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AN ASPECT OF COPYRIGHT IN DATA BASES

Colin Tapper*

Despite the burgeoning flood of conferences, courses, and monographs on the subject of the law relating to computers, it simply has little more than creased the fabric of the law and perhaps strained a few of the seams. Fundamental tailoring seems to be required in just one more place. This is the law of intellectual property. It is an especially vulnerable area mainly because it has not acquired its strength from the interweaving of common law strands, but rather from a series of statutory patches. This part of the law first developed largely as a response to the new technologies of printing and manufacturing that were transforming the intellectual and economic landscape of the expanding western world. Even at that time it was far from clear that the adaptation of notions traditionally associated with land and "things" was ideally suited for application to writing and ideas. It was found, for example, that the new statutory institutions and the remedies they provided needed some support from common-law concepts, such as those of confidence and unfair competition. In modern times, the area is characterized as being divided somewhat uneasily between the three major plots of patent, copyright, and unfair competition. In the United States, the situation was further complicated by the split between the predominantly state law of unfair competition and the federal law of patent and copyright, leading to the invocation of the preemption doctrine to smooth out any friction. The lines of demarcation have never been completely clear. In one old English case, for example, a competitor copied the scale attached to a

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2. Davis v. Comitte, [1885] 54 LJ Ch 419.
popular barometer. It is hard, on such facts, to eliminate patent, copyright, or unfair competition law as a source of possible remedy. It is precisely at this weak point of intersection between different concepts that computers make their impact.

At first, attention was largely focused upon the capacity of any of these areas to cater for computer programs. It was frequently held, remarkably often by the Supreme Court,\(^3\) that particular computer programs were not patentable subject matter, but it is now recognized that no rule of automatic exclusion applies to these programs and that more complex analysis must be applied.\(^4\) Similarly, in the context of copyright the view was once canvassed that, in machine-readable form at least, computer programs were not writings,\(^5\) but this has been overtaken by explicit statutory amendment.\(^6\) It is only recently that the spotlight has shifted to the much more intractable problem of what is to count as an infringement of patent or copyright in this context. The reason that this is such an intractable problem is that patent protects specific means and processes for achieving a given end and copyright protects particular forms of expression of ideas. Neither protects the end or the idea as such, yet in the case of computer programs, the argument centers upon the question of whether the program is best understood, described, and treated as means or end, form, or idea. The problem arises because the computer is a very versatile device, capable of achieving similar results in a multitude of different ways, and by means of steps capable of dissection at numerous different levels. This prevents the easy ascription of any form of canonical definition or level of abstraction to the function of any given program. As will become apparent, the unresolved character of these questions, and the interaction with them of the law of unfair competition, complicates the superficially unrelated area of intellectual property in computer-readable data bases.

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Relatively little attention has hitherto been bestowed upon the particular problems of computer-readable data bases, despite their increasing importance in commercial life. In general, the situation is that a data base is compiled by its owner either from noncopyright material or from copyright material. In the latter case, assuming that he falls outside fair-use exemptions and that he is using material in which the copyright is owned by a third-party, he will pay a royalty for the use he makes of such information to the extent to which he copies it. He will then either make the data base available through his own facilities, in which case the conditions of use will be governed by a contract with the end-users, or he will make it available through a retailer, in which case there will be two contracts, one between the owner and the retailer and another between the retailer and the customer. There may be further complications to the extent that equipment is owned by other parties, or publicly owned facilities are used, or if there are sublicenses, which will often be the case where the data base is to be made available on an international basis. While this scenario may be complicated in practice, it does not in itself pose any deep conceptual problems. These emerge only when a party outside the contractual chain seeks to duplicate the data base so as to compete with the original supplier. Even then, there seems little problem to the extent that the data base being duplicated consists of copyright material. The real problem is with the situation in which the apparently noncopyrightable portions of a data base are copied. This situation has recently come before the federal courts in litigation between the West Publishing Company, the publishers of various law reports, and Mead Data Central, the proprietors of a computer-readable data base of legal materials. The progress and implications of this litigation, which is probably still in its early stages, may not only clarify the application of the relevant rules of intellectual property as they apply to computer-readable data bases, but still more significantly may reveal current trends, movement, and conceptual difficulty in those rules themselves. This article will address both issues.

7. More than 2,500 different data bases are currently publicly available in the United Kingdom.
8. Often referred to as a "spinner."
I. West Publishing Company v. Mead Data Central Inc.\(^9\)

This dispute was precipitated by Mead's announcement in advance of the 1985 meetings of the American Bar Association and American Association of Law Libraries of a "star-pagination" feature on its LEXIS data base.\(^{10}\) This feature was designed to interpolate into the screen display of the relevant case reports, references to the points at which there was a change in the page numbering in the most frequently used hard-copy versions of the cases. This reference to the hard-copy pagination was also to be displayed in the running header to the screen, and to be independently searchable, but for browsing purposes only.\(^{11}\) The inclusion of such a feature makes it easier to use a computer-readable data base. It gives a much better sense of the structure of a lengthy article, such as the report of a case; it permits orientation during the browsing process; and it enables more efficient cross-reference to the hard-copy version, which is particularly important in the courtroom situation. Indeed it has been found to be advantageous even in the wholly hard-copy context where one series of reports seeks to incorporate cross-reference to other series. Such cross-referencing has been common both in the United States and in the United Kingdom for more than a century.\(^{12}\) It is still used by a number of lawbook series, including several published by the West Publishing Company.

The initial Mead announcement referred to federal cases as being the first scheduled for star-pagination, with state law cases following in their wake. In such reports, except for decisions of the Supreme Court, the pagination would clearly refer to the volumes of the various federal series published by the West Publishing Company. Although it is settled law in the United States that copyright cannot subsist in the opinions handed down by the judges,\(^{13}\) West nevertheless claims,\(^{14}\) and receives,

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11. This means that while such interpolated page numbers cannot be used as primary search parameters, they can be used to move about within a case once it has been retrieved by the use of other searchable elements.
12. It was, for example, used in volume 1 of Curtis's American Reports published in Boston in 1854.
13. "[N]o reporter has or can have any copyright in the written opinions delivered by this court and ... the judges cannot confer on any reporter such rights." Wheaton v.
registration as copyright owner of the various volumes of reports that it publishes. Its standard form excludes from its claim "any part of the original work prepared by a United States Government officer or employee as part of that person's official duties." West describes its additional material in the claim as a "[c]ompilation of previously published case reports including but not limited to opinions, synopses, syllabi or case law paragraphs, key number classifications, tables and index digest with revisions and additions." It may be noted that there is no explicit reference to pagination or to arrangement. Upon learning of Mead's intentions to include star-pagination on LEXIS, West moved for an injunction pursuant to a writ alleging infringement of copyright, false representation, various deceptive practices, misrepresentation, misappropriation, and unfair competition. In its complaint, West added to the material described as its original work in its regular applications for registration of copyright "arrangements of reports and the numbering and paging of volumes." It further claimed that "[t]he page numbers contained in each volume of West's National Reporter System publications are a material and substantial portion thereof," and alleged that "MDC's intended use of West's page numbers will constitute copyright infringement in violation of the copyright laws of the United States." It is significant that, in the principal affidavit in support of its claim, West concentrated on explaining the way in which it ordered the cases reported within each volume.

In its defense, Mead argued, inter alia, that West's complaint failed to disclose any valid cause of action; that West had dedicated its arrangement and pagination to the public by encouraging citation by series, volume number, and page; that the inclusion of page numbers was fair use; that by accepting MDC's use of the first page number of a case as part of the standard


14. Sometimes describing the claim as for the entire work and sometimes as for compilation in the section of the form referring to the nature of authorship.

15. There is some variation from this terminology in the case of some claims, but the above, which related to 599 Federal Supplement, seems to be the most extensive in detail.

16. Limited to the claim for breach of copyright.

17. The scheme requires series, volume, and pagination to remain constant in both advance sheet and bound volume format.
West citation, West had acquiesced in the use of page numbers; and that volume and page numbers were no more than functional symbols.

In the course of the hearing before the district court, it became apparent that the West case was based not on infringement of the page numbering scheme itself, but on its being an expression of the arrangement of West material. This can be understood at four different levels. It might refer 1) to the arrangement of material within a given report, 2) to the arrangement of reports within a given volume, 3) to the arrangement of volumes within a given series, or 4) to the arrangement of series within a given collection or system. In argument, although some indiscriminate attention was paid to the first three of these, when it came to encapsulate the notion of arrangement, it was expressed in terms of finding a particular decision within the whole West arrangement.18 This argument was accepted by the district court, which held somewhat vaguely that:

The West Publishing Company's arrangement is a significant work of skill and enterprise which is itself entitled to copyright protection;
Use of the second and succeeding numbers following the initial citation to West's arrangement, the so-called jump cite ... infringes on West's copyright;
Once one has the jump cite, one has access to the copyright-protected overall arrangement; and
West has made an adequate showing ... that its National Reporter System publications constitute a copyright arrangement of which the numbering and pagination of its volumes are a part.19

On this basis, it enjoined Mead from "displaying, referencing or including the page numbers within plaintiff's National Reporter System ... within or in relation to the text of court opinions contained in the LEXIS data base."20

18. See transcript of proceedings at page A204 where West's counsel said: "The important thing about this arrangement is that you have to be able to find, in the West arrangement, where the case is. That is what this means. Here you have this huge arrangement. Where is the case in this arrangement? That is the important information that this (indicating [apparently a standard form of citation]) gives us. It does not give anything else. It gives us the location of the case in the arrangement."
20. A literal reading would prevent Mead's use even of the first page number as part of the standard citation of a report although West has always acquiesced in such use. Such a consequence was averted by a specific proviso, as was MDC's entitlement to employ star-pagination for its own internal purposes.
Mead appealed against this preliminary injunction, essentially upon the same basis as in its initial defense, namely that West had no copyright in its arrangement; that if it did, the use of page numbers did not infringe it; that the conditions for issuing a preliminary injunction had not been met; and that the injunction was contrary to public interest. West's response did, however, disclose a considerable shift of emphasis. Although limited in terms to the claim for breach of copyright, much more attention was placed upon the commercial implications for West of Mead's plans, and not only within the context of the likelihood of irreparable harm, which was required to be shown to justify preliminary relief by way of injunction. Much more was made of Mead's alleged "commercial theft" of West's arrangement and "wholesale appropriation" of West's pagination for a "directly competitive, commercial purpose." The concept of an "arrangement" was also somewhat clarified, with the emphasis shifting slightly from the arrangement of cases within a given volume to the arrangement of material within a given case. Two questions that remain to be considered, therefore, are whether West can claim copyright in its pagination or arrangement, and if so, whether Mead's use of star-pagination can amount to an infringement of it. These will be considered separately.

A. Availability of protection

The majority opinion of the federal court of appeals reflected these shifts of emphasis and departed in some respects from the reasoning in the district court below. It seemed to have moved further toward concern with the arrangement of cases within a given volume for the purpose of invoking the protection for compilations explicitly afforded by the Copyright Act of 1976. Section 103 of the Act extends copyright protection to compilations as follows:

(a) The subject matter of copyright as specified by section 102 includes compilations and derivative works, but protection for a work employing pre-existing material in which copyright subsists

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21. To succeed in an application for a preliminary injunction in the Eighth Circuit, the movant must show a probability of ultimate success on the merits, irreparable harm to himself unless the injunction is issued, absence of substantial harm to his opponent if it is issued, and that the relief is not contrary to public policy. Dataphase Systems Inc. v. C.L. Systems Inc., 640 F.2d 109, 114 (8th Cir. 1981)(en banc).
does not extend to any part of the work in which such material has been used unlawfully.

(b) The copyright in a compilation or derivative work extends only to the material contributed by the author of such work, as distinguished from the preexisting material employed in the work, and does not imply any exclusive right in the preexisting material. The copyright in such work is independent of, and does not affect or enlarge the scope, duration, ownership, or subsistence of, any copyright in the preexisting material.22

This specific provision for compilations applies the definition of a compilation to be found in section 101,

A "compilation" is a work formed by the collection and assembling of preexisting materials or of data that are selected, co-ordinated or arranged in such a way that the resulting work as a whole constitutes an original work of authorship. The term "compilation" includes collective works.23

Applying these concepts, the majority concurred with the conclusion of the district court that

West's arrangement is a copyrightable aspect of its compilation of cases, that the pagination of West's volumes reflects and expresses West's arrangement and that Mead Data Central's intended use of West's page numbers infringes West's copyright in the arrangement.24

This conclusion seems to concentrate upon the arrangement of pages within a given volume of cases, such a volume being a compilation within the meaning of the Copyright Act, and its arrangement and pagination being the original work of its author, West. The concentration upon the arrangement of a particular volume is further disclosed by the fact that, in its discussion, the majority concentrated exclusively on cases that had considered the arrangement of individual volumes, some of which will be discussed below. This approach is, indeed, mandated by the very structure of copyright law, which protects only registered works. West registered individual volumes and not the National Reporter System as a giant compilation.25 The point is, however, obfuscated a little

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24. 799 F.2d at 1223.
25. As contrasted with the registration of a multipart work, all parts of which may be covered by one registration.
later when the majority, seeking to find evidence of the expend-
iture of intellectual labor in making the compilation, relied heavily
upon West’s efforts to divide cases into different series. Then in
its final encapsulation of this part of the argument, the majority
asserted that, despite the emphasis in West’s original claim,

protection for the numbers is not sought for its own sake. It is
sought, rather, because access to these particular numbers, the
“jump cites”, would give uses of LEXIS a large part of what West
has spent so much labor and industry in compiling, and would pro-
tanto reduce anyone’s need to buy West’s books. The key to this
case, then, is not whether numbers are copyrightable, but whether
the copyright on the books as a whole is infringed by the unauthor-
ized appropriation of these particular numbers.\textsuperscript{26}

Two important points emerge. First, the court is openly taking
into account the motives for the appropriation of West’s efforts,
which might be thought more appropriate to counts of unfair
competition, a topic discussed in more detail later in this article.
Second, the reference is to “books” in the plural and not in the
singular. Given the concentration throughout, in the argument
by West in the court below, in the opinion of the District Court,
and in the brief for West as appellee,\textsuperscript{27} it seems that here the
arrangement sought to be protected does extend beyond that of
the material in a given volume. This seems inappropriate, how-
ever, in a situation where the National Reporter System had never
been treated as a copyright compilation by West. Nevertheless,
it might be argued that even within the context of a given volume,
the selection of cases (even though mandated by some general
overall scheme for which copyright is not sought), may still satisfy
the minimal levels of skill and originality demanded by copyright
law. It is on this point that consideration of the case law comes
into play.

The matter was considered in dicta of the United States
Supreme Court in \textit{Callaghan v. Myers},\textsuperscript{28} a case in which the official

\textsuperscript{26} 799 F.2d at 1227 (emphasis supplied).

\textsuperscript{27} “The combination of West’s series descriptions, volume numbers, text of case
reports, page breaks and pagination connotes West’s arrangements which are included
within its compilation copyrights.” Brief for appellee 11, n.7.

\textsuperscript{28} 128 U.S. 617 (1888).
law reporter for Illinois sought to prevent the publication of a rival set of reports that had incorporated much of its undeniably copyrightable material into headnotes and tables. In the Supreme Court's broad dissection of the contents of Callaghan's volumes, it distinguished opinions of judges, which, following Wheaton v. Peters, could not be the subject of copyright, and other aspects of the reports.

Therefore the only matter... which could have been the subject of copyright... was the matter not embracing the written opinions of the court, namely, the title page, table of cases, headnotes, statements of facts, arguments of counsel and index. Such work of the reporter, which may be the lawful subject of copyright, comprehends also the order of arrangement of the cases, the division of the reports into volumes, the numbering and paging of the volumes, the table of the cases cited in the opinions (where such table is made), and the subdivision of the index into appropriate condensed titles, including the distribution of the subjects of the various headnotes, and cross-references, where such exist.

It is arguable whether the two sentences distinguish two different sorts of subject matter. The first sentence could be understood to refer to substantial editorial additions to the text of court opinions included in the volumes that are, in principle, of sufficient originality to be susceptible of copyright protection if claimed; the second sentence would then refer to further additions made by the reporter, of such a mechanical nature as not to merit protection. To justify such a reading, the parenthesized clause in the second sentence would have to be understood to refer back to the first sentence, as would the initial "Such." Some support for this view can be gleaned from comparison of some of the items separated into the two groups. Thus, the "table of cases" reported comes into the first category because it reflects a selection that could be of sufficient originality in some circumstances to deserve copyright protection, for example, a selection of cases on some particular topic. By contrast, the "table of cases cited" comes into the second category because it is a purely mechanical task to list the cases that

29. Wheaton, 33 U.S. at 223. Applied in Banks v. Manchester, 128 U.S. 244 (1888) to permit the publication by a rival of the noncopyrightable portions of case reports originated by the judges.

30. 128 U.S. at 649 (emphasis supplied).
happen to be referred to in the reports. Similarly, the "index" comes into the first category because the compilation of an index requires skill and judgment while the mere "subdivision of the index" is a much more mechanical task falling into the second category. Indeed, unless some such reading is adopted, it is difficult to understand why the two categories should be distinguished so sharply as to be listed in separate sentences, rather than run together. Such a reading is, of course, perfectly consistent with the result of the case since some material, headnotes, and synopses in particular, falling into the categories listed in the first sentence, had been copied. It is also consistent with the rationale that refuses to allow pagination and arrangement alone to justify injuction. The court expressly adopted the reasoning of Judge Drummond below that,

Undoubtedly, in some cases, where are involved labor, talent [and] judgment, the classification and disposition of subjects in a book entitle it to copyright. But the arrangement of law cases and the paging of a book may depend simply on the will of the printer, of the reporter, or publisher, or the order in which the cases have been decided, or upon other accidental circumstances. Here the object on the part of the defendants seems to have been that there should not be confusion in the references and examination of cases, but the arrangement of cases and the paging of volumes is a labor inconsiderable in itself, and I regard it, not as an independent matter, but in connection with other conditions existing between the two editors, when I say, taking the whole together, the Freeman volumes have been used in editing and publishing the defendants' volumes.31

The majority in the Eighth Circuit Court of Appeals interpreted this passage as allowing the possibility of copyright in arrangement and pagination, provided only that sufficient labor, talent, or judgment had been expended. It may be noted that the reporter did testify to a scheme of arrangement of cases, though not to anything other than sequential page numbering determined by type size and general style of layout. It is also noteworthy that the copier's motive was simply to avoid confusion of reference. In both of these respects, the case seems identical on its facts to West v. Mead Data Central. Although the tenor of the passage cannot be said to be crystal clear, it seems most

31. Id. at 662 (quoting Myers v. Callaghan, 20 F. 441, 442 (C.C. N.D. Ill. 1883)).
likely that the court was seeking to contrast the kind of book in which the whole merit lies in its arrangement (such as a modern volume of Cases and Materials) and a book such as a volume of law reports, where the arrangement is of vestigial importance. Judge Oliver, in his dissent, conjectures that this passage was probably inserted in response to Callaghan's argument that

the paging of the Freeman edition ... is equally wanting in any element of literary property, originality or exclusive ownership.... Moreover, the printed paging is merely the mechanical labor of the printer, and is never performed by the author or publisher.33

The Supreme Court seems, like the court below, to have regarded the defendant's pagination and arrangement into volumes as merely indicative of his having also copied the clearly original copyrightable parts, such as the headnotes and synopses.34 It should, however, be noted that the original reporter does seem to have regarded pagination as separately protected, even before litigation occurred, as shown by his having secured a separate copyright for a repaginated reprint of volumes 37 and 38 some ten years after their first publication.35

Another case dealing with the alleged pirating of the arrangement of a law book that came before the federal courts in New York was Edward Thompson Co. v. American Law Book Co.36 In that case, the plaintiff and defendant had compiled encyclopedias of law, having first garnered citations to authorities from other published works. The defendant's later volumes included the plaintiff's work. The court of appeals held that in the absence of proof that copyright material had been copied there was no infringement.

32. In an influential English case of the same era, the Court of Appeal distinguished sharply between the mechanical task of noting where a line and page number appeared in a dictionary of quotations with the skill and judgment involved in selecting the quotations themselves. Moffatt & Paige v. George Gill & Sons Ltd., 88 L.T. 465, 471 (CA 1902).
33. 799 F.2d at 1244, n.51 (citing 128 U.S. at 641).
34. These are the only parts described as being susceptible of copyright in Wheaton, 33 U.S. at 263 (Baldwin, J., dissenting); see Banks v. Manchester, 128 U.S. 244, 250 (1888): "copyright ... would protect only the work of the reporter, namely, the indexes, the tables of cases, and the statements of points made and authorities cited by counsel." See also Little v. Gould, 2 Blatchf. 165, 362, and Gray v. Russell, 10 F. Cas. 1035, 1039 (C.C.D. Mass. 1839).
35. 128 U.S. at 622.
36. 122 F. 922 (2d Cir. 1903).
Is a copyrighted law book infringed by a subsequent work on the same subject where the only accusation against the second author is that he collected all available citations, including those found in the copyrighted work, and, after examining them in textbooks and reports, used those which he considered applicable to support his own text? We are of opinion that this question must be answered in the negative.37

This seems to be precisely the charge against Mead. It used all available citations, including West page numbers, to support its own work. The reason for this rule is also expressed most clearly by the Second Circuit Court of Appeals:

The literature of the law as it exists today is the result of evolution. Each author had had the benefit of all that preceded him and has been able to add something to the common fund intended to lighten the labors of the profession. It would be a serious blow to jurisprudence where the rule enunciated that the author of a law book is precluded from taking a list of authorities cited by a previous work on the same subject and making an independent examination of them. Individuals might profit but the development of legal science would be hampered by such a rule, a rule not of advancement but of retrogression.38

While highly suggestive of the correct answer, these cases are not completely on point. The question of star-pagination came before the courts in Banks Law Publishers Inc. v. Lawyer's Co-Operative Publishing Co.39 a few years later. An assignee of the official reporter of the Supreme Court of the United States sought to prevent the defendants from republishing the opinions of the Court in a condensed format with interpolated page-breaks giving the original numeration, in other words, star-pagination in its traditional form and in no material way different from that proposed by Mead Data Central for LEXIS. The Court paraphrased the extract from Callaghan quoted above, by saying that "[t]his excerpt conspicuously instructs that, if the elements infringed consisted simply of the arrangement of the cases and the pagination, a different conclusion would have been reached."40 In Banks, the Court reached that different conclusion, and held that,

37. Id. at 923.
38. Id. at 925.
39. 169 F. 386 (2d Cir. 1909).
40. Id. 390.
provided no original material was pirated, making marginal reference to the paging of the volume was not enough. It encapsulated its finding as follows: "An action for infringement does not lie if the defendant's asserted wrongdoing simply consisted of reporting the decisions of the court with the paging."41 In reaching this conclusion, the circuit court took into account the case of Howell v. Miller,42 where an attempt had been made by the previous official publisher of the Michigan Statutes to prevent a new publication by the defendant. The Court remarked that

If Miller had cut from Howell's books delivered to him by the state, the general laws of Michigan as there printed, and the pages so cut out had been used when his compilation was printed, if this had been done, and nothing more, there would have been no ground of complaint.43

It will be noted that no exclusion is made in that passage, or indeed anywhere else in the opinion, of pagination. If the pages imagined to have been cut out had included the original pagination as part of the reproduced text, giving exactly the same effect as star-pagination, there would have been nothing to stop it.

The majority in the recent West case purported to distinguish Banks on the basis that the reporter in that case was officially appointed, bound to produce the volumes, and in such circumstances, allocation to volumes and internal pagination were already mandated and could not involve sufficient originality. The majority further pointed out that Callaghan v. Myers also involved an official reporter, but had seemed more accommodating to the possibility of copyright in pagination. Finally, it argued that the decision in Banks predated explicit reference to "compilation" in the text of the Copyright Act of the time and that its teaching was inconsistent with later cases. These arguments are unconvincing. Callaghan expressly refuted the suggestion that an official reporter might be in a worse situation than a private reporter.

Even though a reporter may be a sworn public officer ... in the absence of any restriction forbidding him to take a copyright for

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41. Id. 391.
42. 91 F. 129 (6th Cir. 1898).
43. Id. at 137.
that which is the lawful subject of copyright in him ... he is not
deprived of the privilege of taking out a copyright which would
otherwise exist.\textsuperscript{44}

In other words, if any reporter can claim copyright in paging
and arrangement, an official reporter can also do so, in the
absence of any explicit contrary legislation. None was present in
\textit{Banks}. The Supreme Court in \textit{Callaghan} regarded paging and
arrangement as too insubstantial a feature of law reporting to
secure protection, and where, as in \textit{Banks}, nothing else had been
copied, the circuit court refused to intervene. Whatever the
wording of the Copyright Act, these cases, and predecessors
stretching back for centuries, had all proceeded on the basis that
compilations were entitled to copyright protection. There are no
subsequent cases protecting pagination alone. However, in \textit{Eggers
v. Sun Sales Corporation},\textsuperscript{45} where the defendants had used the
plaintiff's pagination of a public domain document, incorporating
it into a very similar souvenir item, the Court remarked that

it is possible that defendant's printers set up the official report
from a copy of plaintiff's book: identity of pagination leads to that
suspicion; but legally that is not of sufficient importance to con-
stitute breach of copyright.\textsuperscript{46}

Similarly, a numbering scheme per se was held not to merit
copyright protection in \textit{Toro Company v. R.R. Products};\textsuperscript{47} nor was
a simple alphabetized arrangement of names thought protectable
in \textit{Cooling Systems & Flexibles Inc. v. Stuart Radiators Inc.}\textsuperscript{48}

For all of these reasons, the purported distinction of \textit{Banks}
seems implausible, and the authorities seem to agree in principle,
rejecting copyright protection for a numbering or pagination
scheme for law reports without more. The question then becomes
whether a claim to protection for an arrangement expressed by
a numbering scheme merits protection. This raises the second
aspect of the case to be discussed, the question of infringement.

\textsuperscript{44}. \textit{Callaghan}, 128 U.S. at 647.
\textsuperscript{45}. 263 F. 373 (2d Cir. 1920).
\textsuperscript{46}. \textit{Id.} at 375.
\textsuperscript{47}. 787 F.2d 1208 (8th Cir. 1986). In England, a similar view was taken in relation to
race cards assigning trap numbers to greyhounds. \textit{Greyhound Racing Association v.
\textsuperscript{48}. 777 F.2d 485, 492 (9th Cir. 1985).
B. Infringement

As noted above, the essence of West's claim was that star-pagination would infringe copyright in their arrangement by amounting to an unlawful reproduction or display of it. The majority in the appellate court held that once LEXIS gave access to a jump cite, it would be possible by using a further LEXIS facility, "LEXSEE," 49 to find and display in sequence every successive report in any given West Reporter. While this is true and was conceded by Mead in oral argument to be true, it is irrelevant to the issue before the court. That issue was whether the provision of jump cites amounted to an infringement of copyright in West's arrangement. Even assuming that such an ability would amount to an infringement, West's argument still fails. The West argument seems to have been that the user could, once jump cites were displayed, simply move to the end of one report, look at the jump cite there, and be in a position to know the first page cite of the next report in the volume. This could then be called up by LEXSEE and the process could be reiterated until the end of the volume was reached. Although the process would be tedious, and although it is very hard to imagine any good reason for accomplishing it, this would indeed be possible. The argument seems to assume that it is the provision of jump cites that makes this possible. That is the fallacy. Jump cites make no difference. Even the most moderately skilled LEXIS user was in a position to reconstruct a volume of a West Reporter long before jump cites were displayed, or LEXSEE introduced. All that was necessary was for the LEXIS user to search in the CITE segment for a given volume followed by a range of page numbers. His printout would give him all of the West reports within that range, and by use of the browsing facilities on LEXIS, he could display them in order of occurrence in the original volume. 50 It is hard to understand why this possibility should

49. This facility enables the user to call up on his screen any given document by entering its standard citation (series, volume, and page number). Thus, entering "616 F.Supp. 1571" would bring up the report of the district court in West Publishing Corporation v. Mead Data Central.

50. For example, the LEXIS query "CITE (616 pre/3 15*)" immediately displays the full citations, including West National Reporter series references, for the fourteen cases contained in the Mead District Court file and reported in the West Federal Supplement series of reports in volume 616 whose first page number falls between pages 1500 and
ever have been denied by Mead, as it seems to have been. Not only does such a technique avoid the need to use jump cites, but it is quicker, easier, and cheaper. The most important thing about it, however, is that it utilizes no more information than West itself has made available, the use of which it concedes to be fair.

This concession seems fatal to West's arguments designed to protect the claimed copyright in its arrangement. West claims copyright for individual volumes. Such a claim must, therefore, as a matter of simple logic, refer either to the arrangement of cases within the volume, or to the arrangement of material within a case, or to both. Nothing else within the volume is arranged. Yet, it cannot be sustained in relation to the arrangement of cases within a volume since, as noted above, West has conceded as a fair use the key to that arrangement. Nor is it plausible to claim on the basis of the arrangement of material in a given case, since the only arrangement of those parts reproduced on LEXIS is that they run from beginning to end, and number sequentially in Arabic numerals as they go, incrementing in jumps roughly\(^{51}\) equivalent to the number of characters on a standard West page of hard copy. There is clearly insufficient originality in that arrangement to satisfy even the minimal requirements of the law of copyright. In truth, neither aspect of this arrangement within a given volume is of the slightest use or interest to lawyers. Perhaps it was because it was so inconceivable that anyone would want to be able to reproduce these arrangements that Mead could not conceive how it might be done.

A more telling argument is that by provision of jump cites LEXIS users would be able to identify the point at which an equivalent reference to the LEXIS passage appeared in the West system. This identification would be of great benefit to LEXIS users and to third parties to whom they wish to communicate away from the terminal. It was to secure this very advantage that the feature was to be introduced. It always has been the

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1599. These are then available for full-text display in order of their appearance in the West Reporter by simple interactive use of the FULL, NEXT CASE and PREVIOUS CASE keys, supplemented in the latter two instances by the use of the number keys as modifiers. It may sound complicated in this description, but it is the work of a few seconds in practice.

51. Not exactly, because copyright characters such as references to headnote numbers, expansions, and normalization of references to the West house style etc. are not represented on the LEXIS version.
main reason for using star-pagination in hard copy. It is because West knows that more people use the official version of the United States Reports that it interpolates its page breaks and numeration into its own series, the Supreme Court Reporter. Mead's need, in the case of LEXIS, is even stronger. A screen display is far too short to be regarded as a page in the ordinary sense of the word, and there is currently neither any satisfactory internal system of counting derived from the amount of text necessary to fill a screen, nor any adequate scheme of overall citation to material on LEXIS. The external restraints are even more overwhelming. The West Federal Reporter System has virtually monopolized the reporting of lower level Federal Court cases and its citation system is generally required to be used. This point was emphasized by the majority in holding that

Jump cites to West volumes within a case on LEXIS are infringing because they enable LEXIS users to discern the precise location in West's arrangement of the portion of the opinion being viewed. Communication to LEXIS users of the location in West's arrangement of specific portions of text is precisely what the LEXIS Star Pagination Feature is designed to do.

With MDC's star pagination, consumers would no longer need to purchase West's reporters to get every aspect of West's arrangement. Some knowledge of the location of opinions and parts of opinions within West's arrangement is a large part of the reason one would purchase West's volumes; the LEXIS star pagination feature could adversely affect West's market position.

Here, too, the Court stresses the commercial effects of the innovation rather than the more strictly copyright considerations. This annexation of concepts, more appropriate to considerations of unfair competition, will be considered more fully below. The question to be considered here is how far, if at all, provision of a parallel scheme of reference can be regarded as infringement of copyright. In its initial claim, West emphasized the differences between the reports as displayed on LEXIS and those in its own reporter system: "The inherent qualities and characteristics of LEXIS reports are not identical to the inherent qualities and characteristics of the referenced West reports which include

52. Though it is described as a page in LEXISSPEAK.
53. For example, by the Harvard Blue Book (A Uniform System of Citation).
54. West, 616 F. Supp. at 1578.
editorial features, enhancements and corrections made by West." 55

This claim was supported by an affidavit alleging numerous alterations to the reports as published by West, resulting in corrections in about half of the cases reported by West. 56 Thus, in a standard West hard-copy report West provides numbered headnotes and interpolates numbered cross-references into the text, allocates key numbers and titles, supplies statements of facts, and augments and corrects citations and references to cases and statutes. No report in the West reporter system is identical to the actual opinion handed down by the judge, whereas LEXIS reports are substantially identical. The report as it appears on the LEXIS screen is thus very different from the same report as it appears in a West volume, in content, in layout, and in general appearance. It is into this different text that the West pagebreaks are interpolated. Their function is to direct the user to the place at which the West equivalent of the passage being displayed occurs. They give no indication of any differences to be found there. It is for this reason that it is misleading to describe the LEXIS screen display as an index to the West text. Even if it were, there is, in principle, no objection to the publication of an independent index to a copyright work. 57 This is true even if the index uses words and phrases taken directly from the copyright text. In the case of the LEXIS "index," the language of the judge that constitutes the "index terms" is not, of course, susceptible of copyright protection, and none is claimed for it. It might be thought more like an index to an index, in the sense that the words of the judge as used on LEXIS are an index to the words of the judge as they are placed in the West volume. But this does not help. An index to an index is not, in principle, an infringement of copyright either. 58 On the other hand, an ordinary index, compiled with care by a skilled indexer, is as much deserving of protection as any other writing produced by the application of skill and judgement. In the district court, it was held that West's pagination was the key to "the self-index by which West's arrangement is accessed". 59 In its appellate brief,

55. §§ 30 of West's complaint.
56. Bergsgaard affidavit §§ 12.
57. Kipling v. G.P. Putnam's Sons, 120 F. 631, 635 (2d Cir. 1903).
59. The point was not pursued by the majority in the court of appeals.
60. 616 F. Supp. 1571, 1579.
West amplified this point a little by claiming that copyright in an index is infringed if both its terms and its references are copied.

In the case of the ordinary copyright index this is clearly correct. It is not, however, applicable in this context. In a full-text data base there are no separate index terms; the words in the text become the index terms, and the references are not separately collected but are a simple function of the appearance of the text. While it is true that the West Reporter notation was used by LEXIS, except for the first page number of each report there was no appropriation of any West copyright index terms without West's approval. Those words had not been created by West, no copyright was claimed in them, and they were not copied by LEXIS. LEXIS has its own scheme for gathering the texts of judicial opinions quite independent of reference to West publications. The selection of cases is different. Even when the same selection is made, the text is frequently different. These considerations make the facts here almost the exact converse of those in the New York Times case. There, the New York Times published annual indexes that indicated the places within the current year's newspaper editions where the indexed terms could be found, including personal names mentioned in the newspaper. The defendants published an index to these indexes for personal names, copying the names but giving as references, not the references to the newspapers, but instead to the index volumes in which the names appeared. So, if a purchaser wanted to discover the references, he had to consult the indexes published by the New York Times itself, which contained the detailed references that the newspaper had expended its skill and efforts in compiling. In that case, the defendant copied the index terms, but not the references; here Mead has copied the references, but not the index terms. Similarly, whereas there the user had to consult the copyright indexes to discover the full details, here, if the user wants to go beyond the text as displayed by Mead, he must consult the West volumes. In the New York Times case, the annual indexes were, without any question, compiled by the expenditure of skill and effort by the New York Times, whereas here most of the material in the West volumes indexing the West system, and all of the material in LEXIS indexing it, is in the public domain in the form of judicial opinions. If the West argument were to prevail, it would become impossible for anyone
to publish an independent concordance of an original edition of a work still in copyright without infringing that copyright; yet so far as is known, no such action has ever so much as been attempted, even in relation to a work all of which is undeniably in copyright. It is submitted that not only would such a concordance not infringe copyright in the original edition, but that it would in such a case itself be entitled to protection by copyright, even against the holder of copyright in the original edition.\footnote{Though he would be free to make his own concordance, here the text of the opinions, which, in effect, constitutes the concordance, is all in the public domain and no copyright could be claimed for it in the form in which it appears on the computer. It is, however, submitted that Mead could, if it so chose, claim copyright in the inverted file derived from the original reports, though in fact it seems to prefer to keep that file secret.}

The second limb of the West claim for infringement was that Mead had encroached upon its exclusive right to display its work. The West brief is indeed brief on this point, but seems to take up the point made by the district court that in communicating page-breaks LEXIS is, in effect, displaying the West arrangement. Mead sought to counter by arguing that its arrangement of the material in its computer was quite different from West's arrangement into serial volumes and that the user would find it difficult to display different reports from West volumes in the sequence in which they appeared in these volumes. As noted above, any such capacity stems, not from the jump cites complained of, but from the first page numbers, the use of which is conceded by West to be fair. If such a sequential display were to be constructed, it would differ from West's display to the extent that no two reports would ever be visible to the user simultaneously, as they might be in perusing a volume.\footnote{Elaborate use of windowing might conceivably be able to reproduce this feature, though it would require complicated techniques and would be so pointless that no one would ever be likely to attempt it.} It also seems to be the case that any such display would be generated not by Mead, but by the user. Nor could any charge of contributory infringement be laid against Mead in such circumstances since, in \textit{Sony Corporation v. Universal City Studios},\footnote{464 U.S. 417, 442 (1984).} the Supreme Court decided that contributory infringement could not occur if there were wide use for legitimate unobjectionable purposes, and that even the capacity for substantial noninfringing

61. Though he would be free to make his own concordance, here the text of the opinions, which, in effect, constitutes the concordance, is all in the public domain and no copyright could be claimed for it in the form in which it appears on the computer. It is, however, submitted that Mead could, if it so chose, claim copyright in the inverted file derived from the original reports, though in fact it seems to prefer to keep that file secret.
62. Elaborate use of windowing might conceivably be able to reproduce this feature, though it would require complicated techniques and would be so pointless that no one would ever be likely to attempt it.
uses would be sufficient. It is quite clear that no user would ever be likely to perform the rearrangement of materials on LEXIS into the order of display in a West volume, and that Mead has not the slightest inclination to encourage him to do so.

If it is accepted, as argued above, that West's arrangement is not susceptible of protection by copyright, and, as also argued, that even if it were, it is neither reproduced nor displayed by the interpolation of West page breaks into the corresponding text on LEXIS, no question of fair use arises. If, however, these contentions are rejected, as they were by the district court and by the majority in the court of appeals, then the question of fair use should be addressed. The Copyright Act sets out the factors relevant to its determination as including:

i) the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes;

ii) the nature of the copyrighted works;

iii) the amount and substantiality of the portion used;

iv) the effect of the use upon the potential market for or value of the copyrighted work.

The district court took into account the fact that Mead's use was avowedly commercial; that even though fair use is more readily accorded in respect to compilations, this is not invariably the case, especially when the intended use is commercial; that although the page numbers themselves were quantitatively insignificant, they constituted "the key to the West arrangement;" and that star pagination would supersede a substantial use of West's copyright hard-copy volumes. The majority in the court of appeals stated that it found this reasoning persuasive. How persuasive is it? It is, in fact, extremely difficult to apply the criteria set out in section 107 to this case. The section envisages the copying of a substantial part of the text of a copyright work for commercial gain, the result of which would be to diminish

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64. For these reasons, it was not argued at length in Mead's appellate brief, nor before the court of appeals in oral argument.
66. A major argument against the issue of the injunction was that it would cause substantial loss and damage to Mead.
the market for the copyright work. Here, it is conceded that the substance of the text of the copyright work is not subject to copyright, but in the public domain. Not only is it in the public domain, but the whole justification for its being in the public domain is that the public must have access to it, unrestricted by any private monopoly. 68 As the district court intimated, 69 the employment of a system to access such reports is essential to their effective use, and, as the founder of the West Publishing Company himself asserted, a uniform system best promotes this end. 70 In the case of reports of the lower federal courts, West has adopted the standard form of reference. It is hard to understand how it can possibly be anything other than a fair use to refer to the place where something occurs in a law report by the description that will be most easily and commonly understood to refer to it. West itself concedes that the use of citation in its Reporter System to the first page of a given report to identify the report is a fair use. It concedes that the display of all such first page references in LEXIS is a fair use. It concedes that reference to individual page numbers by individual researchers is a fair use. In all of these cases, the rationale can only be that it is a fair use to facilitate reference to a point of law in the way most widely accepted. It adopts that practice itself in relation to its own Supreme Court, California, and New York series. 71 The practice is, and has for over a century been, carried on throughout the common-law world, principally because the accurate and consistent citation of precedent is so important within that system. If this is so, it can hardly be other than fair for LEXIS subscribers to use the otherwise universally available reference system also. Far from superseding the West arrangement, which it should be remembered, is the only element the copyright of which is in dispute, Mead’s position depends upon it not being superseded.

70. See West, Multiplicity of Reports, 2 Law Library J. 4 (1909).
71. In Edward Thompson Co. v. American Law Book Co., 122 F. 922, 926 (2d Cir. 1903), where the plaintiff had also adopted the very practice of which he complained, the court said that “[c]onsistency requires that the defendant should not be punished for doing that which the complainant does with perfect impunity,” and endorsed the “general proposition that equity will refuse its aid to a suitor who has himself been guilty of the same inequitable conduct which he denounces in others.”
Nor is it likely to supersede any use of West's copyright elements in its books. Indeed, to the extent that any LEXIS user wishes to refer to any West copyright material in West's books, his use will be facilitated by the provision of easy reference to such material. What West may feel to be unfair is the effect of this in depriving it of the benefits which it may think to derive from its having established its reference system as the de facto standard for Federal Reports. But that issue raises other wider considerations that will be addressed in the second part of this article.

II. WIDER IMPLICATIONS

As noted at a number of points above, the courts at both levels in this litigation felt impelled to consider the commercial realities underpinning the formal legal superstructure. In the contexts of origination, infringement, fair use, and the availability of injunctive relief, there were times when emphasis was placed upon the business motives of the parties, and the probable financial consequences of their action or inaction. These concerns reflect the deeper philosophical and political conflicts which underlie this area of the law. The function of the law of copyright is said principally to be the promotion of competition. Yet paradoxically, copyright seeks to achieve the promotion of competition by conferring a limited monopoly. The tension is apparent. In broader terms, the general political and philosophical ethos of the United States endorses free competition and a free market economy, but still does not go so far as to hold any means of competing to be justifiable for that reason alone. It is not acceptable to kill one's competitors, to steal their products, or to burn their premises, however much it may assist profitability. Few would cavil at such restrictions. The difficulty, as always, is to know exactly where to draw the line between the permissible and the impermissible, between freedom and control. The line cannot be drawn around the criminal law since battery, trespass to goods, and trespass to land are just as objectionable as competitive tactics. In an effort to draw such a line, a whole

new area of law has been mapped out, more thoroughly in the United States than elsewhere—the law of unfair competition. One of its most problematic features concerns the unruly frontier of the law of intellectual property. It is noteworthy that in the instant dispute, claims were not made only for infringement of copyright. Instead, the West complaint was dripping with six counts of deceptive practices, one of false representation, one of misrepresentation, one of misappropriation, and a generic count of unfair competition at common law. A number of recent cases illustrate current development in this whole area. Although it will not be possible, nor even appropriate given the present state of flux, to chart the law in detail, it is still worth drawing attention to some of the issues that are emerging.

One of the first cases to consider the matter in detail in the context of computer technology was *Synercom Technology Inc. v. University Computing Company.*73 The plaintiffs in that case had developed a program to enable engineers to perform calculations for the purposes of structural analysis. The key to the commercial success of this program was to simplify the work of entering information so that it could be used very easily by nonspecialists. To this end, the plaintiffs published manuals, educated users, and most important of all, devised a novel scheme of input formats.74 Claims for copyright in these manuals and formats were all successfully registered. Ignoring a number of shifts of interest in different parties, the complaint related to the strategy adopted by the defendants to market a rival product. The key to the success of this product, which used wholly separate programs, was to be its ability to accept data conforming to the input formats so successfully promoted by the plaintiffs. That promotion, which had been expensive,75 needed to be recouped through sales of the product and was thus reflected in the price. The plaintiffs' customers had also invested large sums of money in preparing their data according to the plaintiff's format. Adoption of those formats by the defendants, therefore, enabled them to undercut the plaintiffs in price because they had incurred no costs in educating the market. It also imposed no extra expense

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74. There were nine different classes of input, the logic and arrangement of which were originated by the plaintiffs.
75. Nearly half a million dollars.
upon the plaintiff's existing customers. The plaintiffs sued for infringement of copyright in the manuals and in the input formats. It is in relation to the latter that the case is so instructive. The district court first held that the input formats were not merely devices to help the user complete a task, but did, indeed, express ideas and were copyrightable "if the ideas they express are separable from their expression."\(^{76}\) It was at this second hurdle that the plaintiff fell. The court characterized the issue as being "whether EDI copied expressed ideas or their expression. EDI put forward an alternative argument that because use of the idea required substantial duplication of Synercom's arrangements and sequencing, copyright protection ought not be allowed (sic)."\(^{77}\)

The motive for the duplication of Synercom's scheme of arrangement was regarded as immaterial if the defendants had done no more than appropriate the idea expressed by the formats. The court felt that the plaintiff could not argue both that the arrangement expressed an idea and that the idea was separate from its expression. Similarly, it can be argued that the West referencing system expresses an arrangement but is not separate from it. As soon as the volume and page numbers are divorced from the arrangement of the series, they become no more than cumulative sequences of Arabic numerals, and as such, were conceded by the majority in the court of appeals not to be copyrightable. "In the end MDC's position must stand or fall on its insistence that all West seeks to protect is numbers on pages. If this is a correct characterization, MDC wins." West's dilemma is the same as Synercom's. Either such characterization must be conceded, and with it the case; or it must be resisted on the basis that the arrangement is inherent in the numbering scheme, in which case it is seeking copyright upon an idea, which is expressly excluded from protection by section 102(b) of the Copyright Act: "In no case does copyright protection ... extend to any idea, procedure, process, system, method of operation, concept, principle, or discovery, regardless of the form in which it is described, explained, illustrated, or embodied in such work." As the Court put it in *Synercom*,

\(^{76}\) 462 F. Supp. at 1012.

\(^{77}\) *Id.*
if order and sequence is the expression, the skilled effort is not separable, for the form, arrangement, and combination is itself the intellectual conception involved. It would follow that only to the extent the expressions involve stylistic creativity above and beyond the bare expression of sequence and arrangement, should they be protected.\textsuperscript{78}

The second argument for the defense in \textit{Synercom} was also accepted, by a chain of reasoning interdependent upon the first. Once it was established that idea and expression had merged, the plaintiffs could not protect the idea by copyright. The court analogized to the pattern of a gear shift devised by one manufacturer, but which could be used by any other without infringement. So long as the material constituted original expression, or, as in the \textit{Mead} case, was in the public domain, rather than material copied from the original manufacturer's expression (and there was never any suggestion of Mead copying West's text) then there was no infringement. Just as any car can use a particular gearshift to locate different gears, so can any version of the opinions of the federal courts use the pattern of the West referencing system to locate parts of the opinions.

Although the copyright claim failed in \textit{Synercom}, the district court felt itself insufficiently briefed to dispose of the unfair competition claim. This was based, like part of West's claim, on the notion of misappropriation stemming from the old Supreme Court case of \textit{International News Service v. Associated Press}.

This widely accepted view states that a plaintiff is entitled to succeed on a showing of expenditure by him on some new product, use of it by the defendant so as to secure some or all of the benefit of that expenditure, and resulting loss to the plaintiff.

This whole area of the law has been extensively developed,\textsuperscript{80} and its impact upon federally regulated areas has had to be curtailed.\textsuperscript{81} In the second hearing of the \textit{Synercom} case,\textsuperscript{82} the district court found that the basic conditions of expenditure, appropriation, and damage were satisfied, but that, nevertheless, the unfair competition remedy was preempted by federal copy-

\textsuperscript{78} 462 F. Supp. at 1014 (original emphasis).
\textsuperscript{79} 247 U.S. 215 (1918).
\textsuperscript{80} See \textit{Callman, The Law of Unfair Competition, Trademarks and Monopolies}.
\textsuperscript{81} See supra note 1.
\textsuperscript{82} 474 F. Supp. 37 (N.D. Tex. 1979).
right law. Its reasoning was based upon the absence of any of the factors favoring the use of state police powers, such as theft of trade secrets, breach of contract, or breach of confidence. In the Mead litigation, the West referencing scheme is the very reverse of secret or confidential and no relevant contract exists between Mead Data Central and West Publishing. A further factor favoring preemption is the undesirability of different rules applying in different states. This clearly applies to this litigation, which relates to a service provided in every state throughout the United States from one central location. Another factor favoring preemption is that the plaintiff seeks a permanent rather than a temporary injunction. West sought a permanent injunction. Last, it cannot be argued with any plausibility that the matter is totally outside the scope of federal regulation when, as shown above, a number of cases have considered the matter in detail without once suggesting that is was inappropriate to do so within the context of copyright protection. So, every single factor mentioned in the analogous Synercom case as favoring federal preemption exists here, and in a number of respects in a considerably stronger form. It also seems to be the case that where, as here, the essence of the unfairness is alleged to be misappropriation of published material, preemption is more likely to prevail than in a trade secret or confidentiality claim. This has been expressly affirmed in relation to a claim for unfair competition under the common law of Minnesota where this claim was brought. The key question is now enshrined in section 301 of the Copyright Act 1976, which states that

all legal or equitable rights that are equivalent to any of the exclusive rights within the general scope of copyright ... are governed exclusively by this title.... no person is entitled to any such right or equivalent right in any such work under the common law or statutes of any State.

83. Id. at 43.
84. There was in Synercom, for example, a much greater aura of breach of confidence.
85. The passing off claims are extremely weak.
Where the claim is based solely on the alleged iniquity of copying something which the plaintiff has published, it is submitted that the right claimed is clearly equivalent to the rights regulated by federal copyright law.

Quite apart from preemption, however, there is some evidence of distortion within copyright law itself, giving perhaps greater weight to considerations of unfairness in the determination of the basic question of infringement. As noted above, the Copyright Act of 1976 has made it clear beyond question that there is now no per se objection to copyright in computer programs. Subsequent development has taken place in the more intractable area of infringement. It is more intractable just because the concepts are more vague (namely, whether the degree of copying was substantial) and closely linked to the factual circumstances of individual cases. The classical problem in its simplest form is whether copyright in a computer program written in one computer language is infringed by a program performing a very similar function written in a different language by someone who had access to the first program. This very issue was addressed in the first Synercom case. The Court made it clear that a simple translation from one programming language to another could amount to an infringement: "It is as clear an infringement to translate a computer program from, for example, FORTRAN to ALGOL, as it is to translate a novel or play from English to French." The court even suggested that this might remain the case if the transition were from a flow chart, or prose instructions, to computer programs. The boundary was, however, reached when it came to reasoning from a statement of a problem to a computer program embodying a solution to it.

In most cases, the formulation of the problem in sufficient detail and with sufficient precision to enable it to be converted into an unambiguous set of computer instructions requires substantial imagination, creativity, independent thought and exercise of discretion, and the resulting program can in no way be said to be merely a copy or version of the problem statement. The program and the statement are so different, both in physical characteristics and in intended purpose, that they are really two different expres-

88. 462 F. Supp. at 1013, n.5.
89. A prophecy that was to be realized by the decision in Williams v. Arndt, 626 F. Supp. 572 (D. Mass. 1985).
sions of the same idea, rather than two different versions of the 
same expression.90

Computer program cases are instructive because they too 
turn upon the difficulties of distinguishing between idea and 
expression, just like the Synercom case, and it is submitted, the 
Mead case. It must be conceded that the question involves issues 
of fact91 and is one in relation to which Judge Learned Hand 
opined that "no principle can be stated as to when an imitation 
has gone beyond the 'idea' and has borrowed its 'expression.' 
Decisions must, therefore, be ad hoc."92 That same great copyright 
judge had earlier noted that a great number of patterns of 
increasing abstraction could be imposed upon any work,93 while 
leaving open the question of where to draw the line, of which he 
said, "wherever it is drawn will seem arbitrary".94 One shard of 
guidance is furnished by the consideration that as ideas and 
expression become less distinguishable, so the degree of required 
similarity increases until, at the extreme, protection by copyright 
vanishes altogether.

When the idea and its expression are thus inseparable, copying 
the expression will not be barred, since protecting the expression 
in such circumstances would confer a monopoly of the idea upon 
the copyright owner free of the conditions and limitations imposed 
by the patent law.95

In Whelan Associates v. Jaslow Dental Laboratory Inc.96 a pro-
gram designed to be used in dental laboratories, written in EDL 
for IBM Series 1 machines and in BASIC for IBM Datamaster 
machines, was alleged to have been infringed by a program 
written in BASIC for use on an IBM PC. The court found that 
the program for the PC had been written by someone with access 
to the earlier programs.97 Everything turned on whether or not

90. Id.
91. See Sid and Marty Krofft Television v. McDonalds Corporation, 562 F.2d 1157, 1164 
(9th Cir. 1977), and O'Neill v. Dell Publishing Co., 630 F.2d 685 (1st Cir. 1980).
92. Peter Pan Fabrics Inc. v. Martin Weiner Corporation, 274 F.2d 487, 489 (2d Cir. 
1960).
93. Nicholls v. Universal Picture Co., 45 F.2d 119, 121 (2d Cir. 1930).
94. Id. at 122.
95. Herbert Rosenthal Jewelry Corp. v. Kalpakian, 446 F.2d 738 (9th Cir. 1971).
97. There was in the background a lapsed marketing agreement between the parties.
copying had taken place, and expert testimony was adduced at the trial on that issue. The judge acknowledged his difficulty in resolving the conflict in this testimony. "It is difficult for one having practically no knowledge of the operation of computers and computer software systems to judge which of two experts in the field is more credible." He did, however, purport to do so. "One thing is readily apparent to even the most casual untutored observation of the operation of the two systems, the visual screens that are displayed are almost identical in format and even in the use of abbreviations and terminology."

Similarity of appearance seems hardly sufficient to resolve the conflict, not even when fortified by the observation that users found no substantial differences between the operation of the two programs. It is certainly not the case that an appearance of similarity dictated by function, which is also what the users would rely upon, indicates that the programs producing such similar effects are the same. It would be perfectly possible for a programmer, without access to any of the coding at all, to use and observe, say a word-processing program, and then write a program from scratch which reproduced its appearance and functions exactly. Indeed, nowadays so many facilities and utilities used in the construction of programs are so well documented that large chunks of code might be very similar, if not quite identical, in the two programs without any copying, just because elegant and optimal coding dictates the use of an identical approach. On appeal, the Third Circuit Court of Appeals was concerned about this question and willing to concede that the similarity of the screens was not direct evidence of infringement of copyright, but it did, nevertheless, regard it as relevant evidence from which infringement might be inferred in appropriate cases.

98. Interestingly, the copying alleged was from EDL to BASIC rather than from one BASIC to another.
100. Id. at 1321.
101. Id. at 1322.
103. In other cases where the programs are designed to produce particular visual effects, the arguments are still stronger; see Broderbund Software Inc. v. Unison World Inc., 648 F. Supp. 1127 (N.D. Cal. 1986).
Very similar issues arose in *SAS Institute Inc. v. S & H Computer Systems.* There, too, the claim related to copying a computer program. SAS markets highly respected programs in the field of statistical analysis, but at the time in question the programs were written in the EBCDIC code and available only for running on IBM hardware. After some desultory and unproductive negotiations in which the defendants offered to adapt the SAS system to run on DEC equipment, the defendants secured access under a restricted license to SAS object code and parts of its source code. In breach of the conditions of the license, the defendants first translated the source code portions into ASCII code which could then be displayed on the DEC equipment for easy editing. The source code was subsequently used extensively to assist with the preparation of source code designed to reproduce all of the SAS features in a program running on DEC equipment, which the defendants proposed to market on their own behalf. The SAS programs were very large and accordingly organized into a number of self-contained modules. The defendants' scheme of arrangement mirrored that of the plaintiffs. The modules themselves were prepared independently by coders working in isolation from each other and from the SAS source code. Such modules, however, were prepared according to a specification supplied by the central directors of the project who did have the SAS code and used it to specify the detailed tasks for the coders. This was the method for ensuring that each of the individual modules would link together successfully. When an action for infringement was brought against them by SAS, the defendants first argued that they had not copied a sufficiently substantial part of the SAS code; second, they argued that any similarities were necessitated solely by the need to retain compatibility with SAS; and third, that SAS was not itself entitled to claim copyright in the code since it was derived from an earlier version of SAS which was in the public domain. The first and third points make an interesting contrast. While it is true that

105. Over 186,000 instructions in seventy separate modules.
106. Sixty-nine of the seventy SAS interface routines were reproduced in the defendants' product.
107. The arrangement changed during the time the programs were being written, but the method described in the text was the final one used and the one most favorable to the defendants' case.
the test for originality to establish a copyright claim and the test for independence so as to avoid a charge of infringement are not the same,\textsuperscript{108} it must be rare for them to be as disproportionate as they were here. It could be shown by only 44 lines of code that there had been direct copying from the SAS original,\textsuperscript{109} less than one-fortieth of one percent of the total coding. On the other hand, the version of SAS on which the claim was based, and which had to be regarded as original, took more than sixty percent of its coding from the earlier public domain version, or about 125,000 lines of code. The disproportion is easily explained, however. The court was reluctant to stomach the deceitful practices of the defendants in attempting to subvert the plaintiff's efforts to retain control over their product by keeping as much secret as they could and licensing the use of the remainder only on a restrictive basis. While one can sympathize with the court's attitude, it is dangerous to distort tools that have to serve in more conventional copyright contexts. The court was more impressed by the similarity of concepts and arrangement than by any direct similarity of coding.

This raises the vexed question of how far a derived work must deviate from the original before ceasing to be an infringing copy. On this question the court found the reasoning in \textit{Meredith Corporation v. Harper & Row Publishing Co.}\textsuperscript{110} persuasive. In that case, the defendants were minded to publish a text on child development. They researched the field and found that the plaintiff's book was the market leader. They then simply outlined the topics in each chapter, and commissioned writers to provide text. Defendants attempted to justify this approach to publishing on the basis that they had access to the market leader's text and did not intend to cover all of the salient points made there. When the plaintiffs sued, the defendants admitted that eleven percent of the new book was a direct copy, but contested infringement in relation to the rest, a contention which the court had no difficulty in rejecting. This case is instructive in the


\textsuperscript{109} There were good grounds for thinking that the version of the defendants' code in existence at the commencement of the litigation contained much more direct and obvious copying, but it disappeared mysteriously before discovery could take place.

\textsuperscript{110} 413 F. Supp. 385 (S.D.N.Y. 1975).
context of the West litigation. In Meredith there is not the slightest suggestion that to have copied the chapter and section numbers for the purposes of cross-reference to a wholly independently written book on the same topic would have amounted to infringement. The heavy emphasis placed upon the slavish paraphrasing of the original, and upon the attempts to conceal it, suggest, on the contrary, that the court found infringement in the attempt to reproduce the original, not in merely making reference to it. It was also expressly conceded that the arrangement would not be infringed to the extent that it was "the necessary result of limited possibilities for organizing and presenting the material to be covered." That issue was not addressed by the district court in the SAS case, but had been strongly argued in a number of cases involving computer programs. In Apple Computer Inc. v. Franklin Computer Corp., for example, where the defendants had virtually duplicated the plaintiffs' code, eliminating only minor cosmetic features such as any reference to Apple itself, the court held that the acid test was whether or not other programs could have been written to serve the same purpose.

If other programs can be written or created which perform the same functions as an Apple's operating system program, then that program is an expression of the idea and hence copyrightable. In essence, this inquiry is no different than that made to determine whether the expression and idea have merged, which has been stated to occur where there are no or few other ways of expressing a particular idea.

This certainly expanded the notion of "expression," but it is unclear what effect it had on the notion of substantial similarity, which required no consideration on the facts of this case, since the coding was for all practical purposes identical and had admittedly been copied.

This very question was, however, extensively reviewed by the Third Circuit in the Whelan v. Jaslow appeal where the issue of substantial similarity was as central as the extent to which idea

111. Id. at 387.
112. 714 F.2d 1240 (3d Cir. 1983).
113. The copyright notice was also deleted.
114. 714 F.2d at 1253 (citing Morrissey v. Procter & Gamble Co., 379 F.2d 675, 678-79 (1st Cir. 1967)).
could be separated from expression in the context of computer programs. The court held that, at least in the context of utilitarian works, it was undesirable to limit protection to the literal coding, whether in source or object form. It explained that coding as such plays only a small part in the production of commercial software and that any realistic protection must extend to some part of the structure and arrangement of the program modules. It appreciated that in so doing it was departing from what it described as the "scholarly opinion" in *Synercom*. Nevertheless, it derived a test from the seminal decision in *Baker v. Selden*, a decision based upon the distinction between end and means.

The line between idea and expression may be drawn with reference to the end sought to be achieved by the work in question. In other words, the purpose or function of a utilitarian work would be the work's idea, and everything that is not necessary to that purpose or function would be part of the expression of the idea. Where there are various means of achieving the desired purpose, then the particular means chosen is not necessary to the purpose; hence, there is expression, not idea.

Although by no means fully developed, this test clearly depends upon the availability of different means to achieve the postulated end. It will often be no easier to distinguish ends and means than it is to distinguish idea and expression. The Court itself concedes that *Synercom* might be upheld consistently with its decision by an appropriate focus of distinction. It seems certain that the *Mead* case can be distinguished, since the purpose of indicating the point in the standard hard copy text that corresponds to the point in the Mead display cannot be accomplished in any other way than by referring to the West citation when the standard version is a West publication.

Four recent cases, the first three decided before publication of the appellate opinion in the *Whelan* case, throw some light upon this further issue. In some ways, the first in point of time, *Williams v. Arndt*, is the most surprising. Copyright was there

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115. 101 U.S. 99 (1879).
116. *Whelan*, 230 U.S.P.Q. (BNA) at 490. This test was approved and applied in Broderbund Software Inc. v. Unison World Inc., where its application was greatly assisted by evidence of a third, and totally differently structured, program that implemented the same idea of enabling users to construct various graphical forms.
claimed for a booklet describing a system for commodity trading. The allegedly infringing copy was a computer program. The defendant argued that the program was a different expression of the idea of commodity trading than that described in the booklet, which had undoubtedly served as the source for writing the computer program. The court analyzed the work of writing a program, albeit somewhat shakily, and concluded that “a source code is not an entirely new, unique expression of ideas. It is simply a translation from one language to another.” This conclusion is very obscure. Source code is simply a means of causing the computer to compile object code. It embodies the programmer's ideas of how to solve the particular program with which he is confronted. Here, however, the court sees the programming, or perhaps more precisely, the coding, function in a very drab light: “To a skilled programmer, the conversion of known input, known output, the mathematical expressions needed and the methods of transferring those expenses into computer language is necessarily a mere clerical function.”

It is true that the court was dealing with a booklet describing a method of trading. The booklet simply described calculations necessary to produce signals indicating whether or not to invest in a particular commodity. The court felt that the program was merely a translation from English into BASIC which produced, in terms of signals, very similar results. The court seemed to have accepted the view of the plaintiff's expert that “the source code meant nothing since the program can be written in various ways.” This seems quite contrary to the view taken by the Third Circuit in the Apple case which argues that it is because the program can be written in different ways that it is an expression; it is elementary copyright law that only the expression (and not the idea alone) can be protected. Williams v. Arndt seems to come very close to allowing a system of commodity trading to be protected.

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118. Id. at 577.
119. Id. (citing In the Matter of the Application John W.C. Sherwood, 613 F.2d 809 (C.C.P.A. 1980), and in fundamental agreement with the analysis in Whelan. But cf. supra note 90 and accompanying text.
121. Williams, 626 F. Supp. at 581.
This aberration, however, was implicitly rejected in the subsequent case of *E.F. Johnson & Co. v. Uniden Corporation of America*[^122], where software used to control radio communication channels was in issue. The defendants intended their product to be compatible with a system marketed by the plaintiffs. There was ample evidence that they had copied the programs[^123] however, because they had used a different processor, the appearance of the code was quite different[^124]. The court explicitly endorsed the approach taken in *Apple v. Franklin*[^125], distinguishing between cases where other forms of expression were available and where they weren't. "If a specific program, even if properly copyrighted, is the only an essential means of accomplishing a given task, their (sic) later use by another does not amount to infringement."[^126]

The third case in this quartet was *Q-Co. Laboratories Inc. v. Hoffman*[^127], which concerned the programming of microcomputers to act as teleprompters. These machines are designed to present smoothly moving text in large and easily readable print so as to give the impression to an audience that a public speaker is not reading a text. To accomplish such functions, the machine should ideally have a good graphics display and adequate word-processing and memory facilities. At the time in question, Atari machines had suitable graphics facilities but were somewhat defective in word-processing and memory while the IBM PC had poor graphics but good word-processing and a much larger memory. The plaintiffs commissioned the first defendant to write a suite of programs to transform the Atari into a usable teleprompter. During the course of this work, the defendant became aware of the demand for similar programs to do the same for the IBM PC. An associate, who had worked with him on the Atari, assured

[^123]: Demonstrated by the familiar form of common errors, and, in this case, unnecessary duplication of features appropriate to the older chip that had been used by the plaintiffs, but quite unnecessary for the newer chip used by the defendants.
[^125]: 714 F.2d 1240 (3d Cir. 1983); *Apple Computer Inc. v. Formula International Inc.*, 725 F.2d 521 (9th Cir. 1984).
him that such a program, though more difficult to construct, could be written. Thereupon, after the completion of his work on the Atari project, he set up his own company to develop and promote a teleprompter program for the IBM PC. When the plaintiffs heard of this, they sought an injunction to prevent his infringing their copyright on the Atari program. Because of the completely different hardware configurations of the two machines, the two programs necessarily differed greatly in their coding and were written in quite different languages, BASIC and ATARI for the ATARI and PASCAL and IBM assembler for the IBM PC. They even used different algorithms. Both suites of programs were modular, and all four of the Atari modules were reproduced among the twelve modules necessary for the IBM PC. Although the court held that the defendants had employed the structure and concept of the Atari program in preparing the program for the IBM PC, it also held that any similarity was of "idea" rather than "expression." The court raised a new issue in opining that the plaintiff's task might be less onerous were it to rely upon the exclusive right conferred upon the copyright holder by section 106(b) of the Copyright Act "to prepare derivative works based upon the copyrighted work." In particular, the court seemed inclined to accord more weight to similarity of structure and arrangement in this regard and thought the method of approach not dissimilar to that adopted in the SAS case or in Meredith Corp. v. Harper & Row. Ultimately, however, this argument also foundered on the same reef. There was no appropriation of "expression," only of "idea." The identity of the four modules was sufficiently explained by the functions necessary to the successful operation of any teleprompter program. "[T]he same modules would be an inherent part of any prompting program.... Their order and organization can be more clearly analogized to the concept of wheels for the car rather than the intricacies of a particular suspension system." It can be seen

128. Id. It is interesting that the expert evidence for the plaintiffs, like that in the Uniden case, relied to some extent upon unnecessary duplication of functions. Here, the memory of the Atari was so constricted that there had to be a separate title module whereas the memory of the IBM PC was sufficiently large to dispense with this, but it still retained a separate title module.

129. Though at the relevant point on page 616 the court inadvertently refers to Affiliated Hospital Products Inc. v. Merdel Game Mfg. Co., 513 F.2d 1183 (2d Cir. 1975).

that there is here no succor for West’s arguments. The problem of the merging of idea and expression remains. It is not alleviated by the notion of a derivative work since the West arrangement is in no way recast simply because it is being used as a scheme of reference for a different and wholly public domain text.

The fourth and final case in this group was *Broderbund Software Inc. v. Unison World Inc.*,\(^1\)\(^,\)\(^2\) where the plaintiffs sued for infringement of the audiovisual copyright in a graphics application program. As in so many of these cases, the precipitating factor was the disruption of a joint venture, in this instance one formed to adapt a package running on Apple computers for IBM PCs. The defendants were originally engaged in merely duplicating the plaintiff’s application so far as result and user interface were concerned, but after they had gone some way, the agreement collapsed and they instead decided to produce an enhanced version of the package. In an effort to save time, they used some of the parts they had already duplicated (though the coding was necessarily different). The court noted the conflict between the guidance offered by *Synercom* and *Whelan*, but applied the latter. Its application was assisted by the fact that the plaintiffs themselves had marketed a functionally similar package, but one which had a totally different structure and arrangement. Therefore, the argument that the definition in 17 U.S.C. section 101 of “pictorial” or “graphic” works did not extend to works of a purely utilitarian character was rejected on the facts because, in *Broderbund*, many of the features had represented aesthetic choices.

What these cases highlight is the urgent need for further clarification of the tests for eligibility for copyright protection, for infringement, and for the interaction with remedies in the law of unfair competition as these relate to the more utilitarian areas of compilations of noncopyright materials and computer programs. In this area, there is cause for concern with respect to the notions of “idea” and “expression,” and the means of distinguishing between these notions.\(^3\) There is also a question as

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2. The substantial similarity test has undergone progressive refinement. It was introduced as a two-stage process in *Arnstein v. Porter*, 154 F.2d 464 (2d Cir. 1946), and endorsed with some modification in *Sid and Marty Krofft Television v. McDonalds Corporation*, 562 F.2d 1157 (9th Cir. 1977). Slightly different two-stage approaches were
to how far competition is likely to be promoted by limiting the extent to which functions of particular programs can be duplicated, and existing programs improved, by third parties.

It is the utilitarian aspect both of compilations and computer programs which compels some, necessarily very brief, reference to the other great limb of federal intellectual property law—the law regulating patents. Note that one of the concerns expressed in some courts has been that to extend copyright protection to a publication in which idea and expression are inseparable would be to employ copyright principles to supplant the properly applicable concepts of the law of patent. Patent protection differs from that offered by the law of copyright in innumerable ways. For these purposes, the more significant differences are that it requires much more originality, for example, the method sought to be patented must be nonobvious to merit protection. Additionally, when a patent issues, the protection given extends to all duplication of the claimed method and applies whether or not copying has taken place. The monopoly is harder to acquire; but once acquired, is more extensive.

As noted above, although it was at one time in some doubt, there is now no question but that, in appropriate circumstances, valid patents can issue for computer programs; they are not, in principle, unprotectable subject matter. Since the seminal breakthrough by the Supreme Court in 1981, patents for more and more computer programs have been issued. Unfortunately, the issuing of a patent does not in itself inhibit subsequent litigation to challenge the validity of the patent so issued. It is trite law that business methods are not patentable subject matter and

suggested in Nimmer on Copyright § 13.03A, and by Note, Copyright Infringement of Computer Programs: A Modification of the Substantial Similarity Test, 68 MINN. L. REV. 1264 (1984). See also Note, Toward a Unified Theory of Copyright for an Advanced Technological Era, 91 HARV. L. REV. 450 (1982). In Whelan, the Third Circuit rejected a two-stage approach in favor of a single-stage approach utilizing expert evidence. In Broderbund, although well-disposed toward the Whelan approach ("may well be the wave of the future in this area"), the court was bound by authority to follow the two-stage approach.

133. See the extract from Herbert Rosenthal Jewelry Corp. v. Kalpakian, 446 F.2d 738 (9th Cir. 1971)(quoted supra at page 25).
would often run some risk of being regarded as obvious.\textsuperscript{136} However, the line is proving difficult to hold. In perhaps the most surprising case so far, \textit{Paine, Webber, Jackson \& Curtis v. Merrill Lynch, Pierce, Renner \& Smith Inc.},\textsuperscript{137} the district court refused to strike down a patent that had been issued to the defendants for their Securities Brokerage and Cash Management System, an automated system for the optimum management and integration of a brokerage security account, a money market fund and a charge/checking account. The court rejected the argument that this amounted to granting a patent for a method of doing business on the basis that, since the claim taught the operation of a system, it was within the technological arts irrespective of the method it replaced or the effect it had on the operations of the computer itself. At that stage, the court was not concerned with just how obvious these methods might be.

Both in this area and in that of copyright discussed earlier, what is clear is that the particular characteristics of the computer, and especially its versatility of function, its facility in copying methods from one machine to another, and the costs it incurs in devising and perfecting new programs have created a new commercial climate inimical to the settled principles of the law of intellectual property. There seems to be a great danger that broad and generalized notions of unfairness may be injected into the realms of copyright and patent. If a defendant has appropriated the work of a plaintiff in some sense, it is felt that he ought to pay, if necessary, for infringement of copyright, despite the lack of an author or an expression separate from the idea. Alternatively it is felt that he ought to pay for infringement of patent despite the method being one of doing business, and however obvious the method of doing it, considered separately from its implementation by computer technology. The danger is that special rules devised to accommodate the impact of computers will spill over into the more settled and satisfactory areas of patent and copyright. The early symptoms are apparent in the decisions of the district courts in \textit{Williams v. Arndt} and \textit{Paine, Webber v. Merrill Lynch}. The virus may well be transmitted into the central area

\textsuperscript{136}. As occurred in \textit{Dann v. Johnston}, 425 U.S. 219 (1976), where the Supreme Court so decided in relation to a method of processing bank accounts by computer in such a way as to classify by category of expenditure the statements returned to the customer. \textsuperscript{137}. 564 F. Supp. 1358 (D. Del. 1983).
of literary copyright by way of the intermediately utilitarian field of compilations of noncopyright materials. Is *West Publishing Corporation v. Mead Data Central* to be the carrier?
SOME PRELIMINARY CONSIDERATIONS CONCERNING EXPERT SYSTEMS IN LAW*

Richard E. Susskind**

Expert systems in law are computer programs that assist in the process of legal reasoning. But what kind of model of legal reasoning should such systems implement? Can we in fact be confident that the law is a suitable domain for application of expert systems research and development? Given that it is, what particular branches of the law lend themselves to such computational treatment? Finally, when it is claimed that expert systems in law hold legal expertise in their stores of knowledge, what is meant by this assertion? These fundamental questions are addressed in this article. However, before discussing these preliminary considerations concerning expert systems in law, it is appropriate to offer an overview of the subject.1

I. EXPERT SYSTEMS IN LAW

Much attention has been paid recently, both by the popular press and by academic writers, to the branch of computer science known as Artificial Intelligence (AI). Roughly speaking, AI programmers seek to design, develop, and implement computer systems that are able to perform tasks and solve problems of a sort we would normally suppose required the application of human intelligence (whatever that might be). With that goal in mind, programs have been written that understand limited subsets of

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natural language, recognize spoken words, and perceive objects in the physical world. Other AI programs are designed to reason and to solve problems; expert systems fall into this latter category.

Expert systems are computerized problem-solvers that perform at the level of human experts. Periodically, they are also referred to as "intelligent assistants," as they are regarded as intellectual aids for their users. Perhaps the best known expert systems are those that operate in the field of medicine. These systems provide high-quality consultative advice on diagnosis and therapy for general practitioners in areas of medicine with which these doctors may not be entirely familiar. The goal of researchers in the field of expert systems in law is to develop systems that offer a similar standard of advice on legal matters. It is helpful to say a little more about expert systems in general before expanding on this description.

An expert system is usually constructed with the assistance of human experts who are specialists in the system's field of application. In that way, it is hoped, a high level of performance is ensured. Every expert system has two principal components. The first is its knowledge base, the part of the system that holds its specialized knowledge and expertise. Research topics associated with this component are those relating to knowledge representation, which concerns the techniques and problems of representing the knowledge of a domain within computer memory, and those pertaining to knowledge acquisition, which relates to the manner in which expertise can be extracted from human beings and articulated with a view to embodying it in a knowledge base. The second component of an expert system is its inference engine, the problem-solving mechanism that controls the application of the knowledge base to any problem data. The research issue of knowledge utilization is relevant here because students of this issue concentrate on identifying or developing reasoning methods appropriate for given fields.

Expert systems have three widely recognized distinguishing characteristics. First, they can offer, as a human expert can, explanations for any assertions they make or inferences they draw. They do this by displaying their lines of reasoning; that is, the facts and rules used in coming to their decisions. This contrasts markedly with many conventional computer programs that merely generate conclusions while giving no indication of
the methods by which these were derived. The second feature of expert systems is what is referred to as their flexibility: their ability to allow, without any great difficulty, modifications to their knowledge bases. Many non-AI systems are not flexible because any knowledge they may hold is firmly embedded within the sets of instructions that constitute the program. By separating the knowledge base from the inference engine, however, flexibility for expert systems is easily achieved. Thirdly, most expert systems hold and reason with what is termed heuristic knowledge as well as with the formal knowledge of the field in question. Heuristics are the informal, judgmental rules of thumb derived from experience that human beings deploy (often subconsciously) when confronted with problems for which they know of no clearly applicable or non-cumbersome decision procedures. Their use while reasoning allows incorrect or insufficient information to be handled, and informed conjectures to be made; in short, heuristics are vital for the solving of difficult problems.

On the basis of the foregoing discussion, one would expect that expert systems in substantive law would correspond roughly to the following tentative characterization: they are computer programs that have been developed with the aid of human legal experts in particular, and usually highly specialized, areas of law. These systems are designed to function as intelligent assistants in the processes of legal reasoning and legal problem-solving. The users of such systems are expected to be general legal practitioners who, when faced with legal problems beyond their range of experience and knowledge, rather than always having to turn to appropriately qualified legal specialists or to unwieldy legal textbooks, may instead consult their expert systems in law. Such systems ask questions of their users and guide them through the problem-solving process, using the embodied heuristic and formal knowledge of the experts who assisted in their design. Moreover, these systems offer explanations for their lines of reasoning and may be required to provide citations of the authoritative sources of all assertions made and conclusions drawn.

It must be stressed that the foregoing outline today amounts effectively only to the research aspirations of workers in the field of expert systems in law and is not a description of any single computer system presently in use by legal practitioners. It is probable, however, that fully operational systems of the sort I have just characterized will be developed in the next five to
ten years, provided that sufficient resources are expended for this purpose. I venture this guarded prediction on the basis of the achievements of current projects in this field over the last fifteen years, approximately twenty-five of which collectively demonstrate the computational feasibility of building such systems, and on the strength of the findings of my own research, which establishes the jurisprudential feasibility (and limitations) of building rule-based expert systems in substantive law of limited scope.2

To hasten the production of the type of system I have projected, I believe it is useful to leave the computer terminal and experimental prototypes for a while and to reflect, as I do in the remainder of this article, on several issues that are crucial for all legal knowledge engineers; that is, for all those whose task it is to design, develop, and implement expert systems in law.

II. LEGAL REASONING AND EXPERT SYSTEMS IN LAW

Because legal knowledge engineers strive to construct programs that can assist in the solving of legal problems, they are in some way concerned with legal reasoning. I have argued elsewhere that the activity of building expert systems in law is laden with jurisprudential implications.3 If this is correct, it is productive at the outset to consider rudimentarily the nature of both the activity of legal reasoning and of theories pertaining to it. This discussion, in turn, gives rise to issues to which few workers in the expert systems field have given consideration, yet which must be faced squarely if progress is to ensue. More specifically, I shall look at the function of legal reasoning and the human agents that may be involved in the process, the distinction between descriptive and prescriptive theories of legal reasoning, and, finally, the relationship between theories of legal reasoning and legal theory in general.

Legal reasoning has always been one of the central concerns of the study of jurisprudence. While few eminent theorists have neglected the topic, however, not all discussions claiming to pertain to it have focused on the same issues. There is, on the

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2. For references to current projects, see Expert Systems in Law: A Jurisprudential Approach, supra note 1. For a full discussion of my own findings, see EXPERT SYSTEMS, supra note 1.
3. Id.
face of it, fundamental disagreement over the function of legal reasoning; that is, over the purpose of engaging in the process. Four functions in particular have received attention.

First, it has been said, with respect to judicial legal reasoning, that justification is its prime function in that judges are generally expected to offer at least ostensible reasons for their decisions by way of what seems, indeed, to be a form of justificatory argument. Second, it has been suggested, especially by the so-called American legal realists, that the function of legal reasoning is prediction; that is, lawyers' reasoning involves predicting judicial and official behavior while judges' reasoning is of an instrumentally predictive nature concerning whether or not laws will work for society. A third function that has been identified is the function of persuasion, whereby the lawyer's task is perceived as that of convincing the court of the argument he is presenting and the law reformer's duty is to incline the legislature in favor of his recommendations.

These three functions are not fundamentally incompatible with one another, however, for the divergence of views is often explicable in terms of the legal reasoning agent being discussed. That agent might, for instance, be a judge, jurist, advocate, legal adviser, legal academic, law reformer, civil servant, or, indeed, a citizen.

The accuracy of characterizing the reasoning processes of each of these persons in terms of any one or more of the adduced functions will no doubt vary greatly. (The nature of the jurisdiction involved in a common law system, civil law system, or, like that in Scotland, a hybrid system will often also be a significant factor).

Given that there are several functions of legal reasoning, does this mean the legal knowledge engineer, before designing any system, has to decide whether his program is to assist in justifi-

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4. I shall not analyze the complex concept of function, for it does not seem that jurisprudential controversy has arisen over the use of that term.
fication, prediction or persuasion? At this stage in the research and development of expert systems in law, it is submitted that the answer to that question should be "no." For there is an underlying, more restricted, and yet fundamental model of legal reasoning common to all three accounts of function I have noted that should be at the core of all current systems. Those who claim that the function of legal reasoning is justification, prediction or persuasion share several assumptions about the nature of legal reasoning. First, they acknowledge the possibility of legal reasoning; that is, of an activity whereby legal consequences can be attached to acts, events, and states of affairs of the physical world (although some may be cynical about how the facts and the law can be manipulated). Second, in using the term "reasoning" and ascribing to it a function, they thereby recognize that legal reasoning is an activity guided in some sense if not by logical principles then at least by principles of rationality. Third, and this factor is not unrelated to the previous two, they all presuppose a more fundamental function: stating what is true or false within the universe of legal discourse (a domain whose existence is assumed) as well as deriving the implications of such truth or falsity with respect to particular facts of particular cases. In short, before any justifying, predicting, or persuading occurs, it seems to be assumed that there is a rational process by which a body of legal knowledge can usually be applied to the facts of a case to yield a legal conclusion, although that is not to say that a legal conclusion can always be yielded with ease or that the conclusion will correspond to a final judicial determination. Once the conclusion is derived, some will set about justifying it, perhaps in terms of the rational process; others will use it, as one (not necessarily overriding) element in their predictive calculus; and still others will bring it to bear perhaps again in terms of the rational process, and again not necessarily as an overriding element in their rhetorical deliverances.

I suggest that expert systems in law today should, if they are to be of practical benefit to the legal profession, be designed to perform this most fundamental operation of drawing legal conclusions based on the universe of legal discourse (as represented in the legal knowledge base) through the deployment of some rational reasoning mechanism (embodied in the legal inference engine, whose rationality, as I argue elsewhere, may be that of

8. EXPERT SYSTEMS, supra note 1, ch. 5 and 6.
deductive logic). Such a system could be augmented to perform a justificatory function through the implementation of what is termed a backward-chaining search strategy, or a predictive function through the addition to the knowledge base of (heuristic) knowledge of the likelihood of the courts adopting, or applying, certain legal rules.

With regard to persuasion, what more convincing argument could there be than one based on deductive logic, particularly when reinforced (through the system's transparency) both with legal authority for each proposition asserted and with fully articulated lines of reasoning supporting each conclusion inferred?

Turning now to theories of legal reasoning, note that a designer of an expert system in law may be concerned with such theories in two ways. On the one hand, in works of jurisprudence, he will find in pre-existing theories of legal reasoning many valuable insights that illuminate problems that also beset legal knowledge engineers. On the other hand, in adopting a method of legal knowledge utilization when he builds or tries to build his system, an engineer implicitly will be defending a theory of legal reasoning. This concern with theories of legal reasoning raises two meta-theoretical issues that also should be borne in mind.

First, it should be remembered that many theories of legal reasoning do not simply offer a reportive account of what the process involves but also recommend how the process ought to be carried out. The former can be called the descriptive (explanatory or factual) component of a theory and the latter the prescriptive (normative or evaluative) aspect. Despite the problems of practical philosophy over whether there can be a truly dichotomous division between description and prescription and whether pure description is possible, it remains the case that some theories of legal reasoning are heavily biased toward description while others seem to be quite unambiguously prescribing particular methods of reasoning in law. We should note, too, that many legal theorists, such as Ronald Dworkin and Neil MacCormick, write about legal reasoning in a manner that is at once explicitly descriptive and prescriptive, on the sound basis, as MacCormick says, that "one can be censor as well as expositor without necessarily confusing the two roles."9 Commentaries on AI and legal reasoning, as well as jurisprudential writings, should always

be examined with this description/prescription distinction in mind.

Legal knowledge engineers must decide whether their goal is to design a program to emulate faithfully the process they think is human expert legal reasoning or whether it is to recommend a mode of reasoning they intend will produce the same legal conclusions as human legal expert reasoning (but through different means).

The second meta-theoretical issue that is worthy of note concerns the connection between a theory of legal reasoning and a theory of law. MacCormick is surely correct when he suggests that "a theory of legal reasoning requires and is required by a theory of law" because any account of legal reasoning necessarily makes assumptions about, and has manifest implications in relation to, the nature of law.

Richard Wasserstrom agrees: "It is impossible to discuss legal decision procedures without talking about the law, laws, legal rules, and the like." For that reason, in addition to discussions of legal reasoning and of the role of logic in the law, any thorough jurisprudential investigation into expert systems in law will also pertain to theories of legal knowledge, of legal science, of the structure and individuation of rules, and of legal systems. It should further be noticed that such jurisprudential theories, as Dworkin has stressed, are necessarily involved with broader questions of philosophical discourse, relating, inter alia, to social, moral, political, linguistic, and logical theory topics that themselves rest on more basic (yet often unarticulated) metaphysical foundations. It is unduly restrictive to think that building expert systems in law is simply about computerizing legal reasoning because legal knowledge engineering reaches into the very core of jurisprudence and philosophy. All current projects should be examined with this in mind and all future work should be conducted in the knowledge of this fundamental proposition.

### III. Law as a Suitable Domain of Application

I have now tentatively suggested how it is that expert systems might reason in law and what theoretical issues are relevant.

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10. Id. at 229.
11. WASSERSTROM, supra note 5, at 36.
12. See EXPERT SYSTEMS, supra note 1.
But a nagging doubt needs to be dispelled; critics have evinced misgivings that even if we know what we want an expert system to do, the nature of the legal domain precludes the successful application to it of expert systems technology. The fundamental question of this section, then, is whether the law is a suitable domain for application of the development of expert systems. I tackle this question through consideration of the several respects in which legal knowledge differs in nature from the knowledge held in most current nonlegal expert systems.

It is widely accepted that the ability of human beings to deploy expertise in the solving of problems of any domain is contingent on their possession of extensive knowledge in the field of discourse in question.

It is that knowledge, in turn, that knowledge engineers endeavor to embody in expert systems. The suitability of a domain of application for AI work is no doubt dependent to a great extent on the nature (and accessibility) of the knowledge of that domain. One of the epistemological problems of AI is that of identifying and evaluating the nature of knowledge in given fields with a view to knowledge representation.14

Although it has been pointed out by an eminent AI scientist that the potential of expert systems for the legal profession is considerable,15 it nevertheless seems to be the case that no expert systems of the sort envisaged have been developed to such a stage that they are actually used by legal practitioners. Progress in the field of law has been far slower than in other fields, and in search of an explanation for this fact, it is appropriate to compare briefly the epistemological foundations of successful domains with those of law. Insofar as law is concerned, it should be noted that the question of legal epistemology falls firmly within the bounds of jurisprudence.16

In my comparison, I shall focus on two issues: 1) the distinction between public and private knowledge and 2) the sources of scientific and legal knowledge. (This is by no means an exhaustive study of legal knowledge and there are many other differences between legal knowledge and nonlegal knowledge not elaborated here).

A. Public Versus Private Knowledge

Most commentaries on expert systems rely on a distinction between two sorts of knowledge: public and private. The former includes "the published definitions, facts, and theories of which textbooks and references in the domain of study are typically composed." However, expertise in any given field, it is argued, invariably involves more than this first type of knowledge and experts are also usually possessed of the latter category of knowledge, which "has not found its way into published literature." For "[t]his private knowledge consists largely of rules of thumb that have come to be called heuristics. Heuristics enable the human expert to make educated guesses when necessary, to recognize promising approaches to problems, and to deal effectively with errorful or incomplete data."18

I suggest, however, that this distinction is inappropriate with regard to legal knowledge, as it is defective in more than one respect. Notice, first, that although "public" legal knowledge appears in the form of legal textbooks, such writings are not exhaustive of the category of public legal material. Our written formal legal sources are also to be found in paper and print. While such sources are perhaps more sensibly termed "legal data,"19 they constitute, in a sense, one higher level of organized public material than is manifested in other domains of application. (I shall shortly discuss this difference in the sources of domains).

17. See, e.g., F. HAYES-ROTH, D.A. WATERMAN, AND D.B. LENAT, BUILDING EXPERT SYSTEMS 4 (1983). This distinction has similarities to the epistemological division between "knowing that" (public knowledge) and "knowing how" (private knowledge) that is favored by philosophers. See, e.g., J. HOSPERS, AN INTRODUCTION TO PHILOSOPHICAL ANALYSIS 143-57 (1967); and G. RYLE, THE CONCEPT OF MIND 28-32 (1949).
Furthermore, although it is suggested by AI scientists that "private" knowledge is not to be found in published form, legal heuristics are in fact sometimes set forth in print: in practitioners' handbooks and in internal memoranda within legal practices. Note, for example (in relation to the chosen legal domain of application for a project at the University of Oxford\(^{20}\)), Sheriff Principal Taylor's remarks in the Foreword to S.A. Bennett's book, *A Short Guide to Divorce in the Sheriff Court*:

There is a large field of practice and decision about divorce which is well known in the Parliament House, but with which the solicitor outside Edinburgh will be quite unfamiliar. In this practical Guide, Mr. Bennett, who has experience of divorce practice in the Court of Session, passes on this accumulated lore and experience to the solicitors who will be dealing with divorce in the future.\(^{21}\)

Thus, it is not the case that in law, as it is in other fields, that private knowledge remains untapped in the heads of experts. This heuristic knowledge is often laid out publicly in texts such as the above and, as I have stated, semi-publicly in in-office handbooks prepared by experts within legal practices.\(^{22}\) In sum, then, the public/private knowledge dichotomy is inappropriate with respect to legal knowledge, and in Section V, in my discussion of legal expertise, I shall introduce a more appropriate distinction; that between academic legal knowledge and experiential legal knowledge.

**B. Sources of Legal and Scientific Knowledge**

The second comparison focuses on the sources of legal and scientific knowledge, but it must be stressed that my concern here is *not* with heuristic knowledge. A recently compiled catalogue of expert systems identifies the following domains of application: agriculture; chemistry; computer systems; electronics; engineering; geology; information management; law; manufactur-


\(^{21}\) Id. at vii.

\(^{22}\) See, e.g., Ross Harper & Murphy, *Sheriff Court - Divorce* (1984). (This is an in-house publication of a Scottish law firm.)
ing; mathematics; medicine; meteorology; military science; physics; process control; and space technology. Examination of the functions of these systems confirms, with the exception of information management, law, and manufacturing, that the vast bulk of the domains are firmly rooted in the mathematical and natural sciences. For the purposes of this comparison, it shall suffice to confine the following discussion to the significant differences between legal knowledge and knowledge of the natural sciences (hereafter "scientific knowledge"). It shall further be sufficient, when I talk of knowledge in general, to understand that phenomenon to result from the cognitive appraisal of data within a field of discourse and the subsequent imposition of coherence over that data.

Scientific knowledge is often expressed in the form of scientific laws. Roughly speaking, these laws are formulated as coherent descriptions of uniformities or patterns in nature and can serve both explanatory and predictive functions. Those who propound scientific laws are usually presupposing that one can talk intelligibly about an external material world and that causality is central to that world. The raw datum (the source of knowledge) on the basis of which scientific knowledge is acquired, and over which coherence is imposed, is, therefore, the empirical world in general. In contrast, the sources of legal knowledge are, in a sense, to be found in one very restricted subset of the physical world (where the notions of cause and effect are of little practical moment), namely, the paper and print that constitute the written, formal sources of law. Legal knowledge comes about through intelligent operations, such as description and interpretation, on that legal data.

Hans Kelsen acutely summarizes the difference between the sources of scientific and legal knowledge when he says that “nature does not manifest itself in spoken and written words, as

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23. See Waterman, supra note 15, ch. 25.
24. A powerful distinction between legal knowledge and mathematical knowledge also could be made, but it seems sensible to focus on the natural sciences, domains in which the greatest advances in expert systems have been made. The bulk of the medical knowledge contained in expert systems in medicine is derived from the natural sciences. That this is epistemologically sound is confirmed quite independently in a very clear discussion of the natural sciences in R.S. Downie and E. Telfer, Caring and Curing ch. 4 (1980), but their emphasis on the role of the social sciences within medical practice should be noted by medical knowledge engineers.
For the natural scientist, then, his ultimate source is the natural world. That source is not created by human beings, but in some sense is given to us, and one of the tasks of the natural scientist is to discover scientific laws. For those concerned with the law, however, their ultimate source has generally been promulgated by fellow human beings and appears in linguistic form requiring description and interpretation, not discovery. There are no authoritatively written formal sources of medicine or of natural science akin to those of law. Still less are the sources of natural science regarded as belonging to a system that can be as coherently identified as a legal system can.

What emerges from my rejection, in a legal context, of the public/private knowledge distinction, and from my identification of the different sources of scientific and legal knowledge, ironically, then, is surely that the law is a singularly suitable and systematized domain of application for expert systems, where the problems of knowledge acquisition do not seem so urgent. Legal knowledge engineers are, it would seem, more fortunate than their counterparts in other domains, for not only are relevant textbooks available in print for their scrutiny, but, unlike in other fields, the very sources of these materials also appear in organized, published form. Moreover, related legal heuristic knowledge is sometimes available in paper and print in a way that is mirrored in few other domains. Given these epistemological factors, and the fact, as I noted in the previous section, that most theorists assume legal reasoning to be, at least in part, a process governed by some principles of rationality, it is perplexing that there has been such a lack of progress in the computer/legal-reasoning field.

However, I believe that expert systems in law have not yet been developed satisfactorily precisely because knowledge engineers to date have had insufficient understanding of the idiosyncratic nature of legal knowledge, of which I have given but a brief indication. A more detailed analysis shows that the variety of legal entities that need to be represented, the difficulty in translating from written sources to manageable statements about these data, and the complexity and subtle interrelationships between the resultant units, all suggest it is not possible, without
extensive modification, to feed legal knowledge into the restrictive frameworks offered by currently available computer programming environments. Yet it should not be assumed because there are not suitable software tools for the development of expert systems in law that the law does not lend itself to this type of computational treatment. The nature of legal knowledge and legal reasoning does not preclude the possibility of building expert systems in law, but it does impose severe restraints on the range of software tools and techniques that are appropriate for this purpose.

IV. THE SUITABILITY OF PARTICULAR AREAS OF LAW FOR EXPERT SYSTEMS

Given that the law is a suitable general domain for application of expert systems research and development, it is appropriate to reflect now on the more specific issue of the suitability of particular branches of the law for the purposes of legal knowledge engineering. In this section, I consider, in the first instance, why it is that tax law seems to be the most promising area, and I then offer guidelines concerning the choice of a legal domain.

Tax law has been favored by more leading researchers (those of TAXMAN, CORPTAX, TAXADVISOR, ATAXIS, ExperTAX,) than any other legal domain, and it is important to assess the significance of this for legal knowledge engineers of today. In an important discussion of the characteristics of future "consultation law machines," Bryan Niblett suggested several years ago that "a safe prediction is that the first practical machine will give advice on tax law," and he offered several reasons why this should be so.

The sources of tax law are statutory and the taxing statutes are construed strictly.... Thus, the meaning of a taxing statute may be

26. Such a more detailed analysis is given in Expert Systems, supra note 1.
more clearly discerned than the meaning of other legislation ... assessment to tax [is] expressed in money terms.28

Niblett’s analysis raises several very interesting points that I shall examine in turn. With regard to his assertion that the sources of tax law are statutory in the United Kingdom, I would observe that while it is true that revenue law is primarily based on Acts of Parliament, is it not also the case that those judicial precedents that bear on the meaning and effect of statutory provisions are also formal sources of tax law? Certainly almost all expert systems in tax law would need to have some case law represented in their knowledge bases, for without knowledge of relevant judicial precedents, systems would often be incapable of offering such advice as we would expect from any human legal expert.

Niblett also directs us to the principle that tax statutes are interpreted literally and refers in this respect to an important passage of a judgment of Rowlatt in Cape Brandy Syndicate v. I.R.C.29 No doubt this principle must be at least partially applicable today or else the notions of “loophole” and “tax avoidance” would be rendered meaningless. In the case of Mangin v. I.R.C.,30 Lord Donovan cited the same passage, but added that the will of the legislator and justice may be of relevance where there is ambiguity, and, further, that the history and motivation behind an enactment may also aid in construction. If this be the case, and if we regard several significant cases decided since Niblett wrote the passage under consideration, it would seem that there has been a gradual shift away from a strictly literal approach to construction of tax statutes (at least in relation to certain series of transactions).31 Consequently, the alleged idiosyncrasy, that tax law, in contrast with other areas of law, is interpreted purely literally, may now no longer be as important a factor in the selection of domains as it once was.

29. [1921] 1 K.B. 64.
Moreover, it should also be stressed that literal interpretation plays an important role in the construction of all statutes. Whether a piece of any legislation is construed in the final analysis literally (having regard only to the words of the statute) or liberally (in accordance with, say, the "golden" or the "mischief" rules), in the first instance, a literal interpretation must always be undertaken. If not, how can the necessity for looking beyond the actual words used to explain the purpose of the enactment or the intent of the legislators be assessed? We can only make sense of modes of construction other than the literal method if we assume that literal interpretation is in some sense, and in some cases, insufficient. In other words, literal interpretation is a necessary and logically prior, but not always sufficient, part of the construction process. Therefore, if it is thought, as Niblett suggests, that an area of law's susceptibility to literal interpretation is a prima facie reason for its suitability as a legal domain of application, then (supplementing this proposition with our own analysis) all areas of law are, on the face of it, potentially suitable domains of application.

It follows, for Niblett, that because statutes are construed literally, "the meaning of a taxing statute may be more clearly discerned than the meaning of other legislation." However, this is not always so. Some tax statutes, it is generally agreed, can barely be understood. As David Walker has commented: "More than any other branch of municipal law, tax law is open to the reproach of being utterly incomprehensible by the individuals affected, and even frequently by their legal advisers." Surely the meaning of many tax statutes is far less discernible than that of many other nonrevenue legislative enactments. It is erroneous to equate the discernibility of the meaning of statutes with the manner in which they ought to be interpreted. However, if the incomprehensibility of tax statutes is due to sheer complexity - and not to semantic or syntactic ambiguity, then indeed (but not for the reason Niblett suggests) these portions of revenue law may well be suitable domains. For the complicated rules and the intricate interrelationships between them could all be captured in a legal knowledge base, and the expert system would afford its user a detailed yet manageable path through the law.

The final point that Niblett makes, and rightly so, is that tax law is intimately concerned with monetary concepts. One might

32. D. WALKER, OXFORD COMPANION TO LAW 1207 (1980).
therefore add that, being numerically orientated, it is thus more amenable to computational treatment than other areas of law.

It might also be added that because tax practice is largely the province of the accounting profession, a body that seems less averse to technological innovations and that already has made more extensive use of computers than its legal counterpart, then it is likely that expert systems in law will be developed in the tax law domain. For this last reason and for those others just substantiated, one can, then, perhaps appreciate the appeal of tax law for knowledge engineers.

The mere suitability of tax law for the development of expert systems for use today, however, ought not to dictate the direction of current research. It is undeniable that all legal knowledge engineers must decide in what area of law they intend their expert systems in law to function. If an expert system is being designed for actual use in legal practice, clearly the motivation behind the construction of such a system in one area of law rather than another (given that the technological difficulties between domains are similar) is the practice's need for such a research facility. Moreover, few practices would embark on the development of a system to be used as a legal tool with the knowledge that the technological know-how simply was not available. Tax law may be the domain of the first "practical" system precisely because, in that field, much research already has been carried out and the technological prerequisites seem to have been satisfied.

However, the choice of legal domain for experimental and theoretical inquiries into expert systems in law is dictated by a wider variety of factors and the successful implementation of a system need not always be the ultimate goal. If, indeed, tax law is not representative of positive law, as elements of the foregoing discussion indicate, then it is open to question whether experimental research into expert systems in tax law is appropriate, or even likely to yield fruitful and generalizable results. The successful operation of an expert system in tax law would perhaps be mildly suggestive, rather than in any way conclusive, of the potential of this new research tool for lawyers. It is surely preferable that research in this field be undertaken with a view to illuminating all legal domains of application and not just a particular, almost hybrid, area of law.

Whether a knowledge engineer is constructing an expert system in law for experimental or for practical purposes, however,
it is submitted that the following guidelines are of use for any legal domain.

(1) Insofar as any area of law is self-contained, it is desirable that the chosen domain be relatively autonomous, the sources limited in number and reasonably well-defined. The law relating to the taxation of corporations, therefore, would be an inappropriate domain because it might entail, *inter alia*, company law, corporation tax law, value added tax law, and personal tax law—clearly a range of legal provisions too extensive for expert systems work at this stage of its technological development. The law in Scotland relating to liability for damages caused by animals, on the other hand, is a suitable domain, being a small, identifiable aspect of the law of delict whose sources can easily be located. The identification of a so-called "self-contained" branch of law and its subsequent severance for the purposes of representing it in a knowledge base raises many problems. It should be borne in mind, however, that these problems are not novel, for this process of "compartmentalization" is and always has been prevalent in legal practice.33

(2) The chosen legal domain must be one whose problems do, indeed, require expertise and not simply brief research for their resolution. There should be a potentially significant range of difficult problems that can arise within the domain.

(3) Intensive coverage of a small legal domain is preferable to superficial coverage of an extensive area of law. This proposition follows from my earlier characterization of expert systems. Expert systems in law are designed to replicate the performance of legal experts. The knowledge represented, therefore, must be of such depth, richness, and complexity as that normally possessed by a human expert. One would, of course, hesitate to call those persons who have a broad but nonetheless shallow familiarity with the law "experts."

In relation to this matter, it is interesting to note that Lucien Mehl suggested as long ago as 1958 that while a consultation machine designed to answer questions "over a vast field of law" would undoubtedly be more complex than one that operated in a "highly specialized field of law," nevertheless, "according to

33. The term "compartmentalization" is Ronald Dworkin's. For an excellent discussion of its propriety, see R. DWORKIN, LAW'S EMPIRE 250-54 (1986).
the exponential law of information, its [the former type's] complexity will increase much more slowly than the volume of legal information which it can handle." He concluded that "[t]his means that a machine covering the whole field of law would be simpler and less cumbersome than a series of machines handling separate legal sectors." As a practical recommendation, however, Mehl's notion of a system embodying the legal knowledge (that is what he means by "information") of an entire legal system cannot be taken seriously. The practical problems faced in engineering a system to function even in a limited legal domain of application are so numerous that it is likely the only way "a vast field of law" could be catered for is through the networking of smaller systems. However, that is not a job for the near future. (It is likely that networking of expert systems in law will be very important in years to come, because, and this is one of the difficulties of compartmentalization, many legal problems will transcend the divisions of the law imposed by these systems).

(4) A domain in which there is agreement among experts regarding its scope and content is to be preferred to one in which there is no such consensus. This principle makes for systems that can be more readily relied upon because a knowledge base of inherently contentious content would be of dubious value. In this connection, it should be added that legal domains in which there seem to be many conflicting legal rules, valid rules that for the same set of circumstances seem to dictate diverging legal consequences, currently are unsuitable domains of application.

(5) Legal domains whose problems require the use of a great deal of "common-sense" knowledge for their resolution are generally unsuitable for expert systems work. Reasoning in law often involves common-sense reasoning, for instance, judgments concerning what is "reasonable." However, because AI techniques cannot presently cope satisfactorily with common-sense, legal domains of high common-sense content, at present, are not ideal for expert systems development. Such domains could be used, however, if it were deemed acceptable for the user to input common sense himself during consultations.

35. BUILDING EXPERT SYSTEMS, supra note 17, at 160.
V. LEGAL EXPERTISE AND THE LEGAL EXPERT

There is a tendency to speak rather vaguely of the notions of legal expertise and the legal expert. AI scientists might prefer to replace these terms with such designations as (legal) domain-specific expertise and the (legal) domain specialist, but whatever labels one chooses to append, it is necessary to have a clear picture of what is meant by them. In this section, I examine the terms in greater detail, and thereby attempt to indicate what kind of lawyer, for knowledge engineering purposes, might appropriately be called a legal expert. I also offer some guiding principles relative to construction of a legal knowledge base.

In Section III, it was said that there are significant practical and epistemological differences between legal knowledge and knowledge in other domains. So profound are these discrepancies that they render much that has been written on experts and expertise in nonlegal fields of discourse of minimal relevance for the legal knowledge engineer. A fresh analysis is thus required and I shall begin by introducing a distinction between academic and experiential legal knowledge. This distinction not only serves to replace the inapposite public/private knowledge distinction rejected in Section III, but also provides a basis for sensible discussion about legal expertise.

Academic legal knowledge can be acquired by anyone trained in, or familiar with, the techniques of legal research. The raw data of academic knowledge are the primary and secondary sources of law; that is, legislation and judicial precedents together with legal commentaries on these materials. Together, these can usefully be referred to as "the repositories of law." Appraisal, interpretation and comprehension of these repositories will eventually be productive of academic legal knowledge. Note again that, unlike the "public" knowledge of nonlegal domains, the written repositories may also provide heuristic knowledge. It is

36. For example, D. Hawkins, in his detailed paper, An Analysis of Expert Thinking, 18 INT'L J. OF MAN-MACHINE STUD. 1 (1983), attempts to propound a "theory of expert thinking." This exposition, however, relates primarily to expert petroleum geologists. Initial suspicions that the epistemological differences between law and petroleum geology will severely limit the relevance of that paper for those interested in expert legal thinking are confirmed by examination of Hawkins' analysis.

37. This is D.M. Walker's term. See D.M. WALKER, THE SCOTTISH LEGAL SYSTEM ch. 11 (1976).
academic legal knowledge, generally, that students of the law attempt to acquire and that teachers of the law invariably possess in some quantity.

Good legal practitioners also have academic legal knowledge. In addition, these lawyers acquire what we term experiential legal knowledge; that is, knowledge of the day-to-day practical administration of the law. Experiential knowledge is gained not through immersion in the repositories of the law but, as the phrase suggests, from personal experience in the workings of the legal process.

Such experience in the practical administration of a legal domain refines, and often modifies, a lawyer's academic knowledge. Experiential knowledge is generally of two sorts. First, there is heuristic knowledge: the informal, judgmental, experiential, and often procedural, knowledge. Second, there is what might be termed nonheuristic procedural knowledge; that is, knowledge concerning how to go about the administration of the law. I term it nonheuristic because it is in no way uncertain, informal, or probabilistic in nature. Rather, it consists of well-settled sets of algorithmic instructions that indicate essential legal procedures. It is of limited use in legal practice to know academic law thoroughly if that knowledge cannot be correctly employed, for example, in knowing both the correct form to complete or document to draft and the appropriate time to do so. To know such matters is to have nonheuristic procedural knowledge.

There is, of course, an overlap between academic and experiential knowledge in that, and this is crucial, experiential knowledge is sometimes articulated in secondary sources of law: in legal textbooks, in practitioners' handbooks, or in "in-house" materials. However, some might deem the borderline itself as unimportant, for they might assert that a legal expert is simply one who possesses extensive and thorough quantities of both academic and experiential knowledge and is capable of solving (usually within a limited domain) difficult legal problems with speed and efficiency. In that event, the legal knowledge engineer is given the formidable job of immersing himself in the repositories of law and, through extensive knowledge acquisition ses-

38. On legal heuristics, see EXPERT SYSTEMS, supra note 1, at ch. 3.
sions, eliciting further (and large amounts of) experiential knowledge from the legal domain specialist. This is perhaps an unassailable sketch of one conception of legal knowledge engineering, but one that, if put into practice, would surely confront the general “bottleneck” problem of knowledge acquisition. Sound techniques have not yet been fully developed for the extraction of heuristic knowledge from human experts. It would be greatly preferable, however, if we could avoid many of the classical problems of knowledge acquisition and it is suggested that this can indeed be done; moreover, it can be justified through acceptance of and reliance upon the following account of legal expertise.

I submit that we can talk meaningfully of a legal expert who is possessed solely of academic legal knowledge and also, therefore, of an expert system that can function with academic knowledge alone. (I am not denying that expert systems in the future might usefully have experiential knowledge that is not held in published materials, but I do cast doubt on the suitability of that as a current goal). We need not trouble ourselves with detailed analyses of the general notions of expert and expertise because they are rather vague and relative notions whose distinguishing common-sense characteristics do seem fairly uncontroversial (i.e., involving high-quality performance of difficult tasks, speed, efficiency, and so forth). Rather, I argue that it is possible to use the term expertise with respect to those who have no experiential legal knowledge and that such knowledge is not essential for expert systems in law. Such an argument can be quite easily sustained because all that I assert is that (other prerequisites of expertise being assumed) those who have vast knowledge of areas of law, as found in the written repositories of law, and who can employ that knowledge in reasoning toward legal conclusions, can rightly be called experts. It can also be argued forcefully that extensive knowledge and understanding of the primary sources alone, together with the ability to apply it, may constitute expertise.

To deny the title “expert” in some circumstances would be to belittle the knowledge of law that so many nonpracticing legal

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40. For a sound analysis, see Building Expert Systems, supra note 17, at 41-45.
EXPERT SYSTEMS IN LAW

academics unquestionably have. An expert system that held the knowledge of some leading academic lawyer would surely be a powerful tool indeed and its lack of experiential knowledge would by no means render it useless. It must be remembered, however, that expert systems are for use by general legal practitioners. They will use the systems as powerful research tools that will be capable of drawing legal conclusions in specialized areas with which these users have no familiarity. The expertise of the systems, then, will not lie in, for example, their possession of nonheuristic procedural knowledge, which the user himself will usually have anyway, but in their profound representation of the substantive law and related heuristics, insofar as the latter are held in secondary sources.\(^{41}\) Of course, the expert who, as we shall see, “tunes” the system, may be an academic or a practitioner; if he is the latter, it is his academic knowledge that is of principal use.

My approach to expert systems, then, constitutes a more realistic, if less ambitious, approach to designing legal knowledge bases than that of those who would argue for the full representation of both academic and experiential knowledge. In light of my conception of legal expertise, the following guidelines are proposed:

1. As a first step, the legal knowledge base should be constructed by inputting only academic knowledge. Thus, at the heart of the legal knowledge base will be the written primary and secondary sources, the repositories of law.

2. The academic knowledge should be input not by a legal expert but by one possessing general legal training or knowledge. The time and effort of legal experts are valuable and expensive resources and there is no reason to waste them by requiring them to do tasks that other less-qualified persons can perform.

3. Until suitable “shells” for expert systems in law have been developed,\(^ {42}\) legal knowledge engineering must be carried out, as

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41. In the context of international private law in English courts in general, the laws of foreign jurisdictions are treated as matters of fact and must be proven by the evidence of a legal expert of the relevant legal system. Note that it does now seem, in relation to civil proceedings at least, that the expert need not ever have practiced law. See J.H.C. Morris, The Conflict of Laws 37 (1980).

42. Shells are ready-made inference mechanisms upon which expert systems can be built. They are created by removing the domain knowledge from an existing expert system, leaving the inference subsystem (together with the user interface and transparency features).
I believe research into expert systems in law must be, in an interdisciplinary manner; that is, by a team comprised of an individual with computational training and one with legal training. Computer scientists cannot be expected (and generally, have insufficient knowledge) to be able to engage in the legal research required for building an academic legal knowledge base of intensive coverage. (See the third guideline of the previous section). In general, computer scientists are no more equipped to carry out such demanding legal work than lawyers are to write computer programs. (This is confirmed by an examination of the corruptions of the law held in many of the current programs). Similarly, the lawyer will need extensive guidance from the computer scientist because a peculiar species of logical rigor will be required, for which neither legal practice nor legal education has prepared him.

(4) Only after the academic legal knowledge base has been developed should the legal knowledge engineers avail themselves of the services of the legal expert (or, preferably, experts). It would be naive to think that a legal researcher could develop a faultless academic knowledge base. It will no doubt require considerable refinement by legal experts. We must pay heed to what has been cautioned by AI scientists: "It is very easy to be deluded into thinking one knows a great deal about the domain. Remember: the expert became one only after years of training and experience."43

(5) The sole function of the legal expert is to "tune" the academic knowledge base. Tuning is the process by which an expert experiments with a system that is under construction and refines its knowledge base (and perhaps even its inference mechanism) in light of his own extensive knowledge of the domain.44 Through extensive interaction with the system, by trying out sample problems that the expert is singularly qualified to concoct, and by examining the system's explanations, the legal expert will gradually correct basic errors in the original representation (for example, misinterpretations of the primary sources) and modify and refine the knowledge base to reflect his own conception of

43. BUILDING EXPERT SYSTEMS, supra note 17, at 165. The author's usage of "experience" need not be equated with my term "experiential," for the legal expert can be said to have had years of experience in operating with academic legal knowledge.

the domain (perhaps by changing the level of generality of some heuristics or by altering their certainty factors). It is not the prime function of the expert to add great quantities of knowledge to the base (although some augmentation is both possible and desirable) but rather to render the knowledge more reliable - in short, to bestow the finishing touches of expertise on the system. Note that the legal knowledge engineer (with legal training) may act as a useful intermediary between the legal expert and the computer expert (with computational background) since there will inevitably be communication difficulties at the tuning stage. Moreover, as long as a suitable user interface has been built into the experimental system, the legal expert himself need have very little knowledge of computer science in general or of expert systems in particular.

Three points should be noted. First, the role of the expert in building expert systems in law can be significantly less active than in other domains. Second, the findings of the previous section may be supplemented by suggesting that a legal domain's suitability for knowledge engineering is dependent also on the richness of the written secondary sources to which the engineer has access. Finally, by following my conception of legal expertise, the problem that prevents the development of expert systems in other domains, that of knowledge acquisition, can be seen largely to dissolve in a legal context.

VI. CONCLUSION

In this article, I have tried to explain why the law is a well-suited field for expert systems applications and to offer realistic guidelines for all those who wish to build expert systems in law. The model of legal reasoning I advocate for implementation, the recommended criteria for selection of legal domains, and my conception of legal expertise may all be considered to constitute encouragement for the development of rather too modest and unexciting systems. Yet widespread failure over the years to produce a working system for the legal profession, I believe, calls for a fundamental reappraisal of the field. If we are to progress, we must now surely operate within the confines of more realistic and responsible expectations and, in discussing some preliminary considerations concerning expert systems in law, I have endeavored to do just that.
HIGH TECHNOLOGY "REVERSE ENGINEERING" THE DUAL STANDARD

R. J. Hart*

In high technology circles, particularly in the electronics industry, much consideration is being given to issues of "reverse engineering" as these apply to Intellectual Property Rights. Reverse engineering had its first legislative airing in the electronics field in the Semiconductor Chip Protection Act of 1984 (SCPA). Section 906 of the Act is entitled "Limitations on exclusive rights: reverse engineering; first sale."2

I. REVERSE ENGINEERING-SEMICONDUCTOR CHIP PROTECTION ACT

The Act does not define reverse engineering per se, however, in Sections 906(a)(1) and (2), it states:

(a) Notwithstanding the provisions of section 905, it is not an infringement of the exclusive rights of the owner of a mask work for-
(1) a person to reproduce the mask work solely for the purpose of teaching, analyzing, or evaluating the concepts or techniques embodied in the mask work or the circuitry, logic flow, or organization of components used in the mask work; or
(2) a person who performs the analysis or evaluation described in paragraph (1) to incorporate the result of such conduct in an original mask work which is made to be distributed.8

The original House and Senate bills4 only contained provisions equivalent to 906(a)(1). Such provisions were required to accom-

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2. SCPA, supra note 1, § 906.

3. Id. § 906(a).

modate the well established practice in the semiconductor chip
industry that permits a chip to be analyzed by a competitor to
determine its structure and function so that compatible chips or
improved designs can be generated. Section 906(a)(2), however,
goes farther and makes it clear that it is not an infringement of
exclusive rights to incorporate the results of reverse engineering
analysis into "an original mask work which is made to be dis-
tributed."5

There appears to be two ways of interpreting these words. The
first interpretation is that the words permit the reproduction
of a protected mask work only for the purposes of teaching,
analyzing or evaluating the techniques embodied in it, and only
to the extent of permitting the incorporation of the results of
the analysis and evaluation in a second original mask work. In
other words, it would not be permitted under this first interpre-
tation of reverse engineering to copy any original segments of
the first work into the second. The second interpretation of the
words of 906(a)(2) is that it also permits copying of original parts
of the first mask work into the second mask work as long as the
second mask work, taken as a whole, is considered original.

The reasons given in the Senate explanatory memorandum for
adding section 906(2)(b) are as follows:

Although the reverse engineering provisions of S. 1201 and H.R.
5525 were almost identical, this amendment includes a provision
(section 906(a)(2)) to clarify the intent of both chambers that com-
petitors are permitted not only to study protected mask works,
but also to use the results of that study to design, distribute and
import semiconductor chip products embodying their own original
mask works. While this intent appears indisputable from the leg-
islative history in both Houses, it seems prudent to spell it out in
the bill itself.
The end product of the reverse engineering process is not an
infringement, and itself qualifies for protection under the Act, if
it is an original mask work, as contrasted with a substantial copy.
If the resulting semiconductor chip product is not substantially
identical to the original, and its design involved significant toil and
investment so that it is not a mere plagiarism, it does not infringe
the original chip, even if the layout of the two chips is, in sub-
stantial part, similar. As noted in the Senate report, the courts

5. SCPA, supra note 1. § 906(a)(2).
LIABILITY FOR REVERSE ENGINEERING

are not likely, as a practical matter, to find it unduly difficult to draw the line between reverse engineering and infringement, because the additional work required to come within the privilege established by section 906(a) will ordinarily leave a 'paper trail.' Of course, apart from the foregoing, the amendment, like both bills, incorporates the familiar copyright principle of substantial similarity. Although, as a practical matter, [the] copying of an insubstantial portion of a chip and [the] independent design of the remainder is not likely, [the] copying of a material portion nevertheless constitutes infringement. This concept is particularly important in the semiconductor chip industry, where it may be economical, for example, to copy 75% of a mask work from one chip and combine that with 25% of another mask work, if the copied parts are transferable modules, such as units from a cell library.6

The second paragraph quoted above appears to go beyond what is necessary to permit the study of a protected mask work and the use of the results of that study. It permits the copying of substantial parts of the first chip into a second chip as long as the second chip, considered as a whole, is original. The main issue to be decided is what is meant by the word "original". It is not expressly defined in the Act.

The House Report7 defines a mask work as original "if it is the independent creation of an author who did not copy it."8 It goes on to state that "[t]his adopts the essence of the customary copyright law concept of originality and applies it to mask works, to the extent it is appropriate and feasible to do so."9 In discussing Section 910 of the House Bill, the report specifies that "[If] the mask work embodied in an alleged infringing chip is substantially similar to a registered mask work, then there can be a judicial finding of infringement of the rights conferred by this Act."10

It, therefore, must be construed that a product of reverse engineering may be "original" under section 906(a)(2) even if it

8. Id. at 17.
9. Id.
10. Id. at 26.
is "substantially similar" to the first work. This interpretation follows from the fact that since "substantially similar" is the standard for infringement under section 910, the exception in Section 906(a)(2) would be pointless if it was construed to mean only that a non-infringing (i.e., a not substantially similar) chip will not give rise to an infringement. The second paragraph of the Senate explanatory memorandum confirms this reasoning.11

Accordingly, it would appear that it is an infringement of a mask work owner's rights under the Act to copy a substantial part of the mask work unless it was copied to facilitate the process of reverse engineering.

Therefore, the term "originality", used in connection with reverse engineering is different from the term as used in section 902(b)(1). Professor Nimmer indicates that the term "original" in the reverse engineering sense relates to a derivative work, i.e., there need merely be a "distinguishable variation" that is more than "merely trivial."12 Support for this contention can be found in an IIC Studies publication where the authors indicate:

It also seems reasonably clear that 'original' within the meaning of section 906(a)(2) is used somewhat differently than 'original' in section 902(b)(1). As previously discussed, in order to be protected under the Act, a mask work must not only be original, but must also not be "staple commonplace or familiar." It seems highly unlikely that Congress would have provided, in order to stimulate reverse engineering, that reverse-engineered mask works do not infringe the rights of the first work under the Act, but themselves may be appropriated by any pirate interested in copying the new effort. Indeed, this would be contrary to the above quoted passage from the Explanatory Memorandum, which suggests that a mask work satisfying the reverse engineering exception also qualifies for protection.

Thus, it is the view of the authors that the standard under section 906(a)(2) is at least as rigorous as those imposed under the entire section 902(b) standard of protectability. Nevertheless, it may be argued that even this standard (whatever it may be) is too low, and might encourage the substantial duplication of protected mask works and the substitution of the minimum amount of new material required to satisfy section 902.

To avoid the situation the judiciary may consider construing the

11 See note 6, supra.
12 3 M NIMMER, NIMMER ON COPYRIGHT § 18.06[D] (1986).
originality standard for reverse engineering in a manner which provides immunity only for those works which fall within the concerns that prompted Congress to create the exception in the first place - that is, form, fit, and function compatible works which copy only the ideas of the first work, and works that improve the design of the first work in some significant way. Works designed primarily for compatibility that copied only the ideas of the first work would not, even apart from the reverse engineering exceptions, infringe the first work. Thus, the relevant inquiry would be a judicial examination of the value of the improvements made in the second work.

Limiting the reverse engineering exception to works that improve a predecessor mask work would likely reduce the ability of second comers to utilize the reverse engineering exception. It is not clear, however, that Congress intended the restriction to be any more restrictive than requiring that the second work be independently registerable under the standard of section 902(b). Perhaps the most that can be said about the scope of the reverse engineering exception is that rather than striking 'the appropriate balance between the rights of the creator and the needs of the public', the Act opens the door for lengthy and expensive technical litigation to determine where that balance actually should be struck.  

It would appear from the above that the issue of reverse engineering is far from having been solved by legislation in the United States.

II. REVERSE ENGINEERING - JAPANESE CIRCUIT LAYOUT RIGHT ACT

The Japanese Circuit Layout Right Act  does not include any reference to reverse engineering, however, it does include a definition of the scope of a circuit layout right as follows:

2. The effect of a circuit layout right shall not extend to the manufacture of a semiconductor integrated circuit which is made by utilizing the registered circuit layout for the purpose of analyzing or evaluating the semiconductor integrated circuit.

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15. Id. at ch. 3, art. 12.
There appears to be no qualification in these words as to what may or may not be copied from a first layout design into a second in the process of reverse engineering the chip of the first.

The Industrial Property Cooperation Center, Tokyo, has indicated that the provisions of the Japanese Act are basically similar to those of this SCPA, with three major differences: (1) no reciprocity, (2) protection starts at the date of registration, and (3) infringement may result in criminal punishment.\(^6\)

The publication indicates that exclusive rights acquired by a creator under the Japanese Act are no absolute. Article 12 of the Act includes language similar to section 906(a)(2) of the SCPA, and is regarded by the authors as legitimizing reverse engineering.

Professor Z. Kitagawa, however, in discussing the question as to whether a substantial similarity test for determining the permissibility of reverse engineering has also been adopted by the Japanese Act indicates that "[t]his privileged treatment afforded to cases of reverse engineering [in the United States] is, in the author's view, not adopted by the Act of Japan."\(^7\)

Professor Kitagawa further indicates that originality is required for a circuit layout to be protected under the Japanese Act.\(^8\) The Act protects circuit layouts to the same extent as is afforded copyright works.\(^9\)

Under this view, copying from a first chip into a second reverse engineered chip is not permissible under the Japanese Act. It should be noted that Professor Kitagawa lead the Japanese delegation to the two sessions of the World Intellectual Property Organization (WIPO) Committee of Experts on Intellectual Property in respect of Integrated Circuits, held in Geneva.

### III. REVERSE ENGINEERING - EEC DIRECTIVE

A third piece of legislation that should be taken into account in this area is the Proposal for a Council Directive from the Commission of the European Communities\(^20\) published on December 23, 1985, which states:

3. The exclusive rights to authorize the acts specified in paragraph 1 shall not extend to any such act in relation to an original circuit layout.
topography created on the basis of an analysis and evaluation of another topography carried out in conformity with paragraph 2.21

The word "original" as used in this Article is defined as follows:

3. However, the topography of a semiconductor product shall not be protected unless it satisfies the condition that it be original in the sense that it is the result of its creator's own intellectual effort. Where the topography of a semiconductor product consists of elements that are commonplace in the semiconductor industry, it shall not be considered original unless the combination of such elements, taken as a whole, is original and not commonplace.22

In the Explanatory Memorandum to the council directive, Articles 5(2) and (3) are qualified as follows:

28. The second and third paragraphs of Article 5 concern the difficult problem of so-called reverse engineering. The second paragraph authorizes reproduction of topographies for the purposes stated and thereby legitimizes reverse engineering as a technical procedure. The third paragraph addresses the more difficult and controversial problem of the commercial exploitation of the results of reverse engineering. Such a provision seems necessary if the Community semiconductor industry is not to be put at a disadvantage by comparison with the United States industry which has the benefit of a similar provision, though at the price of a certain legal insecurity at least in the initial period of the provision's application. In practice, once substantial similarity between two topographies is shown, someone relying on a reverse engineering defense in relation to a product that he has marketed will have the burden of establishing that his topography is indeed an original creation realized on the basis of reverse engineering. To do so, he will have to show in detail how it was developed. This 'paper trail' will have to provide sufficient indication of independent creative activity to exclude the possibility of simple copying.23

As a result of discussions on the directive in the Governmental Working Party on Intellectual Property (Semiconductor Products), amendments were made to its reverse engineering provisions. The version adopted at the meeting of Internal Market Ministers on December 1, 1986 is not addressed in Articles 5(3) and 5(4):

21. Id. at art. 5(3).
22. Id. at art. 2(3).
23. Id. at Explanatory Memorandum, para. 28.
5(3) The exclusive rights referred to in paragraph 7(a) shall not apply to reproduction for the purposes of analyzing, evaluating, or teaching the concepts, processes, systems, or techniques embodied in the topography or the topography itself.

5(4) The exclusive rights referred to in paragraph 1 shall not extend to any such act in relation to a topography meeting the requirements of Article 2(2) and created on the basis of an analysis and evaluation of another topography, carried out in conformity with paragraph 3.24

In addition Article 2(3) has been redrafted and appears as Article 2(2) in the following form:

(2) The topography of a semiconductor product shall be protected insofar as it satisfies the conditions that it is the result of its creator's own intellectual effort and is not commonplace in the semiconductor industry. Where the topography of a semiconductor product consists of elements that are commonplace in the semiconductor industry, it shall be protected only to the extent that the combination of such elements, taken as a whole, fulfills the above mentioned conditions.25

The EEC Directive, in my opinion, must now be regarded as affording less protection to an original mask work owner than does the SCPA. This is because the directive (a) does not require a reproduction to be made solely for the purposes of analysis and evaluation, and (b) it permits a reproduction used for the purposes of analysis and evaluation to be used in the "creation" of a new topography as long as that topography meets the requirements of Article 2(2). The major requirement to be met is that the new (or revised) topography, considered as a whole, must be the result of its creator's own intellectual effort. It is not necessary that it be "original" in the sense that no identifiable segment of the original mask work has been copied. Accordingly, it would seem that as long as the reverse engineered topography is not simply copied in total and as long as the second topography includes some original part, the exclusive rights of the owner of the reverse engineered topography cannot be asserted as against the revised product.

IV. REVERSE ENGINEERING - WIPO DRAFT TREATY

In the WIPO Draft Treaty,26 reverse engineering is addressed as follows:

25 Id.
(4) Notwithstanding the provisions contained in paragraph (1)(a)(i), no Contracting States shall consider unlawful the copying of the layout-design without the authorization of the proprietor in the following cases:
(i) if the copying is solely for the purposes of analysis, evaluation, or reverse engineering, provided that, where the reverse engineering results in the production of a [semiconductor] layout-design, such layout-design is, in itself, original.\footnote{Id. at art. (4)(i).}

Again it should be noted that the words "solely" and "original" are used. "Original" is defined in the Draft Treaty as follows:

vii. \[T\]he layout-design of [a semiconductor] integrated circuit shall be considered 'original' if it has not been copied and is the result of intellectual effort.\footnote{Id. at art. (1)(vii).}

The Draft Treaty has this to say about reverse engineering:

60. It is believed that [reverse engineering] should not be defined in the Treaty. It should not be defined because it is well understood in specialized circles, just as the notions 'circuit,' 'integrated,' 'substrate,' 'passive elements,' or 'active elements' are well understood in such circles. Furthermore, it should not be defined because, with the advance of technology, any definition of 'reverse engineering' is likely to become obsolete in a short period of time. Its meaning is likely to change with the passage of time but the specialized circles will always know what it means at any point of time in its development. A narrative description, rather than a definition, could be included in a document prepared for or by the Diplomatic Conference that will be convened, if one is convened, for the adoption of a Treaty. It will, in any case, emphasize that a \textit{special effort} (time and money) is an indispensable condition of reverse engineering. Otherwise, the description will reflect - as it can do no more - the understanding of the meaning of reverse engineering at the moment of the said Conference. The description will not necessarily be valid during the whole life of the Treaty.\footnote{Id. at explanatory notes.}

During discussion of reverse engineering at the WIPO Experts meeting in June 1986, I made the following statement on behalf of UNICE:

\begin{quote}
We in UNICE are committed to the belief that reverse engineering should \textit{not} permit the unauthorized reproduction of an original part of a first product in a second product... [the] reverse engi-
\end{quote}
neering provision [should] only permit the reproduction of the design layout of the first product for the purposes of analysis and evaluation and ... never allow original parts to be copied from the first product into the second product without authorization from the proprietor of the layout-design of the first product. There [should]... be a right under reverse engineering to use the results of the analysis and evaluation but this should not extend to the copying of the original parts of the first layout into the second product. In our opinion, the [use] of [the word "original"] in [section] 3(4)(i) covers this issue, since ["original"] means not copied.

This position, of course, is the first of the two interpretations discussed at the start of this article.

IV. SUMMARY OF ALTERNATIVE INTERPRETATIONS

A. Reverse Engineering - without copying

In particular it was stated that the concept of reverse engineering, while permitting the copying of the layout-design of an integrated circuit for the purposes of analysis and evaluation, should not permit the unauthorized copying of original parts of the protected lay-out design of an integrated circuit in a further layout-design of an integrated circuit.

This was the meaning of the condition, at the end of paragraph 4 (i), that the layout-design must be, in itself, original. The latter condition otherwise would be in contradiction to the definition of originality, because if originality meant that the layout-design had not been copied, then the concept of reverse engineering should not allow the unauthorized copying of the original parts of a first layout-design into a second layout-design.\textsuperscript{30}

B. Reverse Engineering - with copying

On the other hand, it was maintained that the concept of reverse engineering should not only allow copying for the purposes of analysis and evaluation but also copying of original parts of the protected layout-design of an integrated circuit in the layout-design

established by the reverse engineer, provided that, as a whole, the latter layout-design was different from the protected layout-design and constituted the result of an intellectual effort.\footnote{31. \textit{Id.} at para. 98.}

V. CONCLUSIONS

It would appear that there is a desire in the advanced technical field of semiconductor products for (a) protection to be provided for original designs against slavish copying, but (b) that the protection provided should not impede the development of competing products.

The “reverse engineering” exception, if construed broadly, is, in my opinion, a new type of intellectual property right since in patents and copyright law the recognition of rights in an improved version do not sweep aside rights attaching to the original. In the patent system, for example, patents relating to an improvement can only be used with permission from the original “dominant” patent right holder. Similarly, with respect to “derivative” copyright works, the derivative work can only be exploited with permission from the author of the work from which it derives. The reverse engineering exception takes the unusual step of nullifying the rights of the mask work owner as far as the second mask work is concerned.

It is vitally important, I believe, for industry to operate in an international environment and, therefore, dual standards must be eliminated unless the Intellectual Property sector of industry is to function at a disadvantage. For example, if one country has a more liberal interpretation of reverse engineering, (permitting a designer of a reverse engineered chip to incorporate substantial but not identical parts of the design of a first chip) then chip designers in countries having a strict reverse engineering provision (where copying is not permitted at all) will be at a severe disadvantage in international competition. Further, a situation could occur where a reverse engineered chip would be legitimate in the liberally interpreting country but would be illegitimate, i.e., infringing, when imported into a country applying the strict interpretation. International agreement on the definition of permissible reverse engineering in intellectual property matters is, therefore, vital. Fortunately, when adopting the EEC Directive,
the Council incorporated a statement into the council minutes indicating that the Commission will keep reverse engineering developments under review, including developments in nonmember states and in WIPO, and will make appropriate proposals for further legislation, as a matter of urgency, should these appear necessary. A similar issue is, in my opinion, surfacing in the computer program field. Richard H. Stern has raised the "look and feel" issue as far as computer programs are concerned, and has identified the need for a legislative solution. It appears to me that it may be time to review the fine work done by WIPO in the preparation of its Model Provisions on the Protection of Computer Software particularly in connection with section 5 (Rights of the Proprietor). Perhaps this work should be updated in the light of the reverse engineering issues raised in the semiconductor product field and in the light of changes being experienced in the software field. Some progress has taken place even since the preparation and submission of this article for publication.

32. See, e.g., Whelan Assoc., Inc. v. Jaslow Dental Laboratory, Inc. 797 F.2d 1222 (3d. Cir. 1986).
35. Since preparation of this article, the House of Lords has handed down its decision in Leyland v. Armstrong ([1987] 1979 RPC 551) confirming the advances made in earlier decisions (i.e., L.B. Plastics v. Swish, [1986] 12 Fleet St. L. Rep. 221) but imposing restrictions on the use of copyright for spare parts. Additionally, the British Government published a White Paper (Intellectual Property and Innovation [1986] CMND 9712) proposing the introduction of a new "unregistered design right" (specifically mentioning semiconductor integrated circuit chips as candidates for protection). The expected reform of copyright law suggested by the White Paper was not, however, mentioned in the Queen's speech at the last session of Parliament.

Under current law, mask work owners may seek protection in the United States by interim order under § 914 of the SCPA (reflecting a special reciprocal agreement).

On Dec. 10, 1986, the Council of the European Communities adopted a directive (E.E.C. pub. 11 200/86 P181 ECO 117) addressing the protection of semiconductor products. It requires EEC member states to introduce legislative provisions conferring exclusive rights. The directive is based on the SCPA. This development should force amendments to British law; probably by statute under the European Communities Act. The directive requires that provisions be enacted by Nov. 7, 1987 (the expiration date of the § 914 interim order provision in the SCPA).

The author finds it probable that the British changes will not call for registration, but that registration provisions will be included in the German, French and Italian laws. Belgium, Ireland and Denmark, like the United Kingdom, will, it is reported, opt for non-registration. It is still uncertain what Spain, Portugal and Greece will do.
FOLLOWING IN AMERICAN FOOTSTEPS?
COMPUTER CRIME DEVELOPMENTS IN GREAT
BRITAIN AND CANADA

Martin Wasik*

I. INTRODUCTION

The American legislative response to computer crime has been both sweeping and dramatic. Many states have enacted computer crime laws, commonly based on the pioneering provisions in the California Penal Code, and there is now federal computer crime law, though this is, so far, applicable in only a narrow range of cases. Other federal or state laws have also been found by the courts to extend to situations involving computer crime. Where the statutes have been held by the courts not to cover new varieties of lawbreaking, speedy reformulation of the statutes has been a regular response.

These developments of the criminal law have not gone un-criticized. It has been argued that the scale of the problem has been exaggerated by the media, that computer crime surveys

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3. See, e.g., the overturning on appeal of the conviction in Lund v. Commonwealth, 217 Va. 668, 232 S.E.2d 745 (1977) on a charge under the general larceny statute, and the subsequent passing by the Virginia legislature of a computer crime statute to cover such a case for the future; VA. CODE §§ 18.2-98.1 (1982) (the statute describes computer time or services as things which can be stolen). See also People v. Weg, 113 Misc. 2d 1017, 450 N.Y.S.2d 957 (1982); Evans v. Virginia, 308 S.E.2d 126 (S.C. Va.) 1983.

have provided only subjective and unreliable evidence, and that law reform initiatives in this area have already gone too far. It has also been said that the new legislation is largely unnecessary, since the actual gaps in existing laws are few, and that the creation of specific offenses in relation to computers creates indefensible anomalies in the law. Some of the new statutes are said to be too broad, bringing within the net a great deal of activity which hardly merits the attention of the criminal courts at all. The purpose of this essay is to compare and contrast the response to problems of computer crime to be found in other jurisdictions, namely, Great Britain and Canada.

A recent report of the Organization for Economic Cooperation and Development, entitled Computer-Related Crime: Analysis of Legal Policy, contains a summary of legislative and case law developments in member countries of that organization in the area of computer related crime, including Great Britain and Canada. The aims of the report are stated to be (a) to make it easier for member countries to exchange information about how they are approaching computer related crime; (b) to observe the main evolution and trends of measures taken by member countries in computer-related crime; and (c) to try to reach a common understanding both of computer-related crime itself and how the law can deal with it. A central finding of the survey is that OECD member countries have responded differently in this area. They may be divided into two broad groups in relation to the nature of their response.

The first group of countries regards computer crime as presenting no special features requiring any particular new measures. This group sees no need for any distinction between information in general and computerized information in particular, and regards the computer simply as an instrument that may be used for committing an act which is already proscribed by the criminal law.

The second group takes the position that legislatures should extend existing offenses and introduce new ones to accommodate this significant new form of criminality.

This kind of distinction is simplistic, but useful nonetheless. It is likely that countries would find themselves adopting one or

the other of these responses for a variety of reasons. In part, it would have to do with the nature of their substantive criminal law, particularly its flexibility in adapting to novel situations. It would also have to do with the extent of computerization within that country and, hence, the perception of risk. Finally, of course, it would have to do with other practical matters, such as perceived public and commercial anxiety, law reform initiatives, and legislative priorities.

II. BRITAIN AND CANADA

In terms of the division described above, it seems that Britain belongs to the first group (though showing some signs of wavering), while Canada clearly has now become a card-carrying member of the second group.

Broadly speaking, Britain's approach is explained by its reliance upon the flexibility of its existing law to deal with most computer-related crime problems, although much of that law was drafted without such potential applications in mind. Two recent convictions which received wide publicity in the press, one for criminal damage involving erasure of computer programs, Cox v. Riley\(^6\) in March 1986, and one involving "hacking" into the Prestel computer system and gaining access to private mail boxes (including the Duke of Edinburgh's), Schifreen v. Gold\(^7\) in April 1986, seem to have silenced, at least temporarily, critics who said that the relevant English criminal law was full of loopholes and could offer no effective response to computer criminals. At about the same time, the first significant investigation of the subject by a British law reform body was reported in the Scottish Law Commission's Consultative Memorandum No. 86 on Computer Crime in March 1986.\(^8\) In general, this too espoused the view that the common law could be relied upon to deal with many of the suggested new varieties of lawbreaking. It should be said, however, that the common law of Scotland is in several important

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respects more extensive and more flexible than that of England, with the Scottish judges more cavalier than those south of the border. Even so, the Scottish Law Commission did recommend the creation of one new statutory offense to cover the obtaining of unauthorized access to a computer, including hacking.

In Canada, the most significant development has been the passing of the Criminal Law Amendment Act 1985 which, by provisions in its section 46, created in the Criminal Code of Canada the broadly-worded new offense of "unauthorized use of a computer". Additionally, it amended, by provisions in its section 58, the existing criminal damage provision in the Criminal Code and created the offense of "mischief in relation to data." Both sections contain lengthy definitions of the technical terms used, such as "computer program," "computer service," "computer system," "data," and "function." 9

In contrast to what has happened recently in Britain, it seems that this legislative reform was, in part, spurred by the dismissal of a prosecution appeal by the Supreme Court of Canada in Regina v. McLaughlin. 10 The McLaughlin case, involving a hacker, turned on the inappropriateness of the phrase "telecommunications facility" in section 287 of the Criminal Code to cover the passage of data between a mainframe and a remote terminal. According to Justice Estey, "[t]he court would not be expected by Parliament to glean from words generally associated with the communications industry an intent to attach penal consequences to the unauthorized operation of a computer." 11

Yet, in other cases the Canadian judges have been willing to set aside the dictate that criminal law provisions should be narrowly construed. In Re Turner And The Queen, 12 Justice Gray of the Ontario High Court of Justice was prepared to interpret section 387(1)(d) of the Criminal Code (which proscribes the willful obstruction, interruption, or interference "with any person in the lawful use, enjoyment, or operation of property") broadly enough to cover the defendant's electronic encryption of data. Justice Gray's rationale was that the encryption constituted an activity that effectively denied access to legitimate users. He

11. Id. at 394.
rejected the argument that there had to be physical damage done to bring the defendant within the section.

More remarkable, though, was the decision of the Ontario Court of Appeal in *Regina v. Stewart.* Here, the issue was whether confidential information could constitute the subject matter of theft. Section 283(1) of the Criminal Code, to be found in the part of the Code entitled, “Offenses Against Rights of Property,” declares that

“Everyone commits theft who fraudulently and without color of right takes, or fraudulently and without color of right converts to his use or the use of another person, anything, whether animate or inanimate, (a) to deprive, temporarily or absolutely, the owner of it, or a person who has a special property or interest in it [of its beneficial use] . . . [or] (d) to deal with it in such a manner that it cannot be restored [to] the condition [it was in] at the time it was taken or converted” (emphasis added).

The Court, Lacourciere J.A., dissenting, held that while, clearly, not all information was “property,” there was a right of property in confidential information which brought it within the definition. When the information was taken, its character of confidentiality was destroyed; hence, the defendant’s intent fell within subsection (d). The Court was unimpressed by the logic of the English Divisional Court decision in *Oxford v. Moss* where the defendant student’s theft conviction for making a copy of an unseen examination paper was quashed on appeal, notwithstanding that the offense of theft in English law was applicable even at the time to “tangible or intangible” property. *Oxford v. Moss* is still the law in England; whether *Stewart* will remain the law in Canada depends upon the outcome of its long awaited appeal to the Supreme Court.

Let us now turn to consider some other specific areas of computer-related crime which are posited as presenting problems for traditional criminal law. In each of these areas, the relevant law of Britain and Canada may helpfully be compared and contrasted.

III. CRIMINAL DAMAGE AND COMPUTER DATA

The first area to be considered involves the application of traditional laws of criminal damage to the erasure or falsification of computer data. Such conduct may be perpetrated either by someone who is normally authorized to use the computer, or by an outsider, such as a hacker.

American computer crime legislation clearly extends to cover such conduct. An example is the Florida statute, which makes criminal any willful, knowing, and unauthorized modification or destruction of "data, programs, or supporting documentation residing or existing internal or external to a computer, computer system, or computer network." In contrast, the Scottish Law Commission is of the view that this conduct would fall within either the common law crime of malicious mischief or the statutory offense of vandalism. A difficulty with this latter view, discussed in the Scottish Consultative Memorandum itself, is that where electronic manipulation or destruction of data has taken place, it will be only the data, and nothing else, which suffers damage (this is likened to rubbing writing off a blackboard), and it is doubtful whether data alone could properly be regarded as "property" for the purpose of the offense of malicious mischief. The Scottish Law Commission, however, adopted the argument that:

"Information stored on a disk or tape is represented by magnetic impulses or whatever on the disk or tape itself. Any corruption or erasure of the data which these impulses represent must involve in a sense some damage to the disk or tape since in such a case the disk or tape is not merely an empty receptacle waiting to receive such impulses but one which already has them imprinted on it. On that approach, any corruption of the data is a form of damage to the disk or tape itself."

The issue has not yet been litigated in Scotland, but there have been convictions in England under the Criminal Damage Act of 1971. In May 1986, a case was reported in the press where a defendant, Talboys, pleaded guilty to charges under the Act for altering his firm's computer program so that it could not be

17. FLA. STAT. ANN., § 815.04(1),(2) (West Supp. 1983).
19. Id. para. 3.72.
accessed by staff. It cost the employers 1000 pounds to investigate and put it right. Talboys was conditionally discharged and ordered to pay 1000 pounds compensation. In Cox v. Riley, however, the defendant pleaded not guilty. He had been employed by a firm to operate a computerized saw which relied for its operation upon a plastic printed circuit card being inserted into it so that it could cut window frame profiles of different designs. The defendant, who had a grudge against his employers, blanked the card of all its sixteen programs by repeatedly operating the program cancellation facility. The magistrates convicted him of criminal damage but an appeal to the Divisional Court provided an opportunity for the appellate judges to discuss the applicability of the 1971 Act to this behavior.

First, under English law, it was not open to the appellate court to uphold the conviction on the basis that the programs themselves were damaged. Section 10(1) of the 1971 Act clearly states that the Act does not extend to intangible property.

The second possibility would have been for the court to take the position that the machine, the saw itself, had been damaged. This position would have relied on several earlier cases in which convictions had been returned finding criminal damage in circumstances where a machine had been rendered useless without its having suffered actual physical damage.

The basis announced by the Riley court, however, for upholding the conviction was that criminal damage had been done to “the plastic printed circuit card.” In the view of the Scottish Law Commission, this was a problematic theory if the plastic printed circuit card was appropriately described as being made up of the card and the programs printed on it. The card itself was not damaged and the programs could not in law be damaged. The printed card was, perhaps, viewed rather like an oil painting, where the application of chemical solvent would be regarded as damage to the painting, rather than to the canvas or the paint. But the analogy is not perfect, since the paint itself in that case would be tangible property, and could be the subject of the damage under English law.

In Canada, as we have seen, there was the decision in *Turner*,\(^{23}\) where the defendant was convicted for accessing certain tapes containing data files of American companies and altering or encrypting them so that they could not be used by anyone who did not have the encrypting alphabet. Section 385 of the Canadian Criminal Code provides that “In this Part, ‘property’ means ‘real or personal corporeal property’”\(^{24}\), but 387(1)(d) of the Criminal Code is more generously drafted than the English law, in focusing on the notion of “mischief” rather than “damage”:

“(1) Everyone commits mischief who willfully (a) destroys or damages property; (b) renders property dangerous, useless, inoperative or ineffective; (c) obstructs, interrupts, or interferes with the lawful use, enjoyment, or operation of property, or (d) obstructs, interrupts, or interferes with any person in the lawful use, enjoyment, or operation of property.”\(^{25}\)

The *Turner* Court rejected as irrelevant the defendant’s contention that there had been no interference with the corporeal aspect of the computer tape, or its use in its corporeal aspect, because, clearly, as far as subsection (d) is concerned, interference in the enjoyment of property, rather than physical alteration or damage, is the gist of the offense.\(^{26}\) The impact of this decision is exactly confirmed by section 58 of the Criminal Law Amendment Act 1985, which adds a new subsection to section 387.\(^{27}\) The general effect of this provision is to equate “data” with “property” in subsections (a) to (d). Additionally, to avoid any doubt, it is spelled out in (d) that it will constitute mischief where a defendant willfully “denies access to data to any person who is entitled to access thereto.”

All of this suggests that it may be timely to reconsider the proper ambit of the offense of criminal damage in English law. Since the English law has traditionally confined the notion of tangible damage to physical objects, it seems that, despite the conviction in *Cox v. Riley*, the law should give further attention to specifying the varieties of behavior which are to be proscribed by that offense. The Scottish Law Commission considered, as

\(^{24}\) CRIMINAL CODE, § 385.
\(^{25}\) Id. § 387(1)(d).
\(^{26}\) Turner, 13 C.C.C.(3d) at 433-34.
\(^{27}\) CRIMINAL CODE § 387.
mentioned above, whether to create a specific offense to cover denial of access to authorized data users but provisionally concluded that there was no evidence that this was a widespread problem requiring a criminal law solution. Indeed, the new subsection 387(d) in the Canadian Code seems very broad indeed, for in principle it would extend to waylaying a computer programmer on his way to work.

IV. UNAUTHORIZED ACCESS AND UNAUTHORIZED USE

A second major area where English and Canadian laws have gone very different ways is one that addresses the obtaining of access to a computer by an unauthorized person. A basic difficulty is that one might gain unauthorized access to a computer in any number of ways. For example, although a person may be an employee of a computer owner, he may still not be authorized to use the computer. If he is an outsider, he may physically break into the premises where the computer is housed; he may gain access by means of an unauthorized telephone tap, or, if he is a hacker, by electronic means through a remote terminal or link. While in most cases the gaining of unauthorized access will be preliminary to the defendant's real object, such as falsification of data, removal of information, or use of computer time, the Scottish Law Commission saw the gaining of access itself as a common feature in these activities, one which might conveniently be addressed by the criminal law. Again, the Commission was of the view that, with one possible exception, such conduct would not contravene existing criminal law.

The one exception is the Interception of Communications Act 1985, section 1(1) of which provides:

[a] person who intentionally intercepts a communication in the course of its transmission ... by means of a public telecommunications system shall be guilty of an offense."

As the Home Secretary observed in the course of the bill's passage through Parliament, these provisions are aimed at regulating the activities of telephone tappers, not hackers, and it seems that only rarely could the gaining of unauthorized access

29. Id.
to a computer be caught under this section. First, there is a problem with the word “communication.” In order for it to apply to computer access, it would have to be interpreted to embrace electronic communications between computers, between a terminal and a mainframe, and oral communications between human beings using telephones. The Scottish Law Commission thought that the section might be so interpreted, but the English courts may take their cue from the restrictive interpretation of McLoughlin. Second, the conventional hacker “initiates” rather than “intercepts” a communication and so his activity may well fall outside the wording of the section.

There is in England now, however, another possibility, following the convictions of Schifreen and Gold for hacking activities under the Forgery and Counterfeiting Act 1981. This case has attracted a good deal of attention in England, but it is difficult to ascertain exactly what it decides. Moreover, it is currently under appeal to the Court of Appeal. In this case, Schifreen, taking advantage of some luck, ingenuity, and slack security precautions, was able to gain access to the Prestel computerized information service, in particular, to user files containing the identification numbers and passwords of subscribers. As a result, he was in a position to add to and alter data and to deny access to legitimate users. He and another defendant were charged with several counts of forgery in that, on various occasions, they had “made a false instrument” by electronic means with the intention of inducing the Prestel computer to accept it as genuine, to the prejudice of British Telecom. The prosecution’s argument was that the “instrument” was “made” by entering another person’s identification number and password into the user segment of the computer. It was “false” because it purported to be made by the legitimate user. British Telecom was prejudiced because it was thereby induced to provide the defendants with various Prestel services without charge, the sum involved being some 379 pounds. The defendants were convicted on all counts, in several instances on majority verdicts. They were fined 750 and 600 pounds respectively and each ordered to pay 1000 pounds costs.

The case has not been fully reported and there remains some doubt about whether it is a reliable authority on computer-

32. Id.
related crime. The main difficulty is whether the hackers, in fact, made a false instrument. The term "instrument" is broadly defined in section 8 of the Act and includes, according to section 8(1)(d), "any disc, tape, sound track, or other device on or in which information is recorded or stored by mechanical, electronic, or other means." But the defendants communicated by generating a series of electronic impulses, which does not seem to come within the definition of "instrument." It would seem that if the hackers had obtained the number, and then written it down on a piece of paper, they would have created a false instrument. If, however, they memorized the number and then used it to gain access it would be difficult to reach the same conclusion, given the wording of the Act.

If there was an instrument, was it "false?" It would seem so, since by section 9 of the Act, an instrument may be regarded as false for one of a range of eight separate specified reasons, one of which, section 9(1)(a), may apply, in that the instrument purported "to have been made in the form in which it is made by a person who did not in fact make it in that form." The Scottish Law Commission has proposed the creation of a new offense: "unauthorized access to a computer." The Commission offered four suggested qualifiers in this regard, the first three specifying particular techniques of access (i.e., (a) by means of a public telecommunications system, (b) by means of a telecommunications system, or (c) by any form of telecommunication). The fourth, specifying no particular form of access, would make the offense applicable not only to the hacker but also to any person who obtained unauthorized access by direct physical means. The Commission would like to define the word "access" in a way as to exclude from liability an employee who merely enters the computer room without authority.

In Canada, by contrast, the legislature has chosen, in section 46 of the Criminal Law Amendment Act 1985, to penalize "unauthorized use" rather than "unauthorized access." The new law provides:

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34. Id. § 9(1)(a).
35. Supra note 18 at paras. 6.2-12.
36. See, Wasik & Piperaki, supra note 8.
"Everyone who, fraudulently and without color of right (a) obtains, directly or indirectly, any computer service, (b) by means of an electronic, acoustic, mechanical, or other device, intercepts or causes to be intercepted, directly or indirectly, any function of a computer system or (c) uses or causes to be used, directly or indirectly, a computer system with intent to commit an offense under paragraph (a) or (b) or an offense under section 387 in relation to data or a computer system is guilty of an indictable offense ...."  

This provision would certainly extend to "theft" of computer time, such as the case in which an employee uses his employer's computer for his own purposes. Some such cases may be quite serious, as in the situation where the employee is running his own business in this way, but the majority of incidents are trivial and arguably beneath the criminal law's attention, as where an employee merely programs the computer to play tick-tack-toe. Several American states have followed California's example and have outlawed theft of computer time but there have been very few prosecutions, suggesting that employers are generally content with warning or, where necessary, disciplining the employees concerned. To legislate specifically for computers in this context therefore, would create an anomaly in an environment where, generally, it is no offense to misuse other items of another's property.

It will be clear from what has been said so far that the subject area of computer-related crime is one containing a number of important unresolved issues. Brief mention may be made of two or three other specific problems which await resolution, probably at legislative level.

V. OTHER ISSUES

The question of "theft" of information has already been touched upon. In Stewart, the Ontario Court of Appeal was prepared to say that, in some circumstances, information could constitute the subject matter of theft. One of the judges in the majority decided the case on the basis that special protection should be accorded to confidential information. Another was prepared to regard breach of copyright as equivalent to theft, a position that would greatly extend existing law. 38 There has been a good deal of

37. Criminal Code, § 301.2.
38. Stewart, 149 D.L.R. (3d) 583.
adverse academic comment about Stewart. It remains to be seen whether the Supreme Court will endorse it or adhere to its own previous statement in McLaughlin that such extensions to the ambit of the criminal law are properly the province of Parliament rather than the judges.

The Scottish Law Commission accepted that the law in Scotland on this point was the same as that in England, but felt unable to recommend legislative change. It argued that to confer a property status upon information would have implications going far beyond computer-related crime and that it was doubtful whether information was something which should be capable of exclusive ownership. 39

A practical difficulty in English law has been the impotence of deception-based offenses in the prosecution of computer-related crime. The difficulty arises from discussion in several cases suggesting that the notion of "deception" necessarily involves the misleading of a human mind. The only actual decision on the point, Moritz, 40 has since been reversed by statute, 41 but general uncertainty remains. In Canada, as in several other jurisdictions, the problem has not presented itself because different wording has been used to describe these offenses. 42 The law in Scotland, for example, uses the words "false pretense" rather than "deception." Change in England could be effected by judicial decision, since none of the other authorities address the problem of computers, 43 but the question should properly receive the attention of Parliament.

CONCLUSION

Computer-related crime is a new and developing area of law, presenting several unique problems. The 1986 OECD Report on Computer-Related Crime shows that most member countries have been quicker than Britain to anticipate and respond to these problems by amending and updating their criminal codes. These

41. Finance Act, 1985, CH. 48; see also The Collection of Value Added Tax, Treasury Department, HMSO (1984).
changes have resulted from the involvement of national law reform bodies, as well as from extensive consultation within the computer industry and elsewhere. In Britain, the main developments so far have been by way of judicial decision, the courts having extended existing laws to cover new situations. In Canada, there have been important initiatives at both the judicial and the legislative levels. The danger with leaving matters entirely to the judges is that, in court, the crucial questions concerning the proper ambit of the criminal law, such as whether it should properly be extended to penalize hacking, theft of information, or theft of computer time, are rarely articulated. These questions merit the widest discussion because, as the Scottish Law Commission has observed, decisions to extend the criminal law in the context of computers will often have important implications in other areas.
I. INTRODUCTION

Since the advent of computers, the computer industry has tried to integrate the machine into every aspect of man's existence. One such integration has been into the practice of law. Routine and mundane computer applications allow the attorney convenience and accuracy in maintaining extensive records, such as client billing status. A more dynamic use for computers in the law office has been to assist the attorney in preparing and litigating a case. The enormous storage and organizational capacity of a computer is exactly what an attorney faced with reams and reams of paper documents needs to help organize and digest the issues and answers presented by pending litigation.

A computer-based litigation support system can be thought of, in broad terms, as any computer hardware, software, and associated peripherals used to store, sort, file, index, cross-index, and retrieve by specified search criteria any information pertaining to the management and prosecution of pending litigation. Historically, the use of a computer by an attorney in litigation has been limited to cases broadly categorized as complex litigation. Complex litigation cases typically involve several dozen parties and hundreds of thousands of documents. Traditionally, the reason for such a limitation was the high cost of implementing such a system. It is suggested by this writer that the rapid decline in the cost of computer hardware, the heightened sophistication and storage capacity of the desk-top computer, and the prolific growth
of the software industry will make the computer more attractive to attorneys involved in litigation that is less than complex. This writer also suggests that the entry of computerized support into everyday litigation will necessitate a greater awareness by attorneys of the problems that can arise from the creation of a computer-based litigation support system.

II. CHARACTERISTICS OF A COMPUTER-BASED LITIGATION SUPPORT SYSTEM

Before the problems associated with the creation of a computer-based litigation support system can be discussed, it is necessary to develop an understanding of the formation and functioning of such a system. The computer-based litigation support system can be set up to store and order all documents pertaining to a case in one of three ways: full text, index, or combined.\(^3\) In a full-text system every word of each document is inputted. The advantages of such a system are obvious. No preinput issue-narrowing need be done. Key word searches can be conducted and no information is lost due to preinput screening. On the downside, the full-text system is expensive and requires massive memory capacity.

For the index system, each document is given a unique code that is input to the computer along with predetermined index variables that represent information found within that document. Examples of predetermined input variables include the date of the document, the author, the recipient, and a code of some sort representing the subject of the document. A common desk-top computer could easily accommodate an index system for a small to medium size case.

The final option, an index/abstract system, is meant to be a compromise between the index and the full text systems. For this system, input to the computer would consist of all the elements of an index system plus an abstract of the documents' contents. With this type of system, the attorney can not only search and sort the predetermined index variables, he can also search the abstract for key words in context.

Choosing one of the three alternatives requires consideration of several factors. These factors will vary from case to case.\(^4\)

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3. Hanley, supra note 1 at 52-53.
Two rather obvious factors are the number of contentious issues and the number of documents related to those issues. Through the course of this article the various types of computer-based litigation support systems will be discussed only when relevant to the issue of discoverability.

Additionally, a computer-based litigation support system can be developed to handle only one issue or type of document. For example, the defendant in a class action suit may want a database containing the plaintiffs' names, addresses, and damage claims. Once this type of system is put into place, the computer can be told to analyze the data based on certain criteria.

III. Pretrial Discovery

The most important concern that arises from the creation of a computer-based litigation support system centers around protecting the system from pretrial discovery. A prudent attorney would agree that the creation of a computer-based litigation support system is, at best, counterproductive, if the opposition is able to compel discovery of the database and learn the fruits of his labors. The situation becomes even more dangerous if, through such discovery, the opposition gains an advantage or toehold that, absent discovery of the computer-based litigation support system, he would not have gained.

A. Revelation of Thought Processes

It is the intent of this article to review the basic theory used to protect a computer-based litigation support system from discovery and to discuss recent cases that impact this basic theory. The claim universally asserted to protect a computer-based litigation support system from discovery is "work-product." The Federal Rules of Civil Procedure protect against discovery of documents and "tangible things" prepared in anticipation of litigation unless the party seeking discovery shows both a substantial need and an inability, without undue hardship, to obtain a substantial equivalent by other means. \textsuperscript{5} Heightened, nearly absolute, protection is afforded to documents or tangible things created as a result of mental impressions, conclusions, opinions, or legal theories

\textsuperscript{5} \textit{Fed. R. Civ. P. 26(b)(3)}. 
Thus, it has been established that two levels of work-product protection exist: one level for ordinary work-product, and a heightened, more restrictive level for attorney-opinion work-product. With this dichotomy in mind, a first cut at the discoverability issue almost requires the attorney to be in primary, if not sole, control of the computer-based litigation support system. Protection should be given even if the client possesses all the necessary skills and hardware to maintain the litigation support system himself. It should also be recognized that index or index/abstract systems will contain more of the attorney's opinions and thought processes than will a full text system.

For purposes of this article, the anticipation-of-litigation prong of the work-product test will not be considered. It can be generally assumed that, absent the pendency of litigation, a computer-based litigation support system would not be created. Computer data bases created in situations other than in anticipation of litigation will be freely discoverable to the same extent as any other document created in the ordinary course of business.

The work-product rule protects only documents and tangible things. One law review article puts forth the argument that a computer data base used to house the litigation support system may not be a tangible thing, but rather a unique coding of fleeting electrical impulses, and therefore, outside the purview of work-product protection. The writers conclude, however, that the ambiguity created by the term "tangible things" can be resolved by looking to another Federal Rule of Civil Procedure. Federal Rule of Civil Procedure 34, which deals with discovery and production of documents and things, provides for the discovery of "documents (including writings ... and other data compilations from which information can be obtained, translated if necessary, by the respondent through detection devices into reasonably usable form)." Thus, to prevail on the tangible-things prong of the work-product test, the party seeking work-product protection

6. Id.
7. See infra note 18 and accompanying text.
8. Madden, supra note 4, at 12, 18.
10. FED. R. CIV. P. 34.
of a data base need only point to the language in Federal Rule of Civil Procedure 34 to establish that the computer data base is a “tangible thing.”

As previously stated, two levels of work-product protection exist. The protection afforded ordinary work-product is not as extensive as the protection afforded attorney-opinion work-product. Generally, ordinary work-product is discoverable if the movant can satisfy a two-pronged necessity test. First, the movant must show a substantial need for the materials in the preparation of his case. This test will be satisfied if the party can show that the documents are relevant to contentious issues and could reasonably be of value in the preparation of the case. The second prong of the necessity test requires a determination as to the availability of other sources of discovery for providing a substantial equivalent of the material sought.

The earliest case dealing with the question of discoverability of a computer-based litigation support system is one that was not reported in the federal reporter system. To find this opinion of the United States District Court for the Northern District of California, one must turn to the Computer Law Service Reporter. In *IBM Peripherals*, plaintiffs sought to force disclosure of IBM’s computerized litigation support system, which had been developed by counsel to defend against an antitrust action. Discovery was sought through the submission of interrogatories. Plaintiff went so far as to state that “their ultimate intention was to seek an order entitling them to use said computerized trial support system to identify documents pursuant to search criteria designated by plaintiffs....” Without analysis or citing of prior authority, the court found:

1) That the computerized system and the material contained therein had been prepared solely for litigation and put in computerized form so that it could be used in connection with litigation;

15. Id. at 879.
2) That all documents and other materials contained in the computer-based litigation support system were available to the plaintiff through normal discovery. The computer-based litigation support system in no way hides, destroys, or deprives the plaintiffs of access to any evidence whatsoever;

3) The computer-based litigation support system contained that attorney's mental impressions, theories, and thought processes. The court was not satisfied that information contained in that system can be segregated from such lawyer's mental impressions and theories;

4) To allow plaintiffs a more detailed description of the computer data base or to allow plaintiffs to make use thereof, would impinge on the right of IBM's counsel to organize material in the perspective they want to put it in and to utilize such information in their trial preparation. Plaintiffs have failed to make a sufficient showing of need or urgency to justify such a result;

5) Plaintiffs have failed to show that there are no alternate means available to them to obtain the equivalent information without hardship; and

6) The court will not exercise its discretion to compel disclosure of information from or about the trial support system simply because it would be somewhat more convenient for plaintiffs if the court did so.16

Unfortunately, the obscure location of the IBM Peripherals opinion has resulted in the case receiving little scholarly analysis. It is suggested here that for a court to rule that a computer-based litigation support system is work-product, each prong of the aforementioned six-part analysis must be found in favor of the party seeking protection.

In 1980, the United States District Court for the Northern District of Illinois heard Fauteck v. Montgomery Ward & Co., a case similar to IBM Peripherals. In Fauteck, the plaintiff in a sex discrimination action sought discovery of defendant's computer data base, which had been developed under the direction of counsel and contained information as to name, social security number, education, performance rating, communications with employer about promotion or transfers, salary or hourly rate of compensation, education subsequent to hire, and prior experi-

16. Id. at 879, 890.
ence.\textsuperscript{17} Defendant argued that the creation of the computer-based system required the exercise of considerable judgment and should be protected under Federal Rule of Civil Procedure 26(b)(3).\textsuperscript{18} However, defendant admitted that the data base had been created by defendant’s testifying experts. In addition, plaintiff contended that the creation of the data base was purely mechanical and that its assembly had required no discretion on the part of the attorney.

The court held that the defendant had to disclose the data base to the plaintiff and that the plaintiff had to share the cost. The court found that Federal Rule of Civil Procedure 26(b)(3) was not applicable to material created for expert testimony even if the creation of the data base had required considerable judgment on the part of the attorney. The court also held that if the creation of the data base was purely mechanical, no privilege would arise under any circumstances. In addition, the court concluded that discovery of defendant’s data base would not result in any material prejudice to defendant.\textsuperscript{19} In the final analysis, this case was decided by the fact that the computer-based support system had been created by defendant’s testifying expert. This fact took the discovery question out from under the protective work-product veil of Federal Rule of Civil Procedure 26(b)(3).

Recently, a litigant attempted to use the veil of work-product to prevent the production of a computer-readable form of information previously produced to defendant as a paper printout.\textsuperscript{20} In \textit{National Union}, the court held that the traditional work-product doctrine did not preclude defendant from obtaining plaintiff’s computer data in computer-readable form. At issue was defendant’s motion to compel plaintiff to produce computer-readable tapes containing information previously supplied as a paper printout. Production of the paper printout had been in response to defendant’s interrogatories. The information produced included plaintiff’s annual and monthly sales (broken down into dollars and television units) and annual and monthly production (broken down into dollars and television units). In addition, the interrogatories had requested model numbers for television receivers

\begin{itemize}
\item \textsuperscript{17} Fauteck v. Montgomery Ward Co., 91 F.R.D. 393 (N.D. Ill. 1980).
\item \textsuperscript{18} \textit{Id.} at 398.
\item \textsuperscript{19} \textit{Id.} at 398-99.
\end{itemize}
produced or sold, including various characteristics of the sets (e.g., the number of square inches on the viewing screen of the picture tube). Understandably, the paper printout of the requested data was quite voluminous.

Defendant planned on inputting the requested information into a computer of its own to effectively analyze the data. Defendant conceded that it could have processed the hard copy information into tape form by manually creating a data base identical to plaintiff's. The process would have required the expensive and time-consuming process of having clerical personnel read each piece of data in the paper printout and key punch it into the computer. Defendant argued that it would be much simpler for plaintiff to rerun the data producing program with a new command to produce a magnetic tape record.

Plaintiff asserted that the data at issue involved "decision analysis" (i.e., the sentient selection by counsel from voluminous raw material of a limited amount of data for inclusion in the final data base). Plaintiff asserted, through an affidavit of its computer expert, that plaintiff had, in fact, created a litigation support system on the basis of selection by counsel of a number of documents out of many for inclusion in the computer data base. Specific computer programs had been designed for the litigation support system to instruct the computer to perform various computer functions as a part of plaintiff's trial preparation. Thus, plaintiff argued, the data base was protected under the work-product doctrine.

Initially, the court denied the motion for discovery, in part because of a misunderstanding and in part because the request was couched in a different form. The court had been under the impression that the defendants were seeking data stored by the plaintiffs somewhere within their computer software which differed from the material on the paper printout, and further, that the data was arranged in a particular way so that disclosure might have revealed something about plaintiff's trial strategy. The court, citing the IBM Peripherals case with approval, stated that a motion for discovery in this form would be denied.

In the end, the district court in National Union rejected the work-product argument. The court found that the information

21. Id. at 1259.
that would be on the tape was exactly the same as the data contained in the printout, so that any “decision analysis” had already been revealed. The court also found that it had been the requesting party who had decided how the data would be selected and arranged, by virtue of the framing of the interrogatories.

The court in National Union had to confront another issue that was not directly related to the discoverability of litigation support systems. Instead, the issue dealt with whether or not any provision in the federal rules relieved the plaintiff from the obligation of producing the requested tape. The issue was important because its resolution would undoubtedly set the boundaries within which a discovering party may dictate the form in which fruits of discovery must be produced. Federal Rule of Civil Procedure 34 deals with the production of documents and things.\(^{22}\) The rule provides in part that “[a]ny party may serve on any other party a request .... to inspect and copy, test, or sample any tangible things which constitute or contain matters within the scope of Rule 26(b) and which are in the possession, custody or control of the party upon whom the request is served.”\(^{23}\) The court noted that the 1970 amendments to Federal Rule of Civil Procedure 34 made it clear that computerized records are subject to requests for production.\(^{24}\) The court went on to find that although the Advisory Committee contemplated that the requirement to produce data in a “reasonably usable form” would often result in the production of a printout, it did not preclude production of the information in an electronic medium.\(^{25}\) Finally, the court cited Moore’s Manual for Complex Litigation, which views the production of computer data records in machine-readable form as primary in complex cases, and the production of printouts as a secondary alternative. Concluding that the discovering party was entitled to a machine-readable tape, the court stated that “although there may be some difference between requiring the production of existing tapes and requiring a party to so program the computer as to produce data in computer-readable as opposed to printout form, we find it to be a distinction without a difference, at least in the circumstances of this case.”\(^{26}\)

\(^{22}\) Fed. R. Civ. P. 34 (1970); see generally supra note 11 and accompanying text.

\(^{23}\) Id.

\(^{24}\) National Union Electric Corp., 494 F. Supp. at 1262.

\(^{25}\) Id.

\(^{26}\) Id.
Another recent case dealing with the discovery of a computer-based litigation support system centered around two antitrust suits. AT&T had been sued by MCI and the United States. In preparation for this suit, MCI discovered over seven million pages of AT&T's documents. To handle this volume, MCI created a computer-based litigation support system that consisted of computerized abstracts of documents, deposition transcripts, and other exhibits received from AT&T during discovery. The United States sought and received a protective order allowing MCI to share the fruits of discovery, including the material organized in the MCI computer-based litigation support system. Following the protective order and the resulting exchange of documents and data bases, AT&T served a document request on the United States seeking discovery of the contents of MCI's computer-based litigation support system. The United States raised MCI's work-product privilege as a defense against this request. The district court held that MCI's work-product privilege had been waived when the computer-based litigation support system was disclosed to the United States. The district court also found that even if MCI's work-product privilege had not been waived, the United States could not validly claim the privilege because the United States was not a party to the litigation in which the documents were created, nor was it an agent for MCI. The court of appeals determined that MCI should be allowed to intervene and assert its work-product privilege directly. Discoverability by AT&T would then turn on whether MCI had waived the work-product privilege by giving the documents to the United States. The court of appeals reasoned that the purpose of the work-product privilege is the promotion of adversary preparation, which ultimately furthers the truth-finding process. Accordingly, it found that the work-product privilege is not waived when information is shared between parties with common interests. Common interests should be interpreted broadly, said the Court, to include an interest in a common adversary. Finally, the court of appeals upheld MCI's work-

28. Id. at 1289.
29. Id. at 1290.
30. Id. at 1297.
31. Id. at 1299.
product privilege by finding that MCI and the United States had such a common interest; therefore, MCI's sharing of the computer-based litigation support system with the United States did not constitute a waiver.\textsuperscript{32}

\textbf{B. Availability of Alternative Sources}

Under Rule 26(b)(3), a party seeking discovery of documents prepared in anticipation of litigation must demonstrate both his substantial need for the material and his inability, without undue hardship, to obtain the substantial equivalent by other means.\textsuperscript{33} To discover a computer-based litigation support system, the party seeking the discovery must show that the documents reproduced in the system are no longer available. For example, in \textit{IBM Peripherals}, the court denied discovery because, \textit{inter alia}, all documents and other materials contained in the computer-based litigation support system were available to the plaintiff through normal discovery.\textsuperscript{34} A party who has demonstrated a substantial need and a lack of a substantial equivalent can expect ready discovery of an opponents' full-text system.\textsuperscript{35} Conversely, the moving party may have to show a high standard of need for discovery of the opponent's index or index/abstract system.

\textbf{C. Cost of Production}

The allocation of costs for pretrial discovery can be a difficult problem to resolve.\textsuperscript{36} In a typical discovery situation, the parties will argue as to who should bear the cost. However, a party forcing discovery of an opponent's computer-based litigation support system will normally offer to pay the costs of the discovery. For example, in \textit{National Union}, the defendant offered to pay the additional cost that would be incurred in making the computer-readable tape.\textsuperscript{37} The cost-of-production problem can be sum-

\textsuperscript{32} Id. at 1300.
\textsuperscript{34} IBM Peripherals, 5 Computer L. Serv. Rep. (Callaghan) 878 (N.D. Cal. Feb. 10, 1975); see supra note 15 and accompanying text.
\textsuperscript{36} Monarch Insurance Company of Ohio v. Spach, 281 F.2d 401, 413 n.30 (5th Cir. 1960).
IV. POST TRIAL DESTRUCTION OF A COMPUTER-BASED LITIGATION SUPPORT SYSTEM

The court decided in United States v. American Telephone and Telegraph Co. that parties with common interests can share a computer-based litigation support system without waiving the work-product privilege held by the creator of the data base. However, problems arise when an attorney wishes to destroy his litigation support system upon completion of trial. Such a fact pattern arose in United States v. International Business Machines Corporation. This case involved an antitrust suit, with the United States and Control Data Corporation (CDC) lining up, in separate actions, against IBM. The judge hearing the United States v. IBM litigation issued a pre-trial order stating "that both plaintiff and defendant shall henceforth preserve and secure from destruction all documents, writings, recordings or other records of any kind whatsoever." The dispute between CDC and IBM was later settled. As part of the settlement, counsel for both parties agreed that each side would destroy work-product generated in support of the litigation. Accordingly, counsel for IBM and CDC mutually participated in the destruction of the system. The United States sought to block the destruction, claiming that the computer-based litigation support system was indispensable to its preparation for trial. The district court found that IBM had violated its protective order and that a protective order is fundamentally different from a discovery order for purposes of the work-product privilege. It concluded that the protective order could not be circumvented by asserting work-product privilege to justify the destruction. The court of appeals upheld the district court, finding

40. Id. at 557, n.1.
41. Id. at 558.
42. Id.
43. Id. at 559.
that violation of the protective order had prevented the trial court from assessing the extent of work-product protection required for the individual documents or data bases. In dicta, the court of appeals stated that destruction of documents by counsel following completion of a trial is permissible so long as there is no pretrial document preservation order.44

V. CONCLUSION

The use of computers to assist an attorney in preparation for pending litigation will become more and more prevalent. The increased use is enabled by the falling prices of computers and the growing sophistication in the software industry. The attorney will have a choice as to the type of system to be established. If he chooses a full-text system, each word on every document will be imputed to the computer. In an index system, only predetermined index variables will be inputted. An index/abstract system will combine these two. Finally, the attorney could use the computer to handle only a particular aspect of the litigation.

To prevent discovery of the computer-based litigation support system, the attorney can raise the work-product privilege. To uphold the privilege, the computer-based litigation support system should be created for use in pending litigation and be under the sole control of the attorney. In these situations, a judge will force discovery only if the moving party establishes a compelling need for the information and an inability to attain a suitable alternative. The work-product privilege will be upheld even if several parties share the information, so long as the sharing parties have common interests, e.g., a common adversary. If discovery of a computer-based litigation support system is granted, the party seeking the discovery can be expected to volunteer to pay any additional costs. Following the completion of litigation, it will not always be possible for the creator of the system to destroy the data base. It is critical whether or not the judge has issued a pre-trial order requiring the preservation of documents.

44. Id.
THE APPLICATION OF ARTICLE 2 OF THE
UNIFORM COMMERCIAL CODE TO COMPUTER
CONTRACTS

David A. Owen*

In the last three decades, the vast development of computers has required the current legal system to adapt in response to the evolving questions. Various legal concepts have been applied to the use of computers in an effort to analogize this dynamic new technology to some preexisting form. The laws governing trade secrets, patents, copyrights, privacy, and contracts have all been applied to encompass the use and sale of computer hardware and software. In the area of contract law, a recent question has arisen concerning the application of the Uniform Commercial Code to contracts for the sale or lease of computer equipment and programs. This article addresses whether the Uniform Commercial Code applies to contracts for the sale or lease of computer programs and analyzes those cases addressing the issue.

I. WHAT CONSTITUTES "GOODS" UNDER THE U.C.C.?

Section 2-102 of the Uniform Commercial Code defines the scope of Article 2 as applying to "transactions in goods," with "[g]oods" defined as "all things (including specially manufactured goods) which are movable at the time of identification to the

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3. The Uniform Commercial Code will be referred to as the U.C.C. hereinafter.


contract... In those cases where a contract has involved only computer hardware, the U.C.C. has applied. However, questions arise when the contract involves a combination of hardware and software, or solely software.

A. The "Predominant Purpose" Test

The U.C.C. has generally applied when software is sold in connection with computer hardware. In applying the U.C.C. to these situations, many courts have looked to the predominant purpose of the contract. When the predominant purpose is to provide computer equipment and the providing of software or services in conjunction with the hardware is merely incidental to the sale, the U.C.C. will apply.

The case that appears to have implemented the "predominant purpose" test was Chatlos Systems, Inc. v. National Cash Register Corp. Chatlos involved an action arising out of a sale, through a leasing arrangement, of computer hardware and software. NCR recommended that Chatlos acquire a computer system and

represented that the system suggested would provide six functions through the use of computer programs: accounts receivable, payroll, order entry, inventory deletion, state income tax, and cash receipts. Chatlos signed a "System Services Agreement" for this system before learning that one of NCR's competitors had a more advanced method of storing data available. After being informed of this advanced method, NCR represented that it could provide the same technology through the system previously represented and have the system "up and running" within six months.

In reliance upon these representations, Chatlos entered into an agreement with NCR and paid $5,621.22 as part of the transaction. Because both NCR and an independent leasing company disapproved Chatlos' credit, Chatlos entered into a leasing agreement with Midatlantic National Bank where the Bank agreed to purchase the system and Chatlos would then pay a total of $70,162.09 in sixty-six equal payments.

After several delays, it became apparent that significant problems existed with the system, and therefore, Chatlos requested that the system be removed. NCR sought and received additional time in which to correct the errors, but problems persisted. Finally, more than a year after the agreement was entered, Chatlos sent a letter detailing the past events and requesting removal of the system. The court, without discussion, concluded that the transaction was "for the 'sale of goods' notwithstanding the incidental service aspects and the lease arrangement," and was, therefore, governed by Article 2 of the Uniform Commercial Code.

Triangle Underwriters, Inc. v. Honeywell, Inc. was another case that dealt with a contract for both hardware and software.

14. Id. at 741.
15. Id.
16. Id.
17. Id.
18. Id.
19. Id. at 742.
20. Id.
21. Id.
22. Id.
That case involved a contract to supply Triangle with "a package consisting of 'hardware,' or the computer, printer, collator and other equipment, and programming or 'software' created for use in connection with the hardware." Upon being advised by Honeywell that the system was fully operational, Triangle elected to purchase rather than lease the hardware. However, Triangle alleged that the various programs failed to function as represented by Honeywell.

Honeywell contended that the U.C.C. applied since the contract was a "transaction in goods," and therefore, the action was barred by the statute of limitations provided for by the U.C.C. Triangle countered that the contract was predominantly for services. The court agreed with Honeywell and held the contract to be for goods, stating:

Although the ideas or concepts involved in the custom designed software remained Honeywell's intellectual property, Triangle was purchasing the product of those concepts. That product required efforts to produce, but it was a product nevertheless and, though intangible, is more readily characterized as "goods" than "services." Intangibles may be "goods" within the meaning of the U.C.C. § 2-106. . . . The system was subject to sale, and the services provided by Honeywell, design, installation, and maintenance, were incidental to that sale.

In reaching its conclusion, the court focused on the interrogatories, which made it clear that Honeywell undertook to deliver an "entire system," including not only hardware but the programs, or "software," to be used with the hardware. Further emphasizing the "entire system" concept, the term "turn-key" was used to describe the final product to be delivered. This term alone tends to diminish any argument as to the services

24. Id.
25. Id.
26. Id.
27. Id. at 768. Under § 2-725(1) of the U.C.C., "[a]n action for breach of any contract for sale must be commenced within four years after the cause of action accrued." U.C.C. § 2725(1) (1977).
28. Id.
29. Id. at 769.
30. Id.
31. Id.
being predominant to the contract for the sale of goods since it tends to connote a final package.\textsuperscript{32}

The analysis used in \textit{Triangle} has been applied more recently in \textit{Accusystems, Inc. v. Honeywell Information Systems, Inc.},\textsuperscript{33} where the predominance test was also used.\textsuperscript{34} In \textit{Accusystems}, an action was brought for damages alleged from the failure to provide certain computer products and related services as required by an agreement.\textsuperscript{35} In addressing a motion for summary judgment, the court stated that Article 2 has been extended to include contracts that involve "services merely incidental or collateral to the sale of goods."\textsuperscript{36} The court concluded that since the focus of the dealings with Honeywell was the purchase of computers, the agreement was governed by Article 2 of the Uniform Commercial Code.\textsuperscript{37}

\textit{Carl Beasley Ford, Inc. v. Burroughs Corp.},\textsuperscript{38} also involved the application of Article 2 of the U.C.C. to a contract for the sale of both hardware and software.\textsuperscript{39} However, the issue of whether Article 2 applied was never addressed by the court, nor apparently, was it raised by the parties.\textsuperscript{40} The parties entered into a contract whereby Burroughs was to sell and deliver a computer hardware system, including a programming service that involved thirteen software programs, for the sum of $35,000.\textsuperscript{41} This price was termed a "bundled" price by Burroughs\textsuperscript{42} since it was to remain the same regardless of whether the programming service was performed by Burroughs. Although the equipment and one of the software packages was delivered as agreed, the remainder of the programs were not installed by the agreed date, resulting in considerable damage to Carl Beasley Ford.\textsuperscript{43} Even though it appears that the

\begin{itemize}
\item \textsuperscript{32} The term "turn-key" was used by the parties to define a system completely operational upon delivery and, therefore, appears to connote a good.
\item \textsuperscript{33} \textit{Accusystems, Inc. v. Honeywell Information Systems, Inc.}, No. 80-5710 (S.D.N.Y. Oct. 26, 1982) (LEXIS, Genfed library, Dist. file).
\item \textsuperscript{34} \textit{Id.}
\item \textsuperscript{35} \textit{Id.}
\item \textsuperscript{36} \textit{Id.}
\item \textsuperscript{37} \textit{Id.}
\item \textsuperscript{38} \textit{Id.}
\item \textsuperscript{39} \textit{Id.}
\item \textsuperscript{40} \textit{Id.}
\item \textsuperscript{41} \textit{Id. at 328.}
\item \textsuperscript{42} \textit{Id.}
\item \textsuperscript{43} \textit{Id. at 329.}
\end{itemize}
services to be rendered were incidental to the sale, the court never addressed the issue of whether the contract was for the sale of goods or services, but still applied Article 2.44

B. Transactions for Software Only

One case involving a contract solely for the sale of computer software was *RRX Industries, Inc. v. Lab-Con, Inc.*45 RRX entered into a contract where a software system was to be supplied and all malfunctions or "bugs" that might arise were to be corrected by the supplier.46 Problems with the system arose soon after installation and the supplier was unable to correct them.47 No hardware was involved in the transaction; however, the court still looked to determine whether the services were incidental to the sale.48 This court focused on the predominance of the sale and not on the nature of the goods.49 Although never specifically addressed, the court recognized the software packages to be goods within the definition of the U.C.C.50

Applying what it terms a "case-by-case analysis,"51 the Ninth Circuit found that the employee training, repair services, and system upgrading had been incidental to the sale of the software package and "did not defeat [the] characterization of the system as a good."52 However, if the predominant part of the contract is for services, the transaction may fall outside of Article 2.53 From the result in this case, it appears that software packages may very well be considered goods even when not sold in conjunction with hardware.54

II. WHAT CONSTITUTES A "SALE" UNDER THE U.C.C.?

If the program bargained for meets the definition of a good under the U.C.C., a problem may still exist concerning the defi-
nition of a sale. Section 2-106(1) of the U.C.C. defines the term "sale" as "the passing of title from the seller to the buyer for a price." A lease may or may not be termed a sale. The particular circumstances surrounding the lease transaction may govern whether the U.C.C. applies.

In O J & C Co. v. General Hospital Leasing, Inc., a lease was entered into where General Hospital Leasing purchased a computer from the manufacturer and then leased it to O J & C Company. The parties entered into a contract for a five-year period with the total rent payable in sixty equal, monthly installments. Neither an option nor an obligation to purchase existed; however, O J & C Company had an option to renew the lease at the end of the five-year term.

Payments were made regularly for almost four years before O J & C Company ceased payments, contending that the equipment was defective. O J & C Company attempted to make a claim under the Texas Business and Commerce Code, the Texas codification of the Uniform Commercial Code. However, the court held that the factual situation presented was not governed by Article 2 of the Uniform Commercial Code. The court stated, "Since there was no sale involved, this lease is not subject to Article 2...." Sections 2.102 and 2.106 of the Texas Business and Commerce Code are substantively identical to sections 2-102 and 2-106 of the Uniform Commercial Code.

57. O J & C Co., 578 S.W.2d 877. See also Application of the Uniform Commercial Code to Software Contracts, 2 COMPUTER L. SERV. (Callaghan) § 3.3, Art. 4 (August 1974) (for the proposition that Article 2 should apply to leases, bailments, distributorship agreements, and service contracts).
60. Id. at 877.
61. Id.
62. Id.
63. Id.
64. Id. at 877-878.
65. Id. at 878.
66. Id.
One commentator has justified O J & C Co. on the basis that no sale could have ultimately occurred. This conclusion appears accurate since the transaction that occurred had nothing to do with a sale, nor did it convey those rights traditionally obtained through a sale.

Computer Servicenters, Inc. v. Beacon Manufacturing Co. also addressed the definition of a “sale.” Beacon entered into an oral agreement whereby Computer Servicenters would provide certain data processing operations previously being done internally by Beacon. This oral agreement was entered into based upon a prior written proposal. The written proposal expressly stated that the contract was for services and that any supplies would involve an additional charge if not paid for by Beacon.

Beacon's claim that the U.C.C. applied failed on two counts: first, no goods were transferred, and second, no sale occurred. Although the conclusion of this court was easily reached because of the factual situation, it stands as another example of a case in which a court failed to find a sale where no traditional rights of ownership were conveyed. The Beacon court quoted directly from South Carolina Code section 10.2-106(1), stating that a "sale" consists in the passing of title from the seller to the buyer for a price.

This section of the South Carolina Code is identical to the U.C.C. section 2-106(1).

Nevertheless, in situations where a lease has the effect of putting a lessee in the same position as a purchaser, courts are more apt to view the transaction as a sale and apply the U.C.C.

71. Id. at 655.
72. Id. at 654.
73. Id.
74. Id. The written proposal was prepared by Computer Servicenters, Inc. and delivered to Mr. John Austin of Beacon on or about March 21, 1968.
75. Id. at 654-655.
76. Id. at 656.
77. Id.
81. See Soma, supra note 68.
was the case in Chatlos Systems v. National Cash Register Corp. Chatlos involved a detailed leasing arrangement whereby Chatlos solicited a bank to purchase a computer system and then paid the bank $70,162.09 in sixty-six equal payments. Although this clearly was a leasing agreement, it had the effect of a direct purchase. The lease had only been utilized due to the inability of Chatlos to persuade an independent leasing company or National Cash Register to approve its credit. The court concluded that Article 2 of the Uniform Commercial Code applied regardless of the lease agreement.

Atlas Industries, Inc. v. National Cash Register Co. focused on the same question. Again, the parties utilized a leasing company, which purchased the system from National Cash Register and then leased it to Atlas Industries. Relying upon what it termed "a realistic approach to the role played by NCR in this transaction," the Kansas Supreme Court concluded that National Cash Register was a seller. Primary to the court's holding was the fact that National Cash Register deals in accounting machines and solicits purchasers through a sales force.

On more careful scrutiny of the facts, it becomes obvious that the lease in Atlas conveyed many of the rights traditionally obtained through a sale. Atlas Industries agreed to pay sixty monthly payments of $124.43 for a total payment of $7,465.80. The total cost of the equipment to the lessor was $5,655.73. Further, although a disclaimer appeared in the lease specifically stating that no defect or unfitness of the equipment would relieve the lessee of its obligation to pay rent, there was a provision enabling the lessee to enforce all warranties, agreements, and representations in its own name. The lessee also had an opportunity to

84. Id. at 741-742. "This is common practice in the trade; the computer company sells the system to a bank who in turn leases it to the 'purchaser.'" Id.
85. Id. at 742.
87. Id.
88. Id. at ___, 531 P.2d at 47.
89. Id.
90. Id.
91. Id. at ___, 531 P.2d at 43-44.
92. Id.
93. Id. at ___, 531 P.2d at 44.
renew the lease at an annual rate of $124.43, the amount of the monthly payments under the original terms.94 If the lessee decided not to renew the lease, it was obligated to return the equipment to the lessor at its own expense.95 Another factor noted by the court was the frequency of similar types of transactions in recent years due to the beneficial tax aspects and the avoidance of the large initial capital outlay otherwise necessary in the purchase of expensive equipment.96 Although no option for purchase was available at the end of the lease, the court still held the transaction to be a sale for the purposes of applying the U.C.C.,97 thereby taking some credence away from the theory that an option to purchase is required before the U.C.C. will apply.98

Leasco Data Processing Equipment Corp. v. Starline Overseas Corp.99 held that Article 2 did not govern due to the nature of the transaction.100 The subject matter of the contract was a good as defined by section 2-105(1) of the U.C.C., but the transaction was termed a security transaction and, therefore, expressly excluded by section 2-102.101 Leasco involved a written contract that by its terms required the plaintiff, Leasco, to purchase a sophisticated billing machine specified by the defendant, Starline.102 Starline was to designate the seller of the machine also.103 The terms of the agreement provided that Leasco would lease the machine to the defendant for five years and five months at a fixed, monthly rental of $274.20, with an option to renew the lease at $274.20 a year.104 Starline paid the monthly rental installments for three years before defaulting on the lease, claiming the machine had become inoperable.105 Leasco brought an action for rent due.106

94. Id.
95. Id.
97. Atlas, 216 Kan. at ___, 531 P.2d at 47.
98. But see Soma, supra note 68.
100. Id. at 290.
101. Id. (U.C.C. § 2-102 expressly provides that section 2 "does not apply to any transaction which although in the form of an unconditional contract to sell or present sale is intended to operate only as a security transaction.")
102. Id. at 289.
103. Id.
104. Id. (emphasis added).
105. Id.
106. Id. at 290.
The court refused to apply Article 2 stating that proper construction of the lease agreement forced the conclusion that the transaction had been a "title retention contract and lease ... intended as security" within the meaning of Article 9. The intention of the parties was a major factor in the court's decision. The court had no need to discuss the issue of whether Article 2 would have applied to an action against the seller. Unlike in Chatlos and Atlas, the seller had not been a party to the action. Therefore, the court only analyzed the lease transaction as it related to the purchaser-leasing company and the lessee.

CONCLUSION

The distinction between goods and services in the computer industry has been addressed on a case-by-case basis. In deciding whether the transaction is one for goods or services, courts have relied on several factors. One of these factors is whether the predominant characteristic of the transaction is a sale or lease of goods, with any services provided being merely incidental. Also, whether the package of goods and services contracted for is treated as an "entire system" was determinative in one case.

A common sense approach is also used by the courts in addressing the issue of whether a lease agreement falls within Article 2. When a lessee obtains those rights traditionally associated with a transfer of title, the courts tend to view the transaction as governed by Article 2. One writer has noted that, in this regard, an option to purchase may be a factor that a court may choose to consider, but the presence of such an option has not

106. Id. at 290.
107. Id.
108. Id.
109. Id.
110. Id.
111. See supra notes 12-22 and 81-84 and accompanying text.
112. See supra notes 85-96 and accompanying text.
113. Leasco, 346 N.Y.S.2d at 289.
114. Id.
116. E.g., RRX Industries, 772 F.2d at 543.
118. See generally, Soma, supra note 68.
119. Soma, supra note 68, at 78.
always been deemed necessary. Regardless, the courts have generally taken into account the customary usage of intricate leasing arrangements, which enable companies to acquire a system that would otherwise be beyond their financial capabilities.

Many of these problems could be avoided by parties if they would either agree to apply the provisions of Article 2, or insist on contract terms that limit, or eliminate the application of the U.C.C. One writer has suggested that software contracts should be drafted as if the Uniform Commercial Code applied to the transaction and should expressly provide that the law, including the U.C.C., of a given state will apply. If such advice is heeded, a great deal more certainty can be introduced into this rapidly developing area of the law, and thereby provide some degree of uniformity in the courts' treatment of computer contracts.

123. Soma, supra note 68, at 79.
THE DEVELOPMENT OF NEGLIGENCE IN COMPUTER LAW

John Jay Fossett*

I. INTRODUCTION

The use of computers in our society is growing at a breakneck pace — a rate that is comparable to the speed at which the machines themselves operate. In fact, the ubiquity of computers can be seen in everyday life. Computer chips are used in the electronic circuitry of automobiles. Microprocessors are used as control devices for consumer goods, household appliances, and industrial processes. Blood-gas analysis machines and computerized axial tomography scanners assist doctors in diagnosis and treatment. Computer-aided design and computer-aided manufacturing, including the use of robotics, are in common use today. Biomedical computers are being used to design prosthetic joints to be implanted in the body. More than 85 percent of the increase in business investment in new equipment in recent years has gone into computers and office machines. By one estimate, as many as 10 million computer home "work stations" will be operating by 1990. In short, the use of computers has carried us into a new age of development — the high technology/information age. This age has two phases: the industrial/machine age and the chemical age.

At the same time that the use of computers is expanding, the law governing that use (and nonuse) continues to grow. While computer law in the areas of patent, copyright, trade secrets, contracts, crime, privacy, and evidence continues to increase exponentially with the use of computers, one area of computer

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1. Samuelson, Our Computerized Society, NEWSWEEK, Sept. 9, 1985, at 73.
2. Id.
law has been slow in its development: negligence. Actually, only one area of tort law has been effectively applied in computer cases: misrepresentation and nondisclosure. The much larger concept of computer negligence, which is the topic addressed in this article, has more often been discussed theoretically than it has been applied judicially.

II. Is Tort an Appropriate Action with Computers?

The word "tort" is derived from the Latin "tortus," which means twisted. The metaphor is apparent: a tort is conduct that is twisted, or crooked, or not straight. Prosser says the law of torts is concerned with the allocation of losses arising out of human activities; and since these activities cover a wide scope, so does this branch of law.

Arising out of the various and ever-increasing clashes of the activities of persons living in a common society, carrying on business in competition with fellow members of that society, owning property which may in any of a thousand ways affect the persons or property of others — in short, doing all of the things that constitute modern living — there must of necessity be losses, or injuries of many kinds sustained as a result of the activities of others. The purpose of the law of torts is to adjust these losses and to afford compensation for injuries sustained by one person as the result of the conduct of another.

Prosser's broad definition would seem to indicate that the modern-day use of computers would fit easily into this branch of law. After all, the law of torts has adapted during the past century to the impact of such major inventions as electric light and power, the telephone, radio, radar, television, the automobile, the airplane, nuclear power, and all kinds of complex industrial machinery. As mentioned previously, however, this has not been the case with computers.

6. Id. at 6.
7. Id.
8. The word "computers," as used in this article, means both software and hardware unless otherwise indicated; see notes 35-49 and accompanying text infra.
The reason for such scarcity of law in this area is that contract law, not torts, has been the basis upon which recovery in most computer cases has been founded. While computers do pose some electrical and fire hazards, and while occasional cases of physical injury have been reported, the modern computer is not, for the most part in its current use today, a physically dangerous machine. In addition, some commentators suggest that contract theories are more appropriate in addressing cases in which the parties have knowingly and intentionally entered into a contract-like relationship, such as the relationship involved in buying and selling a computer.

The distinction between the interests sought to be protected by tort and contract, respectively, is fundamental. The law of torts enforces a set of obligations imposed by society for the common good. Such obligations are binding irrespective of individual consent. The law of contracts, on the other hand, enforces the expectations created by bargained-for promises that are voluntarily made; mutual consent is at the heart of contracts. It has been argued that to introduce nonconsensual elements into an obligation that exists only by virtue of mutual consent is inherently wrong.

"While society may impose limitations on the bargaining process, it ought to do so in a coherent, consistent and predictable fashion. Those limitations ought to constitute ground rules for the agreeing process itself, and should not operate to post hoc vitiate an agreement because of subsequent unforeseen events." This argument, however, does not address the many instances in which computers may cause injury to third persons who were not parties to the initial bargain — a situation that will become more prevalent as the use of computers continues to grow in our society.

The attraction of negligence theories for plaintiffs who are injured by computers is obvious. Significant substantive and procedural advantages are gained if a transaction can be taken out of the confines of a written contract. For example, provisions in a contract that disclaim warranties or limit liability are rendered ineffective. Moreover, extracontractual representations that would normally be excluded by the parol evidence rule or integration

11. Id.
13. Id.
clauses become provable and all damages proximately flowing from
the tortious conduct become recoverable regardless of contractual
restrictions. In addition, longer statutes of limitation and more
generous tolling provisions than are applicable to contract claims
may be available.\textsuperscript{14} Finally, the concept of privity — which in many
jurisdictions is still a bar to contract actions against remote sellers
— becomes irrelevant in an action grounded in tort.

Some commentators, among them a special committee to the
Association of the Bar of the City of New York,\textsuperscript{15} have suggested
that contract theories, rather than negligence theories, should be
controlling in all computer cases where the loss alleged is economic
(as distinguished from personal injury or property damage).\textsuperscript{16} The
committee points to a substantial split of authority as to whether
negligence is a viable cause of action in such cases.\textsuperscript{17} Indeed, while
a few states have allowed recovery for economic loss based on
negligent design or manufacture, it seems clearly to be the ma-

\textit{The computer is a recent innovation. Although commercially avail-
able for 30 years, the computer's real impact dates back only to
the past ten or fifteen years. Experts predict that the computer's
major impact lies in the future. This view notes that we are on
the threshold of the computer age.}

\textit{The legal profession in this burgeoning new technology — which
presents many questions not seen before, [and which] reposes old}

\textsuperscript{14} Id.
\textsuperscript{15} Id.
\textsuperscript{16} Id. at 427.
\textsuperscript{17} Id.
\textsuperscript{18} Id.
\textsuperscript{19} Id.
\textsuperscript{20} Id.
\textsuperscript{21} Id. at 445.
\textsuperscript{22} 111 N.E. 1050 (N.Y. 1916).
COMPUTER NEGLIGENCE questions, but in a radically new context—is feeling its way, as 
are the courts. Even fundamental legal issues, such as protection 
for computer software, are currently far from clear.
The central theme of the proposed report is the notion that the 
rules of contract and commercial law developed prior to the com-
puter are of current, indeed perfect, utility in dealing with the 
problems arising in sales and leases of computers. Once all the 
facts and information are in, that may be, but we regard it as 
presumptuous of this Committee to suggest that without the tra-
ditional common law ventilation of facts and views, a small group 
of lawyers is in a better position to perceive whether the “old 
rules” merit application than are the courts. Unfortunately, the 
majority's reasoning seems intent on avoiding a MacPherson v. 
Buick type breakthrough, no matter how factually or socially 
warranted. 24

III. NEGLIGENCE IN COMPUTER CASES

Three types of negligence actions are likely to be asserted 
concerning the use of computers: claims by third persons against 
computer users who negligently operate or fail to operate 
computers; products liability claims imposed against computer 
manufacturers; and computer malpractice claims against those 
who sell and service computers. Regardless of the type of neg-
ligence action that is asserted, four elements must be met: (1) a 
duty of care which, either by one's action or failure to act, (2) 
has been breached, the breach being, the (3) proximate cause of 
(4) the plaintiff's damages or injuries. 25

A. Negligent Use of Computers

Negligence on the part of a computer user raises some of the 
most interesting questions of liability. Since a user is perceived 
as being in control of the computer that inflicted the damage, an 
aggrieved plaintiff will look to him first for his remedy. 26 Since 
a contractual relationship between the injured party and the 
computer user is unlikely in this scenario, negligence actions 
would seem particularly appropriate. In short, those who use

24. Prosser, supra note 5, § 30, at 142.
25. Jordan, The Tortious Computer — When Does EDP Become Errant Data Processing, 
computers have a duty to use them with care. As one court has noted:

Holding a company responsible for the actions of its computer does not exhibit a distaste for modern business practices... A computer operates only in accordance with the information and directions supplied by its human programmers. If the computer does not think like a man, it is man's fault. The fact that [business operations] are carried out by an unimaginative mechanical device can have no effect on the company's responsibility for ... errors and oversights.27

Computer equipment may be sold or rented without the manufacturer being told specifically how the user intends to use it. The normal arrangement is that a user is responsible for working out the applications and programming.28 When such arrangements are made, they have important liability implications because computer malfunctions are most often due to operator error or errors in the program, both of which, in this situation, are under the control of the user.29

To prove negligence in cases in which a computer is involved, the specific computer malfunction, whether mechanical or non-mechanical, must be isolated. When mechanical failure is identified as the source of the problem, reasons which may or may not involve negligence will be encountered. Among the mechanical failures that must be evaluated in this regard are improper or insufficient testing procedures, component failure, improper replacement of failed components, defective wiring, introduction of foreign matter into the circuitry, negligent installation, and overheating.30 It must be recognized, of course, that it is possible for electronic components to fail without negligence or fault on anyone's part.31

Sources of nonmechanical failure include program error, failure to safeguard information adequately, and negligently designed programs that fail to provide sufficient checks of critical operations.32

Regardless of the type of failure that occurs, negligence in the operation of computers can ultimately result in severe conse-

28. Id. at 397.
32. Id. at 11.
quences. Modern computers are used in many complex and potentially hazardous situations. These include air traffic control in airports, control of industrial processes such as oil refineries and steel-blast furnaces, and routing of railroad traffic over single track lines. A prospective purchaser considering a conversion to computerized operation of such functions will be prudent to consider carefully all possible liabilities to which he may be exposed as a consequence.\textsuperscript{33}

As one commentator has noted, "[a] computer system consists of three fundamental elements: software, hardware, and humans. Each element suffers from its own particular weaknesses, and failure of any element may result in serious harm."\textsuperscript{35}

1. \textit{Hardware Errors}

The "hardware" of a computer system consists of devices that prepare data, receive input, perform calculations and computations, and produce output.\textsuperscript{36} Hardware, for the most part, is primarily mechanical in nature. "Because of built-in error-control safeguards, many hardware failures are quickly detected and do not prejudice the computer's output."\textsuperscript{37} Failures that are not detected quickly, however, not only prejudice output but are difficult to isolate and prove in court. This is because of the highly technical nature of computer hardware and the difficulty in distinguishing hardware errors from software errors.

Although computer hardware is tested extensively before delivery to the user, some malfunction of operational components is inevitable. Spontaneous failure may result from such subtle and ephemeral occurrences as temperature variations, humidity changes, power fluctuations, environmental contaminants, or static electricity. Even under ideal conditions, electronic components are expected to wear out after prolonged use. A failure may be transient or very complex in nature, making its cause difficult to detect. Moreover, if electrical or other disturbances alter the instructions or data electronically stored in the computer's memory circuitry,
electronic hardware error can masquerade as software error. In many ways, the nature of the computer hardware complicates the search for the elusive bug because hardware provides more niches in which error may be hidden.\textsuperscript{38}

In *Nelson v. American Airlines*,\textsuperscript{39} a “hardware error” theory was successfully advanced in a *res ipsa loquitur* negligence action against the airline. The lawsuit arose as a result of injuries suffered by the plaintiff when she was thrown about the passenger compartment of an airplane by a sudden and unexpected maneuver caused by malfunction of an automatic pilot device. The issue before the court was whether the defendant had successfully rebutted the legally established inference that the computer malfunction in the automatic pilot had been caused by the negligence of the airline's maintenance personnel. The court found that insufficient evidence had been presented to rebut the inference.

This case is of questionable precedential value, however, because the court's handling of the *res ipsa loquitur* doctrine was in the context of a public carrier, which imposes a stricter burden on the defendant under California law.\textsuperscript{40} In most cases, the *res ipsa loquitur* approach is unsuccessful in establishing liability in cases involving computers.\textsuperscript{41} A prima facie case of negligence can be shown only by proving three elements: (1) the event must be of a kind that ordinarily does not occur in the absence of someone's negligence; (2) it must be caused by an agency or instrumentality within the exclusive control of the defendant; and (3) it must not have been due to any voluntary action or contribution on the part of the plaintiff.\textsuperscript{42} The fallibility of computers makes proof of the first element almost impossible.

2. Software Errors

“Software” is a term used to refer to all types of computer programs. Programs are instructions coded in computer-readable form that tells a computer what to do.

\textsuperscript{38} 70 Cal. Rptr. 33 (C.A. 1st Dist. 1968).
\textsuperscript{39} BENDER, supra note 29, at § 11.0216.
\textsuperscript{40} Jordan, supra note 25, at 8.
\textsuperscript{41} PROSSER, supra note 5, at § 244.
\textsuperscript{42} Note, supra note 34, at 243.
Traditionally, software has been divided into two categories: application software and system software. "Application software" is problem-oriented and usually created by a programmer for the purpose of solving specific problems or performing a particular task. The purpose of "system software" is to manage and regulate the computer system by making the computer's repetitive and mundane operations run smoothly.

Errors can occur in either category of software. In fact, in complex programs, errors are expected and software must be "debugged" before actual use. This process of finding and correcting program errors, which can be time consuming and expensive, usually leads to a reliable program, but not always a perfect one. Eventually, the benefits of discover[ing] and eliminating additional bugs will be outweighed by the costs of further testing. Relying on personal skill and experience, the programmer must make a judgment that the program is reliable enough for operational use. In other words, programmers put software into operation realizing that the software is not error-free and that bugs may remain hidden in it for years.

Therefore, the nature of software renders direct proof of programmer negligence nearly impossible. This difficulty may be aggravated by the fact that if a copy of the software is not preserved, it is unavailable to a plaintiff for examination. But even if a copy has been preserved, the plaintiff will have to employ programmers, who may be completely unfamiliar with the software, to search for a bug that may have escaped detection through months of testing by the original programmer.

One case, however, has found negligence based specifically on software error. In Thompson v. San Antonio Merchant's Association, which involved a damaging credit report that later proved inaccurate, the U.S. Court of Appeals for the Fifth Circuit affirmed the trial court's finding that the defendant had negligently failed to exercise reasonable care in programming its computer.

43. Id. at 246.
44. Id.
45. Id.
46. Id.
47. 682 F.2d 509 (5th Cir. 1982).
to automatically capture information into a file. It also found that the defendant negligently failed to maintain an adequate auditing procedure to foster accuracy.

A similar result occurred in two 1969 cases both involving a bank's repossession of automobiles from borrowers whose accounts erroneously were stated to be in arrears due to the failure of the bank's computer to enter payment credit. The courts found that such an error was "bad faith" that justified plaintiff's recovery of attorneys' fees. One English case has also been litigated in which a bank customer recovered damages arising from the bank's negligent payment of a stop-order check. In this case, however, it appears that the error was essentially a human one, rather than involving any fault on the part of the computer that processed the check.

3. Human error

Even when a computer is properly programmed, faulty results can occur from operator error. Such errors usually are introduced during the translation of data into machine-readable form. If not detected, they can cause the computer to produce misleading information or incorrect results.

In many computer systems, error controls are built into the hardware and software to detect foreseeable data-entry errors. Nevertheless, some operator errors may escape detection and enter the system. As with software programs, searching for and finding such an error after it has been entered into the system, especially a system that is large or updated frequently, may be very difficult, if not impossible. Therefore, proving that human negligence is responsible for computer failure may be an onerous task.

B. Negligence in failing to use computers

Some commentators have suggested that in some situations it would be negligent not to use a computer. This is based upon

51. Id.
52. Id.
53. Note, supra note 34, at 248.
54. See Jordan, supra note 25, at 14; Awalt, supra note 27, at 101.
56. Id.
the notion that a failure to use a computer for some applications would constitute a breach of the obligation to use reasonable care.\textsuperscript{57} Computers, while not ready to replace man, can perform certain operations that men either cannot do as well or cannot do at all within a feasible period of time.\textsuperscript{58}

This theory of liability is a logical extension of the court's reasoning in the 1932 case of \textit{The T. J. Hooper}.\textsuperscript{59} In that case, the owner of a seagoing tug was held negligent in not equipping his tug with a radio to receive weather forecasts. The tug had proceeded into open waters in ignorance of an approaching storm, and as a result, lost its tow of barges in the storm. The court, with Learned Hand writing for the majority, held that the owners of the tug had been negligent in failing to install the radio receivers — even though tugs did not, as a matter of custom and practice in the industry, use radios at that time. In applying this reasoning to computers, however, it should be noted that an important consideration in the balancing test applied by Learned Hand in the \textit{Hooper} case was that the cost of installing radio receivers was relatively low at the time.\textsuperscript{60} This is generally not the case with computers and is not likely to be in the near future unless they decrease dramatically in price much like pocket calculators did in the 1970s. \textit{The T.J. Hooper} rule remains the prevailing one as to custom and usage, i.e., that custom is merely an element to be considered by the court in determining the presence of negligence. As a corollary, conformity to custom does not rule out negligence, and conversely, failure to adhere to custom does not establish negligence.\textsuperscript{61} Custom is merely a factor that the jury considers in determining whether a defendant has conformed with a standard of reasonable prudence.\textsuperscript{62}

As Justice Hand stated in \textit{The T.J. Hooper}:

\begin{quote}
[I]n most cases reasonable prudence is in fact common prudence; but strictly it is never its measure; a whole calling may have unduly lagged in the adoption of new and available devices. It never may set its own tests, however persuasive be its usages.
\end{quote}

\begin{itemize}
\item \textsuperscript{57} 60 F.2d 737 (2d Cir. 1932).
\item \textsuperscript{58} \textit{Id.} at 740.
\item \textsuperscript{59} \textit{PROSSER, supra} note 5, at § 33.
\item \textsuperscript{60} \textit{Id.}
\item \textsuperscript{61} 60 F.2d at 740.
\item \textsuperscript{62} 83 Wash. 2d 514, 519 P.2d 981 (1974).
\end{itemize}
Courts must in the end say what is required; there are precautions so imperative that even their universal disregard will not excuse their omission.\(^{63}\)

Another example of a case in which the failure to use computers might bring liability would be that of a physician or hospital failing to use a computer as a diagnostic aid, especially when it could be shown that the diagnosis made by the computer would be far superior to the diagnosis of an unaided physician. This result would be a logical extension of the Supreme Court of Washington's decision in the 1974 case of Helling v. Carey,\(^{64}\) where it found an ophthalmologist guilty of negligence for not giving a patient a simple glaucoma test. Although it was shown that the physician followed the generally accepted medical standards of his time, the court nevertheless imposed a duty to test.

Citing The T.J. Hooper in support of its decision, the court held that since the glaucoma test was simple and inexpensive and the severity of injury from undiagnosed glaucoma so great, the doctors had a duty to test.

Some courts have since used the Helling reasoning in computer negligence cases. For example, in Torres v. North American Van Lines, Inc.,\(^{65}\) a wrongful death action, the plaintiff's husband was killed when a North American tractor-trailer rear-ended his parked car. The Court of Appeals of Arizona noted that the moving company had a computerized data processing system that could have been used to monitor its drivers' work periods, thus avoiding the driver fatigue that had apparently led to the accident. The court further observed that this computer capability had been used only by the company's claims department. It concluded that North American "never availed itself of all the accident data with a view to improving safety measures and reducing accidents."\(^{66}\) As a result, the trial court's finding of negligence and punitive damages was upheld.

Commentators have suggested that the failure to use a computer in legal research may also constitute an omission that

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64. Id. at 838.
might give rise to liability. Courts have referred to computerassisted legal research systems, such as LEXIS or WESTLAW, as “an essential tool of a modern, efficient law office.” As one commentator has indicated, “[i]t does not seem much of a step from dicta indicating that the use of a tool is ‘essential’ to a finding of malpractice upon the failure of a professional to use that tool.

A hypothetical example that has been commonly used to demonstrate liability in this type of situation addresses the use of computers by railroads to control “single track” operations. In single track operations, railroads, presumably for reasons of economy, allow railroad traffic to run in both directions along a single track. In the past and to a certain extent today, human dispatchers have been employed to control this traffic. The hypothetical assumes that the major railroads have determined that a computer could perform this traffic control function more efficiently, reliably, and safely than could a human dispatcher, and that therefore, all but one railroad had begun using computers for this purpose. If the one nonuser railroad subsequently were to experience a head-on collision on the single line of track due to a nonnegligent human error that might have been avoided by the use of a computer, the hypothetical asks whether the railroad should be guilty of negligence for failure to use one? Using T. J. Hooper as an analogy, the answer would probably be “yes.”

A few commentators have suggested that corporate officers or directors might be personally liable to shareholders for failure to require their companies to take advantage of computer systems to promote, for example, more efficient operation, especially when other firms in the industry have done so. But this possibility seems remote since such a decision seems to fall within the corporate law doctrine known as the “business judgement rule”. The rule gives directors broad discretion in making business decisions. It provides that the usual standard of care required of corporate directors is the care that a reasonably prudent director of a similar corporation would have used under the circumstances of the particular case. Adding credence to the

67. See, e.g., Levin, supra note 9, at 39.
69. Await, supra note 27, at 384.
conclusion that such liability is unlikely is the classic corporate case of *Shlensky v. Wrigley*, where management's failure to install lights at Wrigley Field for night baseball games was held not to be grounds for a Cub stockholder's derivative action suit.

Among the considerations that would probably influence the question of liability for failure to use a computer as a safety device would include:

1. Is a suitable computer generally available?
2. Is it available at a cost that can reasonably be afforded by the corporation?
3. Do computers have at least a limited use in the industry for the purpose involved?
4. Are safety precautions so imperative that a computer must be used to insure safety?
5. Was the absence of the computer a direct cause of the injury?

It seems probable that the fourth point above contains the key to whether or not negligence will be found in a failure to use a computer to insure an adequate standard of safety. Proof of negligence in this situation would require the testimony of experts as to how the safety system in question works. It would also require them to reveal and explain the statistical bases upon which they have concluded that the use of computers in the system would make such a difference that the failure to employ them would impose a substantial and unnecessary risk upon those using the system, i.e., as in the *T.J. Hooper* situation. Courts are not likely to impose an affirmative duty to use expensive and complex safety devices unless there is a clear showing of a high degree of risk to life and property that cannot otherwise be avoided.

**C. Products Liability**

1. **Background**

The law of products liability had its origin in both tort and contract law. For many years, the most common ground for recovery for personal injury or other damage resulting from a

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71. Id. at 40.
72. Id.
product-caused harm was negligence, although the right to recover on such basis was seriously limited.\textsuperscript{73} Later, it was suggested that recovery might be allowed on a theory of breach of warranty.\textsuperscript{74} Privity of contract, however, severely limited this type of action as well. After the development of the warranty theory of recovery, many products liability cases involved assertions of both negligence and breach of warranty. In 1963, a new basis of liability was developed: the principle of strict liability in tort.\textsuperscript{75} While this article principally addresses negligence actions, it is useful to review briefly strict liability principles in this context to provide a more complete picture of the tort theories available against a computer manufacturer in a products liability action.\textsuperscript{76}

2. Negligence

There would seem little doubt that a manufacturer of computers could be held liable for negligently manufactured units, where his negligence is shown to be the proximate cause of damage to a plaintiff.\textsuperscript{77} Except in those situations where strict liability may be imposed, it appears that a computer manufacturer need only meet the usual standard of ordinary or reasonable care, i.e., the prudent man standard, in the design, manufacture, and installation of his computers. Accordingly, the manufacturer need not produce an \textit{optimumly} designed computer and "the rule is well settled that neither the designer nor manufacturer has a legal duty to adopt or produce a process or product incorporating only features representing the ultimate in safety."\textsuperscript{78}

A manufacturer's liability can arise from his failure to make adequate tests of his product, but what is reasonable in this respect seems to be a function of the potential danger he creates by inadequately testing.\textsuperscript{79} With computers, the risk seems minimal, unless they are being made and marketed to control poten-

\begin{footnotesize}
\begin{itemize}
\item \textsuperscript{73} The principle was first applied in Greenman v. Yuba Power Products, 377 P.2d 897 (Cal. 1963).
\item \textsuperscript{74} See notes 84-96 and accompanying text infra.
\item \textsuperscript{75} Levin, supra note 9, at 83.
\item \textsuperscript{76} PROSSER, supra note 5, at § 96.
\item \textsuperscript{77} Neusus v. Sponholtz, 369 F.2d 259, 263 (7th Cir., 1966).
\item \textsuperscript{78} Jordan, supra note 25, at 7.
\item \textsuperscript{79} Id.
\end{itemize}
\end{footnotesize}
tially dangerous equipment or devices. Even if they are, however, there are practical limitations involved in testing electronic components. For example, it is not possible in many cases to test the computer in an actual operating environment. With these limitations in mind, and considering that tens of thousands of components may be incorporated into even a relatively small computer, it seems logical to conclude that a manufacturer's testing procedures might well be considered reasonable, and yet not insure a high degree of reliability. In addition, as previously discussed, new computer installations typically require a considerable amount of "debugging" before the machines perform up to expectations: responsibility for such testing and the time allotted to it is usually spelled out in some detail in the computer sales contract.

Claims by third parties for personal injury or economic loss that rely on negligence theory encounter practical problems because the "duty" owed for the design or use of computers and computer products is undefined. Such design and use is an art. Negligence actions cannot be ruled out, however, because a manufacturer or vendor may create a "duty" in its specifications or literature that it may be obligated to meet.

As previously discussed, some commentators have suggested, and a few courts have found, that a negligence action that seeks to recover for computer malfunctions is inappropriate where there is no resulting personal injury or property damage. Such was the case in Affiliates for Evaluation and Therapy, Inc. v. Viasyn Corp., where a computer manufacturer was sued for his alleged negligence in the selection of a retailer and for the ineffective steps he later took to restore computer operations during a period of mechanical failure.

In Viasyn, a computer purchased from the defendant was plagued with various mechanical failures over a ten month period after it was installed. These failures required the plaintiff to expend thousands of man-hours working on the computer, while

80. Id.
81. See notes 6-23 and accompanying text supra.
82. 500 So.2d 688 (Fla. App. 3 Dist. 1987).
83. Id. at 693.
at the same time trying to manually accomplish all of the business functions that the computer had been purchased to handle, including the manual preparation of payroll statements for its employees. The plaintiff charged that Viasyn was negligent in (1) selecting an incompetent retailer who was unable to install and maintain the computer, and (2) failing to take steps to either repair the computer or to notify the plaintiff that the retailer had no expertise in installing the computer or training personnel to use it.

Citing the leading case of Seeley v. White Motor Co., the District Court of Appeal for the Third District of Florida upheld the trial court’s dismissal of the negligence action on the grounds that the economic losses to the plaintiff’s business were not recoverable in a products liability action based on negligence. Said the court:

[T]he negligence count cannot stand because it fails to allege an essential element of the action when brought, as here, in a products liability context, to wit: personal injury or property damage suffered as a result of the alleged defective computer. The only damages alleged are contract-type damages, namely, economic losses to plaintiff’s business because the subject computer did not perform as it should have.65

3. Strict Liability in Tort

With today’s increase in computer use, claims resulting from physical harm brought about by computer error would seem inevitable.66 Such claims will present the courts with an issue that they have not yet encountered: a strict products liability claim applied to computers and their programs.

Strict liability means liability that is imposed on an actor apart from either (1) his intent to interfere with a legally protected interest without legal justification for doing so, or (2) breach of any duty on his part to exercise reasonable care, i.e., actionable negligence.67 The most common definition of this doctrine is found in the Restatement (Second) of Torts § 402A, which states:

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65. Prosser, supra note 5, § 75, at 534.
66. Restatement (Second) of Torts § 402A (1965).
One who sells any product in a defective condition unreasonably dangerous to the user or consumer or to his property is subject to liability for physical harm thereby caused to the ultimate consumer, or to his property, if

(a) The seller is engaged in the business of selling such a product, and

(b) it is expected to and does reach the user or consumer without substantial change in the condition in which it sold.

(2) The rule stated in Subsection (1) applies though

(a) the seller has exercised all possible care in the preparation and sale of his product, and

(b) the user or consumer has not bought the product from or entered into any contractual relation with the seller. 88

Four policies are generally recognized as supporting the imposition of strict products liability. First, the party in the best position to detect and eliminate defects should be responsible for damages inflicted by defective products. Second, liability should be placed upon the party best able to absorb and spread the risk or cost of injuries through insurance. Third, a remedy should not be prevented by burdensome requirements of proof, since an injured person is not normally in a position to identify the cause of the defect. Fourth, due to modern marketing methods, consumers today rely on the reputation of a manufacturer and no longer accept the doctrine of caveat emptor. 89

It is well settled that the law of strict products liability applies to goods and not services. 90 Applying strict liability to computer hardware, for the most part, 91 is not difficult since by its very nature, such equipment is normally considered a "product." The difficulty arises in the classification of a computer program. One normally buys software in the form of a product stored on a magnetic disk or tape — certainly a "product" in the sense of a chattel. 92 But one is also paying for the programming expertise of the software developer, as is obvious from the difference in price

89. Programs that are built into the computer hardware itself may create some problems.
90. Caveat Vendor, supra note 73, at 375.
91. Id. at 375-76.
92. Id.
between a blank magnetic disk or tape and one with information recorded on it.\(^9\)

It has been suggested that to determine when strict products liability will apply to a transaction involving a computer program,\(^9\) one must look at the facts surrounding the purchase of the program. Of central importance to this determination is whether the seller or manufacturer of the product has employed mass marketing techniques (e.g., mass production, large-scale distribution of finished products, and mass market advertising) and whether off-the-shelf purchases by consumers are involved.\(^9\)

Sales of computer software in the mass marketing context will surely be subject to strict products liability. Software consultants who are hired for their expertise (to develop unique programs and not install those that are mass marketed) are in many ways analogous to purveyors of services such as doctors and lawyers who are not subject to strict products liability. In many cases, programmers will be able to make use of this analogy. But where a large body of consumers is affected by the software, courts will be likely to apply strict products liability due to overriding mass market conditions. . . .\(^9\)

Another commentator, however, has suggested that products liability theories should not apply to computer programs.\(^9\)

Until greater perfection can be achieved in software program design, if it ever can, there might be good reason to avoid saddling that new industry with intolerable liability responsibilities.\(^9\)

\(\text{D. Computer Malpractice}\)

One of the more recent attempts to apply negligence theories to the field of computers introduced the concept of "computer malpractice." This cause of action attacks the expert judgment or experience of those who sell and service computers.

\(^{93}\) Id. at 376.
\(^{94}\) Id. at 399.
\(^{95}\) See generally Freed, Products Liability in the Computer Age, 12 THE FORUM 461 (1967).
\(^{96}\) Id. at 465.
\(^{98}\) Id.
The courts, however, have not accepted the application of malpractice principles to computer merchants or consultants. No court has expressly held that a plaintiff may bring an action for computer malpractice. In fact, in Chatlos Systems v. National Cash Register Corp., a computer malpractice claim was given short shrift by a U.S. District Court in New Jersey. The court dismissed Chatlos' computer malpractice claim in the first footnote of the opinion. In answer to Chatlos' claim that those who sell and service computer systems have an elevated responsibility, the court found that neither the technical complexity nor relative importance to the business community inherent in selling and servicing computer systems justified the imposition of malpractice liability. The court also declined plaintiff's "invitation to create a new tort" on the basis that there was no "sound precedential authority" for doing so. In Triangle Underwriters, Inc. v. Honeywell, Inc., the U.S. Court of Appeals for the Second Circuit also addressed the issue of computer malpractice and similarly denied the claim. In this case, Triangle sought to use the "continuous treatment" concept to extend the statute of limitations. Under the continuous treatment doctrine, the statute of limitations for medical malpractice actions does not begin to run until a physician-patient relationship has ended, rather than from the last negligent act of the physician. The court acknowledged that New York courts had extended the doctrine to other non-medical professionals such as attorneys, architects, and accountants, but stressed that such extensions had been based upon analogously special relationships of trust and reliance that existed between lay clients and these professionals. The court dismissed Triangle's professional liability claim, finding that there was "wholly lacking in the case at bar that professional relationship upon which application of the doctrine, in any context, depends."

100. Id. at 740-41 n1.
101. 604 F.2d 737 (1975).
102. Id. at 744.
103. Id. at 745.
104. Id.
106. Id.
In *F & M Shaefer Corp. v. Electronic Data Systems*, however, the U. S. District Court for the Southern District of New York declared that computer specialists and their clients have a "special relationship" that is based upon the client's reliance on the advice and knowledge of the data programming expert. The reliance creating the "special relationship", said the court, necessarily arose from the technical language used by programmers, the complexity of which prevented the client from giving informed consent to the programmer's work. The court stressed that because of this special relationship, any fraud or negligence would probably not be discovered until after the termination of the relationship. Consequently, it ruled that the statute of limitations should begin to run after the continuing relationship had ended. The case, however, was not finally decided on the professional negligence issue because it ultimately settled out of court. As a result, it is still true that no court has specifically upheld the tort of computer malpractice.

Some commentators persist, however, in urging this as a viable, indeed, a necessary, cause of action:

[I]f the injuries and damages arising from the malpractice of computer professionals are indeed genuine, then the law is obligated to provide a remedy. With more and more inexperienced persons entering the computer market, persons who can not be expected to bargain equally with manufacturers and service bureaus, the law must equitably redistribute the burdens...  

IV. **Conclusion**

While negligence is currently a seldom-used legal theory on which to base liability for injuries suffered through the use, nonuse, selling, or installing of computers, it is likely to become more significant in the future. No major upheaval in tort law should result, although modifications of traditional tort concepts may be necessary to accommodate the technological uniqueness of the machines. It appears almost certain that the use of the tort theories of negligence, strict liability, and even malpractice as applied to computers will continue to be asserted in the

107. Id.  
108. Id.  
future - and with more success - as the use of computers continues to grow.