

will surely continue to shape (post) modern life, but in what direction? We are currently in the midst of a major lighting revolution, with solid-state lighting (namely, light-emitting diodes, or LEDs) harkening in a new age of lighting. There is a great deal of excitement over this new technology, and a rapidly increasing adoption for indoor and outdoor lighting. LEDs offer many benefits, such as efficiency and controllability, but scientific studies and advocacy groups have raised concerns about their long-term ecological and health effects, their contributions to “skyglow” and other types of light pollution, and even their realizable energy-savings.

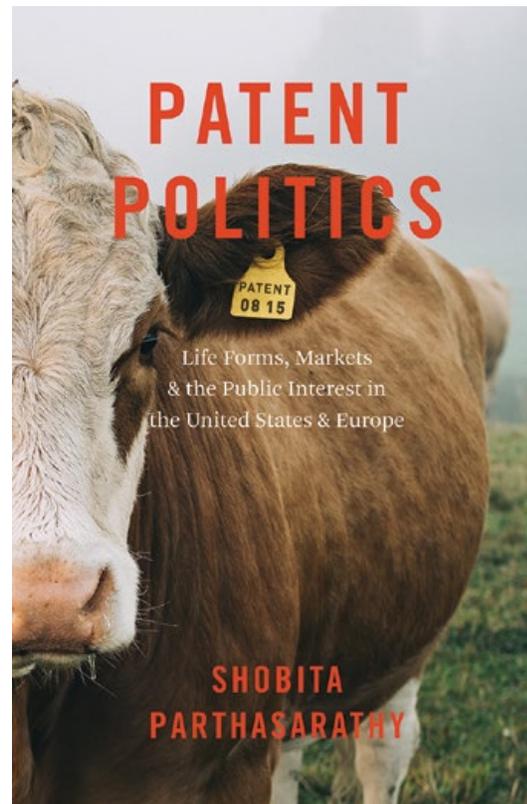
So what will our historian find? What social and political forces will guide the adoption of LEDs, and vice versa? Will they have served narrow commercial interests, or a broader range of social and environmental values? Will they have provided a means to curb light pollution, or exacerbated the adverse effects of nighttime lighting? And will they have served to continue alienating urbanites from the starry night sky, or helped to create a new means of experiencing and interacting with darkness? What sort of medium will the next generation of illumination bring about?

Accepting this new technology uncritically would mean ignoring the lessons we can draw from the cultural history of electric lighting. Further, this next generation of lighting will be layered over the physical and symbolic legacy of the past century of illumination, building on past choices that, although perhaps once contentious, have now faded into normalcy. Through looking back at the history, heritage, and baggage of electric modernism, we are better prepared to look forward.

Taylor Stone (*t.w.stone@tudelft.nl*) is a postdoctoral researcher in the Department of Industrial Design at Delft University of Technology, where he completed his PhD on the ethics of nighttime lighting.

Rights to Life?

REBEKAH SIMON



Patent Politics: Life Forms, Markets, and the Public Interest in the United States and Europe

by Shobita Parthasarathy.
Chicago, IL: University of Chicago Press, 2017, 290 pp.

In 1996, the United States Patent and Trademark Office (PTO) awarded patent protection to Myriad Genetics for a gene that it had sequenced, called BRCA1, and a test for diagnosing mutations in the gene that indicated a susceptibility to breast cancer. Myriad, a publicly traded company headquartered in Salt Lake City, wielded its patent’s legal authority aggressively, shutting down competitors providing breast cancer susceptibility testing services as well as institutions performing BRCA1 research. The patent was legally justified as a reward for Myriad’s technical innovation and contribution to the field of medicine in sequencing the gene. Yet as Shobita Parthasarathy demonstrates in *Patent Politics: Life Forms, Markets, and the Public Interest in the United States and Europe*, the

laws protecting the intellectual merit and market value of such innovative technologies are not always easily reconciled with society’s moral underpinnings.

In just under 300 pages, Parthasarathy takes readers on a deep dive into the tumultuous evolution of patent systems in the United States and Europe, first by constructing historical frameworks for each and then by applying them to the systems’ different reactions to morally ambiguous innovations in biotechnology, such as the patenting of BRCA1. Patent systems were initially designed to incentivize innovation by offering innovators temporary exclusive rights to make and sell their inventions. However, Europe and the United States each introduced qualifications to the idea of an “invention” early on: European systems

expected patentable inventions to preserve or improve society, while the US system merely expected them to be novel (and, ideally, marketable). These differences in the scope of patentable innovation primed the development of a large ideological schism between Europe and the United States regarding how patent law should address the social concerns and implications of new technologies.

Parthasarathy's meticulous documentation of early patent law details the beginning of this rift. Her contrast of Europe's national patent systems of the eighteenth and nineteenth centuries with the fledgling federal PTO in the United States also suggests that this fissure has widened substantially over time. She says that the earliest European patent systems incorporated societal values by

approval, Parthasarathy argues, primed the European patent to be a powerful instrument of ethics in a rapidly technologizing society. This was especially true following World War II, when national institutions gave way to integrated, cross-border institutions such as the European Patent Office (EPO). Over time, the EPO limited patents on pharmaceutical products (though synthesis processes could be patented), certain foodstuffs, and many genetically engineered plants and animals for a variety of ethical reasons.

In comparison, when the US PTO came face to face with rapid innovation in the early twentieth century, its already narrow moral code slipped into obscurity. Industrialization-era patents in the United States were exclusively "techno-legal" documents

The European systems' early adoption of nontechnical patent inspectors and later engagement with ethicists and advocacy groups, such as Kein Patent Auf Leben (No Patents on Life), bolstered their credibility as both technical and moral authorities on patentability. Parthasarathy notes that prior to the European Union's (EU) adoption of the Biotech Patent Directive (BPD) in the 1990s, "EU parliamentarians understood patents as having ethical, social, and economic implications and envisioned a patent system that would take responsibility for these issues." Comparatively, the US PTO consistently leveraged its techno-legal definition to marginalize advocacy groups based on their level of experience with the system, to resist consideration of patentability's moral implications, to force the judicial system to evaluate challenges on what Parthasarathy calls "the domain's narrow goal of certifying inventions," and ultimately to forge a precedent for the systematic exclusion of nonmarket value-based criteria from the process of technology evaluation. This perspective persists even today.

One result of these disparate, entrenched objectives of the European and US patent systems was a series of protracted legal battles surrounding the patentability of new biotechnology. Parthasarathy draws on a cleverly curated selection of judicial proceedings, legal testimony, and mass media reports to show how historical precedent restricted challenges to morally ambiguous patents in the United States, while facilitating their success in Europe. One of these battles occurred over human embryonic stem cells (hESCs), a scientifically valuable type of cell that has the potential to develop into any kind of human tissue.

The US PTO granted several patents to the University of Wisconsin for hESCs that its researchers had isolated and maintained. These patents were eventually overturned—but not because of the moral implications

Differences in the scope of patentable innovation primed the development of a large ideological schism between Europe and the United States regarding patent law.

promptly adopting practices of *ordre public*, a French construct "prohibiting patents on any technology deemed contrary to public policy or morality," and compulsory licensing, a German mandate that "gave governments the power, under specified circumstances, to step in and force patent holders to allow others to make and sell an invention if the patent holder either refused to do so or set the prices of its invention too high." In comparison, after a Supreme Court ruling regarding the patentability of two water pumps in 1817, the US PTO adopted a much narrower set of moral criteria, in which a patent "could be prohibited because [it] did not have a beneficial use, but rather [was] pernicious, frivolous, or worthless."

Ultimately, the European systems' explicit involvement in the moral considerations underlying patent

that served solely to certify novelty and provide commercialization incentive. Both representatives and users of the US patent system vociferously objected to the adoption of European-style government oversight mechanisms, deeming them threats to future market growth and technological advancement. Parthasarathy extracts two defining concepts of this ideological skirmish from her elegantly paraphrased testimony of a member of the US Patent Law Association to the US Congress in 1914: "rational market participants [do] not suppress their patented inventions," and "industrialists and their legal representatives [are] the appropriate experts because they [bring] experience with the patent system."

Parthasarathy also shows that the European and US patent systems treat stakeholder involvement differently.

of patenting life. Instead, the legal challenge to the patents centered on other related scientific findings that should be considered “prior art” and thus invalidate the novelty of hESCs. (The patents were later partly reinstated on appeal.) Other winning strategies for challenging biotechnology patents included characterizing life-related technologies as “natural,” and therefore not an invention. That the patents inhibited further research and unfairly reallocated federal research dollars toward licensing fees was a secondary argument, since the historical precedent of the PTO effectively neutered its effectiveness.

Conversely, by institutionalizing morality into the patent process from the outset, the EPO positioned itself as both an ethical arbiter over technology disputes and an organization that could include nonlegal expert stakeholders in decision-making. When the EPO awarded a patent for hESCs to the University of Edinburgh, opposition groups immediately argued that “the patent violated both the ... *ordre public* clause, and the BPD’s explicit language that forbade patents ... of human embryos.” This opposition grew to include hundreds of private citizens and a rebuke from the European Parliament that the EPO had abdicated its moral responsibilities. Eventually, the EPO’s own Opposition Division ruled that patenting hESCs was immoral, and the European Court of Justice invalidated the university’s hESC patents. This achievement on the part of those seeking to use patentability to address ethical concerns was not attained painlessly, but as Parthasarathy concludes, “that European patent institutions continued to try to address these issues [of access to technology for the greater public good] marks the real difference between the US and Europe.”

Parthasarathy’s final discussions regarding recent concerns over the BRCA genes and plant seed patents complete her vivid historical collages of the two patent systems’ evolution.

As one might now expect, the US Congress’s oversight regarding the PTO’s decision to award Myriad Genetics the BRCA1 patent was extremely narrow; it was motivated by the market suppression Myriad’s monopoly on genetic testing appeared to cause. Similarly, in arguments before the Supreme Court, advocates contesting Myriad’s patents averred, in Parthasarathy’s words, “that human gene patents violated US patent law’s ‘product of nature’ doctrine,” acknowledging that the justices would not adjudicate based on moral violations alone. The Supreme Court agreed, finding that naturally occurring DNA sequences, such as BRCA1, cannot be patented. Such legal acrobatics were less necessary to overturn the patents awarded to Myriad by the EPO. Indeed, the BRCA1 case led to a new EPO practice of incorporating socioeconomic impacts of patents into considerations of *ordre public*, which was a major component of public and parliamentary feedback during the legal battle.

Patent Politics is both a timely and salient contribution to a number of current discussions about the role of government in democratic society, and a prime example of how society can use hindsight to shape future policy. The book offers compelling evidence that citizens expect instruments of policy to extend beyond formal legal obligations, and to incorporate societal morals and values. Yet it also warns those citizens that shortsighted exclusion of the historical forces shaping political discourse will not result in enduring institutional change.

In the United States, both points are relevant to understanding and influencing the politics of health care reform, fossil fuel development, immigration law, and other value-laden issues. In Europe, the European Commission acknowledged morality in law by adopting in 2017 the

European Pillar of Social Rights, which strives to encode a number of societal values in a guiding document for policy-making. Parthasarathy’s analysis of the patent systems serves as a cogent reminder to policy-makers that many citizens, even in democratic societies, are dissatisfied with the overall structure of decision-making. Similarly, the history of the patent systems strongly parallels public discourse regarding the role of government versus the free market. The US patent system is undoubtedly low on the list of priorities for reform, but Parthasarathy demonstrates that it may in fact be a beautifully self-contained example of how successful reform efforts must be, at least in part, constructed around US institutions’ historic obsequiousness to market values.

Finally, *Patent Politics* reflects on the consequences of expanding policy-making institutions to include a more diverse selection of expertise, and shows that both policy-making and technological R&D can benefit from more inclusive tactics. The body of literature in support of scientific codesign and coproduction (in which scientists and other social groups work together to produce new knowledge) is significant, and one could easily marshal Parthasarathy’s analysis of life form patents to test the extension of similar concepts—such as the inclusion of nonexpert stakeholders and nonmarket values—to policy-making. This makes *Patent Politics* a formidable contribution both to the science and technology studies literature as well as to the burgeoning field of bioethics. Parthasarathy masterfully juxtaposes complex human morality with the rigid framework of law, and demonstrates that with a little bit of encouragement they can be far more complementary than expected.

Rebekah Simon (rebekah.simon@colorado.edu) is a PhD candidate in the Department of Geological Sciences at the University of Colorado Boulder.