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RESPONSE

Patents, practical ethics and scientists

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Marx's prophecy

All the sciences, argued Marx (1857–8, p.704), would be 'pressed into the service of capital'. Nothing surprising then, at least for Marx, in Novartis renting an entire department of plant biology in 1998 at Berkley for 5 years for $US25 million (Buchanan and Chapela, 2002). Five million a year sounds like a lot to academics. It is not a lot for a company that in 1998 made pre-tax profits of $US5.5 billion on sales of $US22 billion.[1] It would probably have also found ways to leverage tax advantages from giving to an educational institution.

Of course, there are many more examples one could give of science being integrated into the means of production, as the literature on entrepreneurial science makes clear (Etzkowitz, 2002). The intellectual property rights (IPR) system is probably the key institution in this integrative process. For example, a patent creates rights of exclusion over scientific knowledge, rights that can be sold to others. We can be confident that the contract between Novartis and Berkley would have been very precise about the issues of patent ownership concerning the research coming out of the plant biology department. Patents and other IPR, such as copyright, plant variety rights, semiconductor chip protection and trade secrets, help to create commerce in scientific knowledge.

In their proposition paper, Rhodes *et al*. raise some questions about the effects of this IPR-based knowledge commerce. They worry that the increasingly dominant model of commercialized science will cause problems of access to both the knowledge and the products and processes that embody that knowledge. An organization like *Médecins Sans Frontières*, which has to overcome patent barriers to importing and distributing patented medicines in many developing countries, would share this concern. Rhodes *et al*. also have concerns about the impact of commercialized science on innovation, as well as scientific progress itself. All innovation is cumulative in the sense that no inventor invents every single input that contributes to the invention (for example, the language in which the inventor thinks). The more inputs that have to be paid for, the higher the price of starting innovation and so fewer starts are made.

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Rhodes *et al*. depict the problems in terms of a systems clash. What is the effect of IPR systems on the institution of science? Marx thought that he had worked out answers to how economic systems were likely to evolve. As the productive forces in an economy reconfigured around the ownership of knowledge, new ruling elites would emerge, the apparatus of the state would criminalize knowledge-sharing activities, and scientific labour would be deeply integrated into production. His answer to the question asked by Rhodes *et al*. about who owns science would have been to point to the forces of capital.

I want to ask a slightly different question to the one posed by Rhodes *et al*.: Who owns scientists? The answer to this question is no-one. Scientists, like the rest of us, are moral agents and can make decisions accordingly. I ask – and answer – this question because I want to make it clear that scientists face some practical, ethical questions when it comes to their support for, and use of, the patent system. And, as I shall make clear, scientists are largely responsible for supporting the operation of the patent system. I will confine my analysis to the patent system, not because other parts of IPR are not relevant to science, but rather because the patent system most clearly relates to basic needs. Patent claims over medicines, genes and plants can potentially affect products relevant to the fulfilment of basic human needs.

Who runs the patent system?

Assume for a moment that we had followed Shakespeare's suggestion in *Henry VI* and killed all the lawyers. While it might be a Pareto improvement, it would make no real difference to the operation of the patent system. Overwhelmingly, scientists rather than lawyers keep the patent system running and growing. Search any of the millions of patents being applied for, and almost certainly the inventors will be scientists. This is obviously the case in high-technology areas such as biotechnology, pharmaceuticals, nanotechnology and semiconductors. It is also something that has been true for a long time. The links in the late nineteenth century between the science of synthetic chemistry, invention and the rise of the pharmaceutical industry have been well documented (Dutfield, 2003). Scientists are also needed to draft patent applications. The qualification regimes around the world for patent attorneys vary, but in most developed countries, a patent attorney has to be trained in a scientific discipline of some kind. In Commonwealth countries, the patent attorney profession is independent of the legal profession with entry to the former controlled by an institute of patent attorneys that sets the rules of qualification. Clearly, it would be difficult to describe and define an invention by means of patent claims if one were not scientifically trained. Scientists are not only responsible for applying and drafting patents, they also examine them. Around the world, patent offices are filled with thousands of scientifically trained examiners. Obviously, a patent application that takes the form of, for example, a Markush claim over a class of compounds with potentially millions of members cannot be examined by someone without training in chemistry. Running a patent system represents quite a drain on a country's scientific pool of talent. It is one of the many reasons why most developing countries, with some obvious exceptions, such as China and India, cannot afford the system.

In fact, everywhere one looks, scientists maintain the patent system. Lawyers tend to become involved only in litigation, but just a tiny percentage of patents are litigated. The role of scientists goes beyond tending to the administrative demands of

the system. Over the course of the system's history, entrepreneurial scientists in particular have become its policy advocates and moral defenders. The entrepreneurial scientist was for a long time a rare bit of DNA, as it were, but during the 1980s, some social analogue of the polymerase chain reaction occurred and entrepreneurial scientists involved in start-ups and other commercialization ventures began appearing in numbers, especially in the US and especially in molecular biology departments (Etzkowitz, 1998). For example, William Rutter from the University of California, Berkeley (along with some colleagues) created Chiron, a company that was to become involved in long-running patent litigation through its worldwide patenting of the isolated hepatitis C virus (Palombi, 2009, p.283). As in the music business, writs follow genetic hits. Worldwide patent litigation has occurred as companies have scrambled to sort out the patent ownership of lucrative, naturally occurring genes, such as those related to insulin and breast cancer. In the next section, I want to provide a brief example of the way in which scientists in Australia have rallied to the defence of the patent system when its effects have been publicly criticized.

Claiming nature for one's own

Patents are available for inventions, not discoveries. This principle has now been codified and globalized through the World Trade Organization's Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) (see Article 27(1)). It follows that naturally occurring biological materials are not patentable. However, many public interest principles that are built into patent law are easily circumvented through claim drafting formats. The restriction on patenting naturally occurring biological materials has been circumvented by patent offices being prepared to accept claims such as the following: 'An isolated Y comprising sequence X'. The basic gaming strategy has been to allow patent claims over material that has been isolated from nature. By this logic, the rock that I have discovered in the forest and taken home to put on my mantelpiece is now my invention. Using this contrived distinction, the patent system in the case of biological materials becomes similar to a forestry logging operation.

Some states, such as Brazil, have endeavoured to put an end to this by inserting prohibitions on the patenting of naturally occurring biological materials in their patent law. We should note that whether this type of prohibition is effective is a matter of empirical investigation. Patent offices have huge incentives to approve clever drafting formats since they make money from the grant and renewal of patents. That said, tying the hands of a patent office by means of an express restriction in law is a good start, especially if it is accompanied by other regulatory strategies, such as the independent audit of a patent office's work. Such regulatory strategies are needed because patent offices have well and truly been integrated into a private corporate *rentier* network (Drahos, 2010). They do not serve the national interests of their states.

In November 2010, a private senator's Bill was introduced into the Australian Senate.[2] The events that led to this Bill go back to 2002–03 and 2008 when the company Genetic Technologies attempted to stop organizations within Australia from carrying out tests on patients to find out whether they had the genes for breast cancer. Genetic Technologies argued that such tests would infringe its patents over the genes, patents that it held by virtue of an exclusive licence arrangement with the US company, Myriad Genetics. Genetic Technologies eventually withdrew its

demands, but by then it had caught enough of the public's attention for the matter of gene patents to be referred to a Senate committee in November of 2008.[3]

The explanatory memorandum states the purpose of the Bill:[4]

> [T]o advance medical and scientific research and the diagnosis, treatment and cure of human illness and disease by enabling doctors, clinicians and medical and scientific researchers to gain free and unfettered access to biological materials, however made, that are identical or substantially identical to such materials as they exist in nature.

The Bill was referred to the Senate legal and constitutional committee for inquiry and report, and there for the time being it rests, awaiting burial or birth. This second Senate committee received 114 submissions.[5] Of the big pharmaceutical companies to make submissions – Abbott, Eli Lilly, GlaxoSmithKline, Johnson and Johnson, Merck, Merck Sharp and Dohme, Pfizer, Roche and Sanofi Aventis – none supported the Bill. Members of the agrobiotech industry, such as Bayer CropScience, Agrifood Awareness and Croplife, also warned of ruin if the Bill were passed, as did the big biotechnology players, such as Amgen. The Grains Research and Development Corporation, a Commonwealth statutory authority, whistled the same tune. Similarly, those who earn their living from drafting and advising on patents – the International Federation of Intellectual Property Attorneys, the Institute of Patent and Trade Mark Attorneys of Australia, the Licensing Executives Society of Australia and New Zealand, and the American Intellectual Property Law Association – also came out against the Bill. Individual attorney firms made submissions along similar lines.

More interesting were the submissions from the universities, research institutes and government research organizations. They speak volumes about the boardroom tie ups and links among the scientists working in Australia's universities and government research organizations and the private corporate *rentier* network that has flourished through patent monopolies. This is not the place to go through all the submissions; in any case, there is no need since they are all along similar lines. They argue for the burial of the Bill. So, for example, the Group of Eight, Australia's self-proclaimed elite universities, argued in a joint submission that the Bill would make it harder to obtain money from industry, and that there was a real risk that the biotechnology and pharmaceutical industries would flee Australia's shores, taking their research with them. Sydney University's Technology Transfer Office, presumably not content with the weightiness of the Group of Eight submission, made its own. It pointed to the damaging effects of the Bill on Sydney University's patent portfolio of some 221 patent families, and warned how unhappy the companies that fund university research would be if the Bill were passed. La Trobe University, not a member of the illustrious Eight, pointed out that reduced Commonwealth funding meant that universities were heavily dependent upon industry for research money. The Bill would jeopardize La Trobe's dependence on industry funding. A joint submission from six universities within the Sydney Basin also opposed the Bill. The Australian Academy of Sciences read from the same script, as did the Commonwealth Scientific and Industrial Research Organization, the National Health and Medical Research Council, and various other medical research institutes.

An outsider reading these submissions would probably think that only patent monopolies stop Australia's research capabilities sliding into the dark ages.

Following the boardroom trails of these organizations would probably reveal overlapping public and private networks in which many of the actors had patent holdings. How the passage of public legislation is meant to be secured when a governing network with strong financial interests in the outcome mounts a campaign against it poses an interesting problem.

Some practical ethics

It is clear that on a day-to-day basis, there is a lot of practical support for the patent system by scientists. The number of potentially pending patent applications in 2008 stood at 5.94 million, with an estimated 6.7 million patents in force (World Intellectual Property Organization, 2010, p.10). Whether this practical support is also justifiable as a matter of practical ethics is an open question. Ethical theories are broadly divided into theories that tackle a moral problem by considering the consequences of taking a particular decision, and those that apply a pre-existing rule or principle of some kind (Singer, 1993, p.3). The former are grouped under the label of consequentialism, and the latter are called deontological or non-consequentialist theories.

What is interesting is how little support theories from either of these camps offer advocates of the patent system in general, or even the more specific practice of biotechnology patenting. Can one, for example, defend patent claims over biological materials using a natural rights theory of some kind? This type of theory assumes that people are living in a state of nature and proceeds to find that they have a natural right of property in objects in which they have invested their labour. However, these theories also apply constraints on the exercise of this natural right of appropriation. John Locke (1690, p.17), the philosopher most often linked with this argument, was careful to specify, among other things, that in appropriating material from the common, one had to leave 'enough and as good' for others. Harvesting some fruit is not a problem, but harvesting a gene that allows one to control all the fruit in all the orchards is. Claiming a monopoly over the isolation of a crucial biological material is not to leave enough and as good for others. A natural rights justification for the patent ownership of biological materials might, at best, allow one to defend the ownership of a biological invention, but not a naturally occurring biological material that has been characterized as an invention by means of a legal artifice, such as a claiming format. Interestingly, Robert Nozick (1974, pp.181–2), one of the most influential modern advocates of a natural right of property, argues that the principle of not making anyone worse off by taking away something they might otherwise have had would justify allowing the subsequent independent inventors of the same invention the right to exploit it. This is not the position under current patent law.

It is not even clear that there is a natural rights argument available to justify strong monopoly rights over biological invention. Biological invention may itself depend on a positive common of shared material, in which case, the commoners would have ownership interests in maintaining the common and only use rights over those things derived from the common. There are, in fact, many problems with using natural rights theory to justify the patent system (Drahos, 1996, chapter 3).

The alternative is to offer a moral defence of the patent system in terms of the consequences that it produces. However, defenders of the patent system fare no better in the consequentialist camp. The stumbling point for the patent system here is

that when we judge the system by its consequences, its impact on everyone must be taken into account. As Jeremy Bentham was said to have put it, 'everybody to count for one, nobody for more than one'.[6] Globally, poor people vastly outnumber rich people. The patent system operates on the basis of the ability to pay and so it follows that the system does not service the needs of the poor. This has become blindingly obvious to all in the case of access to medicines. The idea that globally networked patent monopolies in the hands of profit-maximizing multinationals would serve the interests of the poor is counter-intuitive and upon reflection remains so.

Perhaps the desperate defender of the patent system might argue that, even if the system does not work well for poor countries, it works well for rich countries. If this is true, then there is an immediate ethical implication. Rich states should never have used trade threats to force developing countries into trade agreements like TRIPS, and they should clearly stop using trade agreements to bring developing countries into the patent system. They have not and have actually intensified bilateral trade pressures on developing countries to adopt and enforce patent regimes.[7] Any theory of global justice would have as a minimum an obligation not to globalize an economic order that brings harm to poor people (Pogge, 2001, p.22). The US and EU routinely breach this obligation, extending a system that transfers wealth from the poor to the rich.

I think it is also clear that the patent system does not survive a consequentialist assessment of its performance in rich countries. Clearly, the system does not serve poor people in rich countries any better than it serves poor people in poor countries. The only difference is that rich country governments might be able to regulate better for the adverse price effects of patents. In the case of medicines, for example, they might implement a price control system. This type of argument ignores the real world incentive effects of the patent system, effects that we have to take into account when we are evaluating its consequences. Patent monopolies in the hands of multinationals create incentives to extend those monopolies, to change the rules of the patent system to entrench their advantages and obtain more rents. For example, during Australia's free trade negotiations with the US in 2004, it was made clear by the US pharmaceutical industry that it wanted the Australian government to make significant reforms to its pharmaceutical benefits scheme (PBS) (Drahos *et al*., 2004). Australia made major reforms in 2007, breaking the PBS into two formularies, F1 (essentially patented medicines) and F2 (essentially generic medicines). Between 2005–06 and 2009–10, the cost to the Australian government of the patented medicines in F1 rose by 35% (see Australian Senate, 2010). The 2007 reforms have done nothing to contain the public cost of patented medicines and may well have helped to increase them. The rent-seeking effects the patent system unleashes are not confined to medicines, but can also be seen in other areas, such as patent rights over plants and seeds.

A consequentialist defence of the patent system also has to show that there are no superior alternatives to the system. For example, in order to justify the grant of monopolies over discoveries, one would have to show that patent norms were superior in efficiency terms to the norms of science. This would mean arguing that a government should not fund basic research as a public good, a tough argument to make out. There may also be better ways to reward invention than through the patent system. In the nineteenth century, there were examples of organizations preferring to use prizes rather than patents to stimulate invention (Coulter, 1991, p.121).

The arguments for the superior efficiency of prizes continue to be made today (Love and Hubbard, 2007).

Why has the patent system not only survived but grown if there is so little to say in its moral favour? Morally indefensible institutions can hang around for a long time of course, slavery being an example. The patent system also has a rich and powerful elite in its corner, willing to hand out lots of election carrots to politicians or to intimidate them with threats of investment flight. But this is not just a story of the triumphant geopolitics of the powerful. As I have shown, the patent system depends on scientists buying into it and becoming its willing helpers. Enough of them believe in the prospect of a Midas monopoly to continue to support the system. Without their support, the system could not function. Their submissions to the Australian Senate inquiry show what fervent believers they have become. Lawyers can be blamed for lots of things, but not for the patent system.

Notes

1. See 'Healing Novartis', available from http://www.businessweek.com/1999/99_44/b3653212.htm.
2. Patent Amendment (Human Genes and Biological Materials) Bill 2010 (No. 2).
3. The Senate committee reported in November of 2010. See Australian Senate, Community Affairs References Committee, *Gene Patents*, November 2010, available from http://www.aph.gov.au/Senate/committee/clac_ctte/gene_patents_43/report/report.pdf.
4. The text of the explanatory memorandum is available from http://www.aph.gov.au/Senate/committee/legcon_ctte/patent_amendment/.
5. These are available from http://www.aph.gov.au/Senate/committee/legcon_ctte/patent_amendment/index.htm [accessed June 2011].
6. Attributed by John Stuart Mill to Bentham. See his 'Utilitarianism' in Warnock (2003, p.233).
7. Some sense of the scale of bilaterals in intellectual property can be obtained from http://www.bilaterals.org/ [accessed June 2011].

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