Intellectual Property Issues

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Intellectual Property

By the term "intellectual property" (IP) we will refer to material that can be protected by copyright, patent, or even by trademark (although trademark is the least problematical area and will not be considered further here). It is generally felt that some form of creative act leads to the development of concrete information which can be of benefit.

This can be in the form of artistic work such as painting, sculpture, music creation, music performance, prose narratives, didactic or expository writing, poetry, or the like. The protection of access to such items is usually covered by copyright.

Alternatively, it can be in the form of *inventions,* of processes to create things, or of concrete devices. The protection of access to such items is usually covered by patent.

Copyright and patent law has a long history, and is firmly embedded in the legal systems of most countries. In the U.S., among the first powers given to the congress by the constitution are the ability to enact laws governing copyright and patents. Internationally, there has been a constant march of treaty law in this area, and the failure to conform to or join such treaties has been a source of international friction. There is at least one area which was not foreseen when the current approaches were developed, and which seems to fit badly into the prior models – computer software. It is currently treated in a hodge-podge and inconsistent manner, causing considerable litigation and other problems. It will be a continuing example, explicitly or implicitly, throughout this article.

The main thrust of this article is to examine the historical rationale for the present system, consider it in light of current technology and current practice, and suggest that the system no longer serves society well. It is "broken" and requires radical rethinking to avoid hamstringing progress in this new millennium. This article should be seen as a position paper rather than an unbiased scientific study.

A Little History

Intellectual Property - Copyrights

There were no copyrights (or need for them) before the development of the printing press, after about 1500. The press led to the possibility of inexpensive replication of printed works on a large scale. In addition to works of fiction, non-fiction, and religious materials, there was the possibility of wide dissemination of seditious material. In England, the king in principle owned everything and could give away property or rights as he wished. He gave exclusive "Copy Rights" to guilds, monopolies of **publishers,** who had mutual non-competition agreements. This had two main purposes:

(1) To financially reward friends, and indirectly reward authors, leading to the concept of “royalties”; and

(2) To reduce the risk of adversaries printing politically dangerous books, by limiting and controlling the agencies with the right to publish.

Thus copyright originally supported both control and rewards, and encouraged creative work by the financial rewards of monopoly. But the publishers, not the creators, were the direct beneficiaries,

The first copyright law in England was the Statute of Queen Anne, in the early 1700s. The copyright, in this case, was directly to the author, and gave a limited time monopoly.

In the US Constitution, in 1787, copyright and patent laws were authorized by Article 1 Section 8. The first U.S. copyright law was passed almost immediately, in 1790, showing the importance of copyright in the legal system. It has been amended often - usually in reaction to new technology, such as photography and motion pictures.

There was a major revision, the Copyright Act of 1909, called “the Old Law”; it still applies to legacy publications. The current revision, which dates from 1976, and went into effect in 1978, is often called “the New Law”. The current law provides a monopoly over a given work for 70 years after the death of its creator, or for 95 years in the case of shop rights or of an anonymous author (although it is unclear who gets royalties or gives permissions in that case). These periods are consistent with those in force in Europe. Any new publication performance of a work whose copyright has expired can be the source of a new copyright, and new protection.

A crucial part of the copyright law has been the concept of "fair use". Any use of otherwise copyrighted material for teaching, research, parody, criticism, or scholarship is considered fair use, and not infringement. There are a number of other exceptions. The precise wording seems clear:

> …the fair use of a copyrighted work, including such use by reproduction in copies or phonorecords or by any other means specified by that section, for purposes such as criticism, comment, news reporting, teaching (including multiple copies for classroom use), scholarship, or research, is not an infringement of copyright.

However the trend has been to attempt to erode fair use provisions by agreement, pressure, and threats of legal action which would be prohibitively expensive to defend.

More recently the Digital Millennium Copyright Act was passed, to cover new and digital media. It has many controversial provisions, as yet untested in the courts. Among other provisions, it restricts circumventing, or **trying** to circumvent via reverse engineering, the encryption scheme on DVD media.

Since the encryption is a mathematical algorithm, the law makes it illegal to study that part of mathematics. Since mathematics can be thought of as determining the logical consequences of a set of assumptions, the encryption algorithm flows naturally from basic mathematics. Thus it must be illegal under this law to study mathematics, hence to study or use logic. The law virtually tries to ban thinking

International copyright law and practice were originally controlled by the Berne Convention of 1886, which has been revised regularly. Currently the controlling international treaty is the Trade Related Aspects of I P Rights (TRIPS) Treaty of 1994.

Intellectual Property - Patents

The first "US" patent was issued by the Massachusetts Bay Colony for the manufacture of salt, in 1641. Patents are issued directly to the author, and give a limited time monopoly.

Along with the copyright law, the first U.S. patent law, passed in 1790, was among the earliest works of Congress. Patent laws were amended often in reaction to new inventions, but using the old framework. The current revision was passed in 1952, and is administered by the US Patent Office.

Internationally, the Paris Convention of 1883 was signed by 20 countries. It has been revised regularly. Currently the controlling international treaty is the TRIPS Treaty of 1994, with about 120 signers.

The purpose of patent law was to encourage inventors to advance the state of technology by awarding them special rights to benefit from their inventions. Patents were designed to cover machines, compositions of matter (chemicals), manufactured items, industrial processes, major improvements on previous patents, or patterns such as tire or shoe tread design. Also covered were specially bred animals (note that Dolly, the cloned sheep, is patented - not just the process, the animal) or vegetation (asexual), and genes. Finally, in some cases computer software has been patented! Note that software has also been *copyrighted* -- there is a difference in protection.

To be patentable an invention must be "Novel", "Non-Obvious", or "Useful" (= not illegal!) There is no "fair use" concept in patent law. ***Any*** unauthorized use or production, even independent (or in some cases *prior*) development is infringement.

Some things can not be patented, such as Laws of Nature (e.g. $E=mc^2$), mathematics, or algorithms. But somehow, computer programs, which are in fact algorithmic implementations, have been ruled to be patentable. They are seen as able to change the state of a system, thus allowing them to be treated as a device.

In principle, the patent is issued directly to the creator; but this is rarely true in practice. Shop rights go to the employer by default. Patent rights are also typically transferred to a marketer or production company. Patents must be submitted to and approved by the patent office, and become effective after registry. Patents have three parts:

(1) specification: general description of the invention;

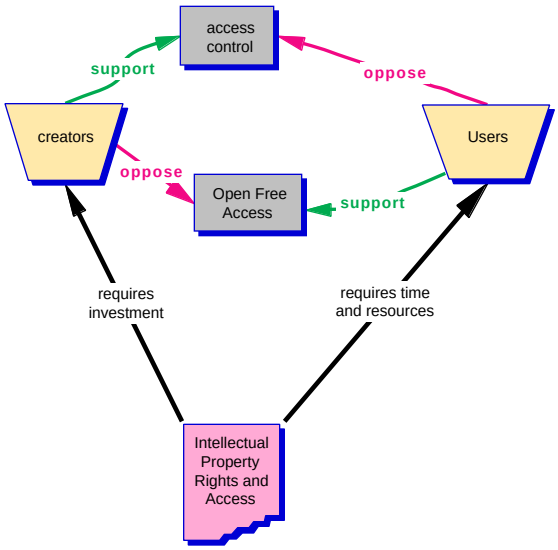
(2) claims: more detailed statements explaining exactly how the invention works or is assembled and what it does. Claims are made as broadly and vaguely as possible, to subsume improvements.

(3) drawings that illustrate the invention.

The average cost to file a patent typically ranges from $10K - $25K US.

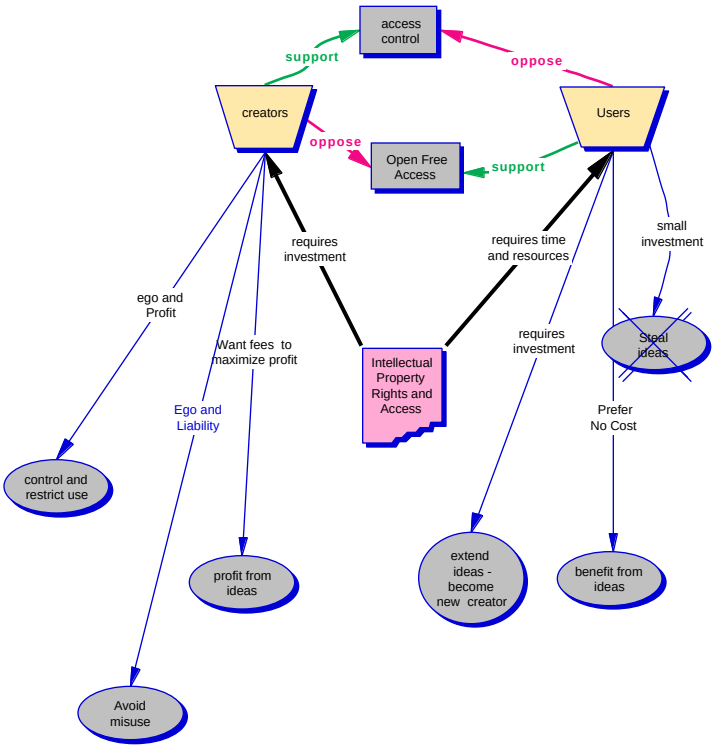
A patent lasts 20 years in the US. Patents are only binding in countries where they are legally filed, and rules for acceptable filing vary.

Intellectual Property Issues: Scenario 1



The Intellectual Property (IP) Rights and Access "game", in which the central issues of IP rights and access are often in conflict, includes the "players", their goals, and their positions and motivations. The first naïve picture of this game is seen in the box to the right. The obvious players are the creators of IP and the users of IP. The goals we consider are IP access **control**, and the open and free access to IP information. Since open and free access denies the creators an opportunity to directly benefit from their creations, they oppose this, and support access control, preferably by them. On the other hand, the users of IP have the opposite position, since control can deny use of the information to them, or make it so costly that the use may not be feasible.

Intellectual Property Issues: Scenario 1 Expanded



Let us examine the goals and motivations of the players more closely. Creators oppose open and free access. They hope to maximize monetary and psychological gain by access control. They can license or sell the use of their IP, obviously producing revenue. They often feel this revenue would not be forthcoming if the IP were freely available. But in addition to financial considerations, creators also have a considerable ego involvement in their IP. They wish to be recognized (which can also have financial value) for their creative work, and they want to control

it to avoid its misuse or denigration, e.g. by having badly designed or ill intentioned clones in the marketplace, sometimes masquerading as their work. These are in fact legitimate concerns. On the other hand, users have strong motivations to oppose control and support free access. They wish to benefit from the use of developed IP, and prefer to do so at low financial cost and without unfair advantage for their competitors. (In fact, they clearly would prefer a no-cost route if it were available, leading to the problem of IP theft.) But the very existence of a monopoly on use by the "owner" of the IP implies that some users might be able to negotiate better terms, or that some might be totally denied access.

Creators who to want their work to be disseminated as widely as possible and to get into as many users' hands as possible can avoid excessive restriction by placing their creation in the public domain, or by allowing royalty free usage to some or all groups, subject to specified conditions.

Many users want to extend existing IP to become creators themselves. They then have mixed interests -- those of creators and of users. The adjudication of whether an extension of IP is itself worthy of protection is one of the most active areas of patent law. The issue is less problematic for copyrighted material, but still exists.

Another issue "contaminates" this model. Nothing prevents the creator from selling, ceding, or giving full right of ownership to a third party. In fact this is the most common case at present.

If a creator is employed at the time of creation, the default owner is usually the company -- by "shop rights". The actual creator may get a portion of the income, a portion of the profits, a flat sum, a promotion, or nothing at all -- at the behest of the company, presumably for providing the environment leading to the work. If a creative work is published in a technical journal, rights are typically ceded to the publisher.

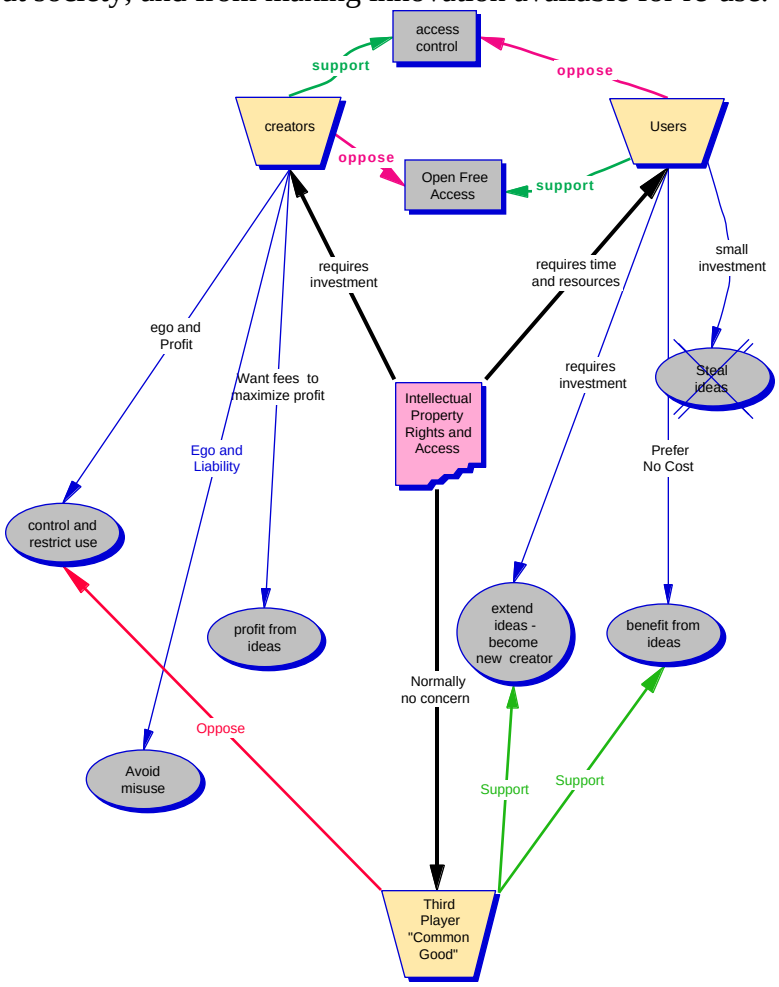
In the case of musical creations, there are only a few large recording companies (which maintain identical industry standard contracts) which gain rights to works not yet created at the time of the contract, making the creators essentially indentured servants. To be sure, some are well paid; but most song writing and performing groups reap very little from their work. The de facto monopoly of distribution overpowers the monopoly of creation even in the current model. A similar situation exists in publishing of fiction and nonfiction books, where the "royalties" accruing to the author are often small or none.

The argument for this situation is that the distribution companies must pay all costs for promotion, production, warehousing, and distribution -- even if the product proves unpopular. But the result is that the vast majority of the proceeds from creative works go to these third parties, rather than to the creators. This has led to a lawsuit in which Courtney Love, a songwriter-performer, is attempting to overturn the standard industry contract. Such a suit has been too expensive, and the time needed for a decision has been so long, that it has not been successfully attempted. But she has the determination and financial resources to pursue the issue, and is creating concern in the industry.

Intellectual Property Issues: Scenario 2: The "Common Good"

There is another player in the IP game, one often neglected -- the "Common Good" -- with its own goals and motivations. In a democratic government, the Common Good holds sovereignty. When the system of patents and copyrights developed, a monarch was sovereign, and had in principle ownership of all in the domain. This ownership was ceded to creators to stimulate their activity, resulting in indirect gain for the sovereign. The rights and needs of the Common Good should be seen in the same light, since copyright and patent law made by the institutions of sovereignty *ceded* the rights to dissemination and control to creators or to those who assume

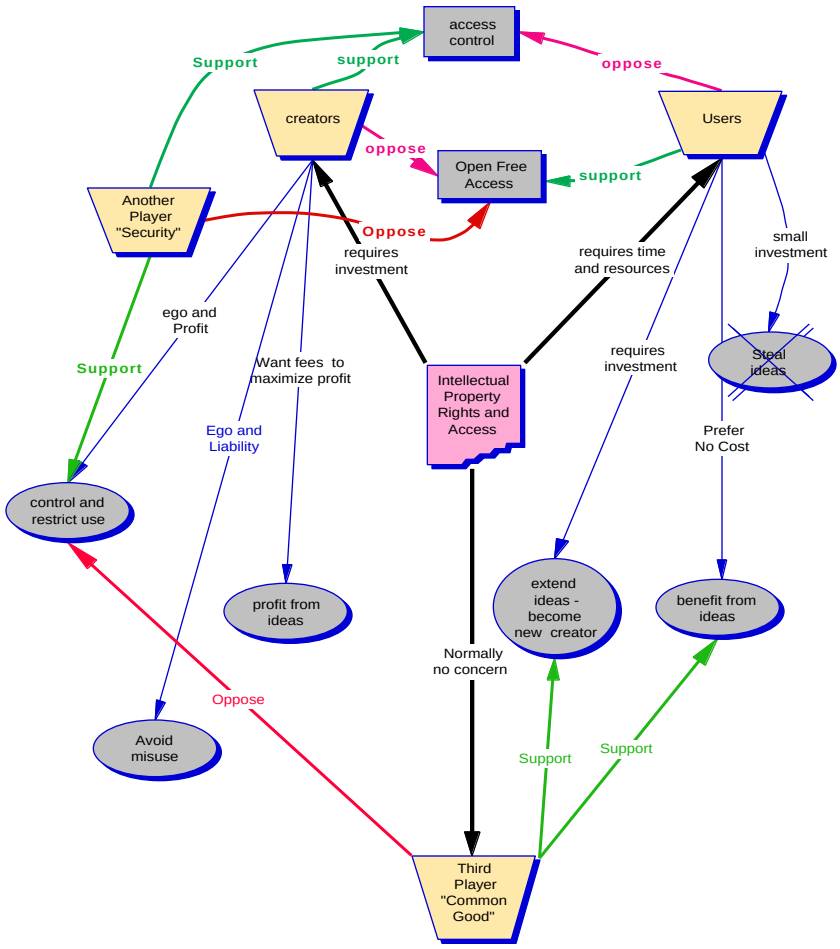
rights to the work. Thus the creation of such laws should in principle be for the benefit of the sovereign, the Common Good. This benefit comes from the stimulation of creative activity and products throughout society, and from making innovation available for re-use.



Thus the Common Good should oppose control and restriction of use, while supporting the extension of ideas and products by producers of new ideas and products, while allowing members of society to use and benefit from these ideas as widely as possible. Clearly these goals are most similar to those of users, with the proviso that the Common Good must assure sufficient incentive to stimulate creators.

Intellectual Property Issues: Scenario 3 -- The Demon Player

Another often-neglected player is Security, which I call the Demon Player. Security supports control and restriction, but opposes open and free access, much the same as creators. But the motivations are totally different, and therefore lead to much more restrictive conditions than even creators would support. Security is unconcerned with financial gain for itself, and has no ego involvement in creative works or activity. Its goals are the same as its motivations. It therefore supports control, even to the detriment of creators, and certainly of users. But as the laws have been developed and administered, it appears to be the dominant player. It seems *directly counter* to the Common Good.



The Issue of Computer Software

Computer software has become a strange new special IP case. Manufacturers would like copyright protection to prevent making direct digital copies of software, or to prevent printing out and reusing the code itself. But they would also like to protect the process that the code produces -- since the original code can be changed radically to port it to a new platform or system, or *reverse engineered* to produce new and different code with the same effect. For this they wish patent protection. Originally, they were denied both protections, but in later cases they have been granted both, sometimes for the same code. It is not clear which protection is more financially important, but as mentioned earlier, the new Digital Millennium Copyright Act bans use of code to reverse engineer ways to defeat encryption schemes

Anecdotal Problems with the Copyright System

In the Napster case, a "company" made computer network services available for owners of a copy of a song to offer (a reduced quality version of) it to others, by Internet up and downloads. It seems to have started as a hobby of its creator. Napster acted as a "dating service" to bring people with similar musical interests together. It provided a database of people, the holdings that they desired to share, and a way for them to interact. It reputedly had some 57,000,000 clients, about the number of US households. It apparently did not itself copy or distribute any materials. Furthermore, Napster made no money from its dating service. Its "business plan", if there was one, has always been unclear, but the company attracted large amounts of venture capital. It was sued by RIAA, representing the recording industry

Yet the courts acted on the behalf of Security, and found Napster guilty of "vicarious infringement" for providing facilities that *could* be used to violate copyright law. It is presumed that all "peer-to-peer" services are now at risk of similar constraints.

This was done with no proof that the activity caused financial harm to the creators or led to misuse of their creations. It was in fact widely felt that the mechanism produced increased interest in the works of many formerly obscure songsters, some without recording contracts, leading to *increased* purchase of their works and increased employment in live concerts. It also demonstrated that the argument, that distribution and advertisement costs warranted transfer of control and profit from creators to distributors, was specious in the Internet environment, since distribution and advertisement could be essentially free. Furthermore, the creators could easily handle the cost of production, and since there was no need for product warehousing, the cost of storage was irrelevant. Security won over the Common Good, which was unrepresented in court. As a result of the decision, Napster is becoming a pay-for-pay music provider.

If the Napster decision were applied uniformly, then makers of copy machines would be put out of business, since their devices could be used "vicariously" to duplicate copyrighted works. All manufacturers of videotape or audiotape, or the machines that use them, would similarly be closed down. Even pencil and pen manufacturers would be guilty of vicarious infringement. Since songs can be played and sent to another person for recording by telephone, all telephone companies (and of course the communication satellites and firms that produce and launch them, or provide fuel for their launch or support) would be guilty of vicarious infringement. The economic consequences are too absurd to be considered.

If the Napster decision is correct, then the law is so badly flawed that it must be replaced. The Common Good cries out for vengeance.

Another Model for IP: "Artists", e.g. Painters

Painters generally have no <u>need</u> for IP protection. Nobody can copy their unique style. The concern is not ownership of the ideas, but the possibility of forgery. The lack of copyright protection does not seem to affect them, but their contributions are clearly original and creative, and thus can be defined as intellectual property. The goal of painters is to sell, not lease.

A similar model is seen in the field of sports. Sports stars are paid a lot, if they have sufficient skills. They *have* “secret techniques”, but they don’t have to protect their secrets. They only need to do better than others. No one patents a baseball swing. When an ice skater develops a new and spectacular move, it is not patented. And others try to copy it as best they can. The move is usually known by the name of the innovator, who often obtains fame and financial gain from others who obtain knowledge of the skill of the creator.

Privacy

Despite all of the protection of intellectual property, there are critical items that appear to be *created* intellectual property which are unprotected by the law. In particular, there is little legal protection for those critical essential items summed up in the identity and privacy of individuals. Who owns a person’s identity and records? According to the law, these are "just" facts, and therefore not protectable. Databases holding names, birthdates, bank balances, secret items revealed to access accounts, and the like may be bought and sold with impunity, even without permission of the person involved, making identity theft a real and current problem. If *anything* is to be copy protected and controlled, it should be the critical factors of a person's identity. In this case there is a clear hole in the law, and little intent to close it.

Anecdotal Problems with the Patent System

Absurd Patents

Among the problems of the current patent system is the lack of rationality in the assignment of patents. Some items patented are so trivial as to be laughable. Others, while useful, are not only obvious, but similar items have been used for long periods. Both of these factors are supposed to make items unpatentable. But in practice, this is not the case. For example, the metal tie used to hold turkey legs together during baking has been patented. Each use of a similar item to hold legs of fowl together during baking must pay for the privilege or be in infringement. Yet it is difficult to argue that nobody tied bird legs together before this patent was issued. Apparently the patent owner has become rich by receiving payments which are individually too small to bother contesting.

Another case, in the field of computer software, is the use of a system to move and redraw a window on a computer display and redraw the contents of the area uncovered by the moved window. The process requires remembering the content behind the current window, an obvious and trivial process. Moreover, this patent was granted long after the procedure was in common use in the field. Still, there is a patent on window systems, and any use unauthorized by the patent holder, no matter how it is implemented, is infringement.

Even more absurd is the existence of patents on the computer use of the XOR (exclusive or) function, which is a logical and mathematical object defined in every text. It was treated as early as 1854 by George Boole, in his book *Laws of Thought*, a foundation for modern computer design. Such a patent has as much merit as claiming a patent on the number 2, based on the fact that nobody else already has one.

No Fair Use in Patents

Unlike the copyright system, the patent system has no concept similar to fair use. *Any* unauthorized use infringes. Independent creation is no defense. The fact that the patented item is obvious or common is no defense. The only way to avoid infringement is to "break" the patent, proving in court that it was incorrectly issued. The cost of such an action is estimated in the hundreds of thousands of dollars. The one with the best lawyer and the most money wins!

Counterproductive Patent Stratagems

Patent wording is one of the best examples of lawyer-ese. Even the inventor can rarely recognize the description of the invention in the patent. Since patents have intentionally broad descriptions and claims, and since patent rights are often purchased by companies solely to prevent the introduction of new products that would compete with their existing products, the result of the patent system is to *reduce* the likelihood of new development

New problems on the horizon

Changing technology produces new problems for IP management. One such new issue is digital fabrication**.** Rather than distributing physical products, it is possible even now to download specifications for computer driven fabrication, using the Internet. Items can then be manufactured directly in customers' homes and offices or in local facilities. The obvious problem is who "owns" what, and what would constitute infringement? Is only the original object protected? Do the duplicates infringe on the patent? Is the specification protected? Is the computer code itself protected? If the code is altered, for example to run on a different system

but produce identical objects, is that infringement? If any or all of these can be protected, it is not clear whether they should be covered by patent or by copyright. Differences in duration and type of protection and rights to fair use are significant.

This problem can only get worse. One can imagine the development of “Fabster”, a peer to peer exchange service for .fab files for “3d printers” on the Napster model, and the subsequent legal problems. The use of lossy (as e. g. MP3 for music) data compression schemes, allowing fabrication of models which are somewhat different from the originals, further complicates the issues to be faced.

What Is the Solution?

Why is a new solution needed? The system of patents and copyrights was designed to solve the intellectual property paradox: neither the creator nor society gets any value if the IP is kept totally secret, since nobody can use it; but if IP is *not* secret, *anybody* can use it and creator still gets no value! However the system of patents and copyrights is now clearly broken and has become counterproductive.

Patents are now used more to stifle competition (hence stifle innovation) than they are to provide a reward and stimulate innovation. The patent system has become a sinecure for litigation and attorneys. One result has been that patents are now so broadly and vaguely written that they are of little use as support for further innovation. Rather, development work must be examined by company lawyers for legal hazards from infringement on patents, which sometimes do not even seem closely related. The patent system no longer rewards innovative individuals, but rather companies who claim or buy rights to their work without necessary reward to the creator. Patent rewards are now largely based on who has the fastest and best financed legal teams.

Furthermore, in industries such as computing hardware and software, telecommunication, video games, and consumer electronics, the product lifetime (on the order of three years) is much shorter than the period of patent protection. Thus, frivolous infringement lawsuits by holders of related patents, designed to keep competing products from the market, can succeed even if they lose in court eventually. Technological advances during the suit can make the final outcome moot if, by the end of the suit, the delayed opposing product is no longer a market threat.

The copyright system has moved rewards for innovation and creativity from the creators to marketing and distribution companies. It has also moved the right to allow or prohibit usage of copyrighted materials from the creators to the publishers. In many cases, the author is even compelled to waive rights to freely use his own creation.

The popular performing group Milli Vanilli created a major stir when it was revealed that they were not actually performing the music but merely moving their lips and bodies, while actual unknown (and low paid) musicians performed. What was their sin? Were they creators or thieves? Clearly the actual creators of the music got limited benefits (fame or money) compared to the disseminators of their work. This was seen to be unfair. Are publishers so different from Milli Vanilli?

The copyright system is basing *current* action on *past* technological conditions, which are *no longer applicable.* It is no longer necessary to support a massive distribution, sales, and marketing system for the dissemination of materials subject to copyright, since that can now be done by the internet, using local printers, displays, and sound systems. "Digital watermarking" techniques are rapidly being developed to enable authors to be acknowledged as the source of materials, and to indicate if materials have been altered, perverting the original intent of the

author. It is only necessary to develop a new business model that will allow creators to obtain financial reward.

The Nature of IP

It is important to assess the very concept of intellectual property. There are really two different types of creative activity to consider.

The first type is context based, creations that are incremental advances on previous creations. This is the character of scientific and mathematical advances, and computer software, typified by the remark *"if I have seen farther than others, it is because I stood on the shoulders of giants"*. In this case, typically covered by patents, it is strange to attribute monopoly property rights to the developer of such an advance, but give no ownership benefits to those that laid the groundwork for the developments. This is, in fact, precisely the argument used to justify shop rights to inventions, or to works subject to copyright but done for hire. The patent system is based on the false assumption that patentable works exclusively come from, and thus should belong to, their first developer, and would not soon be developed by others sharing the same background information, even without the prospect of direct financial gain. History shows otherwise, as does the experience of the patent office in trying to adjudicate which of essentially simultaneous submissions has priority. The logical position is to deny sole ownership to the developer, but to grant ownership to the context making the development possible -- i. e. to place such works in the public domain immediately.

The second type appears to be created from nothing with no context dependence, such as an abstract painting (although some may argue that a critical context also exists in this case, spreading the "ownership"). In this case, it is difficult to duplicate the inspiration leading to the work, so there is little need for copyright protection, but rather a need to protect against forgery or fraudulent representation, improper use, or sale of copies. The situation seems similar to the sports argument already presented. The main protections for a creative artist or sculptor is that it is difficult to duplicate the style, materials, or approach of the creator, and easy to identify the source of the work.

There are, of course, cases that do not fit smoothly into these categories. Works of music, fiction, or nonfiction expositions are created only once, but the financial gain often comes from marketing exact (preferably) copies of the works, rather than from the creative act itself. There are other gray areas. To whom does a photograph belong, the photographer or the subject? What about digital art? What about carefully measured geographical information? Are these simply unprotectable data, such as telephone listings? There are many others, of course, and it would be naïve to believe that they can be swept under the rug. But goals must be considered, before we create a solution to problems! *Who should benefit* from a solution, if not the Common Good? Should not the system be recast to support this?

Possible Approaches

Can *no* protection work? We should no longer ask e.g. whether Napster or the RIAA has legal high ground, but whether the product or process is more good than bad for society. This concept is not startling. The field of scientific communication has long depended on publishing data and results, and became dominated by publishers. The limited publication schedules and limited financial resources of scientific publishers created huge delays in publication, finally resulting in creators being forced to pay to have their work available at all. At first, preprints were circulated by mail, and eventually Arpanet was created to facilitate more rapid exchange. Copyright ceased to be an issue. This "proof of concept" led to the creation of the Internet.

Even now, long after its creation, publication of scientific articles and proceedings of learned conferences is still dominated by paper publication in which some or all rights to the content are waived by the authors. Perhaps this is a carryover from the prestige attached to certain learned publishers, or the presumption of peer review to validate the work for tenure or promotion considerations. Even learned society publications are now being made available by subscription on the Internet, and other models less dominated by copyrights are being considered.

Free and open interchange of information on the Internet has produced a giant acceleration in enhancement and availability of human knowledge. It is fragile and must be protected, not inhibited by copyright (or patent) constraints. But it is essential that other methods need to be developed to reward innovation and creativity. Money is not the only goal. Recognition is important, as is the opportunity to do interesting work. Protection is not the answer. Society benefits from availability of information.

There are many possible financial reward approaches to be considered. One is standardized licensing, with the designated creator receiving a preset fraction of all financial gain from use or marketing of their work. This approach unfortunately implies bureaucratic controls and procedures, or litigation to determine use and fairly determine benefits. Another model (already used) is to provide financial reward from the recognition of ability, such as stipends or employment e. g. at universities or companies. Still another is to allow creators to get what benefit they can while they have a "head start" on the competition. But the present approach is clearly broken, counterproductive from a societal viewpoint, and based on assumptions and practices that no longer apply. As much as possible of what is now regarded as intellectual *property* should be given open and free access, as soon as possible. The entire society, including the "creators", should benefit.