

Shedding Light on Creativity

The History of Photography

One argument for copyright extension is that people are more willing to invest in activities that can gain intellectual property protection. Talking about the issues involved in preserving old and decaying films, for example, the Motion Picture Association of

could make a print; this enabled the creation of multiple copies, whereas each daguerrotype is a unique, finished product. After trying various marketing strategies, Talbot ended up letting amateurs and landscape photographers use his techniques for free; for money, he concentrated on the portrait market, in which he competed with Beard who was licensing the more popular Daguerre method.

Although Beard received very large royalties from his licenses (£25–35,000 in 1842), they didn't make him rich due to lengthy legal battles, in which he sued many photographers he hadn't licensed—some of whom operated only briefly and then moved before the bailiffs arrived. Although Beard had a strong legal position and won the five-year case, he received no damages to offset his high legal expenses; in 1850, he wound up bankrupted by his legal costs.

In 1851, Frederick Scott Archer invented what he called *wetplate* or *collodion-process* photography, using glass plates. This method was faster, cheaper, and less poisonous to the photographer than existing techniques (daguerrotypes used mercury vapor); it provided the process that Matthew Brady used for his famous Civil War photographs. But Archer did not patent his process. Talbot sued him and lost, but it took 10 years to make its way through the courts; meanwhile, Archer died in 1857, completely impoverished. (See Charles Dickens' *Bleak House* for another example of long-running London jurisprudence.)

Photography stabilized for a while, until two patents were registered in the late 19th century for *dry-process* photography. One was awarded to the

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America (MPAA) wrote that “the costs of restoration must be invested up front, and ... individuals or firms are unlikely to make the required investment in the absence of copyright protection.”¹ Similarly, Turner Entertainment's Roger Mayer has said, “The perception is that if a movie falls into public domain, it's more likely to be preserved. Exactly the opposite is true.”²

Yet, every day, libraries that would like to preserve or distribute some work are kept from doing so because of copyright protection. Which of these competing viewpoints is correct? Does protection make it more or less likely that someone will undertake the effort and expense to preserve intellectual property?

Let there be...

For an interesting historical test case, we can look to the beginnings of photography. In 1839, Louis Daguerre sold the patent on his *daguerrotype* photographic process to the French government for a substantial sum: annual pensions of 6,000 francs (about US\$1,500 at the time) for himself and 4,000 francs for the son of his collaborator, Joseph Nicéphore Niépce. (Niépce himself died in 1833.) Daguerre had previously tried to sell the process commercially for 200,000 francs, but he found no takers.

Pointing to the daguerrotype's immense value to painters, archeologists, and others, the French government decided to put the patent in the public domain and let anyone use it. French officials felt it would be hard to protect because many people could practice it, but they also didn't want any other country to have the honor of giving the world such a wonderful discovery.

Daguerrotypes became a huge success and millions of portraits were made during the next few years. Daguerrotypes provided a viable option for many middle-class people who could not afford traditional painted portraits. Artists also began using them to portray scenery, and there was even daguerrotype pornography.

Competition

Daguerre also received a patent in the UK. In 1841, Miles Berry, Daguerre's UK agent, sold the patent to Richard Beard (a former coal merchant) for a yearly license of 150 pounds. Thus, daguerrotypes could be made for no charge in France, but required a license in the UK.

Yet, the portrait photography business in the UK was not clear sailing. William Henry Fox Talbot had also invented and patented a photographic process, which he called the *talbotype*. Talbot's process involved creating a negative from which a photographer

Reverend Hannibal Goodwin, who transferred it to Anthony & Scovill, later known as Ansco. The other patent went to Henry Reichenback, a chemist working for the Eastman Dry Plate Company, later known as Eastman Kodak. Not surprisingly, a court battle ensued over these two patents, but the parties had enough sense to settle this time: Eastman paid Ansco \$5 million and built an empire. (To add to photography's strange history, color plate photography was invented in 1907 by two French brothers: Auguste and Louis Lumière.)

Reality versus perception

If I were to believe the MPAA, I would assume that more people took pictures in England during the 1840s, when photography was licensed there, than in France, where it was free. Did that really happen?

It doesn't appear that anyone actually counted how many pictures were taken during that decade, but commercial directories of the time do show how many photographers were registered. In Paris, there were 35 listings for daguerrotypists and 36 for people selling accessories for daguerrotypes (frames and so on) in 1849. By contrast, London had only about a dozen photographers in 1848—although with Beard suing every unlicensed photographer, some probably didn't list themselves in any directory. So photography thrived in Paris, without protection, and was on the legal ropes in London, which had roughly twice as many people in 1850 (2.3 million versus 1.2 million).

Government intervention

Penicillin is another example of a patent the inventors gave away and made freely available. By contrast, Selman Waksman patented streptomycin and charged royalties, which he donated to research. Merck, which was funding Waksman's work, was the only producer; although the company was generous (donating streptomycin to Japan, for example), shortages in

England in the late 1940s gave rise to a black market in the drug. Of course, in fairness, it's not entirely clear that allowing other companies to manufacture the drug would have increased the supply dramatically, given the very difficult manufacturing process in the early years. The patent, however, certainly did not encourage others to try to make streptomycin.

In some cases, governments appropriate and give away patents; other times, they enforce *compulsory licensing*. Although not as generous as free availability, compulsory licensing does remove a stage of negotiation and often involves lower prices than the patent holder would have otherwise charged. One good example comes from the early days of aviation. The US dominated airplane development until about 1908 because of the Wright brothers and Glenn Curtiss. Each held some of the critical patents for building airplanes and sued each other, arguing over whether *wing-warping* and *ailerons* were the same thing.

Meanwhile, the Europeans paid no attention and used both sets of patents (without paying for them), which helped the French take the world lead in aviation. This went on until the US entered the first World War, at which time government officials realized that American pilots would be shot down and killed because they were flying half-capable airplanes. The Assistant Secretary of the US Navy intervened. Instead of accepting the Wright (now Wright-Martin) demand that manufacturers

that 67.5 percent went to Wright-Martin, 20 percent to Curtiss, and the rest to cover administrative costs.

In wartime, governments have taken over numerous other patents. Leo Szilard, who had started patenting aspects of the atomic bomb in 1934 in the UK, donated his patent to the British Admiralty to keep it secret (it took two tries to persuade them to accept the donation). The Norden bombsight was famous in old movies as the device that let US flyers drop a bomb into a pickle barrel. It was basically an analog computer that adjusted the bomb-release time according to the plane's speed, course, and altitude, adjusted for wind and bomb design. Carl Norden was ready to patent the bombsight in 1930, but the military refused to allow the patent until 1947, when it forced cooperation between Norden and Sperry to encourage bombsight production.

Even in peacetime, however, governments impose various compulsory license procedures for patents. In a compulsory licensing arrangement, the intellectual property owner must permit others to use it for a fixed fee. Perhaps most common is the compulsory license that allows singers to record any song previously recorded (see www.harryfox.com for details) and the right of cable television services to rebroadcast network signals, which protected cable in their early days before they acquired their current market dominance.

Perhaps most important to IEEE readers, the Bayh-Dole Act guaran-

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pay a US\$1,000 per-plane licensing fee, Assistant Secretary Franklin D. Roosevelt forced all airplane patents into a pool. Access to the pool cost US\$200 per plane, and was divided so

tees the US government free use of all patents held by universities but derived from federally funded research. Whether the Bayh-Dole Act has increased the conversion of university

research into products is unclear. Trying to answer whether the transfer of federally funded research would suffer significantly in the absence of licensing under Bayh-Dole, authors Jerry and Marie Thursby argue that some technologies would be commercialized anyway, and others simply would not be. They suggest the key issue is faculty involvement in the development rather than the legal protection possible.³

Considerable international dispute has erupted recently over the licensing of AIDS medicines in third-world countries, and even about the sale of routine medicines from Canadian drugstores to US customers. Again, the pharmaceutical companies argue that intellectual property rules are essential for future funding of research into new drugs. In this case they have been pressured by public opinion into relaxing their control of prices and licenses and the drugs have become more available. The advantage of public and charitable funding rather than commercial funding for drug research helps not only with the provision of drugs in third world countries but also with the need to fund prevention programs (usually not lucrative) as well as treatment methods.

The US also requires compulsory licensing of inventions related to air pollution, atomic energy, and alleviating black-lung disease, as well as various inventions under the Plant Protection Act, the Public Health Emergency Medicines Act, and the Federal Insecticide, Fungicide, and Rodenticide Act. If you invent a new rat poison, for example, and someone wishes to license it but can't come to an economic agreement with you, Federal arbitrators will set a price. Is there a shortage of new pesticides as a result of Federal interference with market exploitation? The biotechnology area is generally booming, so there is no obvious lack of research, even if intellectual property protection in this area is slightly weaker than it might be. As proof, the number of patents issued with the word "pesti-

cide" has grown substantially over the past two decades: from 173 in 1980 to 216 in 1990 to 502 in the year 2000.

The loudest argument about intellectual property rights and creativity might be about "open source," where there's no agreement on whether protecting computer software technology is essential for innovation. Rob Enderle of *TechNews-World* wrote that "open-source software kills software innovation"⁴ because it will dry up the funds for researchers.

On the other hand, Thomas Goetz of *Wired* said that "open source is doing for mass innovation what the assembly line did for mass production."⁵ This question deserves a longer discussion in a future column, but it's the same basic issue, and there are many strong opinions on both sides. At least according to the bloggers, patenting software is not helping make it better.

So what does all this tell us about protecting intellectual property? As you might expect, it seems to decrease use: Protection, in the form of a charge, raises the cost of using something, which obstructs the ease of using it. Proponents suggest that this is outweighed by a secondary mechanism in which higher charges encourage investment and thus create industries that would not otherwise exist. They might point, for example, to various Web services that appeared during the dot-com boom and disappeared because they couldn't find an economic basis for their operation. Whether these failed because they lacked legal protection or merely because they lacked customers is less clear to me. Plenty of dot-coms disappeared despite having no intellectual-property issues.

On the other hand, if I pick an out-of-copyright author—Dickens, Twain, or Melville, for instance—I can find their works in online libraries. The better-known ones are typically available free through Project Guten-

berg (www.gutenberg.net) or the online books at the University of Virginia (<http://iath.virginia.edu>) or the University of Michigan's Internet Public Library (www.ipl.org). More obscure books are available in commercial products such as Early English Books Online (EEBO) or Literature Online (LiON). However, if I pick an in-copyright author—Hemingway, Fitzgerald, or Tolkien, for example—their works are usually not available in digital form, even for money.

In the end, the lesson seems to be: If you want things to be available, don't clutter them up with intellectual property rules; if you want to reward the owners, compulsory licensing might save you on administrative expenses—and a lot of lawsuits. □

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