Historiography of biomedicine: "bio", "medicine", and in between

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Historiography of Biomedicine

"Bio," "Medicine," and In Between

By Ilana Löwy*

ABSTRACT

History of biomedicine is a hybrid domain, intersecting with many other scholarly disciplines. From the 1970s, historians who investigated recent developments in medicine increasingly shared the approaches, presuppositions, and methods of inquiry of historians and sociologists of science and technology. One reason is that the increasing reliance of medicine on technologies, instruments, and drugs makes the demarcation between "medicine," "science," and "industry" more difficult. Another is the "practice turn" in the history of science, which gave greater attention to the ways scientists and physicians work. The impressive achievements of historians who applied these new approaches came, however, at a cost. The neglect of an earlier generation of historians of medicine may have limited more recent ambitions for understanding health and disease in society. Closer links with historians of science and technology and sociologists of science may have blurred the specificity of medicine as a domain grounded in the distinction between the normal and the pathological and lessened scholars' interest in "the clinic" as a unique site of the production of knowledge.

IN 1947 A SPECIAL ISSUE of the *Bulletin of the History of Medicine*, the first professional journal of medical historians, celebrated the retirement of its founder, Henry Sigerist (1891–1957). One of his longtime supporters, Alan Gregg, the director of the Medical Sciences Division of the Rockefeller Foundation, explained that

> beyond and above anyone else Henry Sigerist made us aware of the fact that medicine is the study and application of biology in a matrix that is at once historical, social, political, economic, and cultural. . . . Sir Oliver Lodge once remarked that the last thing in the world that a deep sea fish could discover would be salt water. Henry Sigerist removed us, with a historian's landing net, from a circumambient present into the atmosphere of the past and thus discovered to us the milieu in which we were swimming, floating, and betimes stagnating.[1]

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[1] Alan Gregg, "Henry E. Sigerist: His Impact on American Medicine," *Bulletin of the History of Medicine*, 1948, *22*:32. On the relationship between Sigerist and Gregg see Theodore M. Brown, "Friendship and Philanthropy: Henry Sigerist, Alan Gregg, and the Rockefeller Foundation," in *Making Medical History: The*

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Gregg's proposal—that the medical historian's task is to show what happens to biological knowledge when it is applied to the cure or the prevention of diseases—in all likelihood reflected the Rockefeller Foundation's commitment to the promotion of biology-based medical sciences. These efforts were successful, and the tightening of the links between fundamental scientific research, clinical practices, and industry, especially in the second half of the twentieth century, changed the nature of medical practice.[2] This change in turn affected historians' studies.

FROM SCIENTIFIC MEDICINE TO BIOMEDICINE

From somewhere in the mid-nineteenth century, doctors did not just evoke "science"; they increasingly relied on laboratory sciences. Some historical studies imply that many doctors rapidly and enthusiastically embraced practices that originated in the laboratory, while others accentuate doctors' resistance to the "scientific turn" and their defense of "incommunicable" clinical expertise.[3] It seems difficult to construct a single narrative of changes in medicine in the late nineteenth and early twentieth centuries, but rather easier in the case of the post–World War II period, when the term "biomedicine," coined in the interwar era, became a common shorthand for the work of doctors and scientists.[4] A growing focus on the role of proteins and amino acids led to the "molecularization"—or, rather, "macromolecularization"—of biology and medicine and to the increasing homogenization of the methods and techniques used to study fundamental life phenomena and those applied to the investigation of diseases.[5]

World War II is usually presented as a turning point in the "biomedicalization" process. It accelerated and intensified collaboration between biologists, clinicians, and industrialists, a development exemplified by the wartime production of penicillin. In industrialized countries, the post–World War II era was also characterized by important increases in public funding for medical research, the extension of health insurance to large parts of the population (a process that, in nearly all the Western countries, the United States excepted, was also supported by the state), and the rapid growth of the pharmaceutical industry. Of course, the separation between pre– and post–World War II circumstances is not absolute: laboratory sciences were intertwined with clinical practices from the early twentieth century, while large-scale production and the testing of drugs started in the interwar era

Life and Times of Henry E. Sigerist, ed. Elizabeth Fee and Theodore M. Brown (Baltimore: Johns Hopkins Univ. Press, 1997), pp. 288–312.

[2] Today some historians use the term "biomedicine" to describe nineteenth-century Western science-based medicine; see, e.g., Shruti Kapila, "The Enchantment of Science in India," *Isis*, 2010, *101*:120–132.

[3] Christopher Lawrence, "Incommunicable Knowledge: Science, Technology, and the Clinical Art in Britain, 1850–1914," *Journal of Contemporary History*, 1985, *20*:503–520; Morris Vogel and Charles Rosenberg, eds., *The Therapeutic Revolution: Essays in the Social History of American Medicine* (Philadelphia: Univ. Pennsylvania Press, 1979); John Harley Warner, "Therapeutic Explanation and the Edinburgh Bloodletting Controversy: Two Perspectives on the Medical Meaning of Science in the Mid-Nineteenth Century," *Medical History*, 1980, *24*:241–258; Bruno Latour, *The Pasteruzation of France*, trans. Alan Sheridan and John Law (1984; Cambridge, Mass.: Harvard Univ. Press, 1988); and George Weisz, *Divide and Conquer: A Comparative History of Medical Specialization* (Oxford: Oxford Univ. Press, 2005).

[4] The term "biomedicine" was initially linked to U.S. programs on military and civil applications of radioactive compounds. Later, its growing popularity reflected the increasing homogenization of techniques used to study healthy and sick bodies. See Timothy Lenoir and Marguerite Hays, "The Manhattan Project for Biomedicine," in *Controlling Our Destinies*, ed. Philip Sloan (South Bend, Ind.: Univ. Notre Dame Press, 2000), pp. 29–63; and Peter Keating and Alberto Cambrosio, "Does Biomedicine Entail the Successful Reduction of Pathology to Biology?" *Perspectives in Biology and Medicine*, 2004, *47*:357–371.

[5] Soraya de Chadarevian and Harmke Kamminga, eds., *Molecularizing Biology and Medicine: New Practices and Alliances, 1910s–1970s* (Amsterdam: Harwood, 1998).

with the manufacture of vitamins, hormones, and sulfa compounds. Nor were the postwar transformations of medicine uniform. "Science rich" disciplines such as hematology, endocrinology, and oncology rapidly became "biomedicalized," while other medical specialties were slower in turning to the laboratory.[6]

The heterogeneity of "biomedicalization" notwithstanding, most historians have seen increasingly dense networks linking the bench, the bedside, and the production plant, strongly affected by the increased economic and political importance of health care and by tightening regulation of doctors', scientists', and industrialists' practices. From the 1970s, the networks were also molded by the growing role of patient activism.

The 1970s and 1980s were also a period of expansion and professionalization of history of medicine. An increase in the number of historians of medicine with formal training in history, or new forms of history of science, led to tensions, especially in the United States, where doctor-historians and radicalized nonmedical historians went to the same meetings. Many younger historians of medicine became interested in gender, race/ethnicity, postcolonialism, and non-Western systems of knowledge, and some were later influenced by the "practice turn" in history of science.[7] Scholars who investigated recent developments in medicine came to share with historians of the experimental sciences an interest in laboratory practices and laboratory cultures, instruments and measures, technical skills and tacit knowledge, the circulation of reagents, techniques, and researchers, and the links between science and other domains, such as craft, commerce, industry, and the military.[8]

Though many historians of the post-1960s generation felt that they were engaged in a very different scholarly enterprise than their post–World War II predecessors, some knew of the older, richer heritage centered on Baltimore. There, in the 1930s, 1940s, and 1950s, history of medicine was already a social and cultural history, with a highly ambitious project integrating history of medicine with general, cultural, and economic history and also with sociology, history of art and of religion, economy, archaeology, linguistics, and anthropology. Scholars such as Henry Sigerist, Owsei Temkin (1902–2002), Erwin Ackerknecht (1906–1988), and George Rosen (1910–1977) urged historians of medicine to study the social conditions that produce morbidity and mortality, the ways diseases were seen, the socially accepted ways to treat the sick, how doctors and other health professionals were trained and evaluated, and how medicine was practiced in a given society. Historians socialized in the interwar era viewed history of medicine as a mirror of society

[6] For the big picture see Roger Cooter and John V. Pickstone, *Medicine in the Twentieth Century* (Amsterdam: Harwood, 2000). For more focused studies see Andrew Cunningham and Perry Williams, eds., *The Laboratory Revolution in Medicine* (Cambridge: Cambridge Univ. Press, 1992); Robert Bud, *The Uses of Life: History of Biotechnology* (Cambridge: Cambridge Univ. Press, 1993); and John Harley Warner, "Science in Medicine," *Osiris*, 1985, 2nd Ser., *1*:37–58. For the "biomedicalization" of medicine see Adele E. Clarke *et al.*, "Biomedicalization: Technoscientific Transformations of Health, Illness, and U.S. Biomedicine," *American Sociological Review*, 2003, *68*:161–194.

[7] On changes within the history of medicine see Susan Reverby and David Rosner, "'Beyond the Great Doctors' Revisited: A Generation of the 'New' Social History of Medicine," in *Locating Medical History: The Stories and Their Meanings*, ed. Frank Huisman and John Harley Warner (Baltimore: Johns Hopkins Univ. Press, 2004), pp. 167–193; and Warner, "The History of Science and the Sciences of Medicine," *Osiris*, 1995, 2nd Ser., *10*:164–193. On the practice turn in history of recent biology see Hans-Jörg Rheinberger, "Recent Science and Its Exploration: The Case of Molecular Biology," *Studies in History and Philosophy of Biological and Biomedical Sciences*, 2009, *40*:6–12.

[8] See, e.g., Lorraine Daston, "Science Studies and the History of Science," *Critical Inquiry*, 2009, *35*:798–813.

and culture, and they were bold enough to look on big—and sometimes very big—pictures.[9]

Two elements in the post-1960s history were, however, genuine innovations: the focus on practices and an engagement with recent medical science. Sigerist and some of his colleagues had certainly engaged with contemporary issues around socialized medicine, but less so with medicine's technical aspects, perhaps because of the "Western exceptionalism" then common. These scholars were fully aware of the influences of social, cultural, and political context on the medical knowledge and practices of earlier periods but were persuaded that Western science had moved inexorably in the direction of empirical truth and rationality.[10] In 1939, for example, a student of Sigerist, the Polish historian of medicine Tadeusz Bilikiewicz (1901–1987), argued that explanations linking scientific understanding with broader cultural trends were valid only for earlier historical periods, when scant empirically grounded scientific knowledge needed to be supplemented by elements from general culture.[11] He was opposing the view of the Polish-Jewish pioneer of sociology of science Ludwik Fleck (1896–1961) that recent "scientific facts" were as dependent on culturally and socially conditioned "scientific thought styles" as those produced in ancient Greece or Renaissance Italy.[12] From the 1970s on, the majority of historians of science and medicine adopted Fleck's point of view; regrettably, some thereby rejected the totality of the achievements of scholars who believed in "Western exceptionalism."

A NEW HISTORIOGRAPHY FOR A NEW MEDICINE

Studies of recent biomedicine grew exponentially in the late twentieth century. The percentage of publications listed in what was then called the *Isis Critical Bibliography* that dealt with the twentieth century (defined as the post-1914 period) increased from 10 percent circa 1970 to 30 percent circa 1990.[13] Biomedicine was studied by scholars classified as "historians," but also by "sociologists," "anthropologists," and "philosophers," some of whom included a historical dimension; and the work was published in a wide range of journals.[14] Though many historians of all the periods of medicine were

[9] E.g., Erwin Ackerknecht, "The Role of Medical History in Medical Education," *Bull. Hist. Med.*, 1947, *21*:135–146; Henry Sigerist, "Medical History in the United States: Past, Present, Future," *ibid.*, 1948, *22*:47–64; George Rosen, "Towards a Historical Sociology of Medicine," *ibid.*, 1958, *32*:500–517; and Richard Shryock, "The Historian Looks at Medicine," *Bulletin of the Institute of the History of Medicine*, 1937, *5*:887–894.

[10] Charles Rosenberg, "Erwin Ackerknecht, Social Medicine, and the History of Medicine," *Bull. Hist. Med.*, 2007, *81*:511–532, on p. 526.

[11] See Ludwik Fleck, "Science and Social Context," *Przeglad Wspolczesny*, 1939, *18*:8–14; Tadeusz Bilikiewicz, "Comments on Ludwik Fleck's 'Science and Social Context,'" *ibid.*, pp. 149–156; Fleck, "Rejoinder to the Comments of Tadeusz Bilikiewicz," *ibid.*, pp. 168–174; and Bilikiewicz, "Reply to Rejoinder by Ludwik Fleck," *ibid.*, pp. 189–190. For an English translation of this exchange see Ilana Löwy, *The Polish School of Philosophy of Medicine: From Tytus Chalubinski to Ludwik Fleck* (Dordrecht: Kluwer, 1990), pp. 249–275. Thanks to Sigerist's support, Bilikiewicz obtained a Rockefeller Foundation grant to write his Ph.D. dissertation in history of medicine; see Bilikiewicz, "Reminiscences autobiographiques," *Kwartanik Historii Nauki i Techniki*, 1978, *23*:3–51.

[12] Fleck's conviction that contemporary science is no less dependent on specific thought styles than the science of earlier periods did not undermine his faith in the key role of science in promoting freedom, democracy, and human well-being. See Ludwik Fleck, "Crisis in Science," in *Cognition and Fact: Materials on Ludwik Fleck*, ed. Robert Cohen and Thomas Schnelle (Dordrecht: Reidel, 1986), pp. 153–158.

[13] Thomas Söderqvist, "Who Will Sort Out the Hundred or More Paul Ehrlichs? Remarks on the Historiography of Recent and Contemporary Technoscience," in *The Historiography of Contemporary Science and Technology*, ed. Söderqvist (Amsterdam: Harwood, 1997), pp. 1–18, on p. 3.

[14] For work on biomedicine from a number of fields see, e.g., Patrice Pinell, *The Fight against Cancer:*

affected by the "practice turn" in history and sociology of science, those who studied biomedicine had an additional incentive because biological, biomedical, and clinical investigations had increasingly overlapped.[15] Two areas of the new "biomedicine studies" may illustrate the increasingly wide scope of this work: intersections with gender studies and the history of pharmaceuticals.

The women's rights movement, struggles for the liberalization of contraception and abortion, the homosexual liberation movement, and, recently, the activism of intersex people stimulated historians' interest in the ways that science and medicine shaped sexualized bodies in the twentieth century. These studies were partly connected by the uses of sex hormones to control female fertility, to treat a wide range of conditions perceived as pathological or undesirable, to enhance performances of bodies, and to deal (usually in conjunction with surgical technologies) with atypical bodies such as those of intersex people and those wishing to change their sex/gender. The historians studied biological laboratories, production plants, slaughterhouses (a rich source of sex glands used to extract hormones), doctors' offices, and hospital wards. They also focused on social movements and political debates, the regulation of medicines and bodies, the routine management of sexualized/gendered bodies, and the radical reshaping of identities.[16]

Sex hormones are but one category of pharmaceuticals recently investigated by historians as they engage with the increasing social and economic importance of the pharmaceutical industry. This domain of study, like gender and biomedicine, is by definition interdisciplinary, intersecting with business and industrial history, legal history, and political science. Pharmaceuticals are also closely intertwined with the control of natural resources and with intellectual property issues. Scholars have studied the structure of clinical trials, the intersections between the laboratory and the clinic, the marketing of drugs, regulation and standardization, and the circulation of products, instruments, practices, and knowledge both in North–South networks and in the South–South networks that are now expanding.[17]

Dealing with rapidly changing domains and living scientists is a fascinating but

France, 1890–1940 (1992; London: Routledge, 2002); Adele E. Clarke, *Disciplining Reproduction: American Life Sciences and the "Problem of Sex"* (Berkeley: Univ. California Press, 1998); Allan Young, *The Harmony of Illusions: Inventing Post-Traumatic Stress Disorder* (Princeton, N.J.: Princeton Univ. Press, 1995); and Ian Hacking, *Rewriting the Soul: Multiple Personalities and the Science of Memory* (Princeton, N.J.: Princeton Univ. Press, 1995). The sociologist Renée Fox wrote several books with the medical historian Judith Swazey; the sociologist Alberto Cambrosio teamed with the historian of medicine Peter Keating. On the relatively restrained scope of publications in medical history journals see Olga Amsterdamska and Anja Hiddinga, "Trading Zones or Citadels: Professionalization and Intellectual Change in the History of Medicine," in *Locating Medical History*, ed. Huisman and Warner (cit. n. 7), pp. 237–261.

[15] E.g., Alberto Cambrosio and Peter Keating, *Exquisite Specificity: The Monoclonal Antibody Revolution* (New York: Cambridge Univ. Press, 1995); Jean-Paul Gaudillière, *Inventer la biomédicine: La France, l'Amérique et la production des savoirs du vivant* (Paris: La Découverte, 2002); and Hannah Landecker, *Culturing Life: How Cells Became Technologies* (Cambridge, Mass.: Harvard Univ. Press, 2008).

[16] E.g., Nelly Oudshoorn, *Beyond the Natural Body: An Archeology of Sex Hormones* (London: Routledge, 1994); Elizabeth Siegel Watkins, *On the Pill: A Social History of Oral Contraceptives, 1950–1970* (Baltimore: Johns Hopkins Univ. Press, 1998); Lara Marks, *Sexual Chemistry: A History of the Contraceptive Pill* (New Haven, Conn.: Yale Univ. Press, 2001); Alice Dreger, *Hermaphrodites and the Medical Invention of Sex* (Cambridge, Mass.: Harvard Univ. Press, 2003); and Joanna Meyerowitz, *How Sex Changed: A History of Transsexuality in the United States* (Cambridge, Mass.: Harvard Univ. Press, 2003).

[17] E.g., Harry Marks, *The Progress of Experiment: Science and Therapeutic Reform in the United States* (New York: Cambridge Univ. Press, 1997); Jordan Goodman and Vivien Walsh, *Taxol: Nature and Politics in the Pursuit of Cancer Drugs* (New York: Cambridge Univ. Press, 2001); Adriana Petryna, Andrew Lakoff, and Arthur Kleinman, *Global Pharmaceuticals: Ethics, Markets, Practices* (Durham, N.C.: Duke Univ. Press, 2006); Jeremy Greene, *Prescribing by Numbers: Drugs and the Definition of Disease* (Baltimore: Johns Hopkins Univ.

sometimes tricky enterprise.[18] Historians need to handle the sometimes conflictual relationships with scientists and to define their own responsibility toward the people they study.[19] Another potential pitfall is the lure of the new. New forms of identity, subjectivity, and citizenship created through new biomedical techniques may be important well beyond the specialized niches in which they are created, but they may need to be distinguished from overall societal trends.[20] Likewise, the rapidity of changes in some areas of medicine can mask the continued importance of "traditional" methods and approaches.

AN AUTONOMOUS POSITION IN OUR SYSTEM OF LEARNING

In 1936 Henry Sigerist wrote an open letter to the editor of *Isis*, George Sarton, in which he criticized the latter's statement that "the historian of medicine who imagines that he is *ipso facto* a historian of science, is laboring under a gross delusion." Serious historians of medicine, Sigerist claimed, were well aware of the fact that history of science and history of medicine are distinct enterprises and that medicine should not be reduced to science. Indeed, for Sigerist (unlike for Gregg),

> medicine is not a branch of science and it will never be. If medicine is a science, then it is a social science. The physician's goal is to keep his fellow men adjusted or to readjust them if necessary. In order to do this he has to prevent and cure diseases and he does it largely, though not exclusively, by applying scientific method. Yet, it would have been fundamentally wrong to call medicine an applied science, just as it would have been a mistake to call geography or technology applied science. . . . Medicine, like geography and technology, has an autonomous position in our system of learning.[21]

Close intertwining between historical and social science disciplines has now made possible many refined and complex analyses of recent developments in medicine and the biomedical sciences—but perhaps we tend to focus on "bio" rather than on "medicine."[22] Historians of present-day biomedicine tend to be more interested in laboratories than in

Press, 2007); and Christoph Gradmann and Jonathan Simon, eds., *Evaluating and Standardizing Therapeutic Agents, 1890–1950* (Basingstoke, Hampshire: Palgrave Macmillan, 2010).

[18] On the difficulties of studying living scientists see Söderqvist, ed., *Historiography of Contemporary Science and Technology* (cit. n. 13).

[19] See, e.g., Soraya de Chadarevian, "Using Interviews to Write History of Science," in *Historiography of Contemporary Science and Technology*, ed. Söderqvist, pp. 51–70; and Jean-Paul Gaudillière, "The Living Scientist Syndrome: Memory and History of Molecular Regulation," *ibid.*, pp. 109–128. Sociologists and anthropologists who study clinical settings tend to be more concerned about methodological and ethical aspects of their studies than about the reconstruction of the "correct" story.

[20] Paul Rabinow, "Artificiality and Enlightenment: From Sociobiology to Biosociality," in *Essays on the Anthropology of Reason* (Princeton, N.J.: Princeton Univ. Press, 1996), pp. 91–110; and Adam M. Hedgecoe and Paul A. Martin, "Genomics, STS, and the Making of Sociotechnical Futures," in *The Handbook of Science and Technology Studies*, 3rd ed., ed. Edward J. Hackett *et al.* (Cambridge, Mass.: MIT Press, 2007), pp. 817–838, esp. pp. 828–829.

[21] George Sarton, "The History of Science versus the History of Medicine," *Isis*, 1935, *23*:313–320, on p. 319; and Henry Sigerist, "History of Medicine and the History of Science: An Open Letter to George Sarton, Editor of *Isis*," *Bull. Inst. Hist. Med.*, 1936, *4*:1–13, on p. 5. In practice, historians of medicine and science often worked together. For example, in 1946 the History of Science Society was headed by the medical historian Richard Shryock, who played a key role in saving the society's journal, *Isis*, from closing. See I. Bernard Cohen, "The *Isis* Crisis and the Coming of Age of the History of Science Society," *Isis*, 1999, *90*:S28–S42, esp. p. S31.

[22] In the 1980s several "traditional" historians of medicine bemoaned the growing distance between medicine and its historians. See Lloyd Stevension, "A Second Opinion," *Bull. Hist. Med.*, 1980, *54*:134–140; Leonard Wilson, "Medical History without Medicine," *Journal of the History of Medicine*, 1980, *35*:5–7; and Saul Jarcho, "Some Observations and Opinions of the Present State of American Medical Historiography," *ibid.*, 1989, *44*:288–290.

doctors' surgeries and hospital wards, though there are important exceptions to this rather hasty generalization, especially among historians who investigate the reception of medical innovations.[23] But generally we now know much more about biomedical "laboratory life" than about the life of the clinics.

If we want to put more medicine into biomedicine studies, one route may involve the theoretical insights of scholars from earlier generations, such as Sigerist, Temkin, Fleck, Ackerknecht, Rosen, Georges Canguilhem—and Michel Foucault. Critical reading of these thinkers can open new ways to study the "biomedicalization" of medicine and, indeed, forms of medicine that escaped the "biomedical" turn. (If Foucault appears here among the list of the neglected, it is for his early insights on the specificity of hospitals and clinics as sites, in books that remain much less read than the work that helped stimulate the "practice turn" in the history of science.[24]) Foucault, the archaeologist of medical practices, may still inspire historians of recent medicine, as may Fleck, the student of multilayered interactions between the laboratory and the clinic, Canguilhem, the author of reflections on biological normality and social normativity, or Sigerist and his colleagues, as keen investigators of the broad economic, social, and cultural underpinnings of a human activity called "medicine."

Many topics in "biomedicine studies" still await investigation, including the roles of terms such as "biopower," "bioethics," "biocitizenship," and "biosociality." The popularity of these terms may mask the difficulty of grasping the multiple meanings of the "invisible hyphen" they incorporate and the ways in which the "bio" part interacts with power, ethics, citizenship, or socialization. We are still looking for conceptual tools that will better link the social, cultural, and material aspects of medicine, promote studies of the clinic as a key site of the production of new knowledge, and favor an integrated understanding of recent patterns of management of healthy and sick bodies.

[23] Regarding the particular focus on laboratories see Warner, "History of Science and the Sciences of Medicine" (cit. n. 7), pp. 189–193. For some exceptions to the generalization see, e.g., Christiane Sinding, *Le clinicien et le chercheur: Des grandes maladies de la carence à la médecine moleculaire* (Paris: Presses Univ. France, 1991); and Christopher Feudtner, *Bittersweet: Diabetes, Insulin, and the Transformation of Illness* (Chapel Hill: Univ. North Carolina Press, 2003).

[24] Christiane Sinding, "The Power of Norms: Georges Canguilhem, Michel Foucault, and the History of Medicine," in *Locating Medical History*, ed. Huisman and Warner (cit. n. 7), pp. 262–284.