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Pamela Samuelson

Berkeley Law

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DIGITAL MEDIA AND THE CHANGING FACE OF INTELLECTUAL PROPERTY LAW*

PAMELA SAMUELSON**

INTRODUCTION

On the occasion of its twentieth anniversary, I salute the Rutgers Computer and Technology Law Journal for perceiving, before most of the rest of the culture, the vast potential of computers and related technologies to change profoundly how people would conduct their business and their lives, and as a consequence, how the face of the law would need to change to respond to the changes computers would bring about in a wide variety of social institutions.

Intellectual property law has been among the many legal constructs that have been severely taxed by advances in computing. Patent, copyright, and trade secret law have, for the past several

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** Professor of Law, University of Pittsburgh School of Law.
decades, been stretched beyond traditional bounds to accommodate the unusual nature of computer programs. Six years ago Congress took the unusual step of creating a new kind of intellectual property law for the design of semiconductor chips. Some say a new law of a similar sort is also needed for software. But there is also a growing recognition, among those who track developments in the field of electronic documentation, of the potential of digital media to change the face of intellectual property law.

By “digital media,” I mean intellectual products made available in digital electronic form, whether operational in computers or other machines capable of “reading” works in digital form. While most of my work has concerned intellectual property issues raised by computer programs, I have quite recently come to have an interest in the more general challenge posed by digital media for intellectual property law. In this essay, I will share this interest with you.

What distinguishes digital media are six characteristics that will make it difficult for existing categories of intellectual property law to adjust to the protection of works in digital form. They are: (1) the ease with which works in digital form can be replicated, (2) the ease with which they can be transmitted, (3) the ease with which they can be modified and manipulated, (4) the equivalence of works in digital form, (5) the compactness of works in digital form, and (6) the capacity they have for creating new methods of searching digital space and linking works together.

I. EASE OF REPLICATION

The characteristic of digital media that most apparently poses challenges for intellectual property law is the ease with which works in digital form can be replicated. Copyright was clearly a more useful legal right in a world in which the only ways to copy books (and many other kinds of copyrighted works) were either to own and operate a printing press or to hand-copy the work. Printing presses were expensive and bulky machines, requiring

considerable skill and expense to operate, whose use was only economic if multiple copies were made and able to be sold. Hand-copying was a time-consuming activity, useful in general only for making individual copies of the work, and even then generally producing an inferior copy as compared to a printed original. Hand-copying was not a significant economic threat to authors and publishers, and although “pirate” presses were an economic threat, copyright law provided a generally adequate legal weapon with which to fight such piracy in the world dominated by the print medium.

The technology of reprography has improved dramatically in the twentieth century. Among such innovations were the mimeograph machine, to begin with a now outmoded example, the photocopy machine, audio and video tape recorders, and more recently, computers and digital audio tape machines. As this technology has improved, it has become ever more difficult for copyright owners to exercise control over replication of their works and to obtain compensation for unauthorized replication. It has not only become more possible to make unauthorized copies, but it has become cheaper to do so. Newer reprography machines quite often are cheaper, less bulky, and more widely available than printing presses, and they often require less skill to operate. Copying by means of these new technologies has, as a consequence, become more difficult to trace.

Adding to the copyright owner’s problem in controlling the copying of his or her works is the apparently widespread public perception that making copies for personal or private use is lawful. This view was seemingly made respectable by the Supreme Court’s decision in the Sony Betamax case which ruled that making copies of copyrighted programs broadcast to the public, at least for time-shifting purposes, was a fair and non-infringing use of the work.²

While all of the improved reprography technologies pose

² Universal City Studios, Inc. v. Sony Corp. of America, 464 U.S. 417 (1984). The Sony decision says nothing whatever about the legal status of home copying for “librarying” purposes. However, a legal distinction between copying for time-shifting and copying for librarying purposes may be lost on the general public for whom the decision about which kind of copying to do is a matter of convenience and preference, not a moral or legal dilemma.
threats of this sort to copyright owners, what makes works in digital form so much more threatening is that the same technology one needs to use the digital work is the technology that can be used to make multiple copies of the work—and even more frighteningly, can be used to produce "perfect" copies.\(^3\) As it is sometimes put in the world of software engineering, selling computer programs (or for that matter, other works in digital form) is comparable to selling a customer the Ford automotive plant at the same time as selling him or her a Ford automobile. Each instance (or copy) of the program (or other work in digital form) has the potential to become its own factory.

While selling copies of a copyrighted work has long been the most common method of collecting the financial rewards for producing a commercially valuable work, with digital media, it is likely to become increasingly desirable to reap the financial rewards for creating intellectual products by charging for access to and use of digital works, and limiting rights to use and copy those intellectual products let out of the copyright owner's hands. Copyright law has traditionally not provided copyright owners with exclusive rights to control uses made of copies of their works. In time, however, copyright owners may seek more legal control over such uses. If works in digital form were not so readily copyable, copyright owners would probably have less interest in controlling access to and uses of their works. This is why I say that the farther one moves away from printing presses and the kind of control this medium permits over copying, the less useful is the traditional copyright paradigm.

II. EASE OF TRANSMISSION AND MULTIPLE USE

A second characteristic of digital media that seems to pose challenges for traditional intellectual property regimes is the ease with which works in digital form can be transmitted and used by multiple users. With printed books, distribution channels for getting books from the printer to outlets at which they can be sold to the public have been relatively easy for the copyright owner to

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\(^3\) By "perfect copies," I mean copies indistinguishable from an authorized original, and not degraded in quality, as often happens with other kinds of copying.
control. "Pirate" presses and distributors would stand a strong chance of getting caught, for there would inevitably be a public quality to their efforts. Any "pirate" copy, if it reached the hands of a consumer (let's assume one innocent of the fact that the copyright had been infringed), could still only be used by one person at a time. Even if given to a third party, a pirate copy would leave the possession of one consumer, and only be transferred to the next one. One consequence of this was that, while no copyright owner would be happy about the existence of pirate copies in the hands of consumers of the work, the copyright owner would still be content to focus his or her copyright enforcement efforts on shutting down the pirate presses and stopping distributors from selling the illegal copies. Indeed, copyright law does not give the copyright owner the right to seize pirate copies that have found their way into the hands of consumers.4

Concerns about what consumers will do with pirate copies are more serious when works are in digital form. When a single pirate copy can be put, not only in an isolated personal computer at a user's home, but loaded into a computer hooked up to a network of computers or a network of users of a larger computer system, each of whom can have ready and virtually simultaneous use of the same copy, copyright owners are understandably more concerned about controlling pirate copies. Early efforts to exercise such control in the computer software market, through "shrink-wrap licenses" and through technological means, such as copy-protect schemes, have met with mixed success. Copy-protect schemes have largely been abandoned as a result of market forces, for they interfered with legitimate uses of the software by consumers. Shrink-wrap licenses are widely ignored by consumers, and virtually all of the lawyers who have commented on the subject—except those who continue to write such licenses for software firms—seem to agree they are largely, if not completely,

4. The reason for this is that no exclusive right granted by the statute to the copyright owner would have been violated, at least not if the pirate copy was just used by the first consumer and not transferred to a second consumer. See 17 U.S.C. § 106 (1988) (exclusive rights provision). A transfer would violate the exclusive right of distribution, although it would be so difficult to trace as to be a technical violation, not a meaningfully enforceable act.
unenforceable. Export control laws, to the extent that they are
aimed at preventing unapproved distribution of computer
software and valuable information, are something of a joke in a
world in which one can make digital transmissions of protected
works to sources abroad through a variety of means.\(^5\)

Taken together, the ease of replication and ease of transmission
and multiple use, present copyright enforcement challenges of
the first order. To repeat with renewed emphasis, because of
these special characteristics of works in digital form, there will be
powerful incentives for the owners of rights in such works to at-
tempt to restrict access and use, and to derive revenue more from
uses than from sales of copies.

Those who operate computer systems have already developed
elaborate systems for restricting access, not only to the computer
system itself, but within the system, regulating, for example,
which groups of users have authorization to have access to which
parts of the system. In some plans being developed for yet-to-be-
implemented digital library systems, creators of works in digital
form are envisioned to have the power to identify and enforce
what "annuli" (rings of authorized user groups) will have what
access to the work, when, and under what conditions. Develop-
ments of this sort will either force copyright law to change rather
radically, or will leave it hanging out there as law of limited util-
ity, if not making it altogether obsolete. Patrolling consumer
uses of protected works has not been within the traditional realm
of copyright law, except in limited instances.\(^6\)

III. PLASTICITY OF DIGITAL MEDIA

The plasticity of digital media—the ability to easily modify
and manipulate works in digital form—is a characteristic which
will also pose some difficult challenges for copyright law. Eliza-
beth Eisenstein has chronicled a wide array of social and cultural

\(^5\) Computer network mail messages, microwave radio transmissions, fac-
simile hookups, are among the many such means.

\(^6\) A public performance of a copyrighted dramatic play is a kind of use of
the work, which can infringe the copyright because public performance—not
use in general—is an exclusive right of copyright. See 17 U.S.C. § 106(4)
(1988).
changes brought about by the textual "fixity" that the printed medium made possible. Before the advent of printing, written works were relatively few in number, hard to get a hold of, and tedious to copy. Because copyists of an unprinted text might amend the text in various ways (adding new commentary, changing the earlier author’s wording, deleting what was not of use to him) as they copied it, it was sometimes difficult to know what the “official” version of a text was. Although each “copy” of such a work would be “fixed” in the sense that it existed in a tangible form, the problem was that each copy might be somewhat different from every other. With printed works, all of the extant copies of a work (at least for a particular edition of it) would be, and would stay, the same. The additional “fixity” that came from the printed form of a work had some very important consequences, among them that the copyright owner had no reason to fear what the owner of a copy of his or her work might do with that copy—apart from making additional exact copies of it or preparing a second work which made substantial use of protected expression from the first work.

As beneficial as were many of the consequences of the fixed nature of printed works, not all the consequences of fixation were benign, for printed works are, at least for some users and for some uses, in a sense, too fixed. That is, the texts can’t easily be modified (an error corrected, an afterthought added) or updated (a new development reported on), and they look messy if one hand-corrects them. In time, there might be enough changes needed to cause a publisher to want to issue a new edition, but the second printed edition would, in time, also suffer from the same infirmity of being too fixed as the last edition had.

How wonderful, then, is the prospect given to us by works in digital form: to be able to correct errors, add commentary, alter it, delete what we do not want, update information, and so on, thereby overcoming one of the major disadvantages of the print medium. In addition, one can often make such changes without anyone being able to tell, short of a byte by byte comparison of

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the two texts in digital form, that the changes have been made. This too overcomes a defect of the printed medium.

And yet, the plasticity of digital media is not an unmixed blessing. For the copyright owner now has more reason to be concerned about what an individual user might do with his or her copy of the work. What if the user now customizes it and resells it to someone else? What if the user changes it in such a way that misrepresents what the author meant to say? With computer programs, suppose the user modifies it to correct one error, but in the process of making such a correction, inadvertently changes the software in such a way to endanger life or property (e.g., software for operating a nuclear power plant), thereby affecting the vendor's potential warranty liability.

Digital sampling techniques now allow someone to "chop" a sound recording up into "sound bites" that can be re-mixed and even combined with sound bites from other recordings to produce a new recording which is not recognizable as derived from the original recordings. Photographs can be digitally manipulated to add what was not there or to take out what was or to combine photographic elements from many different works. Computer programs can, by being processed through sophisticated re-engineering software or new compilers, be transmuted into unrecognizable forms. And these are only a few examples of what is characteristic of all works in digital form: they are all inherently plastic.

U.S. copyright law does give copyright owners the right to control the making of derivative works. And the term derivative work is defined in the statute in quite a broad fashion ("any work . . . based upon a preexisting work . . ."). Thus, the copyright statute would seem to provide some authority for exercising control over what users can do to transform the copies they might have of a copyrighted work in digital form. And yet, much of what a copyright owner might want to control through the reach


of the derivative work right is really outside the realm of interests that the U.S. Congress has traditionally meant for copyright to protect.

U.S. copyright law, for example, has traditionally not protected authors from misrepresentations or liability for physical harms resulting from changes in the text of a copyrighted work. Other countries which, within the body of their copyright laws, protect the "moral rights" of authors might provide a remedy for misrepresentations, but not even they would reach the physical harm problem. In general, one who buys a copy of a copyrighted work, re-formats it in some way, and re-markets it, has been free to do so, for the "first sale rule" of copyright law has traditionally given owners of copies of protected works the right to exercise their personal property rights in the work so long as they have "tithed" to the copyright owner upon the "first sale" of the copy to the public through the price they paid for the copy.\(^1\)

Generally speaking, the copyright case law thus far also seems to give a more restrictive interpretation to the derivative work right than the statutory language might suggest, seeming, by and large, to require that a second work must have copied protected expression from the first one to be an infringing derivative.\(^1\) If a recognizable copy of a protected work is required to infringe the copyright, then digital sampling may not be infringement.

While there is nothing to forbid copyright law from taking on other functions besides protection against unauthorized copying of protected expression, such a change will alter copyright law considerably. Congress and the courts should also be wary of shaping or interpreting copyright law so strictly that they force consumers of copyrighted works to forego the significant benefits for them of the plasticity of the digital medium. Some balance needs to be found between the interests of copyright owners in controlling modifications to their works and the interests of consumers (and perhaps even competitors) in being able to make use

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IV. EQUIVALENCE OF WORKS IN DIGITAL FORM

A fourth characteristic of works in digital form is what I will call the equivalence of works in that medium. It has been characteristic of copyright law to make distinctions among different kinds of copyrighted works and to treat each kind of copyrighted work somewhat differently. For example, some kinds of works do not have the same sets of exclusive rights as do other works; certain privileges to copy or make certain uses of copyrighted works are available to certain classes of copyrighted works, but not to others.

While there are some historical and public policy reasons for making such distinctions among different classes of works, an important set of reasons for these distinctions is because of the differences in the media by which different works have traditionally been made available to the public, as well as the technologies by which the different media are created and the distribution channels by which different media are disseminated to their respective publics. Books, the quintessential work of the print media, are made by printing presses, bound, and sold largely in bookstores. Paintings, sculpture, and photography are quite different media from books, and tend to be produced and distributed in quite a different manner as well. Phonograph records and compact disks, although somewhat different in terms of the technologies by which they are produced and certain of their characteristics, are nonetheless quite similar media in that they are mechanically impressed with encoded information which, when "played" on a

12. Before turning to the next characteristic of digital media with implications for intellectual property law, it is worth noting that the plasticity of digital media will create a wide variety of other legal problems besides those affecting intellectual property, chief among them problems of authentication. In a world in which undetectable digital "touch-ups" of photographic images can be done, of what evidentiary value is a photograph? Forbes magazine recently featured a story on "desktop forgery." Churbuck, Desktop Forgery, FORBES, Nov. 27, 1989, at 246. Patent lawyers and software designers feud continually over the patent lawyers' insistence that software designers keep handwritten notebooks of their design work because of the evidentiary value of dated logbooks over digital records which are so readily manipulable. And these, again, are only a few of the legal issues raised by the plasticity of digital media.
machine, are able to bring musical performances into one's home. While motion pictures also require a machine to be revealed, they are significantly different as a medium from sound recordings. They have in common with sound recordings and audiovisual works that they are often broadcast by radio waves, yet another medium whose differences from the printed medium were chronicled by Marshall McLuhan, among others. Floppy disks are yet another medium, produced and distributed in quite a different way than other works, and so on. The point of this listing is that copyright has traditionally conceptualized each thing as being only what it is, and not another thing.

This is not to say that copyright has no experience dealing with mixtures of different kinds of works or with "multi-media" works. To take a common example, although music is one category of work, a poem another, and a sound recording yet another, the law has come to an accommodation in dealing with what happens if the three are combined. The music and the poem (i.e., the lyrics), if written to go together, are classified together as a musical work. The sound recording, however, is treated separately. Although some works can be made available in different media (music can be written on paper, sung on stage, or recorded in plastic), there is some recognized equivalence among these different manifestations of the works, but differences in the media by which they are generally made available nonetheless make the works seem somewhat differentiated from one another.

Any work that can be represented in other media can now be represented in digital form. In this form it can be used to operate a computer or other data processing unit, whether to be displayed or heard, or to perform some other function. This would seem to mean that once in digital form, works protected by copyright are going to become less and less differentiated by type and more and more equivalent to one another because they will now all be in the same medium. This equivalence of works in digital form will make it easier and easier to combine what have been thought of as separate categories of works to create a work difficult to classify. (What is an interactive annual report for a company? A literary work? A computer program? An audiovisual
work?) As a consequence, the elaborate distinctions made among different kinds of works, especially in the sections of the copyright statute dealing with privileges to make what would otherwise be unauthorized uses of copyrighted works, will lose much of the meaningfulness that they have had when media were more differentiated.

Even more important than this are the consequences of the blurring of what was once a firm distinction between data and writings, on the one hand, and machines, on the other hand. Computer programs have made the distinction between writings and machines, and between data and machines more difficult to draw. Because of the mechanized character of computer programs, patents are now issuing for methods of representing, organizing, and manipulating data in computer programs. One of the most profound consequences of this is the new entry of patents into an arena in which copyright was once the sole form of intellectual property protection. If a patent issues on a method of organizing data in a computerized data base, does a copyright in the data base also cover this method as a structural abstraction of the data base program, or does the copyright provision excluding “methods” from the scope of copyright protection apply to exclude this aspect of the program from the reach of copyright? However this question is resolved, the resolution will change the face of intellectual property law, for the overlap of copyright law and utility patent law is a new phenomenon.

V. COMPACTNESS OF WORKS IN DIGITAL FORM

Compactness is a fifth characteristic of digital media which I regard as having the potential to create new kinds of intellectual property law questions. Works stored in digital form are essentially an invisible string of stored electrical voltages (the high voltage corresponding to an encoded “1,” the low to “0,” which are binary representations of the individual elements of the work, whether they be letters or numbers or a point on a bit map). By comparison with books and other traditional media, works in digital media do not take up much space.

Among the consequences of this is that works in digital form are inherently easier to steal. IBM has just recently announced
that it has successfully stored a gigabit (a billion bits) of data on a one-inch square magnetic disk. Had this same billion bits of data been typed in double-spaced format, the stack of paper would be three stories tall. There is simply no comparison in the ease with which a square inch disk can be misappropriated and the ease of stealing a three story tall pile of paper. This is yet another reason why distributors of intellectual property will have more interest in controlling access to and uses of protected works in digital form than as to traditional works.

The compactness of digital data will also allow new assemblages of materials that in a print world would be unthinkable. Not only whole encyclopedias (which in a print world would be too bulky to be a single transportable work), but also whole specialized libraries (which have not traditionally been conceived of as themselves being separately protectable compilations of material) are already available on a compact disc. It is becoming commonplace for firms to store all their records on one or more central computers. While we are used to thinking of a firm’s records as containing confidential information and perhaps also trade secrets, we are not used to thinking of the firm’s records as a copyrightable compilation of materials. In the world of print, the same records would not be thought of as a protectable compilation, nor would a library. But where the compactness of digital media makes it possible to put company records, whole libraries, and the like in one compact form, some new kinds of intellectual property law problems seem likely to result from these new protectable assemblages.

Another consequence of compactness is that this very quality of digital works makes it increasingly difficult to get anything more than a small glimpse at the contents of these works at any one time, for the whole is virtually invisible to the user by reason of its storage in electronic form. While it is true that with printed works, it is difficult, at least using one copy, to view more than one page of a book at a time, still the very heft of the tome makes printed works have a visibility that digital works do not have. With printed works, because of their visible character and bulk, there are no significant constraints on one’s ability to move from one page to another deep within the text, and to browse through
the book at whatever pace and in whatever manner one chooses. With works in digital form, users of the work will tend to become much more dependent on user interface systems which will serve as a "porthole" through which to sight the contents of the compact, but nonetheless oceanic, text of the digital work. Unless one can design one’s own specialized portholes for viewing the encoded contents of the work, one’s ability to access its contents will be constrained by how well or poorly the generalized user interfaces are made available to users.

So, while compactness is a virtue for users because it takes up less space than paper, the tradeoff for users may be in their greater dependence on user interface systems which will not always have been designed with that particular user’s needs in mind. Those who already use computing systems to do everyday tasks, such as word processing, will have had enough experience with how frustrating it can be to have to deal with a user interface that isn’t user friendly, to understand how critically important user interfaces will be as access systems in a world dependent on digital libraries and other extensive collections of digital data.

VI. NEW SEARCH AND LINK CAPACITIES

A sixth characteristic of digital media that seems likely to change the face of intellectual property law is the capacity digital media creates for new methods of searching texts and for linking texts together. In the print world, we have come to take for granted the ways in which we can search through books and make links from one text to another. We are used to the idea that books have tables of contents, indexes, bibliographies, chapters, page numbers, sections and subsections, and other such elements. We are used to using many kinds of standard devices, such as headings, subheadings, and bold face type, to make our way through books. We underline texts we think we might want to find again later or remember. We turn down page corners or insert bookmarks when we want to hold our place in a printed text. And if we fail to do either of these things, we nonetheless remember approximately how far into the book the passage for which we search might be located, whether on the left or right
hand page, whether at the top or bottom of the page, and so forth.

We are also used to the convention of footnotes by which one author links his or her text to other parts of the same text or to other texts and other sources. Bibliographies are another device which create the potential to link texts together. We copy down the citations for the additional source materials we think we may want to search at a later time, and because of the footnote convention, we usually know where in another text we are likely to find the thing we want. We gnash our teeth or curse if all we get from an author is a general reference to the whole text, and not just the part we want. We think the author a knave or a fool if he or she gives us a reference to another work that is not a correct reference. After navigating through a set of texts, we may feel our research is complete (or complete enough) and we may write our own text which itself may reflect a set of linkages within itself and to the works through which we searched. While much more could be (and has been) said about the devices by which we search through texts and link them together, this describes some of the basic characteristics of searches and links in the world of printed works.

What happens when one converts printed text to electronic form? For one thing, one loses the ability to make use of some of the search techniques of the printed form. Suddenly page numbers aren't very useful any more, unless they are artificially added back in to aid the reader by signaling where the same part of the text is to be found in the printed form of the work. It won't help someone, now looking through an electronic version of the work for a particular passage, once seen in the printed version, to recall that in the book the passage was in the upper right-hand corner on the left side of the page. One cannot browse through a book in digital form the way one can browse through a printed book. And yet, there are things one can do with digital versions of text that are, as a practical matter, very difficult or impossible in printed form (e.g., finding in the text of a very long deposition every single instance in which the witness mentioned ABC Electronics).
Depending on how well one designs the conversion of an existing printed text to hypertext (an electronic form of the work with built-in "links" and search capacities), much more than just "Boolean" searches of this sort (i.e., finding every instance of a string of digital text) can be created. Parts of the text can be linked to other parts of the text, so that one can, with the "click" of a mouse, bring up on the screen a related entry or even text from a related but separate document. One can create a kind of bookmark trail through the digital text by examining different aspects of it, one by one, and can navigate back and forth at the bookmark stops. Again, depending on the design of the work, one may even be able to save one's bookmark trail, so that one can come back and re-traverse the same trail at a later time, and perhaps extend it.

If it is designed to be a multiple user hypertext system, one may not only be able to blaze one's own trail through the text, one may also be able to follow trails blazed by others. If the digital space one searches contains more than one document, the ability to move from one document to another with only a click of the mouse provides a tremendous advantage that is unavailable in printed works. One group involved in the design of digital libraries envisions the creation of "knowbots" to navigate digital spaces. The knowbot would be your very own personal librarian to gather all the stuff you need and bring it back to you, maybe even give you a synopsis of what it finds.

There are a host of new intellectual property law questions raised by the new capacity for searches and linking of works in digital form. Some of them are copyright questions; some are patent questions. Because of the fact that works in digital form are processed by machine, there seems to be room for patents on search and linking techniques that, applied to works in printed form, would unquestionably not be patentable.

13. The Corporation for National Research Initiatives (NRI) is among the groups at work designing digital library systems. "Knowbots" is NRI's name for the artificial intelligence programs they envision to be designed to take a request to retrieve information of a particular sort and make a search through the digital library to make an intelligent search for what the requester really seeks. See, e.g., Richards, The Data Deluge: Exotic Electronic Systems May Hold Key to Future Access, Washington Post, Sept. 24, 1989, at H1.
An example might be a method of organizing an index for a text. Patent law has long had a rule that "printed matter" (such as a new method of organizing a train schedule), although technically a manufactured product, is not the sort of thing that patent law (a law chiefly aimed at protecting technological innovations) was intended to protect. Under this rule, methods for organizing indexes in printed works would not be protectable. Yet the very same method, when put in digital (and therefore into machine-executable) form may suddenly be patentable, as may be such things as methods of footnoting, methods of linking parts of text together, methods of representing symbolically how one can search the text, and methods of displaying information on a computer screen.

Among the many copyright questions raised by hypertext forms of works is whether creating a search trail through the digital text is itself a protectable work of authorship, particularly when one does it within the confines of the copy of the hypertext system copyrighted by somebody else. Another is whether it is an infringing derivative work to create a program that links a variety of texts and parts of texts together such that the user of the program can jump from one related part to another but without there being a new, and potentially infringing, copy made of any of these texts. While in the print world a bibliographer might compile a list others might want to search for materials on a particular topic, and this compilation might be copyrighted when printed in some journal, it has not been thought to be a copyright infringement for a reader of the bibliography to traverse the search path set forth by the bibliographer. Yet especially for works in digital form, creating links within texts and among texts may be a kind of intellectual work for which some recompense is appropriate, and copyright law may need to consider taking such links into the fold of protectable expression. To the extent hypertext allows us to extract the "right" pieces of information in a timely and economical fashion from a tremendous volume of data, some value is created, but who owns it: the person who initiated the search request or the person who made it

possible to make the search by designing a good hypertext system?

**CONCLUSION**

Any one of the six characteristics of digital media mentioned in this essay would be enough to cause some disruption and adjustment in the doctrines of the existing intellectual property systems. But the six of them in combination seem to me likely to change the face of intellectual property law as we know it. Probably the old legal forms, copyright and patent, will continue to exist and be called by their old names. There will undoubtedly be some significant family resemblances between the old legal forms and the new ones we will create to deal with digital media. But the law of intellectual property will look different after coming to terms with digital media. And not everybody is going to like the facelift, however it comes out.