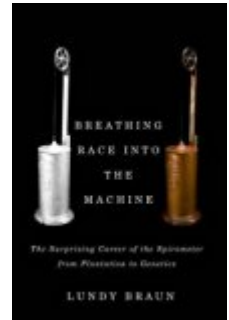


Lundy Braun. *Breathing Race into the Machine: The Surprising Career of the Spirometer from Plantation to Genetics.* Minneapolis: University of Minnesota Press, 2014. 304 pp. \$24.95, cloth, ISBN 978-0-8166-8357-4.



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Commissioned by David T. Benac (Western Michigan University)

A photo of a spirometer in the introduction to Lundy Braun's *Breathing Race in the Machine* suggests the complex power of this "apparently ordinary instrument" (p. xv): in addition to the cylinder that measures the quantity of air inhaled and expired by the subject and buttons that print results and turn the device on and off, there are two switches labeled "race" and "sex." Those switches automatically "correct" the instrument's reading based on supposedly innate differences in lung capacity; specifically, 10 to 15 percent below "normal" for those labeled as "black." *Breathing Race into the Machine* explains the historically contingent, complex, and contested processes behind that "race" switch and all of the assumptions about innate difference that put it there. Drawing on a background in science and public health, Braun's study follows the spirometer's development and application from the laboratory spaces of Victorian London to mid-twentieth-century gold mines on the Witwatersrand plateau in South Africa. Braun argues that in their efforts to design and use the spirometer in a variety of con-

texts and for different ultimate purposes, scientists, doctors, and sometimes patients themselves embedded "cultural notions of race" in the spirometer, turning this seemingly innocuous device into a powerful carrier of racism.

Braun's story begins in mid-nineteenth-century Great Britain, where rapid industrialization and urbanization prompted anxieties about working-class bodies and the body politic. Scientifically oriented physicians sought means by which to precisely measure and quantify the abilities of different human bodies to withstand the rigors of different occupations. Among the targets for investigation and rationalization was respiratory capacity, or "vital capacity," as labeled by John Hutchinson, the London surgeon-physician-inventor widely credited with inventing the spirometer in the 1840s. Imported into the context of the nineteenth-century United States, Hutchinson's table- and statistic-laden reports found fertile racist ground, and the spirometer featured in a variety of studies, including among Civil War soldiers, that "proved" that "blacks" had had less lung ca-

capacity than "whites." As Braun argues, these racial categories were and are, to say the least, extremely problematic, ignoring dramatic differences within such categories and reifying a racist social construction. Additionally, a focus on race allowed physicians and scientists to ignore more important environmental differences, such as differential nutrition and medical care, that probably affected lung function.

Despite such failings, spirometrically measured lung capacity differences became linked to supposedly innate racial differences in a variety of different contexts in the late nineteenth and early twentieth centuries: in U.S. "physical culture" (physical education) programs that sought to quantify, normalize, and improve Anglo-Saxon masculinity; in British investigations of the strength and vitality of its colonial and World War I soldiers; and in other studies throughout the world that by 1930, "established the scientific 'fact' that vital capacity was lower in 'nonwhite,' 'non-European,' or 'non-Western' populations than in those considered 'white'" (p. 111). When used to measure lung damage incurred in the mines of South Wales and South Africa in the mid-twentieth century, the spirometer not only provided an ostensibly objective and precise way of adjudicating debates between capital and labor, but also further reinforced "innate" racial differences between "blacks" and "whites." And so race became inextricably linked to vital capacity and to the device that measured it, the spirometer.

Although *Breathing Race into the Machine* fits most comfortably on the bookshelves of historians of medicine, it also offers insights for environmental historians, particularly those interested in the real and perceived relationships between human health, disease, and environments. Such relationships are often negotiated and even constructed by technology--consider how DDT helped define the problem of malaria, as James Webb, Randall Packard, and others have shown--and Braun's book is a model for understanding and explaining

the development and significance of scientific instruments. Braun also understands how to make sense of and critique "experts" despite their often deplorable views on race and concepts like "vital capacity" that seem quaint in the twenty-first century. Like Linda Nash in *Inescapable Ecologies* (2006), Braun knows that such experts and their views can shed light on historically specific understandings of health and its connection (or lack thereof) to environments. Braun might have been interested in the work of Nash and other historians of health and the environment, including Gregg Mitman, Christopher Sellers, and Conevery Bolton Valencius, particularly in the book's brief discussions of how and why health experts ignored environmental factors in explaining differences in lung capacity. The nonhuman world clearly played a powerful role in many of the situations Braun discusses, especially in the mines of South Wales and South Africa. Environmental history offers the tools and methods to understand and explain those forces--for instance, the ways that certain kinds of mining practices release certain kinds of substances that have certain kinds of effects on human bodies--and may have enriched Braun's explanation about physicians and scientists failing to see and understand the nonhuman world while they only "saw" and constructed race. Such a perspective might point to the need for an "environment," rather than "race," switch on the spirometer--a surprisingly interesting device, as we learn, thanks to Braun's fascinating study.

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