve the interests of the state or polity, and “counter-mapping” focuses on uses of maps to resist the power of the state (7). A number of philosophical and historical topics of greater and lesser interest are covered in the first section, including the emergence of mapping as primarily a post-15<sup>th</sup> Century phenomenon, the uses of maps to create and maintain order on the ground and within society, map elements as “signs,” and maps as aspects of culture.

The section on “Counter-Mapping” begins with a critical appraisal of the field of cartography, in which the author argues that the notion (propounded by Arthur Robinson and others in the 1940s and beyond) that cartography is, or was, a scientific discipline in its own right, never had a basis in theory or practice. The emergence of Geographic Information Systems and GIScience, Wood suggests, have sounded the death-knell for the discipline of cartography. Wood would not argue that there are no professionals who focus on cartography, but, rather, that new tools, techniques and methods of map dissemination make the process of map creation open to all. However, in the chapter on public participation GIS (PPGIS), Wood argues that most of what passes for PPGIS is a sham. The public has little say as to how a PPGIS is created, what its contents will be, or how it will be used. Furthermore, the role for “participation” is so circumscribed that the true potential of what might be achieved through public engagement can never be realized. While Wood makes this argument rather stridently, I found myself largely in agreement with the general proposition.

The book concludes with two chapters on the topic of map art. Here the discussion delves into the interface between contemporary art and methods of human expression and some artists’ use of mapping in a variety of innovative and occasionally disturbing ways.

The section on counter-mapping was more intriguing to me than was the first section, as it points the way to the potential for future methods of expression using maps that extend beyond our current comprehension. As technology evolves, opportunities for counter-mapping will grow at an ever increasing rate—consider, for example, that at the time