Chapter 4. The Evil of Intellectual Monopoly

We hope by now to have convinced at least a few among you that there has been, there is, and there would be plentiful innovation in the absence of intellectual monopoly. We took this as our starting point because a widespread disbelief in the ability of competitive markets to reward innovators inhibits thinking about a functioning free market economy without intellectual monopoly.

After establishing that substantial amounts of money can be made, has been made, and is made by innovators in the complete absence of patents and copyright, the next fundamental doubt is: is that money enough? Quite a rhetorical question for the thousands of innovators that, absent legal monopoly, have nevertheless innovated: the money they expected to make must have been enough to motivate them. Not necessarily such a rhetorical question, though, for potential innovators who chose not to innovate and for all those innovators who took advantage of intellectual monopoly in their activity. Because it is true that an innovator can generally earn more with a monopoly than without, so the profits made under competition may not be "enough" and some socially valuable innovations may not occur under competition. This – in principle – leaves room for government intervention to correct this "market failure." Awarding intellectual monopoly is one possible form of intervention. Unfortunately, it is an especially pernicious form.

Economists and decent citizens alike are suspicious of monopoly. There are many good reasons for this. The traditional economic analysis of monopoly emphasizes the "welfare triangle" – the loss of efficiency due to the fact that monopolies create artificial scarcity in order to garner a higher price. More recent economic analysis emphasizes "x-inefficiency" – that monopolies use inefficient and excessively costly methods of production. The political economy literature emphasizes the rent-seeking nature of monopoly, especially of government mandated monopoly: monopolies distort the political system by purchasing favorite treatment at the expense of everyone else, thereby wasting away a substantial fraction of the social surplus.

There is yet another reason to be wary of monopolies – in order to transfer wealth away from the rest of society and toward themselves they must prevent entry. The easiest way to achieve this is to stifle innovation. This blocks productivity growth thereby reducing overall prosperity. It is a different and arguably more

pernicious source of social inefficiency than the previous three as it operates "invisibly:" how much innovation and productivity growth could have taken place in the software industry if Microsoft had not succeeded in stifling innovation, is very hard to imagine, let alone quantify. This form of inefficiency is specific to the kind of monopoly power patents and copyright bring about. Being its "discoverers" we will christen it "IP-inefficiency" and illustrate its working by means of a few significant examples. The theory of why it comes about is rather simple: like every profit maximizing entrepreneur, monopolists are willing and capable of doing anything legally and technically feasible to retain their monopoly profits.

Later in the book we talk about the Schumpeterian model of "dynamic efficiency" via "creative destruction." The latter dreams of a continuous flow of innovation due to new entrants overtaking incumbents and becoming monopolists until new innovators quickly take their place. In this theory, new entrants work like mad to innovate, drawn by the enormous monopoly profits they will make. Our simple observation is that, by the same token, monopolists will also work like mad to retain their enormous monopoly profits. There is one small difference between incumbents and outsiders: the formers are bigger, richer, stronger and way better "connected." David may have won once in the far past, but Goliath tends to win a lot more frequently these days. Hence, IP-inefficiency.

Although the current tendency in economics is to argue that the "welfare triangle" is not large, in the case of innovation this is not always true. The example of AIDS drugs both illustrates the theory and the potential losses. AIDS drugs are relatively inexpensive to produce. They are so sufficiently inexpensive to produce that the benefits to Africa in lives saved exceed the costs of producing the drugs by orders of magnitude. But the large pharmaceutical companies charge such a large premium over the cost of producing the drugs – to reap profits from sales in Western countries where those drugs are affordable – that African nations and individuals cannot afford them. They create artificial scarcity – excluding Africa from AIDS drugs – in order to garner a higher price for their product in the U.S. and Europe. Through IP and international "free" trade agreements, they also prevent potential competitors (read: imitators) to enter the African or Latin American markets for such drugs. The "welfare triangle" – the net loss to society – from this policy is real and enormous. That is IP-inefficiency at work on a global scale.

We understand that the careful reader will react to this argument by thinking "Well, the AIDS drugs may be cheap to produce now that they have been invented, but their invention did cost a substantial amount of money that drug companies should recover. If they do not sell at a high enough price, they will make losses, and stop doing research to fight AIDS." This argument is correct, theoretically, but not so tight as a matter of fact. To avoid deviating from the main line of argument in this chapter we simply acknowledge the theoretical relevance of this counter-argument, and postpone a careful discussion until our penultimate chapter, which is about pharmaceutical research. For the time being, two caveats should suffice. The key word in the former statement is "enough": how much profits amount to "enough profits?" The second caveat is a bit longer as it is concerned with price discrimination, and we examine it next.

The example of AIDS drugs brings out another feature of monopoly – their desire to price discriminate. That is, competitors charge the same price to everyone, while monopolies try to extract a higher price from those who value the product more highly. Economists usually argue that this is a good thing because monopoly without price discrimination is even worse than monopoly with price discrimination. Price discrimination, they argue, enables lower valued consumers to purchase a product that otherwise the monopoly would not sell to them. Relatively speaking – that is: relative to a word where the monopolist does not price discriminate – this is a correct statement. In the case of AIDS drugs, effective price discrimination would enable the large pharmaceutical companies to charge a low price to poor blacks without lowering the price they charge rich whites. A more successful example of price discrimination for drugs is the low price charged poor Canadians against the high price charged rich Americans.

In practice, however, it is both difficult and costly to price discriminate. Experience suggests that while it is relatively easy to find consumers who highly value a product and are willing to pay a high price, there is not much selling by monopolies at low prices to consumers who are only willing or able to pay a low price. Economic theory suggests two related reasons for this fact. In anonymous markets the monopolist has a hard time telling which consumers value its product a lot and which value it little, as the former would pretend to be the latter when given a chance. The second, even more straightforward, reason is that selling to some consumers at a low price creates competition for the monopolist. It

creates an incentive to buy at the low price and resell at a medium price that undercuts the high price charged by the monopolist to the high valued consumers. In the case of Canada and the U.S., the lower price charged Canadians has led to a booming gray market for importing drugs from Canada into the U.S. – so much so that there have been efforts both to enshrine the right to import cheap Canadian drugs in U.S. law, as well as to make it illegal entirely.

In the case of AIDS drugs, the pharmaceuticals do not sell to Africa at a steep discount because they are afraid that a parallel market, reselling the cheap African product in the Western market, will undercut their profits. Do not let the pharmaceuticals' laments confuse you. It is not that by selling to the African market at a low price they would be making a loss, for which to compensate they desperately need the U.S. and E.U. profits. Because the cost of producing a larger quantity of AIDS drugs is very small, the pharmaceuticals would be making a profit also by selling cheap to the African market. Their problem is the loss of monopoly profits in markets other than the African one. This example is, in fact, quite general: intellectual monopolists often fail to price discriminate because doing so would generate competition from their own consumers.

Effective price discrimination is costly to implement and this cost represents pure waste. For example, music producers love Digital Rights Management (DRM) because it enables them to price discriminate. The reason that DVDs have country codes, for example, is to prevent cheap DVDs sold in one country from being resold in another country where they have a higher price. Yet the effect of DRM is to reduce the usefulness of the product. One of the reasons the black market in MP3s is not threatened by legal electronic sales is that the unprotected MP3 is a superior product to the DRM protected legal product. Similarly, producers of computer software sell constrained products to consumers in an effort to price discriminate and preserve their more lucrative corporate market. One consequence of price discrimination by monopolists, especially intellectual monopolists, is that they artificially degrade their products in certain markets so as not to compete with other more lucrative markets.[1]

So, monopoly has many bad consequences. Through a series of case studies, we use this chapter to document some of the more egregious problems in the case of patents. We discuss the problems of copyrights (or wrongs) in the next chapter.

The Cost of Patent

The second half of the 1990s witnessed an extraordinary increase in the number of new patents registered in the United States, and in the European Union as well. In the U.S. the yearly number of patent applications reached about 345,000 by the end of the 1990s, rising more than threefold from a value which had oscillated around 90,000 during the 1960s. In just four years, between 1997 and 2001, patent applications exploded by a spectacular 50%.[2] Part of the radioactive fallout from this explosion in patent applications was the increase in the membership of the intellectual property section of the American Bar Association, which went from 5,500 to almost 22,000.[3]

If patents beget prosperity and innovation, we might expect that this explosion in patenting coincided with a vast technological improvement. Of course it did not. A common measure of technological improvement is the increase in Total Factor Productivity (TFP) – as mentioned in the previous chapter this measures how much additional output can be produced from a given combination of inputs by using those inputs better. Higher TFP means, for example, more and better cars from the same labor and other factors such as metal and plastic. Rough-and-ready aggregate measures of TFP growth do not display a strong trend during the last 50 years. They increased during the 1950s and early 1960s, then decreased from the late 1960s until the late 1980s or even early 1990s and then recovered, slightly, during the 1995-2000 period. After the 2001 recession the same measures have kept growing at their long-term average. More sophisticated measures of TFP show that, on the one hand, the late 1960s to late 1980s "productivity slowdown" may be nothing but poor measurement on our part while, on the other, the 1990s TFP-recovery either did not take place or is almost entirely due to the widespread adoption of IT technologies. The latter, as we documented in chapters 2 and 3, owe extremely little if anything to the presence of patents.

Similar findings apply to any OECD country, flying in the face of the claim that patents are a good measure of, let alone cause, true improvements in productivity. If they were, TFP should have increased remarkably, and its growth rate should keep increasing in proportion to the continuing increase in the number of patents. Neither happened.

The Patent Thicket[4]

Part of the enormous increase in the number of patents is due to the fact that patents beget yet other patents to defend against

existing patents. The following statement is from Jerry Baker, Senior Vice President of Oracle Corporation

> *Our engineers and patent counsel have advised me that it may be virtually impossible to develop a complicated software product today without infringing numerous broad existing patents. … As a defensive strategy, Oracle has expended substantial money and effort to protect itself by selectively applying for patents which will present the best opportunities for cross-licensing between Oracle and other companies who may allege patent infringement. If such a claimant is also a software developer and marketer, we would hope to be able to use our pending patent applications to cross-license and leave our business unchanged.*[5]

Pundits and lawyers call this "navigating the patent thickets" and a whole literature, not to speak of a lucrative new profession, has sprung up around it in the last fifteen years. The underlying idea is simple, and frightening at the same time. Thanks to the US Patent Office policy of awarding a patent to anyone with a halfway competent lawyer[6] – and, as noted a moment ago, IP lawyers have quadrupled – thousands of individuals and firms hold patents on the most disparate kinds of software writing techniques and lines of code. The numbers are mind-blowing, particularly in the IT and software sectors: Nokia sits on 12,000 patents, while Microsoft is adding at least 1,000 a months to a mountain that is already 20,000+ patents strong. As a consequence, it has become almost impossible to develop new software without infringing some patent held by someone else. A software innovator must, therefore, be ready to face legal action by firms or individuals holding patents on some software components. A way of handling such threats is the credible counter-threat of bringing the suitor to court, in turn, for the infringement of some other patent the innovative firm holds.

Do our readers need more evidence of the fact that large corporations are both aware that most of these patents are a social waste and are also "artificial legal devices" in the sense that their number can be increased or decreased arbitrarily by purely legal means having nothing to do with actual innovations? Here you go: D. Bruce Sewell, from Intel is reported to say

> *We have 10,000 patents – it's and awful lot of patents. Would I be happy with 1,000 patents rather than 10,000? Yes, provided the rest of the world did the same thing.*[7]

John Kelly (of IBM's intellectual property strategy) points out that

> *Even though we have 3,000 patents [awarded annually in America] if we had to, I could make that number 10,000.*[8]

Moreover, how did Microsoft get into the patenting game? Here's the description

> *In 2003, Bill Gates […] faced a number of problems centered around intellectual property. First, the company found it was being sued for patent infringement more often and had to pay hundreds of milions of dollars in damages. Second, antitrust regulators were forcing Microsoft to open its technology to rival to allow different systems to work together. Third, the company recognised that its monopoly on its operating system and desktop software would be eroded over time, in part by open source alternatives, and wanted to delay that process. Lastly, Microsoft was spending around $5 billion a year on R&D and wanted some revenue to help offset that outlay.*[9]

This anecdotal evidence is backed by hard data. Lanjouw and Lerner examined a sample of 252 patent suits. They find that their data is consistent with the hypothesis that preliminary injunctive relief is a predatory weapon in patent cases.[10]

This situation is akin to that of the cold war where we used to hold thousands of expensive nuclear weapons for "defensive purposes." Here firms are spending vast amounts of money to obtain and hold "defensive patents". This leads to an equilibrium that is equally socially bad (because lots of resources are spent to build weapons that should never be used) and more insane than the "threat of mutual assured destruction" was during the cold war. Then, at least, we were trying to protect ourselves from a real and external communist threat we had not created. In the current "defensive patents" equilibrium there is no exogenous threat to our well being – the threat is entirely one we have created by picking the wrong legislation.

In short, a vast expenditure in "defensive patents" is entirely a product of our IP legislation. By allowing intellectual

monopoly and because the courts and patent office allow more and more doubtful claims, there is an enormous incentive for rent-seekers of all kinds to waste resources in obtaining patents solely in order to blackmail innovative firms and extract rents from their creative activity. This is exemplified by Panip IP LLC, a company formed to collect from small businesses using patent claims.[11] Consider their proposed interpretation of two patents that they hold[12]

- US Patent No 5,576,951: Using graphical or textural information on a video screen for the purpose of making a sale.
- US Patent No 6,289,319: Accepting information to conduct automatic financial transactions via a telephone line and video screen.

Obviously they have contributed nothing of significance to either of these broad activities, but their lack of innovation has not prevented them from threatening numerous small businesses with lawsuits alleging patent infringement. Typically they set the license fee sufficiently low that it is less costly to pay the fee than to go to court.

It is often argued that, especially in the biotechnology and software industries, patents are a good thing for small firms.[13] Without patents, it is argued, small firms would lack any bargaining power and could not even try to challenge the larger incumbents. This argument is fallacious for at least two reasons. First, it does not even consider the most obvious counterfactual: How many new firms would enter and innovate if patents did not exist, that is, if the dominant firms did not prevent entry by holding patents on pretty much everything that is reasonably doable? For one small firm finding an empty niche in the patent forest, how many have been kept out by the fact that everything they wanted to use or produce was already patented but not licensed?

Second, people arguing that patents are good for small firms do not realize that, because of the patent system, most small firms in these sectors are forced to set themselves up as one-idea companies, aiming only at being purchased by the big incumbent. In other words, the presence of a patent thicket creates an incentive not to compete with the monopolist, but to simply find something valuable to feed it, via a new patent, at the highest possible price, and then get out of the way. While this may be quite advantageous to the few lucky entrepreneurs who manage to be bought out by the monopolist at a good price, it is not the economic system we, as a

society, should want. It is not beneficial either to consumers, who keep living in a monopolized world paying high prices for bad products, or to the average potential entrepreneur who, plain and simple, cannot enter and compete. IP-inefficiency at work.

If it were not for preventing even the minimum chance of competitive entry in its industry and for keeping all small firms at bay, why would Microsoft be wasting money applying every year for thousands of patents like No. 20,050,160,457, *Annotating Programs for Automatic Summary Generation*? We did not tell you what this great invention is about, here is the official abstract[14]

> *Audio/video programming content is made available to a receiver from a content provider, and meta data is made available to the receiver from a meta data provider. The meta data corresponds to the programming content, and identifies, for each of multiple portions of the programming content, an indicator of a likelihood that the portion is an exciting portion of the content. In one implementation, the meta data includes probabilities that segments of a baseball program are exciting, and is generated by analyzing the audio data of the baseball program for both excited speech and baseball hits. The meta data can then be used to generate a summary for the baseball program.*

Unfortunately, political and judiciary attitudes have shifted toward the use of patents as monopolist's tools. Oscillations in popularity are somewhat recurrent in the history of patents, but never before have the proponents of intellectual monopoly been so powerful in the political and judicial arena and in public discourse. By way of contrast, in the late 1970s anti-trust suits were fought and won against monopolists, and as late as 1997, the Justice Department spoke of the possible role of intellectual property in anti-trust violations. Private companies also sued large monopolies sitting upon piles of unused inventions, such as in *Xerox vs. 3Com.* Today, sadly the three branches of government have given up the fight against appropriating the fruits of other people's labor and the defensive patenting it begets.[15]

In addition to asking about the incentive to innovate that we discussed in the previous chapter, the Carnegie survey also examined why firms do and do not choose to patent.[16]

	Product	***Process***
measure performance	5.75%	5.04%

licensing revenue	28.27%	23.25%
use in negotiations	47.38%	39.96%
prevent suits	58.77%	46.50%
prevent copying	95.81%	77.61%
Blocking	81.81%	63.58%
enhance reputation	47.91%	34.03%

The use of patents in negotiations and horse trading among firms is higher (but not overwhelmingly higher) in complex industries than in simple ones.

Examining this, we see a total rating of 177% to prevent copying or block competitors, which may be loosely translated as "being a monopolist." We see a substantial amount, 106%, for patents being used for negotiations or to prevent suits, which may be loosely translated as "wasteful rent-seeking." This effort is not directed at innovation, but is used as legal and bargaining tool. The economically valuable uses of patents according to standard pro-IP theories, that is: measuring performances and obtaining licensing revenues, add up to a meager 34%. If one recognizes, as we argue, that revenues from licenses are in large part due to wasteful monopoly power, the Carnegie survey tells us that the economically valuable uses of patents are not higher than 10% of the total, a meager number.

There are other indications of the abuse of the patent system for legalistic reasons. The Polaroid vs. Kodak settlement is widely credited as an important signal of the value of defensive patenting. It is unclear what it is that society gained from that settlement, as all it did was to restore monopoly in a relatively important consumer market, and bring almost to bankruptcy an otherwise thriving company, Kodak. With the windfall payment it received, Polaroid neither created new innovations nor new employment and value added; it just enriched its lawyers, its executives, and, albeit marginally, its shareholders. Similarly we have the following statement from Roger Smith of IBM

> *The IBM patent portfolio gains us the freedom to do what we need to do through cross-licensing—it gives us access to the inventions of others that are key to rapid innovation. Access is far more valuable to IBM than the fees it receives from its 9,000 active patents. There's no direct calculation of this value, but it's many times larger than the fee income, perhaps an order of magnitude larger.*[17]

This recognizes that patents are just a trading tool among "big guys." Instead of a competitive market for innovations, we have an oligopolistic market for patents structured around the patent-pool mechanism we discussed in the previous chapter. This use of cross-licensing of patents is not merely the innocuous sharing among existing firms in the industry. Nor, as Bessen points out, are they merely good tools to navigate the patent thicket. They are also instruments for preventing new firms from entering the industry. New firms, not having a portfolio of defensive patents, and not participating in the patent pool, find that they cannot legally compete with the existing oligopoly.

Using Patents to Block Competition

First off, patents and IP more generally are by definition aimed at blocking competition, as their main aim is to prevent other from competing with the innovator by producing the same thing either a little cheaper or of a little better quality. While this is trivial, and we have repeated it *ad nauseam*, it is good to keep it in mind. Now, let us move to the less obvious ways in which patents are strategically used to block competition.[18]

The idea, widely advertised in business courses and management textbooks, that cross-licensing, patent pools, and patents more generally can be used to block entry and enhance collusion has not escaped the notice of firms. Following the increased enforcement of the anti-trust laws after World War II, the chemical and petrochemical industries pioneered the use of patent law as a legal method of colluding and blocking entry. As the number of possible examples is long, and the general principle is rather clear, we will be brief. Here is a sample

> *Both American Telephone and Telegraph and General Electric, for example, expanded their in-house laboratories in response to the intensified competitive pressure that resulted from the expiration of key patents … Patents also enabled some firms to retain market power without running afoul of antitrust law. The 1911 consent decree settling the federal government's antitrust suit against GE left their patent licensing scheme largely untouched, allowing the firm considerable latitude in setting the terms and conditions of sales of lamps produced by its licensees, and maintaining an effective cartel within the U.S. electric lamp market … Patent licensing provided a basis for the participation by GE and Du Pont in the international*

> *cartels of the interwar chemical and electrical equipment industries. U.S. participants in these international market-sharing agreements took pains to arrange their international agreements as patent licensing schemes, arguing that exclusive license arrangements and restrictions on the commercial exploitation of patents would not run afoul of U.S. antitrust laws.*[19]

In recent years there have been innovative efforts to extend the use of patents to block competitors. For example we find

> *A federal trade agency might impose $13 million in sanctions against a New Jersey company that rebuilds used disposable cameras made by the Fuji Photo Film Company and sells them without brand names at a discount. Fuji said yesterday that the International Trade Commission found that the Jazz photo Corporation infringed Fuji's patent rights by taking used Fuji cameras and refurbishing them for resale. The agency said Jazz sold more that 25 million cameras since August 2001 in violation of a 1999 order to stop and will consider sanctions. Fuji, based in Tokyo, has been fighting makers of rebuilt cameras for seven years. Jazz takes used shells of disposable cameras, puts in new film and batteries and then sells them. Jazz's founder, Jack Benun, said the company would appeal. "It's unbelievable that the recycling of two plastic pieces developed into such a long case." Mr. Benun said. 'There's a benefit to the customer. The prices have come down over the years. And recycling is a good program. Our friends at Fuji do not like it.*[20]

Once again examples abound, so let us close with a particularly important one. We mention later in this chapter how the Wright brothers used their patents to try to block the emergence of a US aircraft industry. Interestingly, this pattern of behavior continued. In 1972 the US government charged the aircraft industry with an antitrust violation, basically because they kept using their patent pool and cross licensing to prevent entry. IP-inefficiency at its best.

Seeds, Animals, and Genes

A recent "innovation" in patent law has been the enormous expansion in the types of "ideas" that can be patented. A case in

point is the patenting of plants and animals. We have previously examined how innovations in the agriculture sector were frequent and abundant, in the complete absence of any kind of patent protection, until the early 1970s. Plainly speaking, agriculture evolved, during a period of about twelve thousand years, in the complete absence of IP protection. During these one hundred and twenty centuries, agricultural productivity increased by a few orders of magnitude, making it possible to feed an enormously larger world population. Then, about thirty five years ago, the US Congress intervened.

The US Plant Variety Protection Act (PVPA) of 1970 was the first step toward the complete oligopolization of the agriculture sector, first in the U.S., then in the E.U. and more recently around the world. It allowed for a limited patent protection of sexually reproduced plants and animals. Alas, the appetite of potential monopolists is never satiated. Full protection came in the Supreme Court ruling of June 16, 1980 in the *Diamond vs Chakrabarty* case.[21] The case concerned the patentability of an oil slicks-consuming bacterium that had been bioengineered by Dr. Ananda Chakrabarty, a biochemist working for General Electric. It extended the full protection of patent law to all kinds of engineered or engineerable products of nature, be they alive or not. The final nail in the coffin was set in 1985, when the U.S. Patent Office Board of Appeals ruled that sexually propagated seeds, plants, and cultured tissue could be protected by utility patents. We read

> *The PVPA appears to have contributed to increases in public expenditures on wheat variety improvement, but private-sector investment in wheat breeding does not appear to have increased. Moreover, econometric analyses indicate that the PVPA has not caused any increase in experimental or commercial wheat yields. However, the share of U.S. wheat acreage sown to private varieties has increased - from 3 percent in 1970 to 30 percent in the 1990s. These findings indicate that the PVPA has served primarily as a marketing tool ...*[22]

This is not the odd conclusion of some anti-globalization green-red group. It is the practically unanimous verdict reached by an army of agricultural economists who have analyzed the socio-economic impact of that tombstone of free competition known as the Plant Variety *Protection* Act (PVPA). The word "protection" is most ironic, as in the hand of a few monopolistic, and unfortunately

mostly U.S. based, multinationals this bill has become the single most dangerous tool against plant variety protection. We could go on the rest of the book talking about this subject, which is of utmost importance not just for the future of hundreds of millions of farmers in underdeveloped countries, but also for us, the mostly non-farmers living in developed countries. Still, this would take as too far astray from the IP-inefficiency topic that is the concern of this chapter.

Back to economic development. The agricultural sector is a small fraction of national income both in the U.S. and in the E.U., between 3% and 10%, depending on the country. As we already documented in the previous chapter, there is no evidence in the data that this enormous increase in patent protection leads to any measurable increase in the growth rate of TFP in the US agricultural sector. But the tentacles of IP-inefficiency reach far outside national borders. In poor and developing countries the share of agriculture in national income is an order of magnitude bigger than in the US, and its strategic role for future development absolutely crucial. It is for these countries that agricultural patents are a deadly blow, as they manage to do two harms at once. On the one hand, by making new seeds and animal species prohibitively expensive, agricultural patents render farmers from poor countries unable to compete on the global agricultural market. One may wonder why this affects poor farmers more than rich ones, and the answer is trivial: credit constraints. New seeds are, on average, more efficient than traditional ones, but also require a much higher up-front investment to be purchased. Because they cannot finance initial purchases of efficient seeds poor farmers use less efficient ones, hence the break-even price at which they can sell their products is higher, making them uncompetitive. On the other hand, by monopolizing seeds and species that are and have been for centuries in the public domain, agricultural patents rob the same poor farmers of their capital.

The history of economic development, and of agricultural development in particular, is a history of imitation: catching up takes place because followers imitate the more advanced techniques of the leader. If a small group of companies from the leading countries prevent and prohibit imitation by monopolizing agricultural innovations around the globe, imitation and adoption of advanced techniques and seeds are retarded or altogether blocked. Furthermore, subtly and unjustly this small group of monopolistic companies is slowly but surely expropriating the "agricultural wealth" of many developing countries. How? By

taking traditional seeds and plants that have been grown and selected there for centuries, modifying/improving them genetically to a more or less irrelevant extent, and then grabbing a patent as broad as possible. Modified varieties are usually stronger or with a superior yield than the original variety, thereby displacing the latter quite rapidly. When this does not work fast enough, the broad patent is used, supported by an army of IP lawyers and the "diplomatic" weight of the US government, to claim property rights on the original varieties.

This sounds like one of those "multinational conspiracy" stories favored by lunatics and anti-market (but copyright-protected) snobs attending Parisian art shows while sipping patented California Chardonnay. Some stories of course are exaggerations, but many are both true and well documented. One such is the example of Basmati rice.

> *The battle over who controls the world's food supplies has escalated dramatically with the Indian government launching a legal challenge in the United States against an American company which has been granted a patent on the world-renowned basmati rice. It is thought to be the first time a government in a developing country has challenged an attempt by a US company to patent – and thus control the production of – staple food and crops in what campaigners dub the 'rush for green gold.' Basmati rice, sought-after for its fragrant taste, was developed by Indian farmers over hundreds of years, but the Texan company RiceTec obtained a patent for a cross-breed with American long-grain rice. RiceTec was granted the patent on the basis of aroma, elongation of the grain on cooking and chalkiness. However, the Indian government last week filed 50,000 pages of scientific evidence to the US Patents and Trademarks Office, insisting that most high quality basmati varieties already possess these characteristics. The US Patent and Trademarks office accepted the petition and will re-examine its legitimacy. The patent – granted only in the US – gives RiceTec control over basmati rice production in North America. Farmers have to pay a fee to grow the rice and are not allowed to plant the seeds to grow the following year's crops. India fears the patent will severely damage exports from its own farmers to the US. In 1998, they exported almost 600,000 tonnes of basmati rice.*[23]

Another astounding example of American intellectual imperialism is in – not so surprising – Iraq

> *The American Administrator of [Iraq] Paul Bremer, updated Iraq's intellectual property law to 'meet current internationally-recognized standards of protection.' The updated law makes saving seeds for next year's harvest, practiced by 97% of Iraqi farmers in 2002, the standard farming practice for thousands of years across human civilizations, newly illegal. Instead, farmers will have to obtain a yearly license for genetically modified seeds from American corporations. These GM seeds have typically been modified from IP developed over thousands of generations by indigenous farmers like the Iraqis, shared freely like agricultural 'open source.' Other IP provisions for technology in the law further integrate Iraq into the American IP economy.*[24]

Communists like Lenin used to argue that monopolistic capital breeds war because it needs the support of the imperialistic state to acquire new markets and grab economic resources. As a theory of wars and as an argument in favor of socialism, this is as dumb as it gets. It does no good to either capitalism or democracy, though, to have rent-seeking monopolists and their lawyers make dumb theories look reasonable to the alienated masses of poor people by following dumb policies.

Undoing Progress

Design

The "everything is patentable" virus seems to have also struck in the business of architectural design. The federal judges in the U.S. Court of Appeals for the Federal Circuit have never seen a competitive industry with lively innovation that they could not "improve" by allotting a little monopoly power here and there, and they recognize no judicial restraint on their ability to impose judge-made law. Certainly, they appear always ready to rule in favor of anyone who claims their intellectual "property" has been violated by someone else's commercial success. Sadly their conceit has penetrated also to the lower courts.

So it is that as we write on August 10, 2005 Judge Michael B. Mukasey has ruled[25] that there are enough similarities between David M. Child's 2003 design for the Freedom Tower to be

erected at Ground Zero and a 1999 architectural student's project that the student, Thomas Shine, may sue the architect. Mr. Mukasey ruled that observers "may find that the Freedom Tower's twisting shape and undulating diamond-shaped facade make it substantially similar to Olympic Tower [the student's project at Yale School of Architecture], and therefore an improper appropriation" of copyrighted artistic expression. Never mind that, as he also pointed out, it is "possible, even likely, that some ordinary observers might not find the two towers to be substantially similar," and that the final Child project for Freedom Tower will not make use of the so called "diagrid" design that is here being debated (and which, in Chicago, you can admire on the John Hancock building.) Never mind also the fact that "In the late 1990's – around the time Shine was at Yale - there was a virtual tidal wave of twisting tower projects."

Imagine, if you will, the same judicial logic applied to, say, the liberty design patterns of Barcelona's Quadrat d'Or, or to the Renaissance buildings of Rome and Florence, or to the doric column or to any other column's design for that matter. Imagine the city of Venice or the government of Egypt bringing Las Vegas hotels to court because their buildings imitate similar buildings in Venice or Egypt, or Paris for that matter as in Las Vegas we now have an imitation of the Eiffel Tower as well. Imagine the owners of eighteenth or nineteenth century Mediterranean style villas in Naples or the Cote d'Azur suing Hollywood "stars" for the blatant imitation of the originals in which they live, which they can afford only because of their copyright induced monopoly rents! Why bother with common sense when another judicial case can be fabricated to force yet another competitive industry into the hands of patent lawyers, litigation lawyers, and all the rent-seekers seeking to grab a piece of a pie they never contributed to create?

Software

We have previously observed that for a long time also, the software industry was free of patent protection. The long standing tradition of free competition and lack of intellectual monopoly began to crumble in 1981 with the Supreme Court decision in *Diamond v. Diehr,* collapsing completely with the publication of new examination guidelines by the U.S. Patent and Trademark Office in 1996, which made computer programs fully and clearly patentable. This change in the property right regime in the software industry was relatively fast; it constitutes, therefore, an interesting case study to test competing hypotheses on the determinants of

patents and their impact on productivity. After carrying out a careful econometric analysis of the microeconomic evidence from the software industry, Bessen and Hunt reach three interesting conclusions. The first is that the shift in legal standards for patenting software was a potent incentive to increase expenditure in patents. It may in fact be one of the key factors behind the dramatic increase in the number of patents we reported earlier in this chapter. As we noted, the increase in the number of patents in the U.S. economy was not accompanied or followed by an equally visible increase in TFP or in any other economic measure of effective innovation and productivity. The second finding by Bessen and Hunt supports and reinforces this assertion

> *Thus, our analysis appears to decisively reject the incentive hypothesis during the 1990s. Software patents may have complemented R&D during the early 80s – when patenting standards were still relatively high – but they substituted for R&D during the 1990s. Regulatory changes increased the amount of patenting, but they are also associated with lower R&D. We can reject naïve arguments that more patents, relaxed standards, or lower patenting costs lead to more R&D.*[26]

Notice, in particular, that patenting is found to be a substitute for R&D, leading to a reduction of innovation. In the authors' calculation, innovative activity in the software industry would have been about 15% higher in the absence of patent protection for new software. Finally, and most interestingly in our view, Bessen and Hunt point out that one of the channels through which relaxed patenting criteria and a judicial system more prone to entertain claims of patent infringement, negatively affect innovative activity is by increasing the risk of the return on innovations. Stephen P. Fox, associate general counsel and director of Hewlett-Packard highlights this

> *pervasive uncertainty about legal rights, both in terms of ability to enforce one's own patents and ability to avoid rapidly escalating exposures to infringement claims by others. And that uncertainty heightens risks surrounding innovation investment decisions.*[27]

According to Cecil D. Quillen, Jr., former General Counsel at Eastman-Kodak,

> *If the uncertainties are such that you cannot be confident that your products are free and clear of others' patents you*

> *will not commercialize them, or a higher return will be demanded if you do to compensate for the additional risk. And this probably means you will not do the R&D that might lead to low return (or no return) products.*[28]

Submarine Patents

A particularly egregious method of patent abuse is the submarine patent. Until recently, the length of patent term was measured from the time at which the patent was awarded; prior to the award the existence of the patent is secret, and it is possible to continually defer the award of the patent by filing amendments. While the patent term was measured from the date of award, prior art and the validity of the patent is measured from the day of submission. Hence the submarine patent – the filing of a useless patent on a broad idea that might, one day, be useful. The existence of the filing is secret (hence the submarine), and the application process is extended until some actual innovator invests the time and effort to make the idea useful. At that time, the amendment filing stops, the patent is awarded, and the submarine surfaces to demand license fees.

This form of legal blackmail was pioneered by George Selden, who patented the idea of a "road engine" in 1895. He first applied for a patent in 1879 and used all possible legal means to delay approval for sixteen years. This took place while the American car industry was developing and the technology of the road engine was being widely adopted and improved. Once Selden's patent 549,160 was awarded, it commanded royalties of 1.25% on the sale value of every automobile sold in the United States. Selden's monopoly power had a dramatic impact on the future of the US automobile industry; it lead, *de facto*, to its reorganization under a much more oligopolistic structure than it had at the time Selden acquired its patent. We learn from Stuart Graham's doctoral dissertation chapter that

> *Selden had sold his patent 549,160 in 1899 to a syndicate for $10,000 and 20% of any royalties. Early manufacturers who had originally seen the Selden patent as a threat formed a cartel around the patent, the Association of Licensed Automobile Manufacturers, which limited membership and licenses to manufacture under the Selden patent.*[29]

If you were wondering why the U.S. automobile industry developed so quickly into the oligopoly we know and deplore, a fair share of the roots lies in bad intellectual property legislation and the intellectual monopoly it created.

In more recent days, Jerome Lemelson, who patented the "idea" of machine vision and related data identification techniques, has probably matched Selden in this dubious ranking. Bringing lawsuits 18-39 years after initially filing for patents, it is estimated that Lemelson's submarines collected on the order of $1.5 billion, primarily by suing large end-users such as Motorola and Ford. While not an example of IP-inefficiency, the Lemelson case and hundreds of lesser known ones are worth reflecting upon as a strange and socially inefficient consequence of our patent laws.

Jerome Lemelson was most certainly a man of genius and quite dedicated to his life-long task of being an inventor. Anyone surfing the web and reading about his career on the hundreds of sites celebrating his genius, will realize that Lemelson invented and successfully patented dozens of interesting devices and ideas. The problem is that he invented them only "so to speak," so that while the patent applications may have run hundreds of pages, the useful information was quite generic and there is little evidence that the ideas contained in them led to useful devices. Most of the ideas or devices he invented never made it to the market, and those that did were developed by someone else – as far as we can tell without having benefited from the original patented idea. Mr. Lemelson contented himself with either selling his patents to producers interested in that line of business, or suing them, when someone else somewhere else, most often unaware of Lemelson's discovery and patent, was producing a useful tool that could more or less be related to the pre-existing Lemelson patent. The issue here is not the often-debated issue of whether Mr. Lemelson was or was not in good faith making the claims he made. The issue is that what matters for social welfare are copies of ideas, that is, ideas that materialize into goods and services that are produced and that people use. Hence Lemelson's contribution to social welfare was small, or even negative as he cost at least $1.5 billion to firms that were inventing by themselves and then producing goods and services useful to consumers.[30]

Submarine patents are an especially egregious problem, since by the time the claim is made, the cost of development is sunk, so there is no reason for the submarine to allow the innovator even to cover his own costs. The most recent extension of the patent term from 17 to 20 years measures the patent term from date

of application rather than date of award, which makes submarine patents more difficult. But as the case of Rambus shows, submarine patents are still a significant social problem.

Rambus is a "fabless" manufacturer of memory chips, meaning that they do not actually manufacture chips, but they design them, and sublet the actual manufacture to other companies that have the large expensive "fabs" needed to produce chips. More recently, as its own designs have not turned out to be terribly successful, Rambus has switched to a new business model: trying to collect license fees from other chip makers who have successful designs. In the early 1990s Rambus patented a number of memory chip-related ideas. The most significant among these was the "idea" of including on-chip phase-lock-loop (PLL) circuitry to control timing. It should be noted that PLL circuitry was already widely used to control timing on processor chips.

What happened next, according to the FTC, is a classical case of a submarine

> *Rambus's anticompetitive scheme involved participating in the work of an industry standard-setting organization, known as JEDEC, without making it known to JEDEC or to its members that Rambus was actively working to develop, and did in fact possess, a patent and several pending patent applications that involved specific technologies proposed for and ultimately adopted in the relevant standards. By concealing this information - in violation of JEDEC's own operating rules and procedures - and through other bad-faith, deceptive conduct, Rambus purposefully sought to and did convey to JEDEC the materially false and misleading impression that it possessed no relevant intellectual property rights. Rambus's anticompetitive scheme further entailed perfecting its patent rights over these same technologies and then, once the standards had become widely adopted within the DRAM industry, enforcing such patents worldwide against companies manufacturing memory products in compliance with the standards.*[31]

This hijacking of an industry standard is at once very profitable and socially costly. There are generally many similar designs for computer circuitry, and compatibility is often more important than the specific implementation. If, however, an "intellectual property" claim can be made against a standard after it has been

implemented, the claimant can free-ride on the "network externality" that arises because it is expensive to switch to a different standard.

In the case of Rambus, the FTC charged Rambus with fraud. Although a lower court found that Rambus did indeed engage in fraudulent behavior, this decision was subsequently overturned by an appeals court. It now appears that all memory chip makers – and consumers of memory chips – will have to pay an "intellectual monopoly tax" to Rambus – which contributed little of substance to the design of the memory chips that are to be taxed.

One indication of patent abuse occurs when patents that are never used by the patentee, or licensed. Such patents do not represent useful ideas – they are rather fishing expeditions – representing the hope that someone else will invest the time and effort in producing a commercial useful idea sufficiently related to the original that royalties can be collected. Indeed, it is estimated that forty to ninety percent of issued patents are not used or licensed by the patentee. One specific example: In 1991, Minolta was ordered to pay Honeywell $127.5 million in damages after a court ruled that Minolta had infringed Honeywell's autofocus camera patent. Yet it was also established that Honeywell was not actually using the idea.[32]

> *A man "has a right to use his knife to cut his meat, a fork to hold it; may a patentee take from him the right to combine their use on the same subject?" -- Thomas Jefferson*[33]

The Dilbert Factor[34]

Monopoly has many costs. Some, like loss of social surplus and rent-seeking have been extensively studied by economists. A less well-known cost is the fact that not all innovators and managers are the clever individuals usually assumed in economic theory. In the history of innovation, examples abound of innovators, who far from maximizing their monopoly profits, have achieved closer to the minimum.

One exceptional example of innovators playing with less than full deck, is that of the Wright brothers. Despite their own rather modest contribution to the development of the airplane, in 1906 they managed to obtain a patent covering (in their view) virtually anything resembling an airplane. The application had been filed much earlier, meaning that between March 1903 and May 1906 they were capable of building an airplane or teaching other people how to do it, but did not. Further even after the patent

was granted, rather than take advantage of their legal monopoly by developing, promoting and selling the airplane, the Wright brothers kept it under wraps, refusing for a couple of more years to show it to prospective purchasers. However, while refusing to devote any effort to selling their own airplane, they did invest an enormous amount of effort in legal actions to prevent others, such as Glenn Curtis, from selling airplanes. Fortunately for the history of aviation, the Wright brothers had little legal clout in France, where airplane development began in earnest in about 1907.[35]

Another case in point takes place in England, also before the First World War. At that time the Badische Chemical Factory held a patent covering practically all chemical-based textile coloring products. Levinstein and Co. developed a new and superior process to deliver the same product. Badische Chemical sued and obtained a court restraint, preventing Levinstein from using the new process to obtain the old product. Did Badische take advantage of this legal victory to introduce the new and superior process in their own business? No, in fact Badische was apparently unable to figure out how the new process worked, and so did not make use of it. Levinstein, on the other hand, moved to the Netherlands, where the patent was not enforced. Badische was less fortunate, as competition from Levinstein eventually put them out of business.[36]

Lest one take the lesson that narrow-mindedness was widely prevalent among monopolists only prior to the First World War, because after all, we know many monopolists today who aren't that dumb, we draw attention to the behavior of the recording industry in recent years. The single most important innovation in the movie industry has been the videotape – today about 45% of all industry revenue is derived from the sale of recordings, and while the videotape is gone current video recording devices all evolved from that basic idea: record movies so they can be watched at home. Far from embracing this lucrative new technology when it first appeared, the movie industry fought a long and costly legal battle against it. Shortly after Sony introduced the Betamax, Universal and Disney filed suit. Fortunately for them, when the court ruled in 1979, it ruled against them. Unwise to the end, Universal appealed the decision, and was "rewarded" in 1981 by an appellate court decision, overruling the original decision. After further speedy actions by the court system, the U.S. Supreme Court in 1984 finally reversed the appellate decision, finding that, as had the original court, "time-shifting" constitutes fair use.

The music industry, in the form of the RIAA, has also engaged in a series of legal blunders. In 1998, the RIAA filed a lawsuit against a small relatively unknown company, Diamond Multimedia Systems. Diamond's crime? They were engaged in selling a portable electronic device capable of playing music in a compressed format not widely known at that time – the MP3 format. Not only did the RIAA manage to lose the lawsuit – but the attendant publicity was an important factor in popularizing the format among consumers. As newspapers gave the case enormous coverage, music aficionados rushed to their computers to convert their inconvenient old CDs into convenient MP3 collections.[37]

The massive conversion of CDs is largely responsible for the next chapter in the sad saga of the RIAA – the peer-to-peer network. With the advent of Napster in 1999, music lovers discovered that, especially with the advent of broadband connections, MP3 formatted songs could be conveniently shared over the Internet. The RIAA lawyers sued Napster. The lawsuit did little to prevent the spread of the technology – although it may have helped publicize it. Court filings indicate that at that time Napster had fewer than 500,000 users. By mid-2000, driven by the enormous publicity over the case, Napster reported nearly 38 million users worldwide. By 2001 the RIAA prevailed on appeal, and an injunction against Napster began the effective shutdown of the network. By 2002, Napster declared bankruptcy.[38] So effective has this shutdown been that it is now estimated that in the US alone, there are over 40 million people sharing files using "peer-to-peer", or p2p, networks.[39]

"Being a monopolist" is, apparently, akin to going on drugs or joining some strange religious sect. It seems to lead to a complete loss of any sense of what profitable opportunities are and of how free markets function. Monopolists, apparently, can conceive of only one way of making money, that is bullying consumers and competitors to put up or shut up. Furthermore, it also appears to mean that past mistakes have to be repeated at a larger, and ever more egregious, scale. Consider the ongoing controversy over the Google Print project, which is now relabeled Google Book Search and is fighting to survive the legal obstacles we summarize next. The Authors Guild filed a lawsuit about two years ago trying to stop it; the lawsuit accuses Google of violating "fair use" and infringing upon its copyrights. Trying to prevent the very damaging effect that the lawsuits could have on its overall finances (it has become a very rich company, in recent times) Google seems to be caving in to all kinds of requests, modifying

the Book Search product accordingly. Anyone who has used it both in 2004 and 2006 can appreciate the difference. The original Google Print was a wonderful tool for bibliographic research that made us purchase very many useful books; the current Google Book Search is an emasculated and frustrating program whose social value and marketability are unclear, to say the least.

Now, what did Google Print plan to do? It planned to scan all the books in a number of large university libraries around the world and to allow people to search their content via the Internet in the usual "Google-style." Once an item is searched and results are found Google Print allows the user to see about one or two paragraphs, sometime a few pages, from the scanned book(s) in which the item is mentioned or referred. It will also link the user to various sites where the book can be easily purchased.

That is all. Instead of spending hours going to the library trying to find out which books write about the Dilbert Factor, one can just enter "Dilbert Factor" at print.google.com and find that dozens of interesting books discuss it. One can, for example, find amusing little texts such as *When Did Ignorance Become A Point Of View: A Dilbert Book*, by Scott Adams, and purchase it from one of the many online bookstores linked in the same page, as we just did. Why? Partly to compensate the Authors Guild for the dramatic loss of revenue that our book may cause them, and partly because one of us got interested by Adams' proposal of a new way of making presidents of powerful countries accountable to their own people when using their mighty military power. Alternatively, one can avoid spending money purchasing bad books, as in most cases one only needs reading a few pages to spot one of them. Finally, you may search Google Print for "Authors Guild," and spend an afternoon browsing numerous interesting books providing evidence of a society once run by smart people and not a shill for Disney.

One can hardly think of a better advertising cum shopping tool for books. This service is to be offered, absolutely free of charge, to authors and publishers alike. Still, not to allow the motion picture industry to outperform them in monopolistic blindness, the Authors Guild has sued and the publishers' lobby followed soon after.[40]

We have no reason to think that monopoly makes people unusually incompetent and hateful of others. The reader may wonder: why are incompetent monopolists more dangerous than, say, incompetent hamburger flippers? Simply put, competition tends to weed out the incompetent. Beyond this, a relatively simple

mathematical result known as Jensen's inequality shows that while 1 of 10 firms in an industry run by an incompetent is short-term amusement for the rest of the industry; 1 of 10 industries run by an incompetent is a social catastrophe.

Errors in Patenting

The private sector has no monopoly on inadequacy. Government bureaucrats are notorious for their inefficiency. The U.S. Patent office is no exception. Their questionable competence increases the cost of getting patents, but this is a small effect, and, perhaps a good thing, rather than bad. They also issue many patents of dubious merit. Since the legal presumption is that a patent is legitimate unless proven otherwise, there is a substantial legal advantage to the patent holder, who may use it for blackmail, or other purposes. Moreover, while some bad patents may be turned down, an obvious strategy is simply to file a great many bad patents in hopes that a few will get through. Here is a sampling of some of the ideas the US Patent office thought worthy of patenting in recent years.[41]

- U.S. Patent 6,080,436: toasting bread in a toaster operating beween 2500 and 4500 degrees.
- U.S. Patent 6,004,596: the sealed crustless peanut butter and jelly sandwich.
- U.S. Patent 5,616,089: a "putting method in which the golfer controls the speed of the putt and the direction of the putt primarily with the golfer's dominant throwing hand, yet uses the golfer's nondominant hand to maintain the blade of the putter stable."
- U.S. Patent 6,368,227: "A method of swing on a swing is disclosed, in which a user positioned on a standard swing suspended by two chains from a substantially horizontal tree branch induces side to side motion by pulling alternately on one chain and then the other."
- U.S. Patent 6,219,045, from the press release by Worlds.com: "[The patent was awarded] for its scalable 3D server technology … [by] the United States Patent Office. The Company believes the patent may apply to currently, in use, multi-user games, e-Commerce, web design, advertising and entertainment areas of the Internet." This is a refreshing admission that instead of inventing something new, Worlds.com simply patented something already widely used.

- U.S. Patent 6,025,810: “The present invention takes a transmission of energy, and instead of sending it through normal time and space, it pokes a small hole into another dimension, thus, sending the energy through a place which allows transmission of energy to exceed the speed of light.” The mirror image of patenting stuff already in use: patent stuff that can't possibly work.

Summing up

That monopoly is generally bad for society is well accepted. It is not surprising that the same should be true of intellectual monopoly: the evidence presented here is no more than the tip of the iceberg. Many other inefficiencies, bad business practices, technological regressions, etc. are documented daily by the press. These are a consequence of the especially strong form of monopoly power that current IP legislation bestows upon patent and copyright holders. We insist on documenting and discussing a subset of these facts for the simple reason that we have become so accustomed to them that we inclined to take them for granted. Yet these inefficiencies are not natural – they are manmade, and we need not choose to tolerate them. We argue in later chapters that neither patents nor copyright succeed in fostering innovation and creativity. So we must ask: what is the point of keeping institutions that provide so little good while inflicting so much harm?

Comments

This chapter used to be much longer, crammed full of additional examples of the patent system gone awry. One has to do with a patent covering the idea of having breakfast by mixing various kinds of cereals (and milk), see freeculture.org/cereal/. The second is much older and convoluted: to learn how the use and abuse of patents affected the improvement of that classical transportation tool called the bicycle, see velonews.com/news/fea/7550.0.html

Notes

[1] Intellectual monopolists are quite aware that their interest requires selling restricted products that are less useful for consumers; which is why they perceive the "darknet" – on which you and I can trade the things we purchase – as a major threat. Biddle et al [undated] clearly, if unwillingly, documents this.

[2] Detailed data on patents applications, approvals, country of origin, and so on are available on line, for the period 1963-2005, at the site of the U.S. Patent and Trademark Office, www.uspto.gov.

[3] That in the 1990s the number of IP lawyers grew even more than the number of patents, a worrisome sign, we learned from an address by Richard Posner to the American Enterprise Institute, November 19, 2002. We read it at http://www.techlawjournal.com/intelpro/20021119.asp

[4] Much of the discussion of patents in the software industry is drawn from Bessen [2003] and Bessen and Hunt [2003], who give detailed references to the original judicial, legal, and factual sources.

[5] Quoted in Bessen [2003], p. 1. Jerry Baker's statement was made at the USPTO Hearings [1994].

[6] We inferred the "halfway competent" assessment about lawyers from the official approval rates for patents' applications, which is at www.uspto.gov/web/offices/ac/ido/oeip/taf/us_stat.pdf. Since the early 1960s roughly 50% of applications are granted. Percentages are even higher for particular kinds of applications,

such as those for designs and plants www.thestandard.com/article/0,1902,20543,00.html

[7] The Economist [2005].

[8] The Economist [2005].

[9] The Economist [2005]. In the same issue of that celebrated magazine we can find the story of QualComm, the prototypical "IP-company," the paean of which is sung so beautifully and in such revealing terms that we cannot help quoting, extensively, from pages 8-9 of the above mentioned special survey.

> *Qualcomm created a technology called CDMA, which now forms the basis of third-generation wireless networks. Around one third of the company's revenues (and 60% of its profits) come from royalties on all equipment that uses the technology; the remainder comes from selling the chips that rely on that intellectual property, where it has a market share of over 80%. Because its technology underlies the third-generation mobile-phone standard, Qualcomm has become a toll bridge that all equipment-makers must cross. […] The licensing practice began when Qualcomm was young and struggling in the early 1990s, helping its cashflow. At first, the company made the mobile phones as well as developing the underlying technology, but in 1999 it sold its handset division in order to focus on the less tangible – and more lucrative – part of the business. Today it spends almost $1 billion a year, or 19% of revenue, on R&D. […] In August [2005] Qualcomm paid $600m for Flarion, a firm with little revenue but around 100 patents either issued or pending on a new generation of wireless technology. If all goes as planned, this will allow Qualcomm to dominate the next phase of high-speed mobile communications too."*

[10] Lanjouw and Lerner [1996].

[11] The story of Panip IP is well documented in the press. See, for example, Pofeldt [2003].

[12] Details of particular patent applications can be found by at the USPTO web site by entering the particular patent number, or by using Google Patent Search.

[13] Two studies arguing that patents are good for small firms, are Gans, Hsu and Stern [2000] and Mann [2004]. The first is particularly interesting as it proves what we argue, only reversing the value judgement, that is, claiming that competition is due to inefficiencies in the market for ideas. The authors call "cooperative commercialization strategy" the cross-licensing between innovators and incumbents aimed at maintaining monopoly pricing for the cooperators, and conclude (p. 30)

> *While a cooperative commercialization strategy forestalls the costs of competition in the product market and avoids duplicative investments in sunk assets, imperfections in the "market for ideas" may lead innovators to instead pursue a competitive strategy in the product market.[...] firms who control intellectual property or are associated with venture capital financing are more likely to pursue a cooperative strategy.*

Notice what this says: IP facilitates collusive behavior and the persistence of monopoly. Competition and "creative destruction" come along only when IP rights are weak or non-existent.

[14] On line at http://www.freepatentsonline.com/20050160457.html

[15] For the views of the Justice Department on the relation between anti-trust and intellectual property see Klein [1997]. Also in 1997 Xerox sued 3Com the makers of the palm-pilot over the "graffiti" handwriting recognition system. The Xerox patent covered the "idea" of using a variation on the Latin alphabet to aid the computer recognizing the difference between different letters. Xerox, evidently, never put the idea to any good use, and the Xerox "invention" does not seem to have assisted 3Com in any material way in designing a useful working system.

[16] "The Carnegie Survey" is described in Cohen et al [2000].

[17] Quoted in Bessen [2003], p. 2.

[18] Gilbert and Newbery [1982] develop a theoretical analysis of how and why strong patent protection makes monopolists' preemption of competitive entry viable and, indeed, profitable. They conclude that

> *Indeed, a perfect market for R&D inputs* [that is complete IP enforcement] *gives the monopolist a credible threat that it would overtake any rival undertaking a competitive research program, which reduces the cost of preemption to nil and makes the preservation of his monopoly costless and hence doubly attractive.* (p. 524)

This paper was written in the late 1970s, before the current IP craze began, and before the special Court of Appeals for the Federal Circuit was established, by the lobbying of IP lawyers, to handle IP cases. Its content, including its optimistic predictions that this kind of preemptive activity may not become socially too damaging because of the high cost of enforcing IP, sadly reads today as an unheard alert against the social losses that increasing legal and judicial IP protection was bound to bring on us.

[19] Mowery and Rosenberg [1998], pp. 18-19. See also the original Mowery [1990].

[20] *The New York Times*, August 3, 2004.

[21] Information about the Diamond versus Chakrabarty case and its implication for the patentability of biotechnology products is widely available on the web. One possible starting point among many is Urban [2000]. Two other judicial rulings were instrumental in the process of extending patents to the agricultural and biotechnological sector are *Ex parte Hibbert* in 1985 and *Ex parte Allan* in 1987.

[22] Alston and Venner [2000], Abstract. For a classical study of the diffusion of agricultural innovation in the US in the period before the PVPA bill made it a big monopolies feast, the technically inclined reader should consult Griliches [1957], who beautifully documents competitive innovation at work. The many broad statements we have made, here and in the previous chapter, in relation to the agricultural sector and the irrelevance of patents for its technological development, are based on the scientific research

reported in Butler and Marion [1985], Campbell and Overton [1991], Griliches [1960], Kloppenburg [1988], McClelland [1997], among other.

[23] June 25, 2000 article, available at www.biotech-info.net/basmati_patent.html. Additional detailed information about the Basmati rice patent are widespread on the net. www.american.edu/TED/basmati.htm, for example, reports detailed and precise info about this and a dozen other cases.

[24] Slashdot, /science.slashdot.org/article.pl?sid=04/11/13/2023220. The story about the Provisional Authority imposing agricultural IP on Iraq farmers is also widely documented elsewhere.

[25] The copyright lawsuit over the Freedom Tower is discussed in Sadeghi [2004].

[26] Bessen and Hunt [2003], p. 25. James Bessen, formerly an electronic publishing innovator, has become during the last few years a very prolific researcher on the theme of software patents, with a particular attention to the empirical aspects of the problem. A number of other interesting papers, beside those we quote here, can be found at his site, www.researchoninnovation.org, while a substantial amount of technical news is at the Technological Innovation and Intellectual Property blog he edits.

For more fun with software patents go to the site by the same name, at swpat.ffii.org/patents/effects/index.en.html, which defines itself as a "Collection of news stories and case studies showing how the granting, licensing and litigation of patents is affecting players in the software field." It makes for entertaining and very educational reading.

[27] Fox [2002], p. 2.

[28] Quoted in Bessen and Hunt [2003], p. 27. Consistently similar arguments can be found in his writings and presentations collected at http://www.researchoninnovation.org/quillen/quillen.htm

[29] Graham [2002] p. 1. This valuable, if technical, paper is the source for our story of Selden and the cartelization of the American automobile industry. Graham also looks at the "strategic" usage of the continuation patent during the 1975-1994

period. To make a long story short, "continuation" consists of a set of legal devices, all supported by current legislation, allowing you to keep secrecy and make your patent "last longer" at the same time; a kind of "Duracell monopoly." It will certainly not surprise you that, since the middle 1980s, the share of continuation patents has been increasing rapidly and steadily.

[30] A good discussion of Jerome Lemelson and his submarine patents is in Perelman [2002], but plenty of information can be found on line by entering the name in Google and following the links. Most sites are apologetic, but they report the facts, which speak for themselves.

[31] From the FTC complaint, FTC [2002] p. 2. The story of Rambus is drawn from that complaint, available at http://www.ftc.gov/opa/2002/06/rambus.shtm

[32] The outcome of the Honeywell versus Minolta case was widely reported. See for example, Mallory [1992].

[33] When we started writing this book, arguing that patents and copyright are bad for our economic system was thought to be a radical-fringe position. No longer. Mainstream media, from *The New York Times* to *The Wall Street Journal*, from *Fortune* to *Business Week*, are reporting regularly about the evident damages the patent epidemic is causing our free market economy. The irresistible, and more relevant than ever, quote from Jefferson we found in a *Business Week* article (dated January 9, 2006) on yet another case of submarine patent affecting the car industry, the title of which was, in fact, "The Patent Epidemic."

[34] If a Google Books Search does not bring the information on Dilbert you seek, try visiting his website http://www.unitedmedia.com/comics/dilbert/.

[35] The Wright's brothers patent can be found on line at http://invention.psychology.msstate.edu/i/Wrights/WrightUSPatent/WrightPatent.html. The story of Glenn Curtiss and the Wright brothers is from Shulman [2003]. The evidence suggests that not only did Curtiss contribute far more to the airplane design than the

Wright brothers, but he was far less inclined to use patents as a tool against competitors.

[36] The story of Levinstein and Badische Chemical, together with the demise of the British coloring industry, is discussed by Penrose [1951], p. 106 and Gardner [1981], Chapter XXVIII. See also http://www.colorantshistory.org/BritishDyestuffs.html.

[37] Information about the Diamond Rio lawsuit can be found at www.wired.com/news/business/0,1367,16586,00.html.

[38] For information about Napster go to grammy.aol.com/features/0130_naptimeline.html.

[39] The 40 million current users figure is from www.usatoday.com/tech/webguide/internetlife/2002-10-14-p2p-swapping_x.htm.

[40] The story of the Google Print project, its unfortunate transformation into the Google Books Search project, and the legal battles we mention is easily traceable via Google Search.

[41] In case our short list of insane patents amused you, and you wish to read more, Jaffe and Lerner [2005] is a good source.