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The Economy of Ideas

A framework for rethinking patents and copyrights in the Digital Age

(Everything you know about intellectual property is wrong)

By John Perry Barlow

"If nature has made any one thing less susceptible than all others of exclusive property, it is the action of the thinking power called an idea, which an individual may exclusively possess as long as he keeps it to himself; but the moment it is divulged, it forces itself into the possession of everyone, and the receiver cannot dispossess himself of it. Its peculiar character, too, is that no one possesses the less, because every other possesses the whole of it. He who receives an idea from me, receives instruction himself without lessening mine; as he who lights his taper at mine, receives light without darkening me. That ideas should freely spread from one to another over the globe, for the moral and mutual instruction of man, and improvement of his condition, seems to have been peculiarly and benevolently designed by nature, when she made them, like fire, expansible over all space, without lessening their density at any point, and like the air in which we breathe, move, and have our physical being, incapable of confinement or exclusive appropriation. Inventions then cannot, in nature, be a subject of property." - Thomas Jefferson

Throughout the time I've been groping around cyberspace, an immense, unsolved conundrum has remained at the root of nearly every legal, ethical, governmental, and social vexation to be found in the Virtual World. I refer to the problem of digitized property. The enigma is this: If our property can be infinitely reproduced and instantaneously distributed all over the planet without cost, without our knowledge, without its even leaving our possession, how can we protect it? How are we going to get paid for the work we do with our minds? And, if we can't get paid, what will assure the continued creation and distribution of such work?

Since we don't have a solution to what is a profoundly new kind of challenge, and are apparently unable to delay the galloping digitization of everything not obstinately physical, we are sailing into the future on a sinking ship.

This vessel, the accumulated canon of copyright and patent law, was developed to convey forms and methods of expression entirely different from the vaporous cargo it is now being asked to carry. It is leaking as much from within as from without.

Legal efforts to keep the old boat floating are taking three forms: a frenzy of deck chair rearrangement, stern warnings to the passengers that if she goes down, they will face harsh criminal penalties, and serene, glassy-eyed denial.

Intellectual property law cannot be patched, retrofitted, or expanded to contain digitized expression any more than real estate law might be revised to cover the allocation of broadcasting spectrum (which, in fact,

rather resembles what is being attempted here). We will need to develop an entirely new set of methods as befits this entirely new set of circumstances.

Most of the people who actually create soft property - the programmers, hackers, and Net surfers - already know this. Unfortunately, neither the companies they work for nor the lawyers these companies hire have enough direct experience with nonmaterial goods to understand why they are so problematic. They are proceeding as though the old laws can somehow be made to work, either by grotesque expansion or by force. They are wrong.

The source of this conundrum is as simple as its solution is complex. Digital technology is detaching information from the physical plane, where property law of all sorts has always found definition.

Throughout the history of copyrights and patents, the proprietary assertions of thinkers have been focused not on their ideas but on the expression of those ideas. The ideas themselves, as well as facts about the phenomena of the world, were considered to be the collective property of humanity. One could claim franchise, in the case of copyright, on the precise turn of phrase used to convey a particular idea or the order in which facts were presented.

The point at which this franchise was imposed was that moment when the "word became flesh" by departing the mind of its originator and entering some physical object, whether book or widget. The subsequent arrival of other commercial media besides books didn't alter the legal importance of this moment. Law protected expression and, with few (and recent) exceptions, to express was to make physical.

Protecting physical expression had the force of convenience on its side. Copyright worked well because, Gutenberg notwithstanding, it was hard to make a book. Furthermore, books froze their contents into a condition which was as challenging to alter as it was to reproduce. Counterfeiting and distributing counterfeit volumes were obvious and visible activities - it was easy enough to catch somebody in the act of doing. Finally, unlike unbounded words or images, books had material surfaces to which one could attach copyright notices, publisher's marques, and price tags.

Mental-to-physical conversion was even more central to patent. A patent, until recently, was either a description of the form into which materials were to be rendered in the service of some purpose, or a description of the process by which rendition occurred. In either case, the conceptual heart of patent was the material result. If no purposeful object could be rendered because of some material limitation, the patent was rejected. Neither a Klein bottle nor a shovel made of silk could be patented. It had to be a thing, and the thing had to work.

Thus, the rights of invention and authorship adhered to activities in the physical world. One didn't get paid for ideas, but for the ability to deliver them into reality. For all practical purposes, the value was in the conveyance and not in the thought conveyed.

In other words, the bottle was protected, not the wine.

Now, as information enters cyberspace, the native home of Mind, these bottles are vanishing. With the advent of digitization, it is now possible to replace all previous information storage forms with one metabottle: complex and highly liquid patterns of ones and zeros.

Even the physical/digital bottles to which we've become accustomed - floppy disks, CD-ROMs, and other discrete, shrink-wrappable bit-packages - will disappear as all computers jack-in to the global Net. While the Internet may never include every CPU on the planet, it is more than doubling every year and can be expected to become the principal medium of information conveyance, and perhaps eventually, the only one.

Once that has happened, all the goods of the Information Age - all of the expressions once contained in books or film strips or newsletters - will exist either as pure thought or something very much like thought: voltage conditions darting around the Net at the speed of light, in conditions that one might behold in effect, as glowing pixels or transmitted sounds, but never touch or claim to "own" in the old sense of the word.

Some might argue that information will still require some physical manifestation, such as its magnetic existence on the titanic hard disks of distant servers, but these are bottles which have no macroscopically discrete or personally meaningful form.

Some will also argue that we have been dealing with unbottled expression since the advent of radio, and they would be right. But for most of the history of broadcast, there was no convenient way to capture soft goods from the electromagnetic ether and reproduce them with quality available in commercial packages. Only recently has this changed, and little has been done legally or technically to address the change.

Generally, the issue of consumer payment for broadcast products was irrelevant. The consumers themselves were the product. Broadcast media were supported either by the sale of the attention of their audience to advertisers, by government assessing payment through taxes, or by the whining mendicancy of annual donor drives.

All of the broadcast-support models are flawed. Support either by advertisers or government has almost invariably tainted the purity of the goods delivered. Besides, direct marketing is gradually killing the advertiser-support model anyway.

Broadcast media gave us another payment method for a virtual product: the royalties that broadcasters pay songwriters through such organizations as ASCAP and BMI. But, as a member of ASCAP, I can assure you this is not a model that we should emulate. The monitoring methods are wildly approximate. There is no parallel system of accounting in the revenue stream. It doesn't really work. Honest.

In any case, without our old methods, based on physically defining the expression of ideas, and in the absence of successful new models for nonphysical transaction, we simply don't know how to assure reliable payment for mental works. To make matters worse, this comes at a time when the human mind is replacing sunlight and mineral deposits as the principal source of new wealth.

Furthermore, the increasing difficulty of enforcing existing copyright and patent laws is already placing in peril the ultimate source of intellectual property - the free exchange of ideas.

That is, when the primary articles of commerce in a society look so much like speech as to be indistinguishable from it, and when the traditional methods of protecting their ownership have become ineffectual, attempting to fix the problem with broader and more vigorous enforcement will inevitably threaten freedom of speech. The greatest constraint on your future liberties may come not from government but from corporate legal departments laboring to protect by force what can no longer be protected by practical efficiency or general social consent.

Furthermore, when Jefferson and his fellow creatures of the Enlightenment designed the system that became American copyright law, their primary objective was assuring the widespread distribution of thought, not profit. Profit was the fuel that would carry ideas into the libraries and minds of their new republic. Libraries would purchase books, thus rewarding the authors for their work in assembling ideas; these ideas, otherwise "incapable of confinement," would then become freely available to the public. But what is the role of libraries in the absence of books? How does society now pay for the distribution of ideas if not by charging for the ideas themselves?

Additionally complicating the matter is the fact that along with the disappearance of the physical bottles in which intellectual property protection has resided, digital technology is also erasing the legal jurisdictions of the physical world and replacing them with the unbounded and perhaps permanently lawless waves of cyberspace.

In cyberspace, no national or local boundaries contain the scene of a crime and determine the method of its prosecution; worse, no clear cultural agreements define what a crime might be. Unresolved and basic differences between Western and Asian cultural assumptions about intellectual property can only be exacerbated when many transactions are taking place in both hemispheres and yet, somehow, in neither.

Even in the most local of digital conditions, jurisdiction and responsibility are hard to assess. A group of music publishers filed suit against CompuServe this fall because it allowed its users to upload musical compositions into areas where other users might access them. But since CompuServe cannot practically exercise much control over the flood of bits that passes between its subscribers, it probably shouldn't be held responsible for unlawfully "publishing" these works.

Notions of property, value, ownership, and the nature of wealth itself are changing more fundamentally than at any time since the Sumerians first poked cuneiform into wet clay and called it stored grain. Only a very few people are aware of the enormity of this shift, and fewer of them are lawyers or public officials.

Those who do see these changes must prepare responses for the legal and social confusion that will erupt as efforts to protect new forms of property with old methods become more obviously futile, and, as a consequence, more adamant.

From Swords to Writs to Bits

Humanity now seems bent on creating a world economy primarily based on goods that take no material form. In doing so, we may be eliminating any predictable connection between creators and a fair reward for the utility or pleasure others may find in their works.

Without that connection, and without a fundamental change in consciousness to accommodate its loss, we are building our future on furor, litigation, and institutionalized evasion of payment except in response to raw force. We may return to the Bad Old Days of property.

Throughout the darker parts of human history, the possession and distribution of property was a largely military matter. "Ownership" was assured those with the nastiest tools, whether fists or armies, and the most resolute will to use them. Property was the divine right of thugs.

By the turn of the First Millennium AD, the emergence of merchant classes and landed gentry forced the development of ethical understandings for the resolution of property disputes. In the Middle Ages, enlightened rulers like England's Henry II began to codify this unwritten "common law" into recorded canons. These laws were local, which didn't matter much as they were primarily directed at real estate, a form of property that is local by definition. And, as the name implied, was very real.

This continued to be the case as long as the origin of wealth was agricultural, but with that dawning of the Industrial Revolution, humanity began to focus as much on means as ends. Tools acquired a new social value and, thanks to their development, it became possible to duplicate and distribute them in quantity.

To encourage their invention, copyright and patent law were developed in most Western countries. These laws were devoted to the delicate task of getting mental creations into the world where they could be used - and could enter the minds of others - while assuring their inventors compensation for the value of their use. And, as previously stated, the systems of both law and practice which grew up around that task were based on physical expression.

Since it is now possible to convey ideas from one mind to another without ever making them physical, we are now claiming to own ideas themselves and not merely their expression. And since it is likewise now possible to create useful tools that never take physical form, we have taken to patenting abstractions, sequences of virtual events, and mathematical formulae - the most unreal estate imaginable.

In certain areas, this leaves rights of ownership in such an ambiguous condition that property again adheres to those who can muster the largest armies. The only difference is that this time the armies consist of lawyers.

Threatening their opponents with the endless purgatory of litigation, over which some might prefer death itself, they assert claim to any thought which might have entered another cranium within the collective body of the corporations they serve. They act as though these ideas appeared in splendid detachment from all previous human thought. And they pretend that thinking about a product is somehow as good as manufacturing, distributing, and selling it.

What was previously considered a common human resource, distributed among the minds and libraries of the world, as well as the phenomena of nature herself, is now being fenced and deeded. It is as though a new class of enterprise had arisen that claimed to own the air.

What is to be done? While there is a certain grim fun to be had in it, dancing on the grave of copyright and patent will solve little, especially when so few are willing to admit that the occupant of this grave is even deceased, and so many are trying to uphold by force what can no longer be upheld by popular consent.

The legalists, desperate over their slipping grip, are vigorously trying to extend their reach. Indeed, the United States and other proponents of GATT are making adherence to our moribund systems of intellectual property protection a condition of membership in the marketplace of nations. For example, China will be denied Most Favored Nation trading status unless they agree to uphold a set of culturally alien principles that are no longer even sensibly applicable in their country of origin.

In a more perfect world, we'd be wise to declare a moratorium on litigation, legislation, and international treaties in this area until we had a clearer sense of the terms and conditions of enterprise in cyberspace. Ideally, laws ratify already developed social consensus. They are less the Social Contract itself than a series

of memoranda expressing a collective intent that has emerged out of many millions of human interactions.

Humans have not inhabited cyberspace long enough or in sufficient diversity to have developed a Social Contract which conforms to the strange new conditions of that world. Laws developed prior to consensus usually favor the already established few who can get them passed and not society as a whole.

To the extent that law and established social practice exists in this area, they are already in dangerous disagreement. The laws regarding unlicensed reproduction of commercial software are clear and stern...and rarely observed. Software piracy laws are so practically unenforceable and breaking them has become so socially acceptable that only a thin minority appears compelled, either by fear or conscience, to obey them. When I give speeches on this subject, I always ask how many people in the audience can honestly claim to have no unauthorized software on their hard disks. I've never seen more than 10 percent of the hands go up.

Whenever there is such profound divergence between law and social practice, it is not society that adapts. Against the swift tide of custom, the software publishers' current practice of hanging a few visible scapegoats is so obviously capricious as to only further diminish respect for the law.

Part of the widespread disregard for commercial software copyrights stems from a legislative failure to understand the conditions into which it was inserted. To assume that systems of law based in the physical world will serve in an environment as fundamentally different as cyberspace is a folly for which everyone doing business in the future will pay.

As I will soon discuss in detail, unbounded intellectual property is very different from physical property and can no longer be protected as though these differences did not exist. For example, if we continue to assume that value is based on scarcity, as it is with regard to physical objects, we will create laws that are precisely contrary to the nature of information, which may, in many cases, increase in value with distribution.

The large, legally risk-averse institutions most likely to play by the old rules will suffer for their compliance. As more lawyers, guns, and money are invested in either protecting their rights or subverting those of their opponents, their ability to produce new technology will simply grind to a halt as every move they make drives them deeper into a tar pit of courtroom warfare.

Faith in law will not be an effective strategy for high-tech companies. Law adapts by continuous increments and at a pace second only to geology. Technology advances in lunging jerks, like the punctuation of biological evolution grotesquely accelerated. Real-world conditions will continue to change at a blinding pace, and the law will lag further behind, more profoundly confused. This mismatch may prove impossible to overcome.

Promising economies based on purely digital products will either be born in a state of paralysis, as appears to be the case with multimedia, or continue in a brave and willful refusal by their owners to play the ownership game at all.

In the United States one can already see a parallel economy developing, mostly among small, fast moving enterprises who protect their ideas by getting into the marketplace quicker than their larger competitors who base their protection on fear and litigation.

Perhaps those who are part of the problem will simply quarantine themselves in court, while those who are part of the solution will create a new society based, at first, on piracy and freebooting. It may well be that

when the current system of intellectual property law has collapsed, as seems inevitable, that no new legal structure will arise in its place.

But something will happen. After all, people do business. When a currency becomes meaningless, business is done in barter. When societies develop outside the law, they develop their own unwritten codes, practices, and ethical systems. While technology may undo law, technology offers methods for restoring creative rights.

A Taxonomy of Information

It seems to me that the most productive thing to do now is to look into the true nature of what we're trying to protect. How much do we really know about information and its natural behaviors?

What are the essential characteristics of unbounded creation? How does it differ from previous forms of property? How many of our assumptions about it have actually been about its containers rather than their mysterious contents? What are its different species and how does each of them lend itself to control? What technologies will be useful in creating new virtual bottles to replace the old physical ones?

Of course, information is, by nature, intangible and hard to define. Like other such deep phenomena as light or matter, it is a natural host to paradox. It is most helpful to understand light as being both a particle and a wave, an understanding of information may emerge in the abstract congruence of its several different properties which might be described by the following three statements:

Information is an activity.
Information is a life form.
Information is a relationship.

In the following section, I will examine each of these.

I. INFORMATION IS AN ACTIVITY

Information Is a Verb, Not a Noun.

Freed of its containers, information is obviously not a thing. In fact, it is something that happens in the field of interaction between minds or objects or other pieces of information.

Gregory Bateson, expanding on the information theory of Claude Shannon, said, "Information is a difference which makes a difference." Thus, information only really exists in the Delta. The making of that difference is an activity within a relationship. Information is an action which occupies time rather than a state of being which occupies physical space, as is the case with hard goods. It is the pitch, not the baseball, the dance, not the dancer.

Information Is Experienced, Not Possessed.

Even when it has been encapsulated in some static form like a book or a hard disk, information is still something that happens to you as you mentally decompress it from its storage code. But, whether it's running at gigabits per second or words per minute, the actual decoding is a process that must be performed by and upon a mind, a process that must take place in time.

There was a cartoon in the Bulletin of Atomic Scientists a few years ago that illustrated this point beautifully. In the drawing, a holdup man trains his gun on the sort of bespectacled fellow you'd figure might have a lot of information stored in his head. "Quick," orders the bandit, "give me all your ideas."

Information Has to Move.

Sharks are said to die of suffocation if they stop swimming, and the same is nearly true of information. Information that isn't moving ceases to exist as anything but potential...at least until it is allowed to move again. For this reason, the practice of information hoarding, common in bureaucracies, is an especially wrong-headed artifact of physically based value systems.

Information Is Conveyed by Propagation, Not Distribution.

The way in which information spreads is also very different from the distribution of physical goods. It moves more like something from nature than from a factory. It can concatenate like falling dominos or grow in the usual fractal lattice, like frost spreading on a window, but it cannot be shipped around like widgets, except to the extent that it can be contained in them. It doesn't simply move on; it leaves a trail everywhere it's been.

The central economic distinction between information and physical property is that information can be transferred without leaving the possession of the original owner. If I sell you my horse, I can't ride him after that. If I sell you what I know, we both know it.

II. INFORMATION IS A LIFE FORM

Information Wants to Be Free.

Stewart Brand is generally credited with this elegant statement of the obvious, which recognizes both the natural desire of secrets to be told and the fact that they might be capable of possessing something like a "desire" in the first place.

English biologist and philosopher Richard Dawkins proposed the idea of "memes," self-replicating patterns of information that propagate themselves across the ecologies of mind, a pattern of reproduction much like that of life forms.

I believe they are life forms in every respect but their freedom from the carbon atom. They self-reproduce, they interact with their surroundings and adapt to them, they mutate, they persist. They evolve to fill the empty niches of their local environments, which are, in this case the surrounding belief systems and cultures of their hosts, namely, us.

Indeed, sociobiologists like Dawkins make a plausible case that carbon-based life forms are information as well, that, as the chicken is an egg's way of making another egg, the entire biological spectacle is just the DNA molecule's means of copying out more information strings exactly like itself.

Information Replicates into the Cracks of Possibility.

Like DNA helices, ideas are relentless expansionists, always seeking new opportunities for Lebensraum. And, as in carbon-based nature, the more robust organisms are extremely adept at finding new places to live. Thus, just as the common housefly has insinuated itself into practically every ecosystem on the planet, so has the meme of "life after death" found a niche in most minds, or psycho-ecologies.

The more universally resonant an idea or image or song, the more minds it will enter and remain within. Trying to stop the spread of a really robust piece of information is about as easy as keeping killer bees south of the border.

Information Wants to Change.

If ideas and other interactive patterns of information are indeed life forms, they can be expected to evolve constantly into forms which will be more perfectly adapted to their surroundings. And, as we see, they are doing this all the time.

But for a long time, our static media, whether carvings in stone, ink on paper, or dye on celluloid, have strongly resisted the evolutionary impulse, exalting as a consequence the author's ability to determine the finished product. But, as in an oral tradition, digitized information has no "final cut."

Digital information, unconstrained by packaging, is a continuing process more like the metamorphosing tales of prehistory than anything that will fit in shrink-wrap. From the Neolithic to Gutenberg (monks aside), information was passed on, mouth to ear, changing with every retelling (or resinging). The stories which once shaped our sense of the world didn't have authoritative versions. They adapted to each culture in which they found themselves being told.

Because there was never a moment when the story was frozen in print, the so-called "moral" right of storytellers to own the tale was neither protected nor recognized. The story simply passed through each of them on its way to the next, where it would assume a different form. As we return to continuous information, we can expect the importance of authorship to diminish. Creative people may have to renew their acquaintance with humility.

But our system of copyright makes no accommodation whatever for expressions which don't become fixed at some point nor for cultural expressions which lack a specific author or inventor.

Jazz improvisations, stand-up comedy routines, mime performances, developing monologues, and unrecorded broadcast transmissions all lack the Constitutional requirement of fixation as a "writing." Without being fixed by a point of publication the liquid works of the future will all look more like these continuously adapting and changing forms and will therefore exist beyond the reach of copyright.

Copyright expert Pamela Samuelson tells of having attended a conference last year convened around the fact that Western countries may legally appropriate the music, designs, and biomedical lore of aboriginal

people without compensation to their tribes of origin since those tribes are not an "author" or "inventors."

But soon most information will be generated collaboratively by the cyber-tribal hunter-gatherers of cyberspace. Our arrogant legal dismissal of the rights of "primitives" will be soon return to haunt us.

Information Is Perishable.

With the exception of the rare classic, most information is like farm produce. Its quality degrades rapidly both over time and in distance from the source of production. But even here, value is highly subjective and conditional. Yesterday's papers are quite valuable to the historian. In fact, the older they are, the more valuable they become. On the other hand, a commodities broker might consider news of an event that occurred more than an hour ago to have lost any relevance.

III. INFORMATION IS A RELATIONSHIP

Meaning Has Value and Is Unique to Each Case.

In most cases, we assign value to information based on its meaningfulness. The place where information dwells, the holy moment where transmission becomes reception, is a region which has many shifting characteristics and flavors depending on the relationship of sender and receiver, the depth of their interactivity.

Each such relationship is unique. Even in cases where the sender is a broadcast medium, and no response is returned, the receiver is hardly passive. Receiving information is often as creative an act as generating it.

The value of what is sent depends entirely on the extent to which each individual receiver has the receptors - shared terminology, attention, interest, language, paradigm - necessary to render what is received meaningful.

Understanding is a critical element increasingly overlooked in the effort to turn information into a commodity. Data may be any set of facts, useful or not, intelligible or inscrutable, germane or irrelevant. Computers can crank out new data all night long without human help, and the results may be offered for sale as information. They may or may not actually be so. Only a human being can recognize the meaning that separates information from data.

In fact, information, in the economic sense of the word, consists of data which have been passed through a particular human mind and found meaningful within that mental context. One fella's information is all just data to someone else. If you're an anthropologist, my detailed charts of Tasaday kinship patterns might be critical information to you. If you're a banker from Hong Kong, they might barely seem to be data.

Familiarity Has More Value than Scarcity.

With physical goods, there is a direct correlation between scarcity and value. Gold is more valuable than wheat, even though you can't eat it. While this is not always the case, the situation with information is often

precisely the reverse. Most soft goods increase in value as they become more common. Familiarity is an important asset in the world of information. It may often be true that the best way to raise demand for your product is to give it away.

While this has not always worked with shareware, it could be argued that there is a connection between the extent to which commercial software is pirated and the amount which gets sold. Broadly pirated software, such as Lotus 1-2-3 or WordPerfect, becomes a standard and benefits from Law of Increasing Returns based on familiarity.

In regard to my own soft product, rock 'n' roll songs, there is no question that the band I write them for, the Grateful Dead, has increased its popularity enormously by giving them away. We have been letting people tape our concerts since the early seventies, but instead of reducing the demand for our product, we are now the largest concert draw in America, a fact that is at least in part attributable to the popularity generated by those tapes.

True, I don't get any royalties on the millions of copies of my songs which have been extracted from concerts, but I see no reason to complain. The fact is, no one but the Grateful Dead can perform a Grateful Dead song, so if you want the experience and not its thin projection, you have to buy a ticket from us. In other words, our intellectual property protection derives from our being the only real-time source of it.

Exclusivity Has Value.

The problem with a model that turns the physical scarcity/value ratio on its head is that sometimes the value of information is very much based on its scarcity. Exclusive possession of certain facts makes them more useful. If everyone knows about conditions which might drive a stock price up, the information is valueless.

But again, the critical factor is usually time. It doesn't matter if this kind of information eventually becomes ubiquitous. What matters is being among the first who possess it and act on it. While potent secrets usually don't stay secret, they may remain so long enough to advance the cause of their original holders.

Point of View and Authority Have Value.

In a world of floating realities and contradictory maps, rewards will accrue to those commentators whose maps seem to fit their territory snugly, based on their ability to yield predictable results for those who use them.

In aesthetic information, whether poetry or rock 'n' roll, people are willing to buy the new product of an artist, sight-unseen, based on their having been delivered a pleasurable experience by previous work.

Reality is an edit. People are willing to pay for the authority of those editors whose point of view seems to fit best. And again, point of view is an asset which cannot be stolen or duplicated. No one sees the world as Esther Dyson does, and the handsome fee she charges for her newsletter is actually payment for the privilege of looking at the world through her unique eyes.

Time Replaces Space.

In the physical world, value depends heavily on possession or proximity in space. One owns the material

that falls inside certain dimensional boundaries. The ability to act directly, exclusively, and as one wishes upon what falls inside those boundaries is the principal right of ownership. The relationship between value and scarcity is a limitation in space.

In the virtual world, proximity in time is a value determinant. An informational product is generally more valuable the closer purchaser can place themselves to the moment of its expression, a limitation in time. Many kinds of information degrade rapidly with either time or reproduction. Relevance fades as the territory they map changes. Noise is introduced and bandwidth lost with passage away from the point where the information is first produced.

Thus, listening to a Grateful Dead tape is hardly the same experience as attending a Grateful Dead concert. The closer one can get to the headwaters of an informational stream, the better one's chances of finding an accurate picture of reality in it. In an era of easy reproduction, the informational abstractions of popular experiences will propagate out from their source moments to reach anyone who's interested. But it's easy enough to restrict the real experience of the desirable event, whether knock-out punch or guitar lick, to those willing to pay for being there.

The Protection of Execution

In the hick town I come from, they don't give you much credit for just having ideas. You are judged by what you can make of them. As things continue to speed up, I think we see that execution is the best protection for those designs which become physical products. Or, as Steve Jobs once put it, "Real artists ship." The big winner is usually the one who gets to the market first (and with enough organizational force to keep the lead).

But, as we become fixated upon information commerce, many of us seem to think that originality alone is sufficient to convey value, deserving, with the right legal assurances, of a steady wage. In fact, the best way to protect intellectual property is to act on it. It's not enough to invent and patent; one has to innovate as well. Someone claims to have patented the microprocessor before Intel. Maybe so. If he'd actually started shipping microprocessors before Intel, his claim would seem far less spurious.

Information as Its Own Reward

It is now a commonplace to say that money is information. With the exception of Krugerrands, crumpled cab fare, and the contents of those suitcases that drug lords are reputed to carry, most of the money in the informatized world is in ones and zeros. The global money supply sloshes around the Net, as fluid as weather. It is also obvious, that information has become as fundamental to the creation of modern wealth as land and sunlight once were.

What is less obvious is the extent to which information is acquiring intrinsic value, not as a means to acquisition but as the object to be acquired. I suppose this has always been less explicitly the case. In politics and academia, potency and information have always been closely related.

However, as we increasingly buy information with money, we begin to see that buying information with other information is simple economic exchange without the necessity of converting the product into and out of currency. This is somewhat challenging for those who like clean accounting, since, information theory aside, informational exchange rates are too squishy to quantify to the decimal point.

Nevertheless, most of what a middle-class American purchases has little to do with survival. We buy beauty, prestige, experience, education, and all the obscure pleasures of owning. Many of these things can not only be expressed in nonmaterial terms, they can be acquired by nonmaterial means.

And then there are the inexplicable pleasures of information itself, the joys of learning, knowing, and teaching; the strange good feeling of information coming into and out of oneself. Playing with ideas is a recreation which people are willing to pay a lot for, given the market for books and elective seminars. We'd likely spend even more money for such pleasures if we didn't have so many opportunities to pay for ideas with other ideas. This explains much of the collective "volunteer" work which fills the archives, newsgroups, and databases of the Internet. Its denizens are not working for "nothing," as is widely believed. Rather they are getting paid in something besides money. It is an economy which consists almost entirely of information.

This may become the dominant form of human trade, and if we persist in modeling economics on a strictly monetary basis, we may be gravely misled.

Getting Paid in Cyberspace

How all the foregoing relates to solutions to the crisis in intellectual property is something I've barely started to wrap my mind around. It's fairly paradigm warping to look at information through fresh eyes - to see how very little it is like pig iron or pork bellies, and to imagine the tottering travesties of case law we will stack up if we go on legally treating it as though it were.

As I've said, I believe these towers of outmoded boilerplate will be a smoking heap sometime in the next decade, and we mind miners will have no choice but to cast our lot with new systems that work.

I'm not really so gloomy about our prospects as readers of this jeremiad so far might conclude. Solutions will emerge. Nature abhors a vacuum and so does commerce.

Indeed, one of the aspects of the electronic frontier which I have always found most appealing - and the reason Mitch Kapor and I used that phrase in naming our foundation - is the degree to which it resembles the 19th-century American West in its natural preference for social devices that emerge from its conditions rather than those that are imposed from the outside.

Until the West was fully settled and "civilized" in this century, order was established according to an unwritten Code of the West, which had the fluidity of common law rather than the rigidity of statutes. Ethics were more important than rules. Understandings were preferred over laws, which were, in any event, largely unenforceable.

I believe that law, as we understand it, was developed to protect the interests which arose in the two economic "waves" which Alvin Toffler accurately identified in *The Third Wave*. The First Wave was agriculturally based and required law to order ownership of the principal source of production, land. In the Second Wave, manufacturing became the economic mainspring, and the structure of modern law grew around the centralized institutions that needed protection for their reserves of capital, labor, and hardware.

Both of these economic systems required stability. Their laws were designed to resist change and to assure some equability of distribution within a fairly static social framework. The empty niches had to be constrained to preserve the predictability necessary to either land stewardship or capital formation.

In the Third Wave we have now entered, information to a large extent replaces land, capital, and hardware, and information is most at home in a much more fluid and adaptable environment. The Third Wave is likely to bring a fundamental shift in the purposes and methods of law which will affect far more than simply those statutes which govern intellectual property.

The "terrain" itself - the architecture of the Net - may come to serve many of the purposes which could only be maintained in the past by legal imposition. For example, it may be unnecessary to constitutionally assure freedom of expression in an environment which, in the words of my fellow EFF co-founder John Gilmore, "treats censorship as a malfunction" and reroutes proscribed ideas around it.

Similar natural balancing mechanisms may arise to smooth over the social discontinuities which previously required legal intercession to set right. On the Net, these differences are more likely to be spanned by a continuous spectrum that connects as much as it separates.

And, despite their fierce grip on the old legal structure, companies that trade in information are likely to find that their increasing inability to deal sensibly with technological issues will not be remedied in the courts, which won't be capable of producing verdicts predictable enough to be supportive of long-term enterprise. Every litigation will become like a game of Russian roulette, depending on the depth of the presiding judge's clue-impairment.

Uncodified or adaptive "law," while as "fast, loose, and out of control" as other emergent forms, is probably more likely to yield something like justice at this point. In fact, one can already see in development new practices to suit the conditions of virtual commerce. The life forms of information are evolving methods to protect their continued reproduction.

For example, while all the tiny print on a commercial diskette envelope punctiliously requires a great deal of those who would open it, few who read those provisos follow them to the letter. And yet, the software business remains a very healthy sector of the American economy.

Why is this? Because people seem to eventually buy the software they really use. Once a program becomes central to your work, you want the latest version of it, the best support, the actual manuals, all privileges attached to ownership. Such practical considerations will, in the absence of working law, become more and more important in getting paid for what might easily be obtained for nothing.

I do think that some software is being purchased in the service of ethics or the abstract awareness that the failure to buy it will result in its not being produced any longer, but I'm going to leave those motivators aside. While I believe that the failure of law will almost certainly result in a compensating re-emergence of ethics as the ordering template of society, this is a belief I don't have room to support here.

Instead, I think that, as in the case cited above, compensation for soft products will be driven primarily by practical considerations, all of them consistent with the true properties of digital information, where the value lies in it, and how it can be both manipulated and protected by technology.

While the conundrum remains a conundrum, I can begin to see the directions from which solutions may emerge, based in part on broadening those practical solutions which are already in practice.

Relationship and Its Tools

I believe one idea is central to understanding liquid commerce: Information economics, in the absence of objects, will be based more on relationship than possession.

One existing model for the future conveyance of intellectual property is real-time performance, a medium currently used only in theater, music, lectures, stand-up comedy, and pedagogy. I believe the concept of performance will expand to include most of the information economy, from multicasted soap operas to stock analysis. In these instances, commercial exchange will be more like ticket sales to a continuous show than the purchase of discrete bundles of that which is being shown.

The other existing, model, of course, is service. The entire professional class - doctors, lawyers, consultants, architects, and so on - are already being paid directly for their intellectual property. Who needs copyright when you're on a retainer?

In fact, until the late 18th century this model was applied to much of what is now copyrighted. Before the industrialization of creation, writers, composers, artists, and the like produced their products in the private service of patrons. Without objects to distribute in a mass market, creative people will return to a condition somewhat like this, except that they will serve many patrons, rather than one.

We can already see the emergence of companies which base their existence on supporting and enhancing the soft property they create rather than selling it by the shrink-wrapped piece or embedding it in widgets.

Trip Hawkins's new company for creating and licensing multimedia tools, 3DO, is an example of what I'm talking about. 3DO doesn't intend to produce any commercial software or consumer devices. Instead, it will act as a kind of private standards setting body, mediating among software and device creators who will be their licensees. It will provide a point of commonality for relationships between a broad spectrum of entities.

In any case, whether you think of yourself as a service provider or a performer, the future protection of your intellectual property will depend on your ability to control your relationship to the market - a relationship which will most likely live and grow over a period of time.

The value of that relationship will reside in the quality of performance, the uniqueness of your point of view, the validity of your expertise, its relevance to your market, and, underlying everything, the ability of that market to access your creative services swiftly, conveniently, and interactively.

Interaction and Protection

Direct interaction will provide a lot of intellectual property protection in the future, and, indeed, already has. No one knows how many software pirates have bought legitimate copies of a program after calling its publisher for technical support and offering some proof of purchase, but I would guess the number is very high.

The same kind of controls will be applicable to "question and answer" relationships between authorities (or artists) and those who seek their expertise. Newsletters, magazines, and books will be supplemented by the ability of their subscribers to ask direct questions of authors.

Interactivity will be a billable commodity even in the absence of authorship. As people move into the Net and increasingly get their information directly from its point of production, unfiltered by centralized media, they will attempt to develop the same interactive ability to probe reality that only experience has provided

them in the past. Live access to these distant "eyes and ears" will be much easier to cordon than access to static bundles of stored but easily reproducible information.

In most cases, control will be based on restricting access to the freshest, highest bandwidth information. It will be a matter of defining the ticket, the venue, the performer, and the identity of the ticket holder, definitions which I believe will take their forms from technology, not law. In most cases, the defining technology will be cryptography.

Crypto Bottling

Cryptography, as I've said perhaps too many times, is the "material" from which the walls, boundaries - and bottles - of cyberspace will be fashioned.

Of course there are problems with cryptography or any other purely technical method of property protection. It has always appeared to me that the more security you hide your goods behind, the more likely you are to turn your sanctuary into a target. Having come from a place where people leave their keys in their cars and don't even have keys to their houses, I remain convinced that the best obstacle to crime is a society with its ethics intact.

While I admit that this is not the kind of society most of us live in, I also believe that a social over reliance on protection by barricades rather than conscience will eventually wither the latter by turning intrusion and theft into a sport, rather than a crime. This is already occurring in the digital domain as is evident in the activities of computer crackers.

Furthermore, I would argue that initial efforts to protect digital copyright by copy protection contributed to the current condition in which most otherwise ethical computer users seem morally untroubled by their possession of pirated software.

Instead of cultivating among the newly computerized a sense of respect for the work of their fellows, early reliance on copy protection led to the subliminal notion that cracking into a software package somehow "earned" one the right to use it. Limited not by conscience but by technical skill, many soon felt free to do whatever they could get away with. This will continue to be a potential liability of the encryption of digitized commerce.

Furthermore, it's cautionary to remember that copy protection was rejected by the market in most areas. Many of the upcoming efforts to use cryptography-based protection schemes will probably suffer the same fate. People are not going to tolerate much that makes computers harder to use than they already are without any benefit to the user.

Nevertheless, encryption has already demonstrated a certain blunt utility. New subscriptions to various commercial satellite TV services skyrocketed recently after their deployment of more robust encryption of their feeds. This, despite a booming backwoods trade in black decoder chips, conducted by folks who'd look more at home running moonshine than cracking code.

Another obvious problem with encryption as a global solution is that once something has been unscrambled by a legitimate licensee, it may be available to massive reproduction.

In some instances, reproduction following decryption may not be a problem. Many soft products degrade

sharply in value with time. It may be that the only real interest in such products will be among those who have purchased the keys to immediacy.

Furthermore, as software becomes more modular and distribution moves online, it will begin to metamorphose in direct interaction with its user base. Discontinuous upgrades will smooth into a constant process of incremental improvement and adaptation, some of it manmade and some of it arising through genetic algorithms. Pirated copies of software may become too static to have much value to anyone.

Even in cases such as images, where the information is expected to remain fixed, the unencrypted file could still be interwoven with code which could continue to protect it by a wide variety of means.

In most of the schemes I can project, the file would be "alive" with permanently embedded software that could "sense" the surrounding conditions and interact with them. For example, it might contain code that could detect the process of duplication and cause it to self-destruct.

Other methods might give the file the ability to "phone home" through the Net to its original owner. The continued integrity of some files might require periodic "feeding" with digital cash from their host, which they would then relay back to their authors.

Of course files that possess the independent ability to communicate upstream sound uncomfortably like the Morris Internet Worm. "Live" files do have a certain viral quality. And serious privacy issues would arise if everyone's computer were packed with digital spies.

The point is that cryptography will enable protection technologies that will develop rapidly in the obsessive competition that has always existed between lock-makers and lock-breakers.

But cryptography will not be used simply for making locks. It is also at the heart of both digital signatures and the aforementioned digital cash, both of which I believe will be central to the future protection of intellectual property.

I believe that the generally acknowledged failure of the shareware model in software had less to do with dishonesty than with the simple inconvenience of paying for shareware. If the payment process can be automated, as digital cash and signature will make possible, I believe that soft product creators will reap a much higher return from the bread they cast upon the waters of cyberspace.

Moreover, they will be spared much of the overhead presently attached to the marketing, manufacture, sales, and distribution of information products, whether those products are computer programs, books, CDs, or motion pictures. This will reduce prices and further increase the likelihood of noncompulsory payment.

But of course there is a fundamental problem with a system that requires, through technology, payment for every access to a particular expression. It defeats the original Jeffersonian purpose of seeing that ideas were available to everyone regardless of their economic station. I am not comfortable with a model that will restrict inquiry to the wealthy.

An Economy of Verbs

The future forms and protections of intellectual property are densely obscured at this entrance to the Virtual Age. Nevertheless, I can make (or reiterate) a few flat statements that I earnestly believe won't look too silly

in 50 years.

- In the absence of the old containers, almost everything we think we know about intellectual property is wrong. We're going to have to unlearn it. We're going to have to look at information as though we'd never seen the stuff before.
- The protections that we will develop will rely far more on ethics and technology than on law.
- Encryption will be the technical basis for most intellectual property protection. (And should, for many reasons, be made more widely available.)
- The economy of the future will be based on relationship rather than possession. It will be continuous rather than sequential.
- And finally, in the years to come, most human exchange will be virtual rather than physical, consisting not of stuff but the stuff of which dreams are made. Our future business will be conducted in a world made more of verbs than nouns.

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