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Notes

Preface

- 1 My ongoing commentary about the case can be accessed online at <http://whoownsyou-drkoepsell.blogspot.com/>

Introduction

- 1 As I began to discuss in *The Ontology of Cyberspace: Law, Philosophy, and the Future of Intellectual Property*, Chicago, IL: Open Court, 2000.
- 2 Or more broadly ‘nanowares’ which encompasses a range of technologies between full MNT and desktop 3D printing, as I will discuss in more depth soon.
- 3 See generally, Dipert, R. (1993), *Artifacts, Art Works, and Agency*, Philadelphia, PA: Temple University Press.
- 4 See generally, Williams, T. and Singer, C. J. (1954), *A History of Technology*, vols. 1–6, Oxford: Clarendon Press; Bronowski, J. (1973), *The Ascent of Man*, Toronto, ON: Little, Brown and Company.
- 5 Daniels, P. and Bright, W. (1996), *The World’s Writing Systems*, Oxford: Oxford University Press, p. 146.
- 6 See generally, Smith, B. D. (1995), *The Emergence of Agriculture*, Scientific American Library.
- 7 Braudel, F. (1992), *Civilization and Capitalism: Vol. 2, The Wheels of Commerce* (trans. S. Reynolds), Berkeley, CA: University of California Press.
- 8 Wolf, A. (1950), *A History of Science, Technology, and Philosophy*, vol. I, New York: Harper Torchbooks, pp. 54–70.
- 9 See generally, Morton, D. L. Jr. and Gabriel, J. (2007), *Electronics: The Life Story of a Technology*, Maryland: The Johns Hopkins University Press.
- 10 Sobel, D. (1996), *Longitude: The True Story of a Lone Genius Who Solved the Greatest Scientific Problem of His Time*, London: Penguin Books.
- 11 http://en.wikipedia.org/wiki/Mallock_machine [accessed 22 September 2010].
- 12 Morton and Gabriel, *Electronics* (and now, materials other than silicon as well).
- 13 Campbell-Kelly, M. and Aspray, W. (2004), *Computer: A History of the Information Machine*, Boulder, CO: Westview Press.
- 14 Campbell-Kelly and Aspray, *Computer*.
- 15 I describe and defend this notion of the Jacquard Loom in *The Ontology of Cyberspace*.
- 16 209 US 1 (1908).
- 17 Pub. L. 94-553 (19 October 1976); 90 Stat. 2541.
- 18 As I argued we should do in *The Ontology of Cyberspace*.
- 19 I develop this argument at length in both *The Ontology of Cyberspace*, and in *Who Owns You?* If you want to follow this argument without buying those books, you can read more about it on my blog for *Who Owns You?*. Available at <http://whoownsyou-drkoepsell.blogspot.com/>

Chapter One

- 1 This chapter includes material from, and expands upon my article (2009), 'Let's Get Small: An Introduction to Transitional Issues in Nanotech and Intellectual Property', *Nanoethics*, 3(2): 157–66 which is published under an Open Access license: DOI citation: 10.1007/s11569-009-0068-9.
- 2 Published first in *Engineering and Science* (1960), republished at <http://www.zyvex.com/nanotech/feynman.html> [accessed 22 September 2010].
- 3 Drexler, E. (1986), *Engines of Creation: The Coming Era of Nanotechnology*, New York: Anchor Books.
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- 5 Kurzweil, R. (2000), *The Age of Spiritual Machines*, London: Penguin Books.
- 6 Joy, B. (2000), 'Why the Future Doesn't Need Us', *Wired*, 8(4), April.
- 7 Kuhn, T. (1962), *The Structure of Scientific Revolutions*, Chicago, IL: University of Chicago Press.
- 8 During a talk in 1977 for the World Future Society, in Boston. <http://www.snopes.com/quotes/kenolsen.asp> [accessed 9 September 2010].
- 9 See, for example: Ach, J. S. and Siep, L. (eds) (2006), *Nano-bio-ethics: Ethical Dimensions of Nanobiotechnology*; Cameron, N. M. de S. and Mitchell, M. E. (eds) (2007), *Nanoscale: Issues and Perspectives for the Nano Century*; Berne, R. W. (2006), *Nanotalk: Conversations with Scientists and Engineers about Ethics, Meaning, and Belief in the Development of Nanotechnology*; Allhoff, F. and Lin, P. (eds) (2009), *Nanotechnology and Society: Current and Emerging Ethical Issues*; Schummer, J. and Baird, D. (eds) (2006), *Nanotechnology Challenges: Implications for Philosophy, Ethics and Society*; Roco, M. C. and Bainbridge, W. S. (eds) (2006), *Nanotechnology: Societal Implications*; Miller, J. C., Serrato, R., Represas-Cardenas, J. M., and Kundahl, G. A. (2004), *The Handbook of Nanotechnology: Business, Policy, and Intellectual Property Law*; Boucher, P. M. (2008), *Nanotechnology: Legal Aspects*.
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- 11 Seed, P. (2001), 'Taking Possession and Reading Texts: Establishing the Authority of Overseas Empires', in S. N. Katz, J. M. Murrin, and D. Greeberg (eds), *Colonial America: Essays in Politics and Social Developments*, 5th edn, New York: McGraw-Hill, pp. 22, 26.
- 12 Cheung, S. N. S., 'Property Rights in Trade Secrets', *Economic Inquiry*, 20(1): 40.
- 13 Chicago, IL: Open Court (2000).
- 14 <http://fab.cba.mit.edu/about/faq/> [accessed 10 June 2009].
- 15 <http://fabathome.org/wiki/index.php?title=Fab%40Home:Overview> [accessed 10 June 2009].
- 16 <http://reprap.org/bin/view/Main/WebHome> [accessed 10 June 2009].
- 17 25 November 2006, <http://www.guardian.co.uk/science/2006/nov/25/frontpagenews.christmas2006> [accessed 10 June 2009].

- 18 25 November 2006, <http://www.guardian.co.uk/science/2006/nov/25/frontpagenews.christmas2006> [accessed 10 June 2009].
- 19 See, *Who Owns You? The Corporate Gold Rush to Patent Your Genes*.

Chapter Two

- 1 <http://www.iter.org> [accessed 22 September 2010].
- 2 Drexler, E. (1992), *Nanosystems: Molecular Machinery, Manufacturing, and Computation*, New York: John Wiley & Sons.
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- 6 Drexler, E., Forrest, D., Freitas, R. A. Jr., Hall, J. S., Jacobstein, N., McKendree, T. and Merkle, R. (2001), *On Physics, Fundamentals, and Nanorobots*; Peterson, C. (2001), *Rebuttal to Smalley's Assertion that Self-replicating Mechanical Nanorobots Are Simply Not Possible*, Institute for Molecular Manufacturing.
- 7 <http://www.softmachines.org/wordpress/?p=175> [accessed 22 September 2010]; Jones, R. A. L. (2008), 'Rupturing the Nanotech Rapture', *IEEE Spectrum's Special Report: The Singularity*.
- 8 Attempts to manipulate biological systems and parts to conduct, essentially, MNT. This is inspired by the fact that many biological phenomena are essentially nanoscale phenomena.
- 9 <http://www.nanotechproject.org/> [accessed 22 September 2010].
- 10 Koespell (2000), *The Ontology of Cyberspace*.
- 11 Koespell (2009), *Who Owns You?*
- 12 Watt, S. (1997), 'Introduction: The Theory of Forms (Books 5–7)', Plato: *Republic*, London: Wordsworth Editions, pp. xiv–vi.
- 13 And arguably a third sort of thing we might call 'accidents'.
- 14 See, *The Ontology of Cyberspace*.
- 15 Simons, P. and Melia, J. (2000), 'Continuants and Occurrents', *Proceedings of the Aristotelian Society*, Supplementary Volume 74: 59–75, 77–92; see Munn, K. and Smith, B. (2008), *Applied Ontology: An Introduction*, p. 268.
- 16 For more on Basic Formal Ontology, see <http://www.ifomis.org/bfo/1.1> [accessed 22 September 2010].
- 17 This is an explicitly Aristotelean view of universals, and contrasts with Plato's metaphysics. *Metaphysics*, Z 13; *Posterior Analytics*, I 5, 74a: 25–32.
- 18 A method of placing an order for an item comprising: under control of a client system, displaying information identifying the item; and in response to only a single action being performed, sending a request to order the item along with an identifier of a purchaser of the item to a server system; under control of a single-action ordering component of the server system, receiving the request; retrieving additional information previously stored for the purchaser identified by the identifier in the received request; and generating an order to purchase the

requested item for the purchaser identified by the identifier in the received request using the retrieved additional information; and fulfilling the generated order to complete purchase of the item whereby the item is ordered without using a shopping cart ordering model.

Chapter Three

- 1 http://educhoices.org/articles/How_to_Make_AlmostAnything_OpenCourseWare_MITs_Free_Graduate_Level_Course_on_Fabrication_and_Design.html [accessed 22 September 2010].
- 2 Gershenfeld, N. (2005), *FAB: The Coming Revolution on Your Desktop – From Personal Computers to Personal Fabrication*, New York: Basic Books.
- 3 <http://fab.cba.mit.edu/about/charter/> [accessed 22 September 2010].
- 4 http://www.fabathome.org/wiki/index.php/Fab%40Home:_Model_2_Overview [accessed 22 September 2010].
- 5 <http://reprap.org/wiki/Mendel> [accessed 22 September 2010].
- 6 ‘There are around 1.5 million patents in effect and in force in this country, and of those, maybe 3,000 are commercially viable’ (Richard Maulsby, director of the Office of Public Affairs for the US Patent & Trademark Office, says). ‘It’s a very small percentage of patents that actually turn into products that make money for people’ (Richard Maulsby quoted in Klein, K. E. (2005), ‘Smart Answers, “Avoiding the Inventor’s Lament”’, *Business Week*, 10 November).
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- 8 Welsh, C. A. (1948), ‘Patents and Competition in the Automobile Industry’, *Law and Contemporary Problems*, 13(2), The Patent System (Spring): 260–77.
- 9 Bill Gates admits his proficiency in coding grew from thousands of hours of free time on the computer at his schools in which he could muck about and write code to his heart’s content. At that stage, he had not begun to use IP to protect his code, and the code of others on the system with whom he collaborated, learned, and honed his skills was similarly unprotected. See, Gladwell, M. (2008), *Outliers*, London: Little, Brown and Company.
- 10 ‘The History of the GPL’. Available at http://www.free-soft.org/gpl_history/ [accessed 22 September 2010].
- 11 See http://en.wikipedia.org/wiki/List_of_free_and_open_source_software_packages [accessed 22 September 2010].
- 12 Thurston, R. (2006), ‘HP: Open Source Can be More Profitable than Proprietary’. Available at <http://www.ZDNet.co.uk> [accessed 29 October 2010]; <http://www.zdnet.co.uk/news/application-development/2006/10/29/hp-open-source-can-be-more-profitable-than-proprietary-39284344/> [accessed 22 September 2010].
- 13 <http://seekingalpha.com/article/10166-chart-software-companies-gross-profit-margins> [accessed 22 September 2010].

Chapter Four

- 1 This principle, which puts the burden of proof of safety upon those who would pursue something (such as a technology) given the possibility of some harm, is statutorily required in the European Union. Recuerda, M. A. (2006), 'Risk and Reason in the European Union Law', *European Food and Feed Law Review*, 5.
- 2 Taebi, B. (2010), 'Sustainable Energy and the Controversial Case of Nuclear Power', in R. Raffaele, W. Robison and E. Selinger (eds), *Sustainability Ethics: 5 Questions*, Copenhagen: Automatic Press.
- 3 Before law school, I had the honor of serving as a clerk for New York State attorneys who sued Hooker Chemical on behalf of the State for damages arising from the massive dumping of chemical byproducts at Love Canal, in Niagara Falls, NY. That case was but one of many that uncovered what many allege were derelictions of duties owed by chemical companies to residents, both present and future, of areas where chemicals were made and wastes disposed, without the sort of precautions now required. See Glaberson, W. (1990), 'Love Canal: Suit Focuses on Records from 1940's', *The New York Times*, 22 October.
- 4 The Belmont Report is a significant statement of ethical principles pertaining to research on human subjects in the United States. 'The Belmont Report: Ethical Principles and Guidelines for the Protection of Human Subjects of Research' by The National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 18 April 1979. This report is now the foundation upon which rules and guidelines for determining the ethics of studies on humans are based. Available at <http://ohsr.od.nih.gov/guidelines/belmont.html> [accessed 22 September 2010].
- 5 Milgram, S. (1963), 'Behavioral Study of Obedience', *Journal of Abnormal and Social Psychology*, 67: 371–8. DOI: 10.1037/h0040525; Milgram, S. (1973), 'The Perils of Obedience', *Harper's Magazine*, December, pp. 62–77.
- 6 Tuskegee Study – Timeline. NCHHSTP. Centers for Disease Control 2008-06-25. Available at <http://www.cdc.gov/tuskegee/timeline.htm> [accessed 22 September 2010].
- 7 Koepsell (2009), 'On Genies and Bottles: Scientists' Moral Responsibility and Dangerous Technology R&D', *Science and Engineering Ethics*, 16(1): 119–33 (2010 – in print). Online first/Open Access DOI citation: 10.1007/s11948-009-9158-x.
- 8 <http://www.foresight.org/guidelines/current.html> [accessed 22 September 2010].
- 9 http://ec.europa.eu/nanotechnology/pdf/nanocode-rec_pe0894c_en.pdf [accessed 22 September 2010].
- 10 The Avalon Project – The Laws of War, Yale Law School, Lillian Goldman Library. Available at http://avalon.law.yale.edu/subject_menus/lawwar.asp [accessed 22 September 2010].
- 11 Press Briefing by Homeland Security Director Tom Ridge, Health and Human Services Secretary Tommy Thompson, CDC Emergency Environmental Services Director, Dr. Pat Meehan 29 October 2001. Available at <http://www.presidency.ucsb.edu/ws/index.php?pid=79187> [accessed 22 September 2010].
- 12 Cello, J., Paul, A. V., and Wimmer, E. (2002), 'Chemical Synthesis of Poliovirus cDNA: Generation of Infectious Virus in the Absence of Natural Template', *Science*, 297(5583): 1016–8. DOI:10.1126/science.1072266. PMID 12114528.

- 13 <http://gspp.berkeley.edu/iths/UC%20White%20Paper.pdf> [accessed 22 September 2010].
- 14 http://synbiosafe.eu; http://www.idialog.eu/uploads/file/Synbiosafe-Biosecurity_awareness_in_Europe_Kelle.pdf [accessed 22 September 2010].
- 15 http://ec.europa.eu/european_group_ethics/docs/opinion25_en.pdf [accessed 22 September 2010].
- 16 <http://synthethics.eu/> [accessed 22 September 2010].
- 17 Garfinkel, M. S., Endy, D., Epstein, G. L., and Friedman, R. M. (2007), *Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science*, 5(4): 359–62. DOI:10.1089/bsp.2007.0923.

Chapter Five

- 1 This chapter incorporates and expands upon my article, ‘Things in Themselves: Redefining Intellectual Property in the Nano-age’, *Journal of Information Ethics*, 21(1) (Spring 2011), and is used with permission.
- 2 ‘To promote the progress of science and the useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writing and discoveries’; enacted through 35 US Code sec. 1-376, The US Patent Act.
- 3 Machlup, F. and Penrose, E. (1950), ‘The Patent Controversy in the Nineteenth Century’, *The Journal of Economic History*, 10(1): 1–29.
- 4 35 US Code sec. 154(a)(2).
- 5 See, *Gottschalk v. Benson*, 409 US 63 (1972), in which the US Supreme Court denied a patent to an algorithm that was essentially a mathematical formula, arguing that patenting an abstract idea or law of nature would not suit the purposes of patent.
- 6 See *Diamond v. Diehr*, 450 US 175 (1981), in which the US Supreme Court allowed a patent utilizing a well-known mathematical algorithm. Although they did not explicitly overrule *Gottschalk*, they reasoned that the algorithm when introduced into the machinery of a computer renders the previously unpatentable algorithm suddenly patentable, as part of a ‘whole’ invention.
- 7 Heim, M. (1993), *The Metaphysics of Virtual Reality*, New York, NY: Oxford University Press, pp. 81–3; see also, Benedikt, M. (1991), *Cyberspace: First Steps* Cambridge, MA: MIT Press.
- 8 McLuhan, M. and Fiore, Q. (1967), *The Medium is the Massage* [sic.], London: Penguin Books. McLuhan’s son has clarified this strange title subsequently, ‘[...]the title was a mistake. When the book came back from the typesetter, it had on the cover “Massage” as it still does. The title should have read The Medium is the Message but the typesetter had made an error. When Marshall McLuhan saw the typo he exclaimed, “Leave it alone! It’s great, and right on target!” Now there are four possible readings for the last word of the title, all of them accurate: “Message” and “Mess Age”, “Massage” and “Mass Age”. Eric McLuhan in: Baines, P., *Penguin by Design, A Cover Story 1935–2005*, Penguin Books, p. 144.
- 9 Koepsell (2000), *The Ontology of Cyberspace* arguing that cyberspace is nothing particularly new, and that all its components are expressions of known, material types.
- 10 See, for example, Stallman, R. (2006), *GPLv3, Presentation*, 25 February, Brussels, BE. Available at <http://sweden.fsfe.org/projects/gplv3/> [accessed 22 September 2010].

Chapter Six

- 1 This chapter expands upon and incorporates my article (2010) 'Authorship and Artifacts: Remaking IP Law for Future Objects', *The Monist*, 93(3): 481–92 and is used by permission.
- 2 Coryton, J. (1855), *The Law of Letters-patent*, London: H. Sweet, pp. 4–5.
- 3 Coryton, *The Law of Letters-patent*, pp. 17–21, 131.
- 4 See generally, Koepsell (2000), *The Ontology of Cyberspace*.
- 5 See, Koepsell (2009), *Who Owns You?*
- 6 See, Coryton (1855), p. 88.
- 7 *Gottschalk v. Benson*, 409 US 63 (1972).
- 8 *Parker v. Flook*, 437 US 584 (1978).
- 9 *Diamond v. Diehr*, 450 US 175 (1981).
- 10 John Searle divides reality into the world of 'brute facts', which exists with or without human intentions, and the world of 'social reality', which is composed of the institutions, predicated upon brute facts, depending upon them in part, but founded ultimately upon human intentionality. Searle, J. R. (1997), *The Construction of Social Reality*, New York: Free Press.
- 11 Although in copyright, if the alleged infringer was innocent, and did not know of the existence of the other work, this is a defense. There is no such defense in patent.

Chapter Seven

- 1 In other words, positive (human made) law cannot contradict natural law. Consider the law of property. I argue that the legal institution of ownership is just because it is based upon the brute fact (the pre-institutional fact) of possession. Laws of ownership are just when they properly uphold brute facts of possession. The old canard that 'possession in 9/10ths of the law' is true, and reflects the fact that the law treats possession as *a priori* justification for continued possession, absent some other valid claim to prior possession, and some evidence of *unjust* dispossession. In legal institutions regarding *real* property (which is exclusive and rivalrous, meaning no two persons can simultaneously possess it), we have created a system of registration to track the proper, just possessors and thus owners. Based on all this, if some regime wished to declare *all* property to be *theft*, for instance, that regime would be unjust since it violates grounded (natural) rights of possession and just legal institutions of ownership. This is a more or less Lockean theory of natural rights to property, with a bit of an Austrian twist.
- 2 Boldrin and Levine, p. 2.
- 3 Menger, C. (1963), *Problems of Economics and Sociology* (trans. F. J. Nock, ed. L. Schneider), Urbana: University of Illinois Press, pp. 213–15.
- 4 Locke, J. (1988), *Two Treatises of Government* (ed. P. Laslett), Cambridge: Cambridge University Press. See, for example, 2d Treatise, Sections 171, 220.
- 5 Rosen, W. (2010), *The Most Powerful Idea in the World*, New York: Random House.
- 6 Machlup and Penrose (1954).

- 7 Moser, P. (2005), 'How Do Patent Laws Influence Innovation? Evidence from Nineteenth-century World's Fair', *American Economic Review*, 95(4): 1214–36.
- 8 Williams, H. (2009), 'Intellectual Property Rights and Innovation: Evidence from the Human Genome', 30 December, unpublished manuscript. Available at http://www.nber.org/~heidw/papers/5_12_10a_hlw.pdf [accessed 22 September 2010].
- 9 35 USC § 200–212[1], and implemented by 37 C.F.R. 401.
- 10 See generally, Greenberg, D. (2007), *Science for Sale: The Perils, Rewards, and Delusions of Campus Capitalism*, Chicago, IL: University of Chicago Press.
- 11 Austin, J. (1832), *The Province of Jurisprudence Determined* (ed. W. Rumble), Cambridge: Cambridge University Press.
- 12 Kelsen, H. (1967), *Pure Theory of Law* (trans. M. Knight), Berkeley, CA: University of California Press.
- 13 Hart, H. L. A. (1958), 'Positivism and the Separation of Law and Morals', *Harvard Law Review*, 71: 593 repr. in his (1983) *Essays in Jurisprudence and Philosophy*, Oxford: Clarendon Press.
- 14 See generally, Rawls, J. (1999), *A Theory of Justice*, revised edn, Cambridge, MA: Harvard University Press; Herman, B. (ed.) (1999), *Lectures on the History of Moral Philosophy*, Cambridge, MA: Harvard University Press.
- 15 Reinach, A. (1913), 'The A Priori Foundations of Civil Law' (trans. J. Crosby), *Aletheia*, 3(1983): 1–142.
- 16 Dworkin, R. (1977), *Taking Rights Seriously*, London: Duckworth.
- 17 Many thanks to Shane Wagman for providing these examples.
- 18 Kot, G. (2009), *Ripped: How the Wired Generation Revolutionized Music*, Scribner, p. 215.
- 19 <http://www.nytimes.com/2010/02/20/opinion/20kulash.html> [accessed 22 September 2010].
- 20 http://nymag.com/daily/entertainment/2010/03/new_ok_go_video.html [accessed 22 September 2010].
- 21 <http://2007.sxsw.com/music/showcases/band/26755.html> [accessed 13 June 2009].
- 22 http://ghosts.nin.com/main/order_options [accessed 22 September 2010].
- 23 http://ghosts.nin.com/main/order_options [accessed 22 September 2010].
- 24 Kot, p. 249.
- 25 <http://www.jillsnextrecord.com/> [accessed 22 September 2010].
- 26 Thompson, K., 'Future of Music Coalition', *New Business Models* (on file with the author).

Chapter Eight

- 1 This chapter includes and expands upon my article (2010) 'On Genies and Bottles: Scientists' Moral Responsibility and Dangerous Technology R&D', *Science and Engineering Ethics*, 16(1): 119–33 (in print). Online first/Open Access DOI citation: 10.1007/s11948-009-9158-x.
- 2 Atlas, R. M. and Dando, M. (2006), 'The Dual-use Dilemma for the Life Sciences: Perspectives, Conundrums, and Global Solutions', *Biosecurity and Biodefense Strategy, Practice, and Science*, 4(3): 276–86.

- 3 Preston, R. (2003), *The Demon in the Freezer*, New York: Fawcett.
- 4 Preston, *The Demon in the Freezer*.
- 5 Preston, *The Demon in the Freezer*.
- 6 Cohen, H. W., Gould, R. M., and Sidel, V. W. (2004), 'The Pitfalls of Bioterrorism Preparedness: The Anthrax and Smallpox Experiences', *American Journal of Public Health*, 94(10): 1667–71.
- 7 Childress, J., Meslin, E., and Shapiro, H. (eds) (2005), *Belmont Revisited: Ethical Principles for Research with Human Subjects*, Washington, DC: Georgetown University Press.
- 8 Childress, Meslin, and Shapiro, *Belmont Revisited*.
- 9 Ehni, H.-J. (2008), 'Dual Use and the Ethical Responsibility of Scientists', *Archivum Immunologiae et Therapiae Experimentalis*, 56: 147–52; Somerville, M. A. and Atlas, R. M. (2005), 'Ethics: A Weapon to Counter Bioterrorism', *Science*, Policy Forum, 25 March, p. 1881; Nixdorff, K. and Bender, W. (2002), 'Ethics of University Research, Biotechnology and Potential Military Spin-off', *Minerva*, 40: 15–35.
- 10 Gelsinger died during a controversial clinical trial of gene therapy. Some have argued that the principal investigator's dual role as both a researcher and a major shareholder of a private company involved with the trial was a conflict of interest that helped precipitate a number of errors.
- 11 Musil, R. K. (1980), 'There Must be More to Love than Death: A Conversation with Kurt Vonnegut', *The Nation*, 231(4): 128–32.
- 12 Jones, N. L. (2007), 'A Code of Ethics for the Life Sciences', *Science, Engineering Ethics*, 13: 25–43.
- 13 Miller, S. and Selgelid, M. J. (2003), 'The Ethics of Dual-use Research', in S. Miller (ed.), *Ethical and Philosophical Consideration of the Dual-use Dilemma in the Biological Sciences*, The Netherlands: Springer Sciences, NV (Chapter 3).
- 14 See, Preston, *The Demon in the Freezer*.
- 15 Guston, D. H. and Sarewitz, D. (2002), 'Real-time Technology Assessment', *Technology in Society*, 24(1–2): 93–109; Corneliussen, F. (2006), 'Adequate Regulation, a Stop-gap Measure, or Part of a Package?', *EMBO Reports*, 7: s50–4.

Chapter Nine

- 1 Merton, R. K. (1942), 'Science and Technology in a Democratic Order', *Journal of Legal and Political Sociology*, 1: 115–26. Reprinted as Merton, R. K. (1973), 'The Normative Structure of Science', in *The Sociology of Science. Theoretical and Empirical Investigations*, Chicago, IL: University of Chicago Press, pp. 267–78.