Canada, Copyright, Computers: Impact and Analysis in an International Perspective or From Gutenberg to Uruguay: Protecting the Soul of a New Machine, 10 Computer L.J. 265 (1990)

Peter Heeseok Kang

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CANADA, COPYRIGHT, COMPUTERS:
IMPACT AND ANALYSIS IN AN
INTERNATIONAL PERSPECTIVE
OR FROM GUTENBERG TO
URUGUAY: PROTECTING THE SOUL
OF A NEW MACHINE

By
PETER HEESEOK KANG*

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PREFACE

As the 1980s have drawn to a close, many writers, commentators and other delineators of social evolution find it fruitful to look back, reminisce and distill the essence of the past ten years. This decennial post-mortem is customary and, moreover, provides writers suffering from writer's block a wealth of material, as well as handsome paychecks. They strive to collect those events, people and things which had a profound impact on the decade. As hippies, protests and Woodstock symbolized the Sixties, the symbols for the Eighties remain to be proclaimed.

Occasionally, I find myself engaged in exactly this type of sociological broad-stroke painting. I remarked to a friend recently that my personal computer and its word-processing capabilities saved my life in meeting deadlines numerous times during law school. To underscore this point, I bemoaned my lack of adequate typing skills and further pointed out that the last time I actually typed out an essay on a real typewriter was when I was a freshman at Stanford, way back at the beginning of the decade (lo! those many years ago). It then struck me that the personal computer has, in that short time, effectively penetrated offices, schools, governments and, well, society. Thus, the computer and computer software certainly must qualify as one of the "symbols of the Eighties."

Because of its widespread impact, computer technology has become a rich and complex subject to explore. More specifically, computers interface with the law in a multitude of ways. Therefore, any article which tackles this subject runs the risk of becoming dangerously complex. It is precisely to avoid this complexity that I have included this very unscholarly and rather informal preface for the benefit of you, the reader (and, I must confess, for my own benefit as a writer, in order to get a firmer grasp on what I wanted to say overall). I want to make clear from the outset what it is I am trying to say, what the Big Picture is.

In general terms then, this is what this Article is all about: this Article will address copyright protection for computer software, in three parts. First, the Article will start with an examination of how Canada, as a case study, reached the decision to grant full copyright protection to software. Second, this Article will compare Canada's protection system with the systems of other nations. Third, the Article will discuss the impact of international software copyright protection on international trade.

I chose to start with Canada as a case study because it was timely, in that the Canadian government just recently amended their copyright laws. More importantly, I believe that Canada provides an excellent
case model for what has and will yet happen in many other countries. I also chose to analyze the Canadian case model by using a theoretical framework, developed by Prof. Vincent Brannigan. This theory, "technico legal revolutions," is specifically tailored to address situations in which the law and technology interact.

My friends have (repeatedly) stressed the importance of a "theme" with which I can illuminate this field and help the practicing attorney. I should be so bold as to presume to actually help a practicing attorney, but the effort must be made. Since my Article is in three parts, I thought the theme should follow the same structure. First, my theme is that granting full copyright protection for computer software is excessive because it stretches a legal doctrine beyond the bounds it can reasonably cover. I believe the legal conflict in Canada underscores the problems people have with software copyright protection. Second, pressure from the U.S. and computer industries is leading the rest of the world to follow Canada's example, regardless of what I might think. (So that goes to show you how much influence I have). Third, full copyright protection will, on the whole, hurt international trade because it unfairly favors the developed nations which already have strong software industries at the expense of under-developed nations. Now, I'm not saying protecting software is bad; just that there must be better ways to protect it than through copyright law.

Well, that's my preface. I hope my rambling about "symbols of the Eighties" helps you appreciate the importance that computer technology has in the world and in our future. I hope you can keep in mind the overall structure of my Article. I hope my meager scratchings will be of some help to some practicing attorney somewhere, if only to help me vindicate my friends' expectations of me. And I hope I have not unduly offended any readers by starting this Article with the informal and decidedly un-academic tone of this preface. I swear it will never happen again.

P.H.K.
Spring 1989
Washington, D.C.
I. INTRODUCTION

Throughout history, advancements in science and technology have created new forms of wealth, power, and status. These developments upset pre-existing notions of legal ownership, duties, and rights because they do not fit squarely within pre-existing legal regimes. This, in turn, fosters an atmosphere of uncertainty and extreme caution, which stifles technical advancement. The result is that society is harmed by slowing the spread of socially beneficial developments.

Often, the legal system is unable to protect this new form of wealth without creating a new form of legal protection. For example, the development of the printing press and the concomitant rise of the publishing industry forced the legal systems of Europe to develop the copyright system. Legal systems, which, common sense tells us, are generally conservative by nature, have customarily been slow to adapt to the often rapid changes that technological advancements produced. Since technological developments occur worldwide, this problem is not unique to any one legal system or any one culture. However, the society which first develops a particular technology is usually the first to adapt its legal system. This adaptation occurs simply as a consequence of a particular society being the first historically to undergo the developments.

In the second half of the twentieth century, the United States rose as a major world power, not only militarily but also in terms of scientific accomplishments and trade. Major advances in medicine, energy production, and electronics have spread from the U.S. to the rest of the world. Because Canada enjoys close ties to the U.S., economically, culturally, and of course geographically, it is in a unique position to absorb this technology. But Canada has also had to deal with the legal problems these technical advancements can create.

The tremendous leaps in knowledge witnessed in this author's lifetime alone have now made it imperative that legal systems respond more dexterously to technological progress. Technological advances have been occurring much more rapidly in this century than in any previous century. As more resources are invested in research by governments, companies, and universities, the pace of development can only be expected to rise. This is especially true in the scientific realm, where past achievements become the launching point for future research. If the legal systems of the world, and most importantly the legal systems of the developed nations where the largest proportion of research takes place, do not become better at adapting to scientific advances, the problems of uncertainty, caution and stifling technology may hinder the future progress of society. Thus, like science, the law must keep pace with technological developments by building on the past to address the future.
The new high-technology industries pose the latest generation of problems for society. Biotechnology, satellite broadcasting, nuclear power, and genetic engineering have all created their own unique problems and demand more responsive judicial treatment. Perhaps in no other area is this more evident than in the field of computer science. Computers are a vital cornerstone of scientific and economic advancement. The importance of computers to society is perhaps best highlighted by the fact that Time magazine named the computer as its Man of the Year for 1983.1 The rise of the Silicon Age has created mighty industrial empires, new forms of knowledge and skill, and most importantly, new forms of wealth. Some of the largest wars waged in this field during the past decade have determined the control and ownership of these new forms of wealth, especially computer software. While this conflict has raged in practically every industrial and post-industrial nation, Canada presents a particularly vivid example. This is punctuated by recent amendments to the Canadian Copyright Act of 1924, which bring Canada squarely to the forefront of this issue.

The purpose of this Article is to examine the development and impact of copyright protection for computer software. The first part of this Article will detail Canada's progress from giving no protection for software to granting full copyright protection. The analysis will be aided by applying Prof. Brannigan's theory of Technico Legal Revolutions.2 This Article will argue that copyright is an imperfect solution to software protection and that Canada's problematic and twisted road towards copyright evinces the inadequacy of this protection scheme. Analysis of the way Canada has treated this problem is valuable because it provides a model for what has happened in several nations, notably Japan and Australia. Thus, Canada's experience provides a model for what could happen in other nations.

Second, this Article will examine the international impact of this Canadian development. This Article will compare Canada's protection scheme with those of other nations, taking into special account Canada's relationship with the U.S. and other common law jurisdictions. This Article will then analyze Canada's response as part of an international trend. Although copyright is an imperfect protection system for computer software, international political pressure from the U.S. and the major software companies has forced many nations to follow Canada's

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2. Brannigan & Dayhoff, *Medical Informatics: The Revolution in Law, Technology and Medicine*, 7 J. LEGAL MED. 1 (1986); V. Brannigan, Technico Legal Revolutions (Sept. 8, 1988) (unpublished course materials); V. Brannigan, Biotechnology: A First Order Technico Legal Revolution (Sept. 8, 1988) (unpublished journal article manuscript and course materials). The author would like to acknowledge Professor Brannigan's contributions to this Article and thank him for his assistance in its development.
path. Therefore, the current trend among nations is towards copyrighting software. Through an excursion into comparative law and by examining the relevant international conventions, most notably the Universal Copyright Convention\(^3\) and the Berne Convention,\(^4\) this Article will put Canada's legal evolution into an international context.

Finally, this Article will evaluate the impact the new Copyright Act will have on high-technology trade patterns involving not only Canada, but also the United States, the European Community, Japan, and developing nations. The impact of domestic copyright laws on international trade will be discussed. Finally, this Article will argue that full copyright protection for software will primarily benefit the Western industrialized nations and will hurt under-developed states. Therefore, this section will highlight the breadth of impact that computer technology can have, by developing the international legal, economic and political issues it generates.

II. BACKGROUND

A. OVERVIEW OF COMPUTER TECHNOLOGY

The evolution of digital computers is marked by an increase in computational power and a corresponding decrease in size and costs. Electronic computers evolved from the early vacuum tube models in the 1930s to transistor technology in the 1950s to integrated circuitry in the 1960s and finally to Very Large Scale integrated circuitry imbedded on semi-conductor silicon chips which we have today.\(^5\) A digital computer uses switches which are binary. They have two “states:” either “on” (current flowing) or “off” (no current flowing). In this binary code, any number can be represented, and a compilation of this code becomes the data and information that most people understand to be the bread and butter of computers.\(^6\)

Computers have five basic components: input, memory, control, logic, and output. Input consists of any device that gets data into the computer. Memory is any device that stores information, be it data or programs. Main memory is usually contained in the core of the machine in a semi-conductor chip, which is a very small binary circuit made from silicon. Read-only memory (“ROM”) is memory which cannot be erased and is usually found in a semi-conductor chip. Logic de-

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5. J. MANN, COMPUTER TECHNOLOGY AND THE LAW IN CANADA 12 (1987). The initial section of this Article draws heavily on the Mann text as well as on this author's personal experience with computers.
6. Id. at 7.
vices are part of the computer's central processing unit ("CPU") and are hardwired to perform logical and arithmetic functions, such as addition, subtraction, and logical comparisons. Control devices regulate the flow of data between the input, processing, data storage/memory, and output devices. Finally, the output devices, like printers, produce data or the results of computation.\(^7\)

The word "software" refers to any information concerned with the operation of a computer. While this definition includes information such as data, this Article will use the word "software" to refer only to computer programs. The word "hardware" refers to any of the physical devices that actually make up the elements of a computer, as outlined above.\(^8\) The distinction between hardware and software becomes less clear when computer programs are engraved on unerasable ROM chips. This blurred boundary between hardware and software has created much of the legal problems in this area.

After a program is input into a computer, a "compiler" or "interpreter" of some kind translates the human-readable source code into machine-readable object code. A computer's CPU processes electrical impulses by opening and closing switches and thus regulates the flow of electrical current. Since the CPU "understands" object code, it is important to remember that true object code is nothing more than sets of electrical impulses, usually of either +5 or 0 volts. Although object code may be represented by binary or hexadecimal notation, the actual "code" itself is not human-readable since it consists of a series of electrical states.\(^9\)

This distinction between human-readable code and object code was, in Canada, suggested as a basis for determining when to grant different levels of protection. Application computer programs are generally designed to perform user-oriented tasks, such as word processing. Operating System programs deal with the internal workings of the computer.\(^10\) The distinction between application and operating system programs was suggested as another means of distinguishing between different levels of protection.

**B. THEORY OF TECHNICO LEGAL REVOLUTIONS**

The law has been reactionary, at best, toward new scientific developments. In many instances, the legal system has obdurately clung to outmoded or inappropriate modes of thought when confronted with in-

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7. *Id.* at 7-12.
8. *Id.* at 15-16.
novations in the technical and scientific fields. Often, new technical skills will not fit into a pre-existing legal structure. There will, therefore, be a period when the judiciary and the legislature must somehow come to grips with the new technology. Competing interests and conflicting points of view will attempt to guide the judiciary in hashing out rights and responsibilities. Eventually, the system will make accommodations for the new technology and will resolve the dispute. This is, in essence, a Technico Legal Revolution.\textsuperscript{11}

Every technico legal revolution passes through four particular stages: 1) the Autonomy Phase, 2) the Conflict Phase, 3) the Determination Phase and 4) the Resolution Phase. There is no set time limit on each phase; the amount of time spent in each depends on the particular circumstances of each technico legal revolution. However, every technico legal revolution must pass through all four.\textsuperscript{12}

In the Autonomy Phase, the parties who develop a particular technology act with little or no restraint, either from the legal system or society. In the Conflict Phase, some party or parties arise who challenge the original developers. The challengers in the case of computer software were the software copiers, or pirates. In the Determination Phase, each side gathers the facts and arguments it needs to resolve the conflict in its favor. In the final phase, the Resolution Phase, the legal system finally assigns a legal structure to the technological innovation. The legal system accepts one side's facts and arguments, and thereby uses the legal regime promoted by that party as the proper analogous system. One highlight of this phase is how the court allocates the burden of proof with respect to unknown factors. As is true in many other areas of the law, the party with the burden of proof often loses.\textsuperscript{13}

Evolution of computer software is an instance of technico legal revolution. This section of this Article will examine the revolution concerning proprietary rights in this new technology. This Article will detail the steps taken by the participants in the Canadian struggle for computer software ownership through all four phases of the technico legal revolution. Finally responding to pressure from the U.S. and the computer industry, the Canadian government recently enacted an amendment to its Copyright Act, making specific provisions for computer software. Therefore, this Article will emphasize this new legislation as the resolution to this technico legal revolution. The fact that it took sixty-six years for the Canadian government to make any amendment to its Copyright Act underscores the long and tortuous path that both legislative reform and technico legal revolutions can take.

\textsuperscript{11} See Brannigan & Dayhoff, supra note 2.
\textsuperscript{12} Id.
\textsuperscript{13} Id.
III. DISCUSSION: THE TECHNICO LEGAL REVOLUTION

The basic conflict is that the software industry in Canada was attacked by software copiers. Because the legal status of software was indeterminate, software copiers could copy legitimately manufactured software for a fraction of the cost. The so-called software pirates or counterfeiters could reap profits because they did not have to pay for the initial costs of research, development, and marketing. On the other hand, the legitimate software vendors found themselves competing against their own products. Canada's outdated Copyright Act made no mention of electronic devices, much less computers, and thus the legitimate merchants had no legal shield against the software pirates. The pirates were aware of this legal void and took full advantage of the situation to undercut the legitimate market.\(^\text{14}\)

A. AUTONOMY PHASE

This technico legal revolution is unique in several aspects. First, the actions by the original technologists were both unfettered and unprotected. The original software manufacturers acted without restraint, but without harming anyone. It was not until economic challengers, armed with new copy-making technology, started infiltrating markets and eroding profits that the conflict arose. Typically, a party who develops a new technology will exploit the probability that the law relating to the new technology is unsettled and lagging. In this case, however, that strategy backfired. Since the law did not afford a legal shield for the developers, it was a detriment to the software manufacturers and a boon to their challengers.

This particular technico legal revolution is also unique because the Autonomy Phase is dualistic. The length of this phase and its effects are significantly different when viewed from the positions of the parties in conflict. The duality of this occurred when the developers of the technology became the victims after their challengers turned software copying tools against them.\(^\text{15}\) The effects of this dual autonomy will impact the later stages of this technico legal revolution. Perhaps the two-sidedness of this technico legal revolution is a result of the fact that

\(^{14}\) Copyright Act, CAN. REV. STAT., ch. C-30, § 2 (1970) [hereinafter Copyright Act]. The Copyright Act defines protected literary works as: "every original production in the literary, scientific or artistic domain, whatever may be the mode or form of its expression, such as books, pamphlets, and other writings, lectures, dramatic or dramatico-musical works, musical works or compositions with or without words, illustrations, sketches, and plastic works relative to geography, topography, architecture or science." Id. There is no mention of electronics in the Copyright Act.

\(^{15}\) Betts, High-Tech Pirates Said to Reap Billions, COMPUTERWORLD, Mar. 14, 1988, at 79.
there are two principal actors, both of whom rely on the technology to achieve their goals.

The Autonomy Phase for the original developers of Canadian software was relatively long. The first electric computers, using vacuum tubes, were built in 1939.\textsuperscript{16} It was not until 1985 that the first Canadian Court of Appeals even heard a copyrightability of software case.\textsuperscript{17} Therefore, the original computer developers had virtual free rein in Canada for approximately forty years. The nature of the technology was such that, during most of this time period, it was both unprofitable and difficult to copy software. It is perhaps most telling that the innovators relied heavily upon trade secret law to protect their works during most of this period.\textsuperscript{18} Not until the boom in microcomputers did the technology reach a level where anyone could copy software with little training. When mass marketing of software became a reality, software manufacturers and vendors turned to copyright.

On the other hand, the Autonomy Phase was short from the perspective of those parties who sought to copy the software developed by others. Apple first started marketing the Apple II around 1978.\textsuperscript{19} The first lawsuit based on copyright infringement was brought in 1983.\textsuperscript{20} The original developers of this technology acted swiftly to discourage others from copying their products. They understood that such activity, if left unchecked, would set dangerous precedents and would cost them economic gain. Thus, the Canadian software pirates had less than five years in which they could act freely. This contrasts with the decades of unchallenged practice that the original developers had.

Although the autonomy of the copiers was short-lived, it proved to be lucrative. The U.S.-dominated computer industry entered Canada almost haphazardly. "Many U.S. companies have looked at Canada as a minor additional market and the pirates have benefited" from this indifference.\textsuperscript{21} In little time, the domestic copiers realized the potential profit from copying. In addition, the low penalties involved with copyright infringement, coupled with the unsettled state of the law, provided great incentives for entrepreneurs to start copying software.

\begin{footnotes}
\footnotetext[16]{J. Mann, \textit{supra} note 5, at 12.}
\footnotetext[17]{Societe d'Informatique R.D.G., Inc. v. Dynabec Ltee., 6 C.P.R.3d 322, 6 C.I.P.R. 185 (Que. C.A. 1985).}
\footnotetext[18]{Greguras, \textit{Protection of Computer Software in Canada (Part II), SOFTWARE PROTECTION}, June-July 1983, at 2, 3.}
\footnotetext[19]{Telephone interview with Bliss Simmons, Account Representative of Clinton Computer Authorized Apple Dealership (Dec. 16, 1988).}
\end{footnotes}
"Canada, with its maximum penalty for copyright infringements limited to $200 for a first offense, has become a haven for pirates."22 Because the outdated Copyright Act was ineffectual and with no precedent, the entrepreneurs underpriced the "legitimate" software distributors, thereby capturing customers and profit.23 The software copiers were so free that they were able to establish "software clubs", which provided software at substantial discounts or offered software rental, which encouraged home copying.24 Perhaps the attitude of the copiers is best summed up by an entrepreneur who said, "I don't consider myself a pirate. It is not illegal until the government or a judge rules it illegal."25

The domestic copiers were only a part of the problem. The conflict also involved a multitude of nations throughout the world. From the industry's point of view, Canadian imports of software copies from nations with even more relaxed copyright laws were just as bad as copying. The nations that allowed copying included France, Spain, Portugal, Italy, Mexico, Brazil, Saudi Arabia, Hong Kong, Singapore, Argentina, China, India, Indonesia, Japan, Mexico, Korea, Taiwan and Thailand.26 As soon as the technology spread from the United States to these countries, companies sprang up to take advantage of the situation. As in Canada, the law was uncertain; indeed, some nations supported piracy by fostering an atmosphere of government encouragement, if not outright cooperation. Economically, it was in these nations' short term best interests to allow copiers to flourish, since this profitable operation brought increased tax revenues to the exporting nation.27 In Canada, the foreign copycats cost the Canadian computer industry $400 million annually.28 Because a large bulk of this monetary drain went overseas, it deprived Canada's economy of capital. But the impact of the drain was felt ultimately by the U.S. firms who entered the Canadian market. For example, in 1986 it was estimated that foreign copiers were costing the U.S. computer and software industry $4.1 billion.29 Thus, the impact in America was ten times that in Canada.

One important aspect of the Autonomy Phase is its length. The

23. Littman, supra note 21, at 138.
25. Block, supra note 22, at 38.
longer a technological developer can act unchallenged in a particular field, the more a presumption of possession develops. As years go by, the status quo accepts the technological innovator as a de facto possessor of the entire field. In other words, the longer a technological innovator can act unfettered, the stronger their position will be once a conflict arises. Eventually custom, expectation, and economic patterns will develop from prolonged and undisturbed activity. While these factors alone will not decide the technico legal revolution's outcome, they do constitute an unquantifiable yet real advantage for the original developers. Where, as here, the activity has gone on for decades without conflict, there is almost a presumption of ownership in favor of the original software programmers. Such a presumption presents a difficult obstacle for a challenger to overcome.

Because an Autonomy Phase has a larger impact over time, the autonomy of the original developers far outweighs the autonomy of their challengers. Because the developers acted in their field for decades without interference, a presumption arose in their favor. When conflict occurred, the developers were aided by the presumption that they somehow "owned" everything they produced. Conversely, the alleged infringers were "wrong" to infringe this presumed ownership. This idea, although rarely explicitly enunciated, served as the foundation for the analysis of most Canadian courts when they addressed this issue. Thus, the plaintiffs in these cases started out with a great advantage.

B. CONFLICT PHASE

The development of the silicon chip led to the widespread use of personal computers. This subsequently led to a much larger and richer library of software available to more people than ever before. Suddenly, the computer was no longer relegated to servicing large companies' mainframe computers. With the advent of personal computers came the development of floppy disks, programmable ROM chips, and other easily accessible forms of memory storage. The technology for copying programs from one disk to another, or from one chip to another, became as technologically accessible as copying records on a home stereo system. Yet unlike cassette tapes, the resulting software copy is as good as the original because the replicated information is digital.

The economics of copying made software piracy virtually inevitable. Obviously, it costs much less to copy a program than it does to develop the same program and then market it. Thus, the fundamental economic conflict was created; software copiers were selling copies of the original product for a fraction of the cost. Small wonder then that the parties trying to protect their claims of ownership began calling these entrepre-
neurs “pirates.” For the first time, the established computer industry had competition from the outside.

The economic challenge first arose between the industrial sector and the domestic copiers in Canada. As little time as it took Canadian entrepreneurs to establish “software clubs” and other unlicensed distribution outlets, it took even less time for the established industries to strike back. Both Apple and IBM instituted suits as soon as they learned that their programs were being copied. These actions stifled the domestic copiers, with respect to individual software titles. “[A] court victory by Apple or IBM is no guarantee that the [sellers of illegitimate software] will stop selling the other hundreds of software title in their stores.” At the beginning of the conflict stage, the infringing parties have the advantage that the law is unsettled. Pirates can continue their actions until the technico legal revolution is resolved. “They only stop selling the software of the companies that go after them . . . . Unless we [the U.S. software developers] go after them, they won’t stop.”

The Conflict Phase of this technico legal revolution involved the search for legal theories by both sides. Since the software industry had greater resources and more at stake, they developed the widest array of legal attacks against the pirates. More often than not, the copiers and importers of Far Eastern copies were merely put on the defensive and, instead of asserting their own legal arguments, they simply responded to the industrial arguments. Canadians on both sides of this issue, as well as the government, were acutely aware of the foreign trade impact that any resolution would have, especially with the United States. Canada imports most of its high-tech goods from the U.S., and these imports are vital in keeping Canada at the forefront of technology.

1. Legal Analysis Under Unamended Copyright Act

The industries relied on a variety of legal theories to try to protect their software, such as copyright, trade secret, and patent law. The most important is copyright law, because it was the legal theory which eventually gained acceptance. The Canadian Copyright Act remained essentially unchanged since its passage in 1924. Under the Act, copyright protects “every original literary, dramatic, musical and artistic work” by giving the author rights with respect to that work. The

30. See, e.g., Churbuck, supra note 26, at 216.
31. Littman, supra note 21, at 138.
32. Id.
rights of a copyright holder include the sole right to produce or reproduce the work or any substantial part of the work in any material form; to publish the work; to produce or reproduce any translation of the work; and in the case of literary works, to make any record, film or other contrivance by means of which the work may be performed or delivered mechanically.\textsuperscript{35} A copyright in Canada lasts for the life of the author, plus fifty years.\textsuperscript{36}

In order for a plaintiff to show that a copyright has been infringed, that plaintiff must prove that the work was in fact copyrighted, that the plaintiff owns the copyright, and that the defendant has somehow infringed the copyright.\textsuperscript{37} Once a plaintiff has met the requirements, the following forms of relief are available: recovery of all infringing copies of the work, any profits the defendant made from the sale of the infringing copies, any damages the plaintiff suffered as a result of the infringement, and damages limited to a maximum of $200.\textsuperscript{38} The low limit on damage awards highlights one of the drawbacks in resorting to copyright as a means of enforcing the industries' interests. A $200 cap does not provide much of a deterrent effect, especially in light of the potential profits from selling software copies.

To prove copyright exists at all, the plaintiff must prove that the work in question falls within one of the categories of protected works listed above (i.e., literary, dramatic, musical, or artistic works, or contrivances to reproduce sounds mechanically).\textsuperscript{39} In addition, the plaintiff must prove that the work in question is “original,” that the work is fixed in a material form, and that authorship requirements are satisfied.\textsuperscript{40}

The plaintiff must find a category of protected works to apply to the specific work in question. However, section 2 of the Act further defines a literary, dramatic, musical, and artistic work as “every original production in the literary, scientific or artistic domain, whatever may be the mode or form of its expression.”\textsuperscript{41} These categories are rather narrowly defined by the Act.\textsuperscript{42} Because the definition of “literary works” is fairly broad, most advocates of copyright protection have tried to fit software under this category. The argument stems from the language of the Act. Software arguably consists of an “original production . . . in

\textsuperscript{35} Id. § 3(1)(a)-(e).
\textsuperscript{36} Id. § 5.
\textsuperscript{37} Sinnott, supra note 9, at 16.
\textsuperscript{39} Id. § 4(1), (3).
\textsuperscript{40} Id. § 4(1); J. MANN, supra note 5, at 40.
\textsuperscript{42} Id. Software designed to control video games might fall into these categories. Video games often involve both visual displays and musical accompaniment.
the scientific . . . domain, whatever may be the mode or form of expression." Because the language is so broad, software may indeed fall under the category of literary works.

After this primary obstacle is dealt with, the three remaining requirements for copyright protection are fairly simple to meet. First, in order for a work to be "original," a plaintiff need only show that it was not copied from someone else. In addition, the author need only show that sufficient effort was expended to produce the work. The fixation requirement is a reflection of the policy that copyright should protect expression, but not ideas. The industrial advocates argued that source code is a work within the meaning of the Act and that, even if object code is not, object code is a translation of source code and should thus receive protection also. The final criterion, authorship, is easily satisfied. Any author is protected if they are either a British subject, reside in "Her Majesty's Realms and Territories," or are citizens of a nation that has agreed to the Berne Convention, an international agreement on literary and artistic works. Additionally, an author will be protected by the Act if the author is from any nation that has entered into a treaty or agreement with Canada and has promised to give Canadians the same protection as its own citizens. During the Conflict Phase, Canada and the United States were both adherents of the Universal Copyright Convention. Thus, Canada protected American authors, even though the U.S. was not a member of the Berne Convention.

A copyright infringement has occurred when the defendant has done something only the owner of the copyright has the right to do under the Act. An author does not need to register copyrights with the government, although if the copyrights are registered, the plaintiff enjoys a procedural and evidentiary advantage. A registered copyright held by a plaintiff provides evidence that copyright subsists in the work in question and that the person registered is the actual owner of the copyright. While this is not conclusive evidence, it does shift the burden of proof more toward the defendant. Also, there is case law to sug-

43. Id.
44. J. MANN, supra note 5, at 40.
46. Id.; Jeffreys v. Boosey, 4 H.L.C. 815 (1855). This case established the principle of expression versus idea in common law jurisdictions.
47. J. MANN, supra note 5, at 42.
49. Id. § 4(2).
50. J. MANN, supra note 5, at 41.
52. Id. § 36(2).
gest that registration's benefits only accrue to items which are clearly "works" as listed by the Act.

2. Miscellaneous Industrial Arguments

In addition to copyright law, the software industry has used patent, criminal, trade secret, licensing, and misappropriation law to fight against unlicensed software copying.\(^\text{53}\) For example, in Canada it may still be possible to use patent law to protect computer programs. Recent decisions of the Patent Appeal Board have allowed this form of protection in certain cases.\(^\text{54}\) Because the law in Canada was so uncertain, it was in the industries' best interests to attempt as many different approaches to protect software as possible. While each of these areas of the law provided theoretically sound arguments, they all suffered from drawbacks peculiar to each field.\(^\text{55}\) Moreover, these theories never

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53. Patent protection for computer programs is generally unavailable in Canada. See infra note 54.

Trade secret and licensing law had been used extensively by the industry. Trade secrecy law protects the underlying algorithms, as opposed to simply the expression of a program. Moreover, the protection lasts for as long as the secrecy is maintained and there is no need for registration or application. J. MANN, supra note 5, at 115.

Misappropriation theories have also been asserted to protect software. A third party may be enjoined from misappropriating information under an equitable theory of unjust enrichment. Id. at 135.

Finally, criminal law had been suggested as a means of protecting intellectual property interests. In light of recent rulings, it was possible that distribution of infringing copies of software may have constituted criminal fraud. See Regina v. Kirkwood, 42 O.R.2d 65 (C.A. 1983); Regina v. Stewart, 42 O.R.2d 225 (C.A. 1983). The advantages for proceeding with the criminal law is that, since the prosecution would be carried out by the state, the software developer carries none of the economic burden of pursuing the case. In addition, criminal sanctions may provide greater deterrent for future infringers and there is no statute of limitations for criminal fraud actions. The limit for actions brought under the Copyright Act is three years. Can. Rev. Stat. § 24; Hitchcock, Intellectual Property Infringement as Criminal Fraud, 1 CAN. INTELL. PROP. REV. 182, 183 (1984).

54. The Federal Court of Appeal, whose decisions are binding on the Patent Appeal Board, found programs to be analogous to mere scientific principles or abstract theorems, which are specifically disallowed patent protection by the Canadian Patent Act. Schlumberger Can. Ltd. v. Commr. of Patents, 56 C.P.R.2d 204 (Can. Ct. App.1981); Patent Act, Can. Rev. Stat., ch. P-4, § 28(3) (1970). Because programs are not inventions, they are not patentable standing alone. However, subsequent decisions of the Patent Appeal Board have made clear that patents will issue if the program is derived from an inventive concept or the program is part of an improved process that serves a useful end result. See, e.g., Re Application of Patent of International Business Machines Corp., 6 C.P.T.3d 99 (Pat. App. Bd. 1984) (now Patent No. 1,187,197). It may now be possible to describe Operating System programs as methods or strategies to achieve a particular result in such a way as to make them patentable. Additionally, application programs may be patentable if they are part of a larger system which does more than mere calculations. J. MANN, supra note 5, at 151-52.

55. Patent protection, while desirable because it protects the underlying inventive
made it beyond the Conflict Phase of this technico legal revolution. In a certain sense, they each comprise a technico legal revolution in themselves.

3. Competing Legal Theories

The software copiers were much less innovative in developing legal theories under which to defend their position. As a first response, they automatically denied the appropriateness of applying any of the theories outlined above. Next, they argued that the marketplace should remain unregulated and that freedom of competition demanded that software remain unrestrained. Another argument was that public access to software increases society's welfare and that impeding access to innovative technology and its control should not be allowed. Finally, they argued that none of the existing forms of intellectual property schemes are relevant to computers or software, and that new, sui

concept and not merely the form of expression, has drawbacks because the patent only lasts for seventeen years. The patent prosecution process is also expensive in both time and money.

Trade secret law is not particularly useful in a mass-marketing context. For the holder of an alleged trade secret to obtain legal relief, the holder must have undertaken reasonable steps to protect that secret, steps which are antithetical to the concept and practice of mass marketing. J. MANN, supra note 5, at 126-27. The legal strength of a trade secret complaint lies in the existence of an underlying confidential relationship. Such relationships rarely exist between developers and users or copiers of software.

"Shrink-wrap" licenses have not been evaluated by the Canadian courts, but analogous cases indicate that the developers would be under considerable onus to prove they took enough steps to bring the license provisions to their customers' notice. Id. at 335.

Misappropriation of trade secrets by third parties suffers from the same problem. It will generally only be enforceable where there has been a breach of some confidential relationship resulting in information flowing to the third party from the breaching duty holder. Id. at 134. Since this equitable theory is dependent on the surrounding circumstances, it cannot protect all software per se. Id. at 135.

There are several disadvantages to using the criminal justice system. First, the fraud charge assumes that the software copies infringe the Copyright Act. This was not necessarily a valid assumption in 1984 when this theory was first asserted. Second, the piracy victim will not receive damages, unless the court orders restitution. Hitchcock, supra note 53, at 183. Third, the burden of proof in criminal cases is much higher than in civil cases. The burden is raised to "beyond a reasonable doubt." Id. Finally, the Crown Attorney (Canada's equivalent to a District Attorney) may exercise prosecutorial discretion and not pursue the case at all or not as forcefully as the victim might wish. Id. at 189. This approach to software protection was not widely pursued because too much discretion was left in the hands of a third party, the Crown Attorney. Additionally, while the deterrent effect may be greater, this course of legal action did not create any positive rights in the developers of the software.


generis legislation is needed to create a better, more flexible, and more equitable system for protecting software. This last legal theory was the most persuasive and, since it conceded that some kind of protection was needed, it was the most realistic proposal.

The most viable legal argument the software copiers made was the suggestion that legislation be passed which would create a new legal protection scheme for software. The details of this sui generis legislation were expounded in the Canadian government's White Paper on Copyright Reform, issued in 1984. The proposal distinguished between human-readable and machine-readable computer programs, between source code and object code. The White Paper would give human-readable programs normal copyright protection for the life of the author plus fifty years. On the other hand, machine-readable programs would only be protected for five years. This protection scheme, modeled loosely on the U.S. Semiconductor Chip Protection Act, would allow dissemination of programs more quickly and, thus, would take into account the relatively short life-span of software's value. This approach realizes that full copyright protection is inappropriate both from a historical point of view, since copyright was first developed to protect book printers, and from a practical point of view, since to offer full copyright in software is to provide a monopoly for much more than the valuable lifetime of any software.

Since most of the software copiers' other arguments were fairly weak, this legislative proposal was the primary legal strategy that the software copiers brought into the Determination Phase. Their other arguments, based on economic and social policy, fell aside as did the theories of patent, trade secret, misappropriation and criminal law that the industrial advocates promoted. Consequently, entering the next phase, the opposing parties brought their strongest theories to bear. Now it was up to the legal system to begin sorting out the conflict in the Determination Phase.

58. Sinnott, supra note 9, at 45.
60. Id. at 11. The term of protection for the machine-readable code could be modified, for example, to ten years instead of five, as long as the modification does not go beyond the seventeen years afforded by the Patent Act. Sinnott, supra note 10, at 45-46. The exact numbers could be determined by consensus or negotiation, but the important point is that the protection scheme should be flexible and realistic.
61. Levenberg, supra note 45, at 84 n.99.
C. Determination Phase

It was in the economic challengers' interests to drag out the Determination Phase as long as possible, since there was very little negative pressure under existing law. In addition, the copiers had fewer resources with which to fight and were not as well organized as their industrial opponents. These handicaps, coupled with the presumptions in favor of the original technological developers, led to a dim prognosis for the challengers. Thus, the longer it took for the technico legal revolution to be resolved, the longer the copiers could profit.

1. Judicial Action

The Determination Phase of this technico legal revolution witnessed the legal system's choice between two competing legal regimes: Copyright Protection or *sui generis* protection tailored specifically for the problems inherent in high technology. The entrenched industries clamored for copyright protection for software, while commentators, some government officials, and the economic challengers sought the legislative approach. A review of the jurisprudential development will indicate how the arguments brought by the various parties affected judicial action.

The first cases involving software protection went largely unreported and dealt with plaintiffs seeking preliminary injunctions. Many of the initial cases involved video games, where the plaintiff sought an Anton Piller order, which would allow the plaintiff to seize infringing copies. The earliest reported suit is *Midway Mfg. Co. v. Amusement Electronics Ltd.* brought in 1981, in which the plaintiff successfully obtained an injunction. In most of these early cases, very few meaningful hearings were held and default judgments and settlements seemed to govern the conduct of the suits.

The first video game case on the appellate level was *Nintendo America, Inc. v. Coinex Video Games, Inc.*, in which the Federal Court of Appeal overruled the trial court and allowed an Anton Piller order to issue. Although the court did not explicitly address the issue of whether copyright existed in the game program embedded in the chip,

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63. Fisk, *supra* note 20, at 176-77. An "Anton Piller Order" is a court order similar to an injunction by which a plaintiff, after persuading a court in an ex parte hearing, is allowed to enter a defendant's premises and seize evidence of copyright, patent, or trademark infringement. It preserves infringing articles which are easy to destroy. The order is named after the case which originally allowed this type of seizures. J. Mann, *supra* note 5, at 101-05.


66. 69 C.P.R.2d 122 (Ct. App. 1982) (Crazy Kong infringing Donkey Kong).
the decision seems to imply that the court believed copyright did exist, since the injunction was allowed. The court believed a strong *prima facie* case of copyright infringement had been presented. To reach this conclusion, the court's underlying assumption must have been that copyright existed in the first place.

These preliminary cases were almost all *ex parte* proceedings where most of the plaintiffs were seeking Anton Piller orders to seize evidence of infringement. Since these were *ex parte* proceedings, their value is suspect because the economic challengers were never allowed to raise their arguments until it was too late. This occurred in both the video game cases and the early "true" software cases.

The first year copyright computer cases were launched in Canada was 1983. As with the video game cases, these early hearings involved injunctions. Two cases which were actually contested are *Spacefile Ltd. v. Smart Computing Systems Ltd.* (Spacefile) and *Apple Computer, Inc. v. Computermat, Inc.* (Computermat). Both cases dealt with applications for preliminary injunctions. In *Spacefile*, the court found that "the source code and programmes [sic] . . . are original ideas expressed in a particular form." The court continued: "They are the proper subject matter of copyright." Although the *Computermat* court discussed copyrightability of computer programs, it did not decide the issue. Neither of these decisions dealt with the issues in depth. Moreover, these decisions did not provide any definitive proclamations of the law. Their importance lies primarily in their influence on later courts which fully tackled this technico legal revolution.

The first case to deal squarely with this issue was *International Business Machines Corp. v. Spirales Computers, Inc.* (IBM). The defendant was accused of selling Taiwanese computers which allegedly contained chips encoded with illegal copies of IBM's BIOS Operating System program. The plaintiff sought an injunction to restrain the defendant from infringing the copyright by selling the computers. In deciding whether the program was properly copyrightable, the court first noted that cases like *Spacefile* were "of somewhat limited value." Justice Reed rejected these cases because they focussed on slightly dif-

68. *Id.*
69. 75 C.P.R.2d 281 (Ont. H.C. 1983).
70. 75 C.P.R.2d 26 (1983).
71. *Spacefile*, 75 C.P.R.2d at 281.
72. *Id.*
73. *Computermat*, 75 C.P.R.2d at 31.
75. *Id.* at 353.
76. *Id.* at 355.
ferent issues.\textsuperscript{77}

The \textit{IBM} court instead relied heavily on cases from other common law jurisdictions, especially decisions which dealt with this issue from British Commonwealth Nations and the United States. The court set the stage by deciding it would not interpret the Copyright Act narrowly.\textsuperscript{78} Then, after refuting each contention by the defense, the court simply concluded by finding for the plaintiff.\textsuperscript{79}

In refuting the first argument raised by the defense, the court relied on a South African case which supported the position that source code is a literary work.\textsuperscript{80} Next the court referred to a United States Third Circuit case to support the contention that object code was also a literary work.\textsuperscript{81} The court then excerpted extensively from an Australian intermediate appellate court case which held that a copyright subsisted in software even though programs do not "communicate" anything to humans.\textsuperscript{82} Finally, the court rejected the argument that only the program as written in the technical manual was reproduced in material form. The court seemed to agree with the Australian case that the code itself is in material form. "[T]he better view would seem to be that the 'chip' version of the code is a reproduction in material form."\textsuperscript{83} The court concluded that the plaintiff presented a \textit{prima facie} case of copyright infringement.

The next two significant cases were both decided by provincial appellate courts. These decisions were only separated by a few months. In \textit{F \& I Retail Systems Ltd.} v. \textit{Thermoguard Automotive Products Canada Ltd.},\textsuperscript{84} the Ontario High Court found that copyright exists in computer systems and issued an injunction. The Quebec Court of Appeal affirmed the decision of the Quebec Superior Court reaching the same conclusion in \textit{Societe d'informatique R.D.G., Inc.} v. \textit{Dynabec Ltee.}\textsuperscript{85} By finding object code to be a translation of the source code, the Quebec Superior Court departed slightly from prior Canadian decisions.\textsuperscript{86} Prior decisions had found object code to be a reproduction of the source code

\textsuperscript{77} \textit{Id.}
\textsuperscript{78} \textit{Id.} at 356.
\textsuperscript{79} \textit{Id.} at 361.
\textsuperscript{81} \textit{IBM}, 12 D.L.R.4th at 357; \textit{Apple Computer, Inc. v. Franklin Computer Corp.}, 714 F.2d 1240 (3d Cir. 1983).
\textsuperscript{83} \textit{IBM}, 12 D.L.R.4th at 361.
\textsuperscript{84} 1 C.P.R.3d 297 (Ont. H.C. 1984).
\textsuperscript{86} \textit{Id.}
in a material form, not a translation. This prior interpretation was not expressly overruled by the Quebec Court of Appeal, but the court seemed to be more receptive to the notion that the object code was a reproduction. This decision put Quebec firmly in line with the Federal Court and appeared to strengthen the burgeoning judicial movement toward full copyright protection.

The first full trial on a computer program copyright was Apple v. Mackintosh and is probably the most comprehensive discussion of this issue by a Canadian court to date. Before the case came to full trial, the plaintiff was denied an interlocutory injunction. The judge who denied the injunction agreed that both sides had presented strong arguments, which were better left resolved after a full trial. The motions court was unimpressed with the plaintiff’s heavy reliance on foreign jurisprudence. Also, the plaintiff failed to make a showing of irreparable harm. Moreover, the plaintiff presented a weak prima facie case. Thus, the motions court refused to issue the injunction.

At the time, this ruling caused some commentators to back away from the view that full copyright protection was imminent, especially since Canadian jurisprudence relied so heavily on case law from foreign jurisdictions where the statutory system was different. However, most commentators believed the full trial would establish copyright protection. One commentator went so far as to predict that “the signs are favourable [sic] for a decision confirming computer program copyright in Canada.” This was hardly an audacious prediction. The trend in prior decisions was that “there have been no cases in Canada (or indeed anywhere in the common law world) which have decided, in the highest court to which the matter was taken, that copyright did not exist for computer programs.”

The defendants in this case were accused of selling Apple computer clones. Instead of copying the programs from one chip to another, they used an EPROM “burner” to mechanically copy the Apple ROM chips onto their EPROM chips. When the case was set for full trial, the de-

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88. Societe d’informa
89. Fisk, supra note 20, at 179.
91. Id.
92. Id.
94. Fisk, supra note 20, at 179.
95. Id. (emphasis added).
fendants were unfortunate enough to get as the presiding Justice the
same Justice who had decided the IBM case, Justice Reed. In light of
her previous decision regarding computer copyright, her final decision
here should have come as no surprise.

After disposing of issues not in contention, the court addressed the
heart of the case. "The issue is whether a computer program which
originates as a written text . . . continues to be covered by copyright
when it is converted into its electrical code version."97 In tackling this
issue, the court addressed each of the defendants' arguments in turn.
As in IBM, after rejecting each of the defendants' arguments, the court
found for the plaintiff.98

The first issue the court dealt with was the whether object code
was a translation of source code. The defendants argued that the object
code version of the program was not a translation of the source code but
a different literary work.99 In rejecting this argument, the court simply
cited a dictionary definition of "translation" and in conclusory language
proclaimed that "[t]he conversion from one code to another clearly falls
within that definition."100 Justice Reed completely abandoned her argu-
ments in favor of treating object code as a "reproduction in material
form" of source code which she developed at great length in IBM.101
Although she mentioned the "translation" argument in IBM, Justice Reed
opined that the "reproduction in material form" argument seems to be "the better view."102

The court next dealt with the argument that copyright law cannot
protect the program since the program is embedded in a ROM chip.
The idea and expression have merged.103 The court rejected this con-
tention and cast doubt as to whether the "merger" doctrine even exists
in Canadian law.104 The court also noted that the defense conceded
that the source code version of the program was copyrightable.105 Why
the defense made such a concession is not explained. If a computer pro-
gram represents the merger between an idea and its expression, then it
should not matter whether that program is in source code or object
code. By making this concession, the defense effectively eliminated de-

97. Id. at 197.
98. Id. at 229.
99. Id. at 197.
100. Id. at 198.
351, 360-61 (Fed. Ct. 1986).
102. Id. at 361.
(Fed. Ct. 1986).
104. Id. at 202, 204-05.
105. Id. at 201-02.
bate on this point. The court also noted that there are multiple ways in which a program can be written and still produce the same result.\textsuperscript{106} This fact would also seem to defeat the application of the merger doctrine.

The defense's third argument was that the Copyright Act does not cover the embodiment of the plaintiff's program in the ROM chip. The language of the Act reads: "'copyright' means the sole right to produce or reproduce the work . . . in any material form whatever."\textsuperscript{107} The argument was that the embodiment of the program is not a reproduction of the work in a material form. Moreover, any reproduction must ultimately communicate the work to human beings.\textsuperscript{108} The court revived the arguments from the IBM decision to address whether or not computer programs were "reproductions in material form."\textsuperscript{109} Justice Reed read the expansive language "in any material form whatever" to be broad enough to include programs embedded in chips.\textsuperscript{110} As to the "communication" issue, the court believed that "the requirement of 'readability' or 'appearance to the eye' found in the jurisprudence requires no more than that there be a method by which the work in which copyright is claimed and the work which is alleged to infringe can be visually compared for the purpose of determining whether copying has occurred."\textsuperscript{111} Since programs can be "retrieved" from ROM, the court reasoned that such a method exists.\textsuperscript{112}

The court's logic is contradictory with respect to Justice Reed's prior decision. When addressing the defense's first argument, the court went to great lengths to find that the program was a translation of the source code. At that point, the court made no mention of the previous IBM decision, in which "the better view" was to treat object code as a "reproduction in material form."\textsuperscript{113} This is probably due to the fact that the plaintiff corporation was itself arguing that the object code was a translation of the copyrightable hexadecimal source code.\textsuperscript{114} Yet, when the court reached this argument, the translation issue was completely ignored. Instead, the court revived essentially the same arguments as in IBM, and concluded that the program was a "reproduction

\textsuperscript{106} Id. at 202.
\textsuperscript{107} Can. Rev. Stat., ch. C-30, § 3(1).
\textsuperscript{109} Id. at 207-08.
\textsuperscript{110} Id. at 210.
\textsuperscript{111} Id. at 208.
\textsuperscript{112} Id. at 208.
\textsuperscript{113} Id. at 198; International Business Machines Corp. v. Spirales Computers, Inc., 12 D.L.R.4th 351, 361 (Fed. Ct. 1984).
in a material form." This conclusion appears to be inconsistent. A computer program can be characterized as a "translation" of the source code or as a "reproduction in material form" of the source code. But it is incongruous for the object code to be both a translation and a reproduction at the same time. And yet, that is exactly what the court seems to be saying. At best, this is mere sloppy jurisprudence. At worst, this is an irreconcilable contradiction which reveals a clear judicial bias as to how this technico legal revolution should be resolved.

The final argument posited by the defense consisted of four policy reasons why copyright should not extend to software. The first policy reason argued was that copyrighting software will grant a monopoly on an item of commerce which is against public policy. The second policy reason argued was that patent law, rather than copyright law, was the appropriate legal regime to apply to protect software. The third policy reason argued was that since Parliament was currently debating how to amend the Copyright Act, the courts should not usurp Parliament's function by extending the Act to software. Finally, the fourth policy reason argued was that since there was so much uncertainty surrounding this issue, the defendants should not be penalized for acting in the way they did. The court rejected each of these arguments in turn. First, the court agreed that copyright will grant a monopoly, but that is the precise purpose of copyright. Second, the court disagreed that overlapping fields of law were to be avoided and did not believe that courts need to frame their decisions to avoid such overlaps. Third, the court rejected examination of legislative debate over copyright reform, preferring to apply the law as currently written and leave the debate to the legislature. Finally, the court stated that it is precisely the role of courts to make decisions when the law is unclear, and that ignorance or uncertainty of the law is not a valid defense.

After the court disposed of all the defendants' arguments, the court proceeded to determine individual liability. The court even pierced the corporate veil and found the directors and officers of one defendant corporation personally liable. The lengthy technical discourse and the full treatment of all the defense arguments are evidence of the court's strong desire to establish the state of law in this uncertain area.

115. Id. at 210; Compare Apple, 28 D.L.R.4th at 206-212 with IBM, 12 D.L.R.4th at 360-61 (discussing the translation issue).
117. Id.
118. Id. at 214.
119. Id. at 214-15.
120. Id. at 215.
121. Id. at 218-30.
122. Id. at 222.
The persuasiveness of both the *Apple* and *IBM* opinions were sharply undermined when the Australian High Court, the highest court in that nation, overruled the Australian case upon which Justice Reed relied so heavily.123 The same reasons Justice Reed gave for following Australian cases now militates against her conclusions. If Australian jurisprudence was of "considerable persuasive value" in support of her position, then it must have the same force in standing against her ultimate decision. Since the Canadian court found "[c]ases decided outside of Canada, in Commonwealth countries having a copyright statute not too dissimilar to our own . . . [to be] more helpful in many ways" than Canadian jurisprudence, the continuing validity of both the *IBM* and *Apple* decisions is questionable.124

While *Apple* was the fullest treatment of this issue, it was only a federal trial court decision. However, in February 1987, a Notice of Appeal was filed.125 In June 1990, the Supreme Court of Canada affirmed the trial court.126

2. *Competing Legal Regimes*

The third and fourth policy arguments that the defendants made in *Apple* were essentially appeals to the court to wait for the legislature to adopt the kind of *sui generis* legislation that constitutes the other competing legal regime in this technico legal revolution.127 While the Canadian judiciary appeared to be opposed to adopting such a legal regime *sua sponte*, the economic challengers, through the legislature and commentators, waged a slightly more successful campaign outside the courtrooms.

As far back as 1957, the Canadian government recognized a need to revise the 1924 Copyright Act, since the Act had failed to keep abreast of technical developments such as television.128 From 1957 to 1977, several committees and commissions were charged with evaluating copyright reform. They unanimously advised that computer programs not be given copyright status.129 It was not until the Determination Phase...
of this technico legal revolution that government committees and departments began to seriously consider extending copyright protection to software.

In 1983, the Task Force on Copyright Law Revision, under the auspices of the Department of Communication, issued its final report. The Task Force recognized the uncertainty in this legal field, implicitly acknowledging the existence of this technico legal revolution. The Task Force specifically rejected creating a new legal regime tailored specifically for this field. On the contrary, the Task Force supported the position of the industries and advised full copyright protection for software, regardless of the form of expression.

In 1984, the Canadian government issued a White Paper on Copyright reform, entitled “From Gutenberg to Telidon: A White Paper on Copyright.” This White Paper, written by both the Department of Consumer and Corporate Affairs and the Department of Communications, made extensive recommendations and dealt explicitly with software. The White Paper proposed a separate legal regime for software and rejected full traditional copyright protection. The White Paper authors divided software into two categories: programs in “human readable form” and programs in “machine-readable form.” A “machine-readable” program was defined as a program that was not intended for human comprehension. Human-readable programs would be given full copyright protection in accordance with Canada’s international treaty obligations. Machine-readable programs would only be given protection for five years and would not include a moral right, a public performance right, a broadcast or cable transmission right, a market segregation right, or a right to use the program. Finally, the White Paper recommended mandatory markings for published programs. This special regime for machine-readable programs would not include international protection.

Naturally, the computer industry and members of the legal community who represented the industry reviled this proposal. However, commentators, especially the academics who had no economic stake in this technico legal revolution, supported the suggestion of a specialized legal regime for software. Thus, for a while at least, it appeared that the eco-
nomic challengers to the software industry might prevail in this technico legal revolution. There were a number of arguments raised in support of this sui generis protection system. First, since programs are economic in nature, and not aesthetic, the new legislation should strike a balance between rewarding the technological innovator and disseminating technical information for the public good.\textsuperscript{139} Full copyright is not desirable because it "would be used as one more device to prevent rather than enable, access to innovative programs- one more device of industrial security."\textsuperscript{140} "[T]he White Paper proposal for sui generis protection for object code programs would seem to be more appropriate than the traditional copyright protection . . . . [I]t remains doubtful whether traditional copyright protection, with its lengthy term of protection, is a suitable form of protection for what can be characterized as being primarily utilitarian objects."\textsuperscript{141} Finally, "the public's justification for copyright . . . is not to serve a private financial interest of one group or another. It is to serve . . . [the] public interest. It is only to that extent that copyright is justified."\textsuperscript{142} As with most arguments in the legislative arena, these tended to stress policy implications.

Thus, two battles in the same war were being waged. The industrial advocates were prevailing in the Canadian courts and were gaining the protection they wanted. On the other hand, the economic challengers concentrated their efforts in the legislature and promoted revamping the law itself.

3. Political Arguments and False Analogies

The IBM court raised a number of political arguments. "It is well known that the process of writing computer programmes [sic] is highly creative and individualistic . . . . It would, therefore, be extraordinary and highly improbable, to find that two programmers not working together . . . had written programmes [sic] to accomplish anything more than the simplest result in the same . . . way."\textsuperscript{143} While this may be true for some programs, it certainly is not true for all computer programs. Indeed, "programmes [sic] that can be effectively expressed (i.e., written or coded) in only one way should not be copyrightable,"\textsuperscript{144} since

\textsuperscript{140} Morgan, supra note 57, at 423 (Commissioner Hersey's dissent).
\textsuperscript{141} Sinnott, supra note 9, at 45, 48.
\textsuperscript{142} Panel on the White Paper on Copyright Law Reform, 1 CAN. INTELL. PROP. REV. 420, 436 (1984) (remarks of Bruce McDonald) [hereinafter Panel on White Paper].
\textsuperscript{144} Wiggs, Canadian Copyright Protection for Computer Software—Recent Developments, 1 INTELL. PROP. J. 137, 143 (1984).
"the merger rule may have application in the case of relatively short or trivial programs." If courts willingly provide full copyright protection to all computer programs in the belief that there is always a high degree of creativity involved, then the result could be that "a software proprietor could obtain something tantamount to patent protection enabling him to deprive computer owners of a functional capability of their machines, but without being subject to the novelty examination process and other safeguards that precede the grant of a patent."

In Apple, the court noted that the "possibility of two programmers creating identical programs, without copying was compared by the defendants' expert witness to the likelihood of a monkey sitting at a typewriter producing Shakespeare." "The plaintiffs' evidence focused on the operation of a computer from a programmer's point of view. The plaintiffs' expert witnesses, except for one, were all software experts . . . [who] described the computer in terms of its function of processing and storing information." "The defendants' expert evidence, on the other hand, focused on the operation of a computer from a hardware point of view . . . [and] focused on the functioning of the machine as a complex system of integrated electrical circuits." In their attempt to rebut the defense, the plaintiffs presented an expert, but the court "found it almost incredulous that the plaintiffs' 'hardware' expert refused to express himself except in software terms." Finally, the court was not convinced by a "table of abstractions" used by the plaintiffs to bolster the proposition that "it was inappropriate to talk of programs and circuitry or voltage levels in the same sentence."

Both sides, again, resorted to a number of political arguments in the debate surrounding the sui generis legislation. The authors of the White Paper claimed that "full traditional copyright protection might impede technological progress and ignore certain realities of commerce and industry." Another commentator argued that "a large difference between the cost of producing a work initially and the cost of copying it is not alone sufficient to show that copyright protection is desirable." Turning the economic argument around against the industry, the argument concludes, "[b]ut evidence is still lacking of any substantial hardship suffered by software manufacturers which is directly related to the

145. Sinnott, supra note 9, at 32.
146. Wiggs, supra note 144, at 143.
148. Id. at 191.
149. Id. at 191-92.
150. Id.
151. Id. at 227.
152. WHITE PAPER, supra note 59, at 11.
hitherto absence of copyright protection."\textsuperscript{153} Finally, there is a policy-derived argument relating to the international aspects of technology transfer. "Canada is a net importer of copyrighted materials and technology. Therefore, strengthened copyright protection for computer programs would result in substantial royalties flowing to persons outside Canada."\textsuperscript{154} This economic argument barely disguises the underlying protectionist and nationalistic sentiment.

On the other side, the advocates of industrial concerns wrote that "[t]o date there has been no problem with copyright being used as a sword to stifle competition."\textsuperscript{155} A colleague of that same author, working for the Department of Consumer and Corporate Affairs, wrote that the United States, which was the first nation to adopt full copyright protection, has seen innovation and progress within their industry, the world's largest and most competitive. The progress "has not been constrained by copyright protection. All available evidence suggests that these healthy economic trends, including increasingly competitive pricing behavior, will continue with firms increasingly relying on the copyright in the software to license and exploit it in the marketplace."\textsuperscript{156} "[N]o deleterious economic results can be traced to the granting of full explicit copyright protection. Indeed, certainty resulting from clear statutory guidance appears to have contributed to both international and domestic trade in these products."\textsuperscript{157}

In \textit{IBM}, the court stated: "[i]t is perhaps not doing too much conceptual violence to think of [a program embedded on a ROM chip] as analogous to a cassette tape in a tape recorder."\textsuperscript{158} With all due respect, this certainly does do too much conceptual violence. This is a false analogy, because computer users do not slip chips in and out of their computers every time they use them. Although chips are replaceable, the normal user does not replace them with any frequency approaching that of a cassette player. The same court was unpersuaded in thinking of the embedded program as being part of the machine. "An analogy in my view would be to the role of a cassette tape in a tape recorder. Information is recorded on a tape in a fashion analogous to information being embedded in the chip—both operate in conjunction with the respective machines for which they are designed but are not part of the

\textsuperscript{153} Morgan, supra note 57, at 421, 422.
\textsuperscript{154} Rush, supra note 139, at 169-170.
\textsuperscript{157} Legislative Progress, supra note 24, at 233.
Again, this analogy falsely assumes that chips are somehow easily replaceable, whereas in reality access to the interior of computers is recommended for qualified repairmen only.  

The Apple court also addressed a number of false analogies. First, the defense in Apple tried to characterize programs as "merely specifications for a machine part." Not all programs are mechanically embedded onto a chip.

Second, the court rejected the defense's analogy to recipes and recipe books. "While copyright would not prevent someone from making Mrs. Beeton's rabbit pie . . . it does prevent someone copying the [recipe] book itself." The defense tried to characterize their actions as analogous to "following the recipe" in the ROM chip. The court changed the analogy from "following" the recipe to "copying" the recipe book. The analogy in both cases is false since the instructions in ROM are intended to control the Operating System of a machine, whereas a recipe in a book is intended for human comprehension.

Third, the defense tried to analogize programs to mathematical formulas, which are not copyrightable. The court believed that a program is more like a textbook on mathematics. The analogy is false because mathematical formulas are not used to control mechanical processes. The programs are not mathematical formulas but are more like logical formulas.

One final analogy tried to compare the computer industry to the pharmaceutical industry. "The pharmaceutical industry invests a substantial amount of capital in research and development . . . . Patent protection, which has public disclosure benefits, is sufficient to enable the industry to recoup its costs—with handsome profit—even though its output can be copied at little cost." Again, this is a false analogy because it presupposes that patent protection would be completely available for all software.

D. Resolution Phase

At the outset of the Resolution Phase, the advocates of full copyright protection had captured the approval of the Canadian courts. The primary battle was now in the legislature. Although the advocates of a

159. Id. at 358.
160. For example, the rear warning panel on this author's Apple MacPlus personal computer clearly reads in bold print: "To prevent electrical shock, do not remove cover. No user serviceable parts inside. Refer serving to qualified servicing personnel."
162. Id. at 203.
163. Id. at 214.
164. Morgan, supra note 57, at 422.
sui generis protection scheme gained the advantage with the issuance of the White Paper, their opponents had already aligned arguments and forces to counter this legislative development. Outside political forces played the largest role in shaping the ultimate resolution of this technico legal revolution in the Resolution Phase.

1. *Shifting the Burden of Proof*

As outlined above, the courts up to this point had almost unanimously found in favor of the advocates of full copyright protection. One salient aspect of a technico legal revolution is that during the Resolution Phase, the legal system assigns the burden of proof to the party that ultimately loses. This certainly happened in Canada. In both *IBM* and *Apple*, Justice Reed attacked the issue with roughly the same logical pattern. She addressed each of the defendants arguments in order, rejected all of them, and found for the plaintiffs. The underlying assumption, therefore, must have been that copyright *already* existed in the software. It was the defendants' burden to prove that copyright did *not* exist in the computer programs. This is contrary to the normal burden of proof in copyright cases. *Cuisenaire v. South West Imports* makes it clear that the presumption of copyright provided by registration of copyright is only available for "works" which are clearly within the categories of "works" as listed in § 4(1) of the Copyright Act. Although the plaintiffs registered their copyrights, they should not have been granted the presumption of copyright. Instead, it should have been incumbent on the software manufacturers to prove that copyright existed in their programs. "Thus, the Court seems to have proceeded upon the wrong footing that the defendants had to rebut a presumption that copyright subsisted in such object code programs."  

The case law affected how the final battle was fought in the legislature. The courts had shifted the burden of proof to the defendant economic challengers. By giving the original technical developers a presumption of copyright, the legal system had fulfilled the expectations which arose during the decades-long Autonomy Phase of the entrenched industries. Since the courts had granted this presumption, the industries were not going to allow the legislature to take it away.

2. *Legislative Action*

The White Paper was panned after it was issued. "The proposals in the White Paper . . . were widely criticized by legal writers and representatives of the computer industry. Most of the objections . . . indi-

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166. *Sinnott, supra* note 9, at 18.
cated that the proposed distinction between human-readable and
machine-readable programs was impracticable and unworkable.”167
Even a government spokesman was forced to admit that the response
was disappointing.168 One argument was that “[a]ny attempt to separate
the protection afforded to source and object code soon leaves the au-
thor/programmer with only protection for the form of the work which
has no value in itself. Clearly, the source code form of the program is
of little interest to anyone because it cannot be used without conversion
first to machine-readable code on a machine-readable media.”169 Be-
cause the government sought general reactions and opinions about the
White Paper, only those parties with an economic interest, and which
were organized, took an active role. The net result was that they only
heard from industry spokespersons. So, naturally “[r]eaction to the
White Paper proposals to distinguish between the human readable and
machine readable phases of programs was . . . almost unanimously
negative.”170

In the same year that the White Paper was issued, the Canadian
elections brought to power Brian Mulroney’s Conservative Government.
At the time, there was some doubt as to whether the new government
would accept the previous government’s report. “[W]e understand that
the White Paper is not a policy position of the present Conservative
Government, and they should not be expected to defend it.”171 After
the election, the Mulroney government referred the whole issue to a
special Parliamentary Subcommittee on the Revision of Copyright.
This subcommittee held hearings during 1985. The Minister of Con-
sumer and Corporate Affairs stated in his appearance before the sub-
committee that “the White Paper did not represent the policy of the
Canadian Government.”172 Thus, due to a shift in political fortunes, the
proponents of sui generis protection began losing their struggle.

After hearing extensive testimony from industrial representatives
and practitioners, the Subcommittee issued its report, A Charter of
Rights for Creators.173 Essentially, the Charter rejected the sui generis
approach recommended by the White Paper. Instead, the Charter ad-
vised giving full traditional copyright protection to software. “[T]he
Sub-Committee report goes a long way to correct the many major defi-

167. J. MANN, supra note 5, at 111-12.
168. Panel on White Paper, supra note 142, at 422 (remarks of Frank Keyes, Director
of Copyright).
169. Id. at 429 (remarks of Casey August of IBM, Toronto).
170. Intellectual Property, supra note 156, at 34.
172. J. MANN, supra note 5, at 112.
173. SUBCOMMIrrrEE ON THE REVISION OF COPYRIGHT, STANDING COMMITTEE ON COM-
ciencies contained in the White Paper in relation to computer programs, thanks in great part to the many comments made by computer manufacturers and software producers during the public consultation process."\textsuperscript{174} The next year the government issued a response to the Charter. With few variations, the Response agreed with the recommendations made by the Subcommittee.\textsuperscript{175}

In May of 1987, the Federal Government finally introduced Bill C-60,\textsuperscript{176} the first phase of copyright reform. Bill C-60 protects computer software as one of the category of works defined as "literary works." The Bill further defined "computer programs" to be "any set of instructions that is expressed, fixed, embodied or stored in any manner and that can be used directly or indirectly in a computer in order to bring about a specific result."\textsuperscript{177} Thus, the bill provides full copyright protection for software.\textsuperscript{178} Given the broad language, "stored in any manner," it may be that programs embedded in ROM are covered, although the government announced that semiconductor mask works would be covered in the phase 2 amendments to the Act.\textsuperscript{179}

The Bill suffered some criticism and stalling in the Senate. "What can one say about the present Bill C-60 which is incomplete, unfinished, imperfect, piecemeal, and will probably be changed in many respects shortly."\textsuperscript{180} The Liberal-controlled Senate blocked passage of the bill for political reasons.\textsuperscript{181} The government was forced to make a few concessions unrelated to software and passage of the bill was delayed until 1988.\textsuperscript{182} On June 8, 1988, the bill received Royal Assent and became law.\textsuperscript{183}

The new law has not been tested in the courts, but its impact is expected to be strong. The law was not substantially changed from the original draft of the bill. Computer programs are still defined as "liter-
ary works,” and are protected in any form or medium. Most importantly, the penalties were dramatically increased, with the Canadian equivalent of a misdemeanor conviction carrying a fine of $25,000 or six months imprisonment and with felony-equivalent convictions carrying a $1,000,000 penalty or five years imprisonment.184 “While the changes were not numerous, with respect to computer software, they appear to be far-reaching.”185

The judicial decisions in the Determination Phase of this technico legal revolution guided the legislature. The government effectively decided “to entrench the decision of [Apple]. It is clear that computer programs either in source code or object code, whether such programs are application programs or operating programs, whether such programs are stored in read only memory-ROM chips or magnetic tapes will be protected.”186 At this stage there never was a serious challenge as to whether copyright should exist at all. The debate, by the time it got to Parliament, was over the scope of the copyright. Since courts had already said the protection should be complete, it was simpler for the legislators to follow suit. The legislation actually goes farther than any of the case law and is a resounding triumph for the industry.

E. AFTER THE REVOLUTION

This Canadian technico legal revolution went through the four phases: Autonomy, Conflict, Determination and Resolution. The resolution came when the courts converted the presumption in favor of the technological developers into a burden of proving non-existence of copyright by the economic challengers. The challengers’ fatal flaw was allowing the arguments to center around copyright law. By arguing in terms of copyright, the economic challengers abandoned their legal theory. When the legislature completed its copyright reforms, the industries had the complete protection they advocated for at the conflict phase. The overall effect was to restore the status quo that had built up over decades. The government appears to have very little trouble accepting a technological monopoly.

Domestically, the new law will almost certainly encourage greater prosecutions, more lawsuits, and more work for lawyers. Because the Copyright Act is broad, even going so far as to include object code embedded in chips, it will spur domestic software production, but it will also hurt the largest and most neglected party, the Canadian consumer. The changes “mean royalty payments and higher prices to consumers

184. Bill C-60, supra note 176, § 25.
185. Szibbo, supra note 183, at 2.
186. Gray, supra note 180, at 397.
in our view, they would be unfair measures for consumers." The impact on consumers was never a major argument in deciding the outcome of this technico legal revolution.

Canada is at the cutting edge of this issue by giving full copyright protection, and possibly patent protection, to software. The election of the pro-industry Conservative Government was a great boost for the U.S.-dominated market participants. The Conservative Government was extremely concerned about the Free Trade Agreement with the United States. The Mulroney government's free enterprise spirit spurred the revision of laws concerning investment and trade. Canada was "open for business."

The new Copyright Act extends the definition of "literary works" far beyond their original parameters. "It is interesting how far we have come from the traditional concept of copyright . . . . We now define a particular type of copyrightable subject matter as something which is designed to bring about a certain result, i.e., that has a utilitarian function rather than one to be appreciated for its own sake." "Are the 'tentacles of copyright' tightening their grasp upon freedom of competition in utilitarian articles of commerce?"

If copyright is indeed stifling competition, it will have undesirable long term effects on software development. As competition decreases, stagnation and technological complacency will impede the future progress of scientific and economic development. Only the future will tell whether Canada chose the proper method of software protection. However, because Canada is not the only nation in this world, this Article will now turn to the international perspectives of copyright protection for software.

First, the status of software protection in the rest of the world will be examined. Next, the international trade impact of such protection.

188. Copyright Reform, supra note 174, at 2.
191. Id. at 87.
192. Id. at 97.
194. Fisk, supra note 20, at 178.
195. This Technico-Legal Revolution is international in scope. The different resolutions each nation fashioned underscores that there is no uniquely correct resolution. A resolution can depend as much on politics as on legal analysis. See generally Brannigan & Dayhoff, supra note 2 (political arguments are used as much as objective arguments, based on scientific facts).
will be discussed. This discussion will show that Canada provides an adequate case study of the world-wide technico legal revolution of software protection.

IV. BEYOND CANADA: SOFTWARE PROTECTION IN OTHER NATIONS

Software can be copied easily from disk to disk.\footnote{196} Therefore, the potential for nations to learn how to copy and market counterfeit software may become a problem in international software trade.\footnote{197} Because software technology is readily transportable, the problems associated with software protection are shared by technology-exporting nations worldwide.\footnote{198} The technico legal revolution that Canada underwent is mirrored in almost every industrialized nation. Thus, the protection available in any one nation must be viewed in the larger international context. "International protection in this context is highly dependent on reciprocal and coordinated legal constraints."\footnote{199}

Copyright is a statutory right and is governed by each jurisdiction in a different manner. Although there are international conventions which cover copyright, most notably the Berne Convention and the Uniform Copyright Convention, they are not universally adopted and have little enforcement capability. Thus, differences between jurisdictional treatment will ultimately only be resolved through international political negotiations, which require diplomats and governments to champion the cause of their domestic industries. As technology-based industries gain ever increasing importance in the world economy, governments will, in turn, become more willing to address the issues of concern to these industries.

Because high-technology and technological development are becoming vital for continued economic success, it is important to survey the differences and similarities between protection schemes that these governments offer for software. Although the trend may be toward granting copyright protection, nations differ on the scope of protection. First, a caveat is in order. Although this overview is comprehensive in breadth, in-depth analysis of every nation's copyright law is beyond the scope of this Article.

\footnote{196. Note, Copyrightability of Object Code and ROM in Japan, Australia, and Germany: Surpassing Traditional Copyright Limits, 6 COMPUTER/L.J. 513, 514 (1986).}
\footnote{197. Correa, Computer Software Protection in Developing Countries: A Normative Outlook, 22 J. WORLD TRADE L. 23, 24 (1988).}
\footnote{198. Nimmer & Krauthaus, Classification of Computer Software for Legal Protection: International Perspectives, 21 INT'L LAW. 733 (1987).}
\footnote{199. Id. at 733.}
A. United States

In 1980, the U.S. amended its copyright laws specifically to include computer software. This was in response to pressure by the powerful computer industry lobby. The industry was expected to achieve total sales of $33.8 billion by 1985. Since the U.S. has the largest software industry in the world, it is no surprise that the U.S. was the first to address this issue. After the Copyright Amendment, computer industry advocates have been able to press the courts to expand the scope of software protection by launching lawsuits involving second-generation computer issues, such as the look and feel debate.

The United States underwent the technico legal revolution much like Canada did. As in Canada, the Copyright Act of 1909 was an outdated law which did not mention computers. There was talk of copyright protection for software in Congress since 1964. In 1974, Congress established a commission, the National Commission on New Technological Uses of Copyrighted Works ("CONTU"), which studied the issue and made recommendations for amending the law. In 1978, CONTU delivered its final report to Congress. The report urged Congress to grant comprehensive protection to computer programs. In amending the Copyright Act, Congress adopted the commission's recommendations almost verbatim.

Under current U.S. law, computer programs are defined as a "set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result." Programs are then included in the category or list of items which are copyrightable. The Copyright Act allows for an archival copy to be made, although

203. See Broderbund Software, Inc. v. Unison World, Inc., 648 F. Supp. 1127 (N.D. Cal. 1986) (computer screen's displays protectable under copyright); Whelan Assoc. v. Jaslow Dental Laboratories, 797 F.2d 1222 (3d Cir. 1986) (copyright infringed where second program had similar structure and organization as original but no slavish line-for-line copying involved).
205. Altman, supra note 201, at 423.
207. Id.
208. See Altman, supra note 201, at 423-25.
210. See id. § 117.
software developers are opposed to this. Having won the first battle, software advocates are now pressing the courts for further protection. An example of the second-generation issue comes in *Broderbund Software, Inc. v. Unison World, Inc.* which involved whether computer screen displays were protected under copyright. A third-generation issue is "shrink-wrap" licensing. Software manufacturers want to limit how ultimate consumers may utilize a product by attempting to enforce unilateral licensing agreements against the users. The copyright holders want to extend their protection by incorporating a control over the "use" of their products, much like patent protection.

The ultimate resolution helped the U.S. industry. Now the industry could point to the U.S. as a model for the rest of the world to follow. By gaining full copyright protection in the largest software market in the world, the industry had a powerful argument to persuade other governments to adopt similar protection. The industry also gained the support of the U.S. government in pressing other nations to adopt reciprocal protection. Piracy weakened U.S. exports and lowered the amount of foreign exchange entering this country.

The Canadian government looked to U.S. law as a model for revision. Canada still has the possibility of using patent law to protect software. In this sense, Canada is even more protectionist than the U.S., since the U.S. does not allow patent protection for software. Internationally, Canada is at the forefront of this issue. The Canadian protections will lead to increased international esteem, goodwill, and cooperation, especially with the U.S. On the other hand, the new law will have a negative impact on relations with nations that are notorious for promoting software copying. Since the U.S. is Canada's largest trading partner, however, this is a minor concern.

**B. Europe**

The European Community ("E.C.") has generally adopted copyright protection for software. However, there are differences among the European Nations which stem from the fact that there are both common law and civil law jurisdictions involved. Other differences arise from

211. See Altman, supra note 201, at 424-25.
214. Dam, *The Growing Importance of International Protection of Intellectual property*, 21 INT'L LAW. 627, 628 (1987). It is estimated that American businesses, which market products dependent on copyright protection, lose about six to eight billion dollars per year to counterfeiters.
the different traditions and histories associated with each member nation's copyright laws. In addition, there are differences in traditional focus on copyright. Continental states tend to view copyright more as a moral right, stemming from the notion of "droit d'auteur," while other states view copyright as simply an economic right, based on the right to profit from what one creates.216

The E.C. has attempted to harmonize its copyright laws. First, the European Court of Justice decided, in a series of cases, that copyright law fell within the scope of the Treaty of Rome and that copyright rights could be exhausted. The court treated copyright as a form of industrial and commercial property.217 In 1974, the European Parliament suggested that copyright law should be harmonized.218 As a result, the European Commission issued a preliminary report and ordered a more comprehensive report which followed in 1976.219 The Commission has continued studying and working, albeit slowly, toward copyright harmonization.220

Although there are twelve members of the E.C.,221 not all the members have well-developed software industries. Therefore, this Article will discuss the laws of the United Kingdom, West Germany and France more comprehensively than the laws of the other European nations.

1. United Kingdom

The United Kingdom Copyright Act of 1956 had been revised numerous times to resolve particular issues, but was never the subject of a complete overhaul, as was the case in the United States and Canada. One of the specific issues that the British government resolved was the software protection problem. Software in the United Kingdom is now explicitly protected by the Copyright Act.222

The amendment to the Copyright Act was preceded by speculation

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216. Vaver, Copyright in Foreign Works: Canada's International Obligations, 66 CAN. B. REV. 76, 82-83 (1987). The European/Continental notion of copyright rests on two pillars: economic and moral rights. In contrast, the Anglo-American notion of copyright is primarily market oriented.


218. Id. at 268.

219. Id.

220. Id. at 268-69.

221. The member states are: Belgium, West Germany, France, Italy, Luxembourg, the Netherlands, Denmark, Ireland, the United Kingdom, Greece, Portugal and Spain. J. BARTON & R. FISHER, INTERNATIONAL TRADE AND INVESTMENT 171 (1986).

222. Cheyne, Copyright Reform in the United Kingdom, 3 CAN. INTELL. PROP. REV. 405 (1987).
as to whether the unrevised laws protected software. In 1977, the Whitford Committee, charged with studying copyright reform, believed that software was protected. Commentators in the legal press generally agreed with the Whitford Paper. As in Canada, a number of initial cases dealing with the issue found that copyright existed in software programs.

By the time the reform bill was introduced into the House of Commons, the consensus was to extend copyright to software. The amendment received support from all the political parties and sped through its Committee stage in the House of Commons in seven seconds. The Copyright (Computer Software) Amendment Act became law in July, 1985.

The amendment stipulated that "[t]he Copyright Act 1956 shall apply in relation to a computer program." The amendment, however, declined to define what a computer program is "because 'everyone knows what one is,' although no case has put forward a definition!" The amendment, sponsored by the Federation Against Software Theft, an industry advocate, brought software within the ambit of copyright law. Thus, the industry's goals and desires for protection were achieved in the United Kingdom, as they were in the U.S. and Canada.

Currently, the British government is in the process of conducting a comprehensive overhaul of its entire copyright structure. A recent Government White Paper did not recommend any drastic changes in protecting software. However, it did make one clarification. The White Paper recommends extending copyright to works which are "fixed in any form from which it can in principle be reproduced." This would affirm the copyrightability of object code in Britain. The White Paper maintains the position that defining computer software is unwarranted.

In three major common law jurisdictions, Canada, the U.S., and the United Kingdom, the norm is to provide copyright protection to software. All three jurisdictions underwent similar reform patterns:

224. COMPUTERS AND LAW, supra note 223, at 9, 12 n.2.
225. Id. at 12 n.4.
226. Id. at 9.
227. Id.
228. Id.; Cheyne, supra note 222, at 408.
230. COMPUTERS AND LAW, supra note 223, at 9.
231. Cheyne, supra note 222, at 408-09.
232. Id. at 408 (quoting the WHITE PAPER, supra note 59).
233. Id.
starting with an out-of-date copyright law, courts wrestled with extending the statutory definitions; then, the government established committees to study the problem; and finally, all three governments amended their copyright laws to include software as a copyrightable work. In addition to these three nations, two other major common law jurisdictions, Australia and South Africa, followed the trend of making software copyrightable. As detailed above, the case law from these two countries affected the outcome of the Canadian resolution. Moreover, since the United Kingdom Copyright Act of 1956 has been extended to Hong Kong, most of the discussion of the United Kingdom in this Article applies equally to Hong Kong. Thus, the international standard for common law jurisdictions is to grant copyright protection to software.

2. France

After the U.S., France is one of the largest participants in the world software market. Like the U.S. and Canada, France first tried to deal with software under its old Copyright Act. Eventually, the government was forced to amend the copyright laws in order to resolve confusion in the courts and bring the laws technologically up to date.

The French Copyright Act of March 11, 1957 did not mention computer software. Contradiction and judicial activism characterized the initial cases that came before the French courts. Two different appellate courts reached opposite conclusions regarding the applicability of the 1957 Act to software. In 1986, the French Supreme Court finally granted copyright protection to software, finding that the program must have "originalité." The Supreme Court (La Cour de Cassation) defined "originality" in the software context as being the "existence of an 'intellectual contribution.'" The court excluded aesthetic factors in deciding the copyrightability of programs.

The French government, like its counterparts in other industrial-

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235. See supra notes 80, 84, 124 and accompanying text; see also Prasinos, Int'l Protection of Computer Programs, 26 IDEA 173, 174 n.6 (1984); COMPUTERS AND LAW, supra note 223, at 12 n.4.

236. Prasinos, supra note 235, at 186.

237. Correa, supra note 197, at 23.

238. du Mesnil de Rochemont, Copyright and Fair Trade Laws Against Software Piracy in European Civil Law Countries, SOFTWARE PROTECTION Sept. 1987, at 1, 4.

239. id.

240. Id. (Judgement of June 4, 1984, Cours d'appel; Judgement of Nov. 2, 1982, Cours d'appel).

241. Correa, supra note 197, at 27 (quoting the court).

242. du Mesnil de Rochemont, supra note 238, at 4.
ized states, empowered a commission to study the legal problems and make recommendations to amend the copyright laws. In 1984, the National Institute of Industrial Property recommended a *sui generis* form of protection, similar to the Canadian White Paper and the Japanese Ministry for International Trade and Industry ("MITI"). The resulting amendment provides a unique form of protection. This protection is essentially a modified form of copyright. The French government opined that the amendment was only a temporary measure, designed to resolve the issue until a better form of software protection could be developed. This opinion reflects the French view that software is a more utilitarian intellectual contribution than a creation in the aesthetic sense.

The amendment explicitly includes software as a copyrightable work and delineates the rights of the copyright holder. The protection term is twenty-five years, as opposed to the traditional term of "life plus fifty." The new copyright law expressly denies the author any "moral rights" which are normally granted under French copyright law. The lack of moral rights results from the belief that developments in the field of software technology could be severely hampered by unfettered application of moral rights which would allow the repeal of licenses due to unauthorized modifications. The software provisions allow for archival copies, which is a common privilege granted under most nations' laws. The French law also provides the copyright holder the right to prevent or control the "use" of the program. This is a power not normally associated with copyright law but rather with patent law.

The French resolution to the technico legal revolution was to provide *sui generis* protection which balanced the rights of the software author, along with third parties. The protection is a modified form of copyright, because patent law is involved through the grant of power over use of the software. The French government departed from the trend set by the common law jurisdictions. France did not completely bow to the desires of the software producers, but balanced the producers' needs for protection against the interests of third parties and future software developers. The French attitude that an even better

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245. *Id*.
247. *Id*.
248. *Id* at 753.
249. *Id*.
250. *Id* at 752.
The protection system remains to be found is forward-looking and reflects a deeper understanding of this technico legal revolution than exhibited by the Canadian, U.S., and British legislators.

3. West Germany

The Federal Republic of Germany also went through the now familiar pattern of this technico legal revolution. Initially, court decisions construed the original German Copyright Act of 1965 to include protection for software. These cases culminated in a landmark decision by the Federal Supreme Court on May 9, 1985. Finally, like the other industrialized states, Germany amended its copyright laws on June 24, 1985 and affirmatively granted copyright protection to software.

In deciding its copyright case, the Federal Supreme Court eliminated the confusion among the lower courts. For example, in 1981, the Mannheim District Court rejected copyright protection for software, while the Mosbach District Court found that software qualified for copyright protection. Similarly, the Munich District Court categorized software as a linguistic work and, thus, under the protection of the Copyright Act. A year later, the same court changed its legal standard and allowed copyright to protect programs which revealed personal, intellectual creation. This is a relatively high requirement for originality in the software context. The Karlsruhe Regional Appeal Court agreed with this standard, finding that, in principle, software was entitled to copyright protection.

In resolving the copyright issue, the Federal Supreme Court relied heavily on the theories of the Chairman of the Senate, Mr. von Gamm. The reliance strengthened the impact of the decision by providing implicit legislative support to the judicial conclusion. The court allowed software protection under copyright law, but placed a high threshold test of creativity for the software to benefit from the law’s protection. The court established a two-step test for ascertaining whether the program has the required degree of “creative individuality” to be afforded protection. The first test is for “individuality,” and the second test is for

251. Note, supra note 196, at 536.
252. See Rottinger, Legal Protection of Computer Programs in Germany: Renunciation of Copyright?, SOFTWARE PROTECTION Sept. 1987, at 8-11 (court accepts copyright in programs but only for programs that represent “outstanding achievement”).
253. Id. at 11-12.
254. Note, supra note 196, at 537; Prasinos, supra note 235, at 203.
255. Note, supra note 196, at 537.
256. Id. at 538.
257. Id.
258. See Rottinger, supra note 252, at 9.
259. Id. at 9-10.
“creativity.” Together, these two tests establish whether a program has “creative individuality” and, thus, deserves copyright protection.260

In order to meet the “individuality” prong of the test, the party seeking copyright protection must go beyond mere “mechanical and technical procedures and development.”261 If the “individuality” test is met, the party must then meet the second prong, “creativity.” The court set a high standard for creativity, stating that “average ability, that is, the purely manual or mechanical and technical aspect, is not covered by copyright law.”262 The court further stressed that copyright protection “assumes a clearly outstanding creativity in selection, collection, organization, and division of the material and directions compared to the general and average ability.”263 The court excluded considerations such as the effort involved in creating the program, the length of the program, the cost and the novelty of the program, from its test.264 Thus, only extraordinary programs will be protected by German copyright.

The German government expressly clarified the copyrightability of software in its Copyright Amendment Act of 1985. As in Canada, the government established a committee to recommend solutions to the issue. The Committee on the Economy brought the resulting amendment to the Lower House of the German Parliament.265 The Copyright Act now extends to “programs for data processing.” This language was inserted into Section 2, § 1, line 1 of the Act.266 Germany grants copyrights for the life of the author plus seventy years.267 While this closes the door on the question of copyrightability of software, it does not alter the “creative individuality” requirement that the Supreme Court established. Moreover, the new law does not allow for archival copies of programs. Private copying for any reason is now illegal.268

German law still presents problems to those parties seeking copyright protection there. First, it is still not clear that programs embedded on a ROM chip are protected by copyright.269 Also, the extremely high standard of creativity that is required remains undefined. Perhaps the most nebulous concept is the determination of the “average

260. Id.
261. Id. at 9 (quoting the court).
262. Id. at 9-10.
263. Id. at 10.
264. Id.
265. Id. at 11.
266. Id.
267. Llewelyn, supra note 229, at 191 (compare this to other jurisdictions, such as the U.K, which only extend protection for life plus fifty years).
268. Id.
programmer" against whom courts are to judge software.\textsuperscript{270} Even though copyright protection exists, it is possible that the scope of such protection could be very narrow. Under its \textit{Staatsexamensarbeit} decision, the Federal Court of Justice implied that it would be legal to circumvent copyright protection by transforming an original program into "a slightly modified linguistic version."\textsuperscript{271}

The ultimate result of Germany's recent revisions is, perhaps, a renunciation of copyright protection. The overall effect of the system in Germany, with its high creativity requirement and narrow scope of protection, is that software is protected "in theory but not in practice."\textsuperscript{272}

As the second civil law jurisdiction examined, Germany, although allowing copyright protection for software, has defined that protection in terms that are significantly different from the protection allowed in common law jurisdictions.

4. \textit{Other European Community Members}

Other European Community members have also moved toward following the international trend. These countries include: the Netherlands, Belgium, Italy, Spain, Denmark, and Portugal. Most of these states are undergoing the technico legal revolution, but with slightly different outcomes. Significant discord exists between levels of software protection within the E.C., even though these countries are going to be unified in 1992 into one common community. This underscores the tension and difficulty of implementing copyright to a new technology and shows how hard it is to gain worldwide compliance for the same legal standard.

Belgium has yet to undergo the technico legal revolution. No Belgian court decisions nor amended laws explicitly cover software. However, it is generally accepted that the current Copyright Act protects software.\textsuperscript{273}

Denmark, on the other hand, is in the midst of this technico legal revolution. Software is protected by Danish copyright laws, as long as it meets the standards of individuality and quality required of all copyrightable materials.\textsuperscript{274} The Danish government also established a commission to study this problem and recommend revisions of the applicable laws. The commission recommended that software should be

\textsuperscript{270} Rottinger, \textit{supra} note 252, at 10.
\textsuperscript{272} See Rottinger, \textit{supra} note 252, at 12.
\textsuperscript{273} du Mesnil de Rochemont, \textit{supra} note 238, at 5.
\textsuperscript{274} \textit{Id.}
considered a separate category of copyrightable works.275

Italy is also currently undergoing this technico legal revolution. The Copyright Act of April 22, 1941 does not mention software or computers.276 However, software can be protected if copying involves an unfair trade practice. In 1983, the ATARI (Bertolino Bros.) v. SIDAM court decided that software could be protected from slavish imitation.277 In addition, software can also be protected through copyright. Another court in Turin extended copyright protection to video game software because it satisfied the creativity and intellectual quality requirements established by the copyright laws.278 If software is copyrightable in Italy, the copyright holder is entitled to economic, publication, reproduction, translation, and moral rights for the usual term of "life plus fifty years."279

The Netherlands copyright laws do not explicitly address software. But court opinions unanimously grant copyright protection to software, as long as the program satisfies the requirements within the Copyright Act.280 There is a move toward amending the copyright laws. A recent survey revealed that 100% of software suppliers favored amending the copyright laws in order to affirmatively extend protection to software.281 The push to amend the laws is underscored by the fact that the Netherlands loses approximately DFL's 50 Million a year to piracy. Piracy is estimated to drain 10% of gross revenues, and if unchecked, it is expected to grow 60% per year.282 It appears that the Netherlands is entering the Conflict Stage of its technico legal revolution.

Portugal has not directly addressed the copyright protection issue. Copyright protection for software is apparently unavailable in Portugal.283

Spain, like most other nations, has an old copyright system which does not explicitly mention software. The Copyright Act of 1879 has not been amended to extend protection to computer programs. Instead, Spain chose to protect software under Article 10(1) of its proposed new law dealing with intellectual property rights.284
5. **Non-Member European States**

The European states which are not currently members of the E.C. conform to the E.C.'s push towards harmonizing laws. Just as most of the E.C. provides some form of protection to software, the same is true in Scandinavian countries, such as Sweden and Finland, as well as Switzerland and Austria.

In 1986, the Austrian High Court extended copyright protection to software.\(^{285}\) By contrast, Switzerland, like Portugal, does not provide any direct protection for software. The Swiss courts will, however, protect a software manufacturer against an unfair trade practice. Piracy often involves an unfair trade practice.\(^{286}\)

In Scandinavia, both Finland and Sweden are working toward resolving this technico legal revolution. In both nations, the Copyright Acts do not explicitly mention software; however, most programs would probably be viewed as protectable work.\(^{287}\) There are no Finnish court decisions on point. However, in Sweden the government established a commission to recommend amendments to the copyright laws. The commission recommended protecting programs as a separate category of works under the Copyright Act. The protection will extend to any program that is the "result of mental creativity," regardless of what form the program takes. Object code would be protected. Like under the German system, the commission also recommended prohibiting archival copying for personal use.\(^{288}\)

C. **JAPAN**

The Japanese government followed the now-familiar pattern of resolving the protection problem. The Japanese courts tried to extend a vague copyright law to cover software. Following the attempts by the courts, the legislature finally considered amending the applicable laws. After receiving recommendations from two commissions studying the problem, Japan adopted full copyright protection.

Japan almost followed the route that France took, but ultimately rejected *sui generis* protection.\(^{289}\) Where France ultimately adopted a modified form of copyright protection, Japan came close to adopting a modified form of patent protection. Unlike France, however, Japan came under tremendous international pressure and eventually abandoned the novel proposal.

The Copyright Law of 1970 protected "works of authorship," but

\(^{285}\) Id.
\(^{286}\) Id.
\(^{287}\) Id.
\(^{288}\) du Mesnil de Rochemont, *supra* note 238, at 5.
\(^{289}\) See Nimmer & Krauthaus, *supra* note 198, at 752.
did not explicitly mention software. Under the Copyright Law, the industry argued that software qualified as "literary works of a scientific nature." In *Taito K.K. v. K.K. ING Ent.*, a 1982 case, the Tokyo District Court held that object code was a protected reproduction. As in most other industrialized nations, copyright protection of software in Japan was granted by courts who were willing to extend the meaning of the copyright laws.

The Japanese government established two different commissions to study this technico legal revolution. Essentially the two commissions differed in their perspectives on what rights were more important for software. The first commission, established under the Education Ministry's Agency for Cultural Affairs ("ACA"), took the approach that an intellectual property right was more appropriate for software. The ACA recommended full copyright protection to software under the traditional terms and with the traditional rights. The second commission, established under the Ministry of International Trade and Industry ("MITI"), thought that an industrial property right was more appropriate for software. Thus, MITI recommended adopting a form of patent protection.

MITI was the subject of a great deal of controversy and international pressure. Mirroring the position of the Canadian White Paper, MITI recommended a *sui generis* form of protection, called Program Rights Law, which was a modified form of patent protection. MITI proposed that protection be granted for only fifteen years without any originality or creativity requirement. MITI also proposed protecting programs in whatever form they appeared. Object code and programs embedded on ROM chips were protected. MITI's proposal eliminated moral rights, required registration and deposit or disclosure of the program's function, and full public disclosure where it was in the public interest.

MITI's proposal received a generally negative reaction. "In 1984 and the early part of 1985, much of the computer industry's lobbying

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290. Note, supra note 196, at 527 (citing MITI, A Registration and Certification Type of System to Protect Computer Programs, MITI Bull., June 5, 1972, reprinted in 5 COMPUTER L. SERv. § 9-4, art. 3, at 3 (1979)).
291. Prasinos, supra note 235, at 206.
293. Llewellyn, supra note 229, at 187-88.
294. *Id.*; Note, supra note 196, at 529-30.
296. Llewellyn, supra note 229, at 188.
297. Note, supra note 196, at 531.
energy was directed against [MITI].” The main objection to MITI’s proposal was the shorter protection term in conjunction with the mandatory disclosure. “The proposal was seen in other countries, however, as threatening the viability of traditional confidentiality protection, as a scheme through which Japanese nationals could unfairly appropriate the work of others.” The U.S opposed the proposal because the mandatory and complete disclosure provisions would have increased Japan’s competitive advantage over the U.S. Since Japan uses more U.S.-made software than it exports, this proposal would generally advance the Japanese software industry without hurting the domestic industry as much as foreign manufacturers. The U.S. exhibited its opposition when the industry threatened to file suit to restrict the sale of Japanese software, presumably under Section 301 of the U.S. Trade Act of 1974.

In the face of “considerable pressure from the United States,” the Japanese government withdrew the MITI proposal. Although there were calls for Japan to adopt other forms of protection, the government acceded to the demands of international political and industrial pressure. In 1985, Japan adopted what was essentially the ACA recommendations and extended full copyright protection to software. Software is now protected in Japan as a copyrightable work for the term of life plus fifty years.

D. RECENTLY INDUSTRIALIZED NATIONS

There are a number of nations which have recently begun to develop software industries. These recently industrialized states, for the most part, adopted software technology first by copying. These countries became the notorious software pirate havens, where markets such as the Golden Arcade could spring up and distribute bootlegged versions of software. It should come as no surprise that the laws of these nations were relatively liberal in the amount of protection they afforded

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298. Llewellyn, supra note 229, at 187.
299. Nimmer & Krauthaus, supra note 198, at 752.
300. Note, supra note 196, at 531-32.
301. Id. (citing U.S. Opposes Japanese Proposal for Limited Software Protection, 27 PAT. TRADEMARK & COPYRIGHT J. (BNA) 424 (Mar. 1, 1984)).
303. Llewelyn, supra note 229, at 188.
304. Higashima & Ushiku, supra note 292, at 3-4 (advocating use of industrial property law as protection for software).
305. Dam, supra note 214, at 636 (citing Law for Partial Amendment to the Copyright Law, Law No. 62 of June 1985 (effective Jan. 1, 1986)).
software manufacturers. Only as a result of intense U.S. pressure have these countries recently begun to reform their laws. However, such reform is by no means complete and has, in some cases, encountered stiff opposition for economic and nationalistic reasons.

South Korea's Copyright Act of 1957 does not explicitly mention software. As a result of being a civil law country, the Ministry of Culture and Information has refused to register software copyrights.\(^\text{307}\) In addition, as of 1985, there were no judicial decisions on this issue.\(^\text{308}\) The Copyright Act discriminated against foreign-produced works which encouraged the copying of foreign works. The Copyright Act of 1957 only protected foreign works which were first published in Korea. Since foreign software producers cannot, as a matter of course, succeed in getting initial publication in Korea, no Korean copyright will issue for foreign works. Moreover, Korea has not adopted either the Berne Convention or the Uniform Copyright Convention.\(^\text{309}\)

This state of the law was completely unsatisfactory from the United States’ point of view. As with Japan, the U.S. exerted a great deal of pressure on Korea to protect foreign software. In 1984, the U.S. conditioned Korea’s further participation in the General System of Preferences program on improvements in Korean protection of intellectual property.\(^\text{310}\) Furthermore, the lack of protection caused a trade imbalance such that the U.S. took action on behalf of its software industry. Korea was subjected to the actions that Japan was only threatened with—namely action under Section 301 of the U.S. Trade Act of 1974.\(^\text{311}\) These measures have led commentators to predict that copyright reform in Korea would take place within three years.\(^\text{312}\)

Brazil is a nation which explicitly decided not to protect foreign software in order to further the growth of its own domestic software industry.\(^\text{313}\) Brazil implemented its national information policy by deferring protection for software. This created a legal system which ensured that technology would be transferred into and retained by Brazil.\(^\text{314}\) Under Brazilian law, software is not covered by copyright. Instead software was supposed to be protected by specific laws passed by the National Congress. No laws have ever been passed, leaving software

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308. Id.
309. Id.
310. Id. at 11.
311. Dam, supra note 214, at 635-36.
312. Lee, supra note 307, at 9, 12.
313. Mille, Software Protection in the Latin American Countries, SOFTWARE PROTECTION, Dec. 1985, at 1, 2.
unregulated.315

As in Korea, this state of the law was unacceptable to the United States. The U.S. exerted pressure on Brazil to accede to the international trend. The U.S. initiated action against Brazil under Section 301 of the U.S. Trade Act of 1974.316 As a result, Brazil recently reached a pact by which it agreed to adopt software protection rules specifically to safeguard U.S. software manufacturers.317 Brazil is also studying proposals to amend its protection laws. One proposal is essentially the same as the Japanese MITI proposal, granting protection for only fifteen years and requiring full public disclosure.318 Even in this nation which was adamantly against protecting software, the pressures of resolving this international problem overcame the government's opposition to protecting software.

The Republic of China, Taiwan, presents another example of U.S. pressure forcing a resolution of this technico legal revolution. Taiwan was another notorious market and workshop for the software pirates.319 In 1980, the Taiwanese government began to study possible amendments to the Chinese Copyright Law of 1964. U.S. pressure resulted in a 1985 amendment to the copyright laws, which specifically granted protection to computer programs under article 4 of the laws.320 The term of protection is thirty years.321 This is much shorter than the term granted by the common law jurisdictions.322 The scope of Taiwanese protection proved to fall short of U.S. expectations. Early in 1989 the U.S. and Taiwan completed negotiations and established a plan to bring Taiwanese copyright law more in line with the international trend of "life plus fifty."323 The new Taiwanese law, once implemented, should improve software protection.

Malaysia's legal regime does not protect software. In Malaysia, a court declared that "Malaysia is under no legal obligation whatsoever to protect copyright of works originated in foreign countries."324 More-

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315. Mille, supra note 313, at 3.
316. Dam, supra note 214, at 635-36.
318. Mille, supra note 313, at 3.
319. Minor, Dazed By Lawsuits, Scrappy Taiwanese Firms Keep Punching, PC WEEK, Jan. 29, 1985, at 46.
321. Llewelyn, supra note 229, at 191.
322. Copyright Act, 17 U.S.C. § 101 (1982); see supra note 204 and accompanying text.
324. Wilder, The Status of Foreign Copyright Protection in Malaysia, 26 IDEA 1, 1 (1985) (quoting Asia Television Ltd., et al. v. Mega Video Recording Supply Centre, High Court of Malaysia, Commercial Division, C1713 (1983)).
over, Malaysia does not adhere to either the Berne Convention or the Uniform Copyright Convention. Malaysia has allowed “an open season on piracy of copyrightable subject matter of foreign origin,” especially software.325

The situation is much the same in Singapore, Indonesia, Thailand and Argentina. The rampant piracy has resulted in software markets that severely undercut the legitimate software vendors.326 These nations are “not yet up to the standards available elsewhere.”327 Presumably, the U.S. will eventually turn its attention to pressuring these nations to reform their software protection laws. There seems to be a dawning realization that software protection better serves long-term interests.328

E. OTHER NATIONS

Although the preceding sections outline software protection among most of the active players in the world software market, there are a handful of other nations who deserve some mention. Further study is needed in this area, but is beyond the scope of this Article.

Since the People’s Republic of China had recovered from the turmoil of the Cultural Revolution, until the recent unfortunate events in Tiananmen Square, there was an increase in awareness of the demands of modernization and more open contact with the West. As a reflection of this awareness, China had embarked on several legislative ventures designed to attract foreign capital investment and technology. China understands that, in order for its domestic software industry to grow, it must protect the investment that goes into the development of products.329 As of 1987, China considered new copyright laws in its effort to modernize by protecting intellectual property.330 These initiatives also serve as an example for other Socialist nations which may want to open up their markets to high-tech joint ventures, products and services, such as software.

Bulgaria and Hungary are two notable Socialist countries who have attempted to protect intellectual property. Hungary is strengthening its protection laws to foster the development of its software industry.331 The Hungarian regulations define “software,” which may render the

325. Id. at 2.
326. Minor, supra note 319. Copies of expensive software can be bought in Taiwan for ten dollars.
327. Dam, supra note 214, at 635.
328. Id.
329. Id. at 632.
330. Id. at 635.
331. Id. at 632.
laws obsolete in the face of future technological advances. The Bulgarian protection system involves special administrative rules which were established in 1979.  Along with the U.S. and the Philippines, Bulgaria was one of only three nations to protect software before 1983. The Socialist states of Bulgaria and Hungary, cognizant of the value of software, established protection even before nations with highly developed software industries.

In other Socialist states and under-developed countries, factors unrelated to intellectual property has inhibited the development of both computer industries and comprehensive software protection systems. In the Socialist bloc nations, political differences with the West, especially with the U.S., has hindered widespread diffusion of computer-related goods and software. Although the Soviet Union adheres to the Uniform Copyright Convention, and seven Eastern European nations are members of the Berne Convention, the software industries in these countries are still in the developmental stages. In addition to being politically at-odds with the Western states, Non-Market Economies possess fundamentally different views on copyright. "Communist governments are traditionally hostile toward private ownership of intellectual property. Marxist-Leninist philosophy considers intellectual creations and inventions as products of the society." Thus, political and economic considerations have had a greater effect on trade with these states than do considerations on copyright.

Collaterally, under-developed nations are plagued by a different set of problems which impede the development of software trade. Before the Third World can solve the problems of copyright protection for software, the various governments must solve more basic issues of human needs. Developments in software protection among other states has only marginal relevance to the immediate future of the Third World.

For example, in sub-equatorial Africa, where political, economic, and subsistence problems still exist, there are few incentives to encourage the development of a software industry. "Direct food aid and

332. Correa, supra note 197, at 28.
333. Id. at 24.
334. Id. at 23.
336. The seven socialist member states of the Berne Convention are: Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, Romania and Yugoslavia. Boytha, supra note 335, at 57.
agricultural aid are in the short term much more likely to be offered to Africa than investment in industry."\(^{338}\) African nations are greatly influenced in how they deal with intellectual property rights by economics, geography, politics, and history. "The politicians must deal with underlying instability problems of Africa before intellectual property practitioners can fulfill their function of assisting industrial clients to build a base of intellectual property rights from which they can develop their manufacturing and trading activities in Africa."\(^{339}\)

V. INTERNATIONAL CONVENTIONS

International Conventions are among the alternatives that have been considered to resolve the software protection problem. In 1971, the United Nations began a study on how best to protect software, while simultaneously facilitating the dissemination of computer programs to developing nations.\(^{340}\) The two relevant international copyright conventions, the Berne Convention and the Uniform Copyright Convention, do not explicitly address software.\(^{341}\) The World Intellectual Property Organization ("WIPO"), which administers the Berne Convention, began discussions on international protection methods in the early 1970's.\(^{342}\) WIPO established an Advisory Group of Non-Governmental Experts, who met in Geneva. These discussions promulgated the WIPO Model Provisions of the Protection of Computer Software in the late 1970's and early 1980's.\(^{343}\)

The WIPO Model Provisions define "computer program" and "software."\(^{344}\) In addition to copying rights, the Model Provisions include concepts from Trade Secret law.\(^{345}\) The Model provisions extend rights protecting software for a maximum of twenty-five years.\(^{346}\) The protected software developer is given the rights to control use of the program, disclosure of the program, development of other "substantially similar" programs from the protected program, and translations of the program from one computer language to another.\(^{347}\)


\(^{339}\) Id.


\(^{341}\) See Berne Convention, *supra* note 4; U.C.C., *supra* note 3.

\(^{342}\) Nimmer & Krauthaus, *supra* note 198, at 750.


\(^{344}\) Prasinos, *supra* note 235, at 239.

\(^{345}\) Id. at 196 n.125.

\(^{346}\) Id. at 240.

\(^{347}\) Id. at 239-40.
The WIPO proposals have never been enacted by any nation.\textsuperscript{348} The proposals do, however, help establish and reflect the evolution of the international norm. In 1983, WIPO promulgated a draft treaty for international protection.\textsuperscript{349} The treaty adopted a national treatment principle for software and established a term of protection of twenty years.\textsuperscript{350} Like the Model Provisions, the draft treaty's \textit{sui generis} protection system was not adopted. A substantial number of nations did not believe the treaty was necessary because copyright protection was adequate.\textsuperscript{351}

Most recently, WIPO and UNESCO convened a group of experts to reconsider amending the Berne Convention or the Uniform Copyright Convention to include specific software provisions.\textsuperscript{352} The consensus at that time was that both treaties already covered software and no amendments were needed.\textsuperscript{353} Although no WIPO provisions have ever been explicitly adopted, the organization and the relevant conventions serve as a guide for studying this problem.

Canada joins the U.S., Japan, the U.K., Australia and West Germany by granting full copyright protection to software. But note that in the E.C. there are different theories underlying copyright. In common law jurisdictions, copyright is treated primarily as a matter of economic rights. In civil law, continental European states, there is more a sense that copyright stems from "droit d'auteur," and is therefore grounded in a moral right. This is a fundamental clash of values and theories. The disharmony that exists in levels of protection among just the Western industrialized nation highlights the problems with overextending the copyright system.

The state of the law with respect to an international approach to software protection is still uncertain. The resolutions discussed above have been reached very recently, especially in Canada, where the Copyright Act amendment only came into force in 1988. Thus, the world situation could change within another decade. A lack of a clear worldwide consensus also keeps the state of law unclear. Although copyright is the international trend, it is by no means unanimous. The U.S. is the only nation which is actively pushing for copyright protection, which is understandable in light of its investment and dominance in that industry. The indeterminative state of the law is perhaps best illustrated by the developments in the two nations, other than the U.S., with major software industries, Japan and France. In the former nation, the gov-

\textsuperscript{348} Nimmer & Krauthaus, \textit{supra} note 198, at 751.
\textsuperscript{349} \textit{Id.} at 750.
\textsuperscript{350} \textit{Id.}
\textsuperscript{351} \textit{Id.}
\textsuperscript{352} Dam, \textit{supra} note 214, at 636.
\textsuperscript{353} \textit{Id.}
ernment came close to adopting a different legal scheme to protect software, and, in the latter state, the government did. Clearly then, this world-wide technico legal revolution is not over.

In conclusion, these differing approaches to software protection underscore the lack of clarity in this field. There is a definite international trend, but it is not a majority view. Indeed, the trend may even be slowing down, now that most countries which have software industries are now more or less the same. Also, the trend may be slowing due to systemic inertia. First, there is difficulty in overcoming the inertia that permeates this issue in countries that have little or no interest in it. And second, there is a certain amount of inertia that is inherent in any legal system which must be overcome.

VI. IMPACT ON INTERNATIONAL TRADE

Trade is affected by domestic laws as well as tariffs and more traditional commercial regulations. "[I]ntellectual property rights have as much significance domestically as they have internationally."\(^\text{354}\) The rise in importance of Non-Tariff Barriers and the concomitant lowering of tariffs worldwide has thrust issues like intellectual property protection into the spotlight of international trade. The Uruguay Round of the GATT is scheduled to discuss this issue.\(^\text{355}\) Intellectual property rights have always been tools of national policies. "And so it is that trade may be affected by decisions of nations as to what subject matter will be protected in one country and in a neighboring [sic] country, and upon the extent of the rights to be conferred by the national laws."\(^\text{356}\)

Free trade relies on a harmoniously balanced interchange of laws. Because trade imbalance can be caused by differing levels of protection, the foregoing survey of software protection illuminates how trade patterns develop. High technology trade is becoming important as more countries develop their domestic industries and compete in the world market. High-technology industries are experiencing the largest growth world-wide of any industry. Consequently, nations must successfully exploit these industries if they wish to have healthy economies.\(^\text{357}\) This underscores the need for successful economies to develop better products, protect them, and market them to nations where the technology


\(^{356}\) Hayhurst, Some Background to Intellectual Property Rights in Relation to Trade Between the United States and Canada, 4 CAN. INTELL. PROP. REV. 202, 203 (1988) [hereinafter Background].

will not be pirated. Especially in the software industry, businesses need "to be able to trade with the certainty that technology developed at great effort and expense will be protected." 358

A. TRADE BETWEEN CANADA AND THE UNITED STATES

Canada and the United States are, in effect, the world's two largest trading partners. . . . The U.S. sells more to the 25 million Canadians than it does to the 280 million people in the European Economic Community. The province of Ontario takes more American exports than Japan. This impressive flow of trade is also reflected in the area of intellectual property. 359

The U.S. has, for a long time, experienced a large trade surplus with Canada in high technology products. Canada ranks relatively low among the major OECD countries in the proportion of its gross national product that is devoted to research and development expenditures. "Thus, Canada is a technology importer and, given that the United States is a net exporter, there can arise both bilateral frictions in trade and frictions over the degree of protection that should be given to intellectual property." 360

The Canada-U.S. Free Trade Agreement ("FTA") cemented the close trade relationship shared by these two nations. However, the FTA did not have a direct impact on computer software trade because the control of software ownership is determined by domestic laws. Both states accord each other's citizens national treatment as to ownership of copyrights. 361

The FTA did, however, provide a backdrop for the resolution of this technico legal revolution in Canada. Since Canadian software copyright protection lagged behind U.S. software copyright protection, there was pressure for Canada to bring their laws into line with the U.S. standard. Since both nations now accord full copyright protection to software, software is treated equally on both sides of the border. This harmony of domestic laws is in conformance with the spirit of Free Trade and was influenced by the demands of the FTA.

"Care should be taken not to overemphasize the effects upon trans-border trade that intellectual property rights may have." 362 There is no substantive discussion of intellectual property specifically in the language of the Canada-U.S. FTA. No substantive provisions are required primarily because intellectual property laws are resolved domestically.

From a Canadian viewpoint, high technology trade is extremely im-

358. Cote, supra note 354, at 8.
359. Id.
361. Differences, supra note 189, at 118.
362. Background, supra note 356, at 208.
important. Canada's high-tech industry is growing and depends heavily on imported technology from south of the border. "Canada is dependent on [technological] inputs because, like most other nations, it cannot generate all or even a major portion, of the technology it needs from domestic sources." Therefore, laws which facilitate the transfer of technology between the U.S. and Canada are in Canada's interests. In order for Canada to approach the U.S. lead in high technology and create an equally energetic domestic industry, American technology must become diffuse and easily available.

One major problem that Canada faces is its smaller population. Since Canada's population is roughly only ten percent of the U.S. population, Canadians can only produce a fraction of the highly trained and skilled technicians and software engineers required by the software industry. However, Canada can easily train and educate Canadians in leading edge technologies. The main problem is creating viable teams of technologists. "This is the step in which we fail in Canada. It is taking the monolayer ability and building scientific teams, sustaining them to the point where their discovery can compete with others who have been doing this for years."364

Canada needs laws and an infrastructure to provide their computer scientists with the same environment that they would enjoy in the United States. Harmony between the U.S. and Canadian copyright laws will help Canada nurture their talented people. "Canada, therefore, has good domestic reasons for protecting intellectual property by enacting adequate legislation. It recognizes that such protection provides a necessary incentive to creative activities."365 If the laws of Canada are such that it makes no difference whether someone lives in the U.S. or in Canada, then Canadians will help their domestic industry. "On the whole, however, in relation to intellectual property rights Canada has had more open borders than the U.S."366 Thus, Canada created an environment which makes it not merely equally, but actually more attractive for industries to bring technology to Canada.

Canada recognized its particular technological needs and reacted even more than the U.S. to attract software technology. "The government of Canada is determined to create and maintain a climate in which new intellectual property and technology can be created and protected."367 Unlike the U.S., Canada kept open the possibility of using patent protection for software.368 As discussed above, this would be an

363. Cote, supra note 354, at 8.
364. McGeer, supra note 357, at 419.
365. Cote, supra note 354, at 8.
366. Background, supra note 356, at 205.
368. See supra notes 33-55 and accompanying text.
extra incentive for Canadian industries, since it would give them an extra weapon of corporate security. Together, patent and copyright protection may be more attractive than the U.S. protection system. In this sense, Canada is even more technologically protectionist than the United States.

This scheme puts the two trading partners on equal terms and can only enhance cross-border technology flow. This North American resolution will result in an increase in trade. More settled laws help promote stable and predictable business relationships. Now that the U.S. and Canada are roughly equal in their stances toward software, there should be an increase in trade. "[I]ntellectual property will be a key factor in helping to determine the technological and industrial future of both [the U.S. and Canada], in an increasingly competitive world." The net benefit will be increased technical proficiency for Canada and a lower trade deficit for the U.S. The future of high-tech trade, at least in North America, is indeed bright.

B. TRADE AMONG DEVELOPED NATIONS

European countries differ in the levels of protection they give to software. With 1992 fast approaching, the European Community must come to a consensus as to how much protection to give software. "Industrialized nations . . . owe a large share of their prosperity to innovation and want to receive a fair price for the technology they have developed." Because some European nations afford little protection to software, these states will frustrate others who expect a fair price for their software. This could result in intra-Community tension. The E.C. countries must resolve their differences.

If the E.C. fails to agree on levels of protection, then the U.S. will only export technology to those nations, like England and France, which provide comparable levels of protection to software. The U.S. will not export software to nations, like Portugal, which provide no protection to software. Yet, in 1992, the free trade of software between the European states will become a reality. Therefore, nations which fail to institute safeguards may become havens for pirates, who will obtain software originating in the U.S. from those European countries with whom the U.S. trades. The result could be U.S. pressure on the E.C. to

369. Morgan, supra note 57, at 422-23. Extra protection, in the form of copyright or patent, would be used by the industry as "one more device of industrial security." Id. (quoting NATIONAL COMMISSION ON NEW TECHNOLOGICAL USES OF COPYRIGHT WORKS (CONTU), FINAL REPORT 1 (1978), at 15).


371. Id. at 7.
adopt uniform laws regarding software as a whole, similar to Canada and Japan.

Obviously these same concerns govern intra-Community trade. Those states with developed software industries, like England and France, will pressure the E.C. states which fail to protect their works. This pressure, above all, may more effectively harmonize the E.C. approach to software. The E.C. may resent or resist outside U.S. pressure. An integrated and expanded E.C. may hurt U.S. export trade overall. Therefore, it is in the interests of the U.S. to ensure that E.C. states do not pirate their software industries.

"It is apparent that the unalloyed exercise of rights arising from indigenous laws providing regimes for the protection of industrial and intellectual property may have anti-competitive effects in terms of the E.E.C. Treaty [the Treaty of Rome]." As discussed above, some European states view copyright as a purely economic right, while other states treat copyright as a moral right, designed to protect the creator for the act of creation. This conflict of laws within the E.C., which affects trade, is a clash "between competing policies rather than between firm rules." The E.C. has moved to harmonize its copyright laws in order to avoid intra-Community unfair trading. If the E.C. succeeds in harmonizing its copyright laws, freer trade will exist within the community. Therefore, Europe must achieve a higher degree of uniformity in order to increase software trade as significantly as between the U.S. and Canada. Unfortunately, "[t]he developments in the field so far 'give the impression, relatively speaking, of preliminary skirmishes: it looks as if most of the fundamental problems of copyright in the Community context are yet to come.'

Japan's efforts, like the E.C., to develop its software industry, will be hampered until they grant full copyright protection to foreign software. Japan will have to pay more to gain access to U.S. software technology. Software trade between the U.S. and Japan should increase for many of the same reasons that software trade will increase between the U.S. and Canada. The net result may be that while trade between Japan and the U.S. may increase, domestic production in Japan may slow down.

Once the E.C. countries agree on their copyright laws, all the major

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373. McKeough, supra note 217, at 242.
374. Vaver, supra note 216, at 82-83.
375. McKeough, supra note 217, at 242.
376. Id. at 268.
377. Id. at 270 (quoting Harris, Community Law and Intellectual Property: Recent Cases in the Court of Justice, 19 COMMON MKT. L. REV 61-62 (1982)).
nations will be playing in the same ballpark. The U.S. controls roughly seventy percent of the world software market. While this condition exists, a level playing field in this area could never be truly reached. "The U.S. initiatives have generated some feelings abroad that, with Yankee rectitude, the U.S. wants a level playing field on which the U.S. is the referee." If the U.S. lobbies every nation to protect software with copyright for the life of the author plus fifty years, then the U.S. will hold a de facto perpetual lead over the rest of the world in software development and accessible library. Naturally, it is in U.S. interests to gain as much protection for software as possible. On a global scale, granting full copyright protection to software will lock in the virtual monopoly that the U.S. has gained.

C. Trade with Developing Nations

As discussed previously, the U.S. government and industries are lobbying for international improvements in high technology laws. However, these U.S. "efforts have not yet met with universal support, particularly from nations that are in less advanced stages of development, or from nations that are, as most are, net importers of technology and of products of the intellect." "[D]eveloping nations need access to innovation, and their priority is to acquire new technologies." The Pacific Rim is becoming one of the most active trade areas in the world. This trend will probably continue well into the next century. The Pacific Rim nations are notorious for the amount of software pirating they allow. Many of these states have benefited from the pirating by developing domestic industries from the initial pirating companies. For example, Korea is poised to enter the world software market. Other nations, like Taiwan, have amended their protection laws because of internal pressure as well as U.S. lobbying. In the Pacific, protection will flow from profit. When domestic manufacturers start producing software and other works they want protected, those manufacturers will start to lobby their governments for protection of such works. Therefore, as trade increases among the Pacific Rim nations, the laws will change. The law will follow the trade patterns. Unlike Europe, where the law will affect the trade patterns, the Pacific Rim nations' laws will change in response to the trade patterns that develop.

378. Correa, supra note 197, at 23.
379. Background, supra note 356, at 206.
380. Id. at 208.
381. Cote, supra note 354, at 7.
383. Lachica, supra note 323.
Before copyright reform, Canada was the back door through which Far East copycats penetrated U.S. markets. Canada's amendments to its copyright laws have closed this door. Thus, Canada's trade with developing Asian nations is adversely impacted by the changes in law. However, since Canada's main trade partner is the U.S., this adverse impact is outweighed by the benefits of increased trade with the U.S.

Brazil is also changing their trade practices. Brazil incurred the wrath of the U.S., which resulted in action under the Trade Act. The Brazilian government has reached a point where change is mandated by the exigencies of international trade. When Brazil's domestic industry begins demanding protection for its domestically produced software, then comprehensive change most likely will accelerate. Like Japan, Brazil's imports of U.S. software will increase, as the piratical activities are phased out.

The People's Republic of China wants to modernize and, therefore, must gain access to foreign technology. China has also recognized the need to reform its legal system in order to stimulate foreign investments in China. "Much of the legal reform has been designed to attract foreign direct financial and technological investment by offering various incentives and protection to foreign technology and proprietary interests." As part of its modernization, China is trying to improve its copyright laws. "China now realizes the importance of a copyright law in the attraction of foreign technology." China has joined WIPO and is currently drafting a copyright law in its efforts to modernize its legal system. Since China has a desire to import technology, the development of an international consensus regarding copyright protection might influence China's pace and scope of modernization.

Future international trade will be impacted when China re-attains its GATT status. "China's request for resumption of its GATT membership constitutes an element of its open trade policy aimed at achieving a greater degree of integration in the world economy." GATT provides

384. Copyright reform and anti-counterfeiting efforts can greatly reduce the amount of pirate software which infiltrates markets. For example, after Taiwan began toughening its enforcement, the percentage of Taiwanese counterfeit goods confiscated by U.S. Customs Officials fell from 56.1% in 1982 to 2.2% in 1984. Chang, supra note 320, at 462.
385. Dam, supra note 214, at 636. Brazil has been subject to Section 301 trade actions by the United States.
386. Chuang & Thurston, supra note 335, at 130. Science and Technology is one of the Four Modernizations of the ruling party's program to transform China into an industrialized socialist democracy.
387. Id. at 131.
388. Id. at 164.
389. Id.
guidelines and enforcement mechanisms in the case of disputes which may make trade with China more attractive. China may become a major software producer in the Pacific Rim, and, indeed, in the world, if the Chinese government can convince investors that foreign technology will be protected in China.

Traditionally, developing countries accord little deference to foreign copyrights, until they develop their own domestic industry. Governments tend to reform the copyright laws when their domestic manufacturers start complaining about lack of protection. Thus, the Third World will resist adopting tough copyright laws so that domestic industries will develop. Their interests run counter to those of the industrialized states. This will become a source of friction in trade when the under-developed nations achieve a sufficient level of technology to start impacting the world software market.391

D. THE GENERAL AGREEMENT ON TRADE AND TARIFFS

The worldwide trend toward protecting software should be clarified when GATT addresses the issue. Unfortunately, GATT is not the optimal forum to discuss domestic laws. GATT negotiations will be impacted, perhaps disproportionately, by economic, political, and social factors. These factors may obscure the legal issues and produce a result which mutates copyright law into pure trade law. The GATT negotiators may resolve the software protection problem in a legally untenable manner. Worse yet, they may fail to resolve the problem at all. A non-resolution situation will aggravate the situation by fostering an atmosphere of international uncertainty. “[I]ntellectual property rights have ceased to be the exclusive domain of highly professional expert circles, such as those meeting at the WIPO. Entering into the open arena of trade politics, within the GATT and elsewhere, involves both chances and risks.”392

Technological advance has spread more quickly than was ever expected. Traditional theories . . . are being complicated because certain developing countries have been able to compete with the industrialized countries on products at the higher end of the technological ladder. It has become clear to most countries that export success is a function of their ability to innovate, adapt to new technologies and produce those goods and services for which world demand is increasing.393

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391. Cote, supra note 354, at 7. The tension between the desire of developing states to acquire access to innovation and the desire of industrialized states to receive a fair price for technological development must be balanced.


The fear is that, in an effort to protect economic rights, the industrialized states may go too far. "When does the protection of intellectual property rights go beyond what is 'adequate' and become an instrument for market domination?" 394

Because GATT is contractual in nature, it provides a better mechanism to achieve worldwide software protection compliance with software protection. Unlike the Uniform Copyright Convention or the Berne Convention, GATT has a built-in enforcement mechanism. It is no accident that in the U.S.-Canada FTA, both nations agreed to pressure other states to adopt similar protection schemes through the GATT.395 The enforcement mechanism is the primary attraction for using GATT as a tool to pressure nations to adopt copyright protection for software. These mechanisms will make it much harder for the Third World and developing nations to get a foothold in the high-tech world. They will have to pay royalties and fees for a long time before most software becomes freeware. The Third World and developing nations will be hampered and discouraged from entering the Silicon Age. This condemns a portion of the world to technological naivete and illiteracy.

VII. CONCLUSION

Uniform software copyright protection will enhance high-tech trade between the developed Western nations because businesses will be assured of equal protection for their products. However, friction in trade relations will develop from under-developed nations and Communist states which have refused to protect foreign software products.

The Third World will resist copyright reform because they have no domestic software industry. A fledgling software industry often grows from a pirate industry. Under-developed nations, wishing to keep open the possibility of developing a software industry in the future, will refuse to reform their copyright laws to protect software.

The U.S. government and U.S. industries are pushing for international improvement in high technology laws. The U.S. has successfully pressured Canada, Japan, Taiwan, and England to conform to the U.S. model of software protection. U.S. pressure has prompted nations like Korea and Brazil to begin copyright reform.396

Technology impacts the copyright laws, which in turn impact trade. Trade injects issues of money, economics, and global politics into the software protection issue. It is a complex web, full of competing ten-

394. Id.
395. Canada-United States Free Trade Agreement, Art. 2004. The two countries agreed to “cooperate in the Uruguay Round of multilateral trade negotiations and in other international forums to improve protection of intellectual property.”
396. Dam, supra note 214, at 636.
sions. "[I]n the United States, intellectual property protection matters are being driven almost as much today by trade policy as by intellectual property statutes." Copyright law is not the best resolution because it creates more tension and friction between the industrialized West and the underdeveloped and developing nations.

Ultimately, U.S. influences will probably get most countries to adopt copyright protection. "[I]f freedom of trade is an objective, there is of course much to be said for working for the Utopian ideal of uniformity of [intellectual property] rights in different countries." However, if this comes about, the U.S. will retain a significant advantage in software development over the rest of the world. This result is antithetical to the ideal of disseminating technology as quickly and as widely as possible. If the U.S. is the prime manufacturer of software, and if this technology is protected for the entire term of a copyright, it will become very difficult for nations to begin nurturing a successful domestic software industry. Most of the expertise and technical skill for creating software will remain in the U.S. As a result, the world will only share in this technology by purchasing it from U.S. producers.

Copyright is used as a means of stifling competition. The trend in the U.S. case law reveals how copyright can be abused. In the U.S., companies are suing in order to restrict their hold on technology and solidify their market shares. For example, Apple Computer Corporation is suing to retain its technological lead in the personal computer market. The second and third generation lawsuits and software issues all flow directly from the initial grant of copyright. If these companies are allowed to restrict the "look and feel" or underlying basic structure of a computer program, then legitimate competitive development can be quashed. At first, these manufacturers were concerned with slavish copying; now, they are using copyright as a tool of industrial security to extend their competitive advantages. "'There is a tendency for copyright lawyers to think . . . that all problems could be solved if copyright laws were applied wholesale to software.'" Unfortunately, copyright creates a number of problems.

If these developments occur on a global scale, software innovation will be restricted only to the U.S. and only to those companies with the financial and legal power to protect their products. The pace of software development will ultimately slow as these companies eradicate their competition, both domestically and internationally. In the long

397. Bale, supra note 360, at 15.
398. Background, supra note 356, at 208.
400. Llewelyn, supra note 229, at 187 (quoting Rumbelow, Software Protection in the united Kingdom, 10 INT'L. BUS. LAW. 263 (1982)).
run, copyright becomes a slippery slope leading to monopolies and technological stagnation.

VIII. PROPOSED GUIDELINES FOR SOFTWARE PROTECTION

The copyright system should be replaced by a more elegant software protection scheme. Although the exact details of such a protection scheme are beyond the scope of this Article, certain characteristics of the protection problem should serve as useful guidelines in the future development of software protection.

First, copyright is a temporary solution at best. Perhaps the French approach is the most realistic. Copyright should be regarded as a stopgap measure, intended to satisfy the demands of manufacturers until something better suited to the real nature of the technology is developed.

A wide diversity in protection schemes exist, even between states that recognize copyright in software. This is a result of different traditions and philosophies underlying copyright. In the long run, the U.S. should strive to attain *sui generis* protection, which does not carry with it conflicting underlying philosophies.

Second, true object code is nothing more than a series of voltages. Courts have confused "object code" with both "hexadecimal code" and "machine code." The courts have missed the essential point that both binary and hexadecimal codes are nothing more than *representations* of the actual sequence of voltages being applied. In essence, object code is electricity, channelled through the computer's hardware.

Third, copyright overprotects software. Most software does not have a shelf life of more than a few years. A protection term of life plus fifty years is much too long for software. An intermediate solution will emerge, somewhere between patent and copyright terms. Copyright was designed for artistic works, like books, and not for utilitarian, industrial articles like software. A better protection system should recognize the inherent industrial nature of software. In addition, copyright underprotects software. Copyright protection would not guard against use, as patent protection would.

As a matter of priorities, the software industry is worried primarily about copycats, since they represent the most blatant and damaging attack on the industry. Naturally, because copying is involved in software piracy, the industry turns first to copyright law. But, this strategy ignores the fact that software is more than just something to copy. Software is an industrial tool. It has value as a basis for research and development. It evolves over time as newer versions are introduced to the marketplace. A protection scheme is needed which adequately protects against slavish copying and simultaneously addresses the other as-
pects of the technology. Otherwise, the industry will gain different forms of protection piece by piece, by bringing subsequent lawsuits. An over-arching approach to software, which recognizes its nature from the outset, is more desirable than a piecemeal approach to software protection.

A new protection system should require a level of creativity and originality above what is required for copyright, but below what is required for patent novelty inquiries. As a trade off for this heightened originality requirement, the protected software manufacturer should be given the power to control use of the software. However, moral rights and "look and feel" complaints should not be allowed. These types of complaints are currently being used to stifle competition and technological development. Finally, a separate legal regime should protect the physical devices upon which the program is stored. Object code programs embedded on ROM should be covered, but the actual ROM chip structure should not be covered. Other protection systems, like the U.S. Semiconductor Chip Protection Act, should cover the actual ROM chip structure.

A more responsive protection scheme will ensure more compliance and implementation than exists now. There will be the same trade benefits and protection for the industrialized states, but less harm to the developing states. The ultimate result will be a fairer, better, and faster spread of technology on a global scale. This will, in turn, enable more states to enter the Silicon Age. And finally, an innovative protection scheme will resolve the international technico legal revolution that encompasses software.

"The only realistic approach, in my opinion, is to attempt to achieve a fair balance between the rights of innovators and the needs of users,\textsuperscript{401} Software needs protection, but copyright is the wrong approach since it underprotects and overprotects. This results in long term stagnation and strangle holds on development. "Adequate protection of intellectual property rights promotes the expansion of trade, while abuse of such rights works in the opposite direction: it tends to impede trade."\textsuperscript{402}

The law is evolving and must adapt to new forms of wealth, property, power, and new realities if it is to guide lives and societies efficiently. Law exists to make life predictable. If the law does not address a central issue of modern life, then it is no longer relevant and makes life unpredictable. Common sense dictates that new realities will require new approaches. This is especially important now that it appears technology will only increase the pace of its rapid advances. The legal

\textsuperscript{401} Cote, \textit{supra} note 354, at 7.
\textsuperscript{402} \textit{Id.} at 7-8.
systems of the world must get accustomed to evolving quickly, since future technical advances will require similarly adept adaptation.