BOOK REVIEW

Magnus, David, Arthur Caplan and Glenn McGee, eds. *Who Owns Life?* Amherst, NY: Prometheus Books, 2002. 300 pp. $26.00 (cloth). ISBN 1-57392-986-7.

Genetics research and biotechnology development – while holding the promise of improved pharmaceuticals, medical treatments, and foods – is also raising concerns about the impact of market forces on scientific enquiry, product development, and the provision of health care. Concerns about the negative effects of commercialization in many cases boil down to issues about the appropriateness of patenting DNA and other biological materials, framed in the public press as the ''ownership of life.'' Public action groups such as the Council for Responsible Genetics, GeneWatchUK, and Greenpeace have decried the costs and dangers of patenting and lobbied strongly against DNA patenting; governments (e.g., in the United States, Canada, and the United Kingdom) have responded with public consultations and policy reports that attempt to alleviate these fears while also supporting ongoing biotechnology development as part of their ''knowledge-economies.'' Yet for the uninitiated, comprehending this diversity of social and ethical issues, weighing the economic and political considerations or sorting the legal and scientific facts remains a daunting task. In *Who Owns Life?*, David Magnus, Arthur Caplan and Glenn McGee have responded to this task with a well organized and accessible volume that collects together 13 short essays from some of the leading figures in American bioethics, law, philosophy, and history. Through these essays, the reader is successfully introduced to the basics of patent law, the social and political context in which DNA became patentable, and the myriad challenges and dangers faced by scientists, regulators, and the public in navigating a terrain where the basic elements of life have become the subject of market forces.

The reader is first introduced to the story behind one of the landmark legal decisions in the patenting of DNA, the 1980 US Supreme Court case of *Diamond v. Chakrabarty*. In permitting the

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patenting of a genetically modified bacterium for the bioremediation of oil spills, the Supreme Court opened the door for patents on a host of biological organisms and genes. Appropriately, it is Ananda Chakrabarty, the scientist responsible for developing the bacterium, who begins the volume. In Chapter 1, he provides a brief history of the early genetics science of the 1970s, as well as some insights into the political debates at the US Patent and Trademark Office (PTO) and the Supreme Court that ultimately led to more widespread patenting of biological material and life forms. With this case as background, in Chapter 2, Jack Wilson applies a straightforward legal analysis of the debate around DNA patents, putting aside the social or ethical implications of patenting as distinct from and not within the purview of patent law or the PTO. Wilson discusses the history of the patent protection of plants and the product-of-nature vs. invention debate and also explores the distinction (or lack thereof) between research and product development in biotech and the threat that patents on research pose for continued scientific enquiry. This discussion is followed by an essay from Rochelle Seide and Carmella Stephens, that is explicitly pro-science and argues in favor of DNA patenting. Unfortunately, the authors have a superficial and naïve view of the successes of new genetic technologies and the benefits of patents (is gene therapy really an example of an unqualified success?) and they dispose of any ethical concerns much too quickly. The essay partly redeems itself by providing a useful overview of the US patent requirements and the role of morality in early case law and the weakening of utility requirements, as compared with the European context. Wrapping up the background chapters is an excellent essay by Ari Berkowitz and Daniel J. Kevles on the history of the political debate around the patenting of expressed sequence tags (ESTs) and the race to sequence the human genome. They discuss the ramifications of the NIH and Craig Venter's attempts to patent thousands of ESTs and reactions by opponents of broad gene patenting, such as Jeremy Rifkin and the European Union. In particular, Berkowitz and Kevles draw attention to a conflict between US and EU views about the place for ethical evaluation in patent policy, which is paradoxically set within a broader context of globalization and patent and trade harmonization.

The central chapters of the volume (Chapters 5–11) present sophisticated legal, philosophical, and ethical analyses of DNA patenting. John Merz discusses the patenting of "disease genes" and in particular the case of Canavan's disease, exploring how commercial

influences have led to the patenting and expropriation by scientists and universities of genes and diagnostic tests from the communities of patients and families who made the research possible. The contribution of research subjects is invariably downplayed in the granting of patents because research subjects have not transformed their genetic information (as scientists have done) and thus have no ownership of or claims to the resulting research. Rebecca Eisenberg explores the shift in terrain from a point (prior to the early 1990s) where the PTO and US courts treated the products of recombinant DNA technologies as analogous to new chemical compounds (compositions of matter), to the current situation where high-throughput DNA sequencing results in patents on the informational content of DNA. Eisenberg argues that taking a permissive stance towards the patenting and control of genetic information weakens the public benefit of patents by undermining the disclosure requirement. Patents were designed for a "bricks and mortar world," and it is hazardous to assume that they can simply be tweaked for an information economy. David Resnik's essay, using careful philosophical reasoning, deconstructs the invention/discovery distinction so crucial to arguments for and against DNA patenting. He demonstrates that, far from resting on objective facts, determinations of whether something is a *mere* discovery or a *real* invention are unavoidably bound up with moral values. Gene patenting is what Resnick calls a "hard case" and like the abortion debate, it will not be resolved by focusing on a simple distinction – we must instead make explicit the value and benefit claims involved.

Mark Hanson takes up the question of whether DNA patenting leads to the inappropriate commodification and objectification of human beings. Like Resnik, he argues that commodification is not about facts as such, but about how people conceive of genes, biology, and heredity. The market rhetoric implicit in patents facilitates a shift in worldviews to one that is more materialist and commercial. Rhetoric, Hanson notes, is important and morally laden, reminding us of the tensions and issues at stake. Shifting to the larger context of scientific research, Robert Lee Hotz draws a detailed picture of the increasing role and integration of commercial forces and ideals in biomedical research. Presenting numerous examples of problems arising from DNA patenting and commercial incentives in science, Hotz concludes by arguing for the need to establish a scientific Hippocratic code of ethics to protect scientific independence and credibility. Lori Andrews and Dorothy Nelkin provide an excellent

and concise introduction to the Doodeward and Moore cases. Drawing an analogy with 19th century body-snatching, they argue that because the body is not property, there is little legal recourse to prevent expropriation of tissues and ownership by third parties. In an environment where the body and its constituent parts have increasing value for biomedical research, Andrews and Nelkin note the growing interest by US courts in favor of using property rights (which Andrews and Nelkin support) as a framework for protecting individuals from exploitation. Arguing against this position, Pilar Ossorio deconstructs the notions of property and ownership. She is concerned that because property rights invariably apply to objects and not subjects, applying property rights to one's body or body parts will bring in market rhetoric that objectifies and commodifies the body in a manner that undermines respect for persons. Nonetheless, she believes a strong case can be made for some sort of ownership right in extracorporeal tissue, but not necessarily as a legal property right.

The volume concludes with two chapters that build on the previous discussions and apply the resulting ideas to the particular cases of bioprospecting in the developing world and stem cell research. In Chapter 12, Glen McGee and Elizabeth Banger look at the implications that patenting has for stem cell research, beginning with a very interesting discussion of the development and patenting of stem cell lines by Geron and WARF and the disputes that have erupted from the PTO awarding broad and often overlapping patents to both parties. McGee and Banger note that, in the case of stem cell research as compared with that of medical genetics, there is a small community of researchers already closely engaged with commercial entities and in control of patents on cell lines. It is difficult for governments to regulate this research because inadequate public funding has meant that much of the science happens privately and outside the purview of the FDA. The danger of patents and commercialization at this early stage of research is that it puts too much power and control into the hands of a few corporations, who have strong incentives to protect their property rights to the detriment of future research.

In the final chapter, David Magnus draws together many of the points raised in earlier chapters to explore issues around plant patents and bio-prospecting in the developing world. He argues that the collaboration of the US, EU, and Japan in linking trade to intellectual property rights (backed by TRIPS) gives power to northern countries and multinationals to exploit both the biological resources and knowledge of indigenous peoples in the developing world. Citing

the case of patents on Mexican yellow beans, turmeric, and products of the Indian neem tree, Magnus describes the current situation as one in which patents are granted to the winners, i.e., to those Western researchers able to build on extensive knowledge and work by indigenous peoples and local research programs. Finally, Magnus shows how the existing legal and political structures are stacked against developing countries, preventing their accruing social and economic benefits from their biological and cultural heritage and leaving them ripe for exploitation by wealthy multinationals.

Who Owns Life? brings together in one volume, essays on the major legal, ethical, and political issues arising from some of the most current and hotly debated topics in DNA patenting. The essays are concise and to the point, written in an open and accessibly manner, and provide an excellent introduction that is informative both for the novice and the expert. This book is a must-have for the bookshelves of anyone interested in the social, ethical, legal, and political issues arising from the patenting of DNA and biological materials.

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