

1999

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Peter A. Alces

William & Mary Law School, paalce@wm.edu

Aaron S. Book

Repository Citation

Alces, Peter A. and Book, Aaron S., "When Y2K Causes "Economic Loss" to "Other Property"" (1999). *Faculty Publications*. 285.
<https://scholarship.law.wm.edu/facpubs/285>

When Y2K Causes "Economic Loss" to "Other Property"

Peter A. Alces[†] and Aaron S. Book^{††}

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[†] Professor of Law, The College of William and Mary School of Law
(email: paalce@facstaff.wm.edu).

^{††} Associate, Hazel & Thomas, P.C., Fairfax, Virginia (email:
abook@hazelthomas.law).

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I. INTRODUCTION

The world will not come to an end on January 1, 2000, the first day of the last year of this millennium, but time will stop, at least for a substantial portion of the computerized world. Perhaps just as problematic, from the perspective of the commercial world, the end of 1999 will be spent ruminating about losses that, to date, no one has been able to certainly quantify or anticipate. "Stuff" will fail; even the keepers of the technological flame acknowledge that much.¹ What we do not know is what will fail and what the consequences of ripple effect failure will be. There may indeed be personal injuries,² and the bases available for imposing liability for failures that hurt people are manifest.³

1. See Laurent Belsie, *A Tech-Linked World Faces "Y2K,"* CHRISTIAN SCI. MONITOR, Jan. 20, 1999, at 1 (discussing implications of the impending crisis); Paul Hampel, *Companies, Agencies Are Taking Steps to Fix Y2K,* ST. LOUIS POST DISPATCH, Jan. 4, 1999, at A1 (discussing competing opinions as to whether Y2K problems will be resolved); M.J. Zuckerman, *Y2K: Minor Glitch or Major Disaster?*, USA TODAY, Dec. 31, 1998, at 10A (discussing the impending Y2K crisis). See generally EDWARD YARDENI, *YEAR 2000 RECESSION?* (last modified Aug. 10, 1999) <<http://www.yardeni.com/y2kbook.html>>; EDWARD YOURDON & JENNIFER YOURDON, *TIME BOMB 2000* (1998) (evaluating and predicting the impact of Y2K on various aspects of life). The Y2K scare has some of the most experienced and respected computer professionals predicting the worst and adding a new acronym to the internet lexicon: TEOTWAWKI (The End of the World as We Know It). See Kevin Poulsen, *The Y2K Solution: Run for Your Life!!*, WIRED, Aug. 1998, at 122, 124. Some of these programmers have become doomsday survivalists, purchasing remote plots of land, stocking up on water and nonperishable food, and acquiring an arsenal of weapons to protect against possible intruders. See *id.* at 122-67; see also Joel Acenbach, *Not Just Waiting for Y2K to Come: Many Who Fear the Bug Are Preparing for Disaster*, WASH. POST, Dec. 7, 1998, at A1 (discussing survivalist preparations for the Y2K crisis).

2. See Ashley Dunn, *Year 2000 Bug Likely to Infest Courtrooms*, L.A. TIMES, Sept. 8, 1998, at A1 (discussing potential lawsuits over Y2K issues, including personal injury); *A Year Before the Millennium, Computer-Related Lawsuits Are Beginning to Tack Up*, DALLAS MORNING NEWS, Jan. 2, 1999, at 6A (same).

3. See RESTATEMENT (SECOND) OF TORTS § 402A (1965). Section 402A provides:

(1) One who sells any product in a defective condition unreasonably dangerous to the user or consumer or to his property is subject to liability for physical harm thereby caused to the ultimate user or con-

To a surprising extent, the developers of software and software systems have avoided liability for the failures of their products. The reasons for this are not immediately obvious, but one thing is certain: The *quality* of the industry's products has not been sufficient to insulate sellers and licensors from liability.⁴ The law has not provided the victims of software failure the redress that contract and tort theories have generally provided disappointed transactors.⁵ There have been relatively few decisions imposing liability on software developers for the failures of their products,⁶ which may be attributed, at least in part, to the fact that this area of the law has been in flux—the cooperation of tort and contract theory dubious.

The world of software liability will never be the same after the consequences of Y2K are fully revealed. There will be litigation (indeed, there already has been litigation)⁷ and there will be statutory responses (there already have been statutory responses).⁸ The legal landscape confronting the software in-

sumer, or to his property, if

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

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

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

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

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

Id.

4. See Cem Kaner, *Liability for Bad Software and Support* (visited Feb. 25, 1999) <<http://badsoftware.com/support1.htm>> (listing cases that impose liability on software manufacturers for failures of their products).

5. See Peter A. Alces, *W(h)ither Warranty: The B(l)oom of Products Liability Theory in Cases of Deficient Software Design*, 87 CAL. L. REV. 269, 269 (1999) [hereinafter Alces, *W(h)ither Warranty*].

6. See Kaner, *supra* note 4.

7. See Mark A. Willard, *Year 2000 Computer Problem Will Spawn Thousands of Lawsuits*, PA. L. WKLY., Nov. 9, 1998, at 13 (reporting on Produce Palace International's settlement of a lawsuit with TEC-America for damages caused by the inability of credit card processing devices, designed by TEC-America, to recognize cards with expiration dates later than January 1, 2000). There are also publications specifically designed to assist litigators in preparing to pursue a Y2K-related case. See generally BOWNE & CO., *THE YEAR 2000 LEGAL GUIDE* (1998); MICHAEL D. SCOTT & WARREN S. REID, *THE YEAR 2000 COMPUTER CRISIS* 6-1 to 6-145 (Supp. 1998/1999); UNDERSTANDING, PREVENTING AND LITIGATING YEAR 2000 ISSUES: WHAT EVERY LAWYER NEEDS TO KNOW NOW (Practising Law Institute ed., Supp. 1998).

8. See, e.g., The Year 2000 Information and Readiness Disclosure Act, Pub. L. No. 105-271, 112 Stat. 2386 (1998) (discussed *infra* notes 52-77 and

dustry after Y2K is the subject of considerable conjecture. Will courts be more disposed to take into account the damage that deficient software can do after January 1, 2000? Or, will the industry's response to the potential Y2K nightmare reinforce the courts' and legislatures' reticence, thereby confounding an industry our legal system has trouble understanding? The answers to those questions will almost certainly depend on the damage done by the Millennium Bug.

While the wake of the Bug may well have an impact on the law's response, it must be recognized that Y2K has already had a profound impact on commercial law and the world's economy.⁹ The costs of Y2K will have been significant even if not one single system were to fail at all as a result of the date change problem. Someone will have to pay for those costs, and, ultimately, it may not be the party who is currently out of pocket. Cases have been working their way through our adversary system—a few as class actions.¹⁰ There are also indica-

accompanying text); 36 HAW. REV. STAT. § 662-15(8) (1998) (providing governmental immunity from "[a]ny claim arising out of or based upon any failure of or error produced, calculated, or generated by a government computer system . . . as a result of the system's not being year 2000 compliant . . ."); VA. CODE ANN. § 8.01-195.3(8) (Michie Supp. 1999) (providing governmental immunity from "any claim arising from the failure of a computer, software program, database, network, information system, firmware or any other device, whether operated by or on behalf of the Commonwealth . . . to interpret, produce, calculate, generate, or account for a date which is compatible with the 'Year 2000' date change").

Many states have introduced legislation that limits liability for certain claims arising out of the Y2K date change. *See, e.g.*, H.R. 82, 21st Leg., 1999 Alaska Sess. Law Serv. 79; H.R. 1111, 20th Leg., 1999 Haw. Sess. Law Serv. 115; S. 1074, 1999 Gen. Assembly, 1999 N.C. Sess. Law Serv. 308; S. 1005, 1999 Gen. Assembly, 1999 N.C. Sess. Law Serv. 295; H.R. 1325, 47th Leg., 1999 Okla. Sess. Law Serv. 302; H.R. 3245, 70th Leg., 1999 Or. Sess. Law Serv. 663; H.R. 3759, 113th Leg., 1999 S.C. Sess. Law Serv. 203; H.R. 808, 101st Leg., 1999 Tenn. Sess. Law Serv. 378; H.R. 2015, 56th Leg., 1999 Wash. Sess. Law Serv. 369.

9. For example, many companies have already expended extraordinary amounts of resources in tackling the Y2K problem and estimates for the total amount that will be spent run as high as one trillion dollars. *See* Belsie, *supra* note 1, at 1. Litigation expenses of Y2K are also predicted to run as high as one trillion dollars. *See* Margaret A. Jacobs, *Some Big Companies Swear off Y2K Suits*, WALL ST. J., Nov. 30, 1998, at B16 (commenting that estimates of litigation costs have run as high as one trillion dollars and have prompted some companies to agree to mediate disputes over Y2K problems rather than litigate).

10. *See Anti-Virus Software Maker Sued on Warranty, Consumer Protection Claims*, PROD. LIAB. DAILY (BNA), Apr. 27, 1998, at D3 (discussing a putative class action suit alleging fraud and breach of warranty claims for a virus protection software that was not Y2K compliant); *Business Files Putative*

tions that insurance and director/officer liability law will determine substantial liability issues.¹¹

This Article confronts what has become the central software liability issue that will fix the substance and extent of the computer industry's Y2K liability: Whether the strict products liability law provides the basis to award a commercial entity damages for the "economic loss" caused by the Millennium Bug. The law is less clear than some potential defendants would want it to be, and the ultimate answer will resolve important jurisprudential questions that resonate through myriad phases of our technologically driven economy.

This Article begins, in the next Part, with a careful exposition of the challenges Y2K poses for our legal system and a juxtaposition of the legal consequences presented by Y2K with those presented by more prosaic technology failures. Then, Part III surveys the array of liability theories that may be brought to bear in Y2K litigation. What emerges is the conclusion that strict liability law, as it has evolved from the consumer product that causes personal injury, provides the best means to redress the imbalance that has resulted from too indulgent an attitude toward those who sell snake oil on floppy disk (or over the World Wide Web). Before the strict liability response will be viable, however, the courts must appreciate how best to come to terms with the "economic loss" limitation on strict liability's operation and, in the course of that inquiry, on the "other property" exception to the "economic loss" doctrine. Part IV focuses on analysis of those issues. That analysis supports the conclusion in Part V that strict liability theory is, in fact, the judicial engine best fit to the task of allocating the losses caused by the Y2K tragedy. The conclusion will also make clear the consequences of the strict liability theory for the

Class Action, Asserts Programs Not Year 2000 Compliant, PROD. LIAB. DAILY (BNA), May 7, 1998, at D2 (discussing a putative class action lawsuit in which a Connecticut business alleged breach of warranty and fraud against an accounting software manufacturer claiming that older versions of the company's software are not able to process dates after Dec. 31, 1999); *Intuit Faces More Lawsuits Over Quicken; State Court Filings Seek Class Action Status*, PROD. LIAB. DAILY (BNA), June 26, 1998, at D6 (discussing the putative class action filed by software users in New York and California alleging that Intuit aggressively marketed its Quicken financial software knowing that the product was not Y2K compliant).

11. See Sara E. Cook & Kristin L. Dvorsky, *D&O Liability and the Year 2000—A Repeat of the 1980s?*, 86 ILL. B.J. 494, 496-500 (1998) (discussing various liability issues that directors and officers may face as a result of their failure to address adequately the Y2K problem).

software law world that dawns after the lights come back on, sometime in January 2000 or so.

II. CHALLENGES Y2K POSES FOR THE LEGAL SYSTEM

This Part describes the nature of the Y2K problem and traces the evolution of this "glitch" to the present day. This exposition takes into account the various manifestations of the Bug and the transactional as well as legislative reactions to it. Part II begins with a primer on Y2K: what it is, why it is, and the legislative response to it so far. Part II then places Y2K in context by describing its affinities to and distinctions from more familiar product failures.

A. THE NATURE OF THE Y2K PROBLEM

1. Genesis

The essence of the Y2K problem is the inability of a computer to recognize January 1, 2000 in its computations involving this date.¹² Most computer date fields represent a calendar year¹³ by two, rather than four, digits. For example, the year 1998 is represented as "98," 1950 as "50," and so on. The genesis of two-digit as opposed to four-digit date functions may be traced back to the earliest days of computing.

Herman Hollerith, a Census Bureau employee in the late 1800s, developed a system for automating the census tabulation system by designing a device that used a card punched with holes representing data.¹⁴ Hollerith obtained a patent on his invention and began the company that eventually became

12. Here, the term "computer" designates both the operating system upon which a computer runs, for example Windows 95 or 98, and software, also called an application, that is installed and runs on a computer or on several computers that are linked together through a network. *See* JAMES A. O'BRIEN, INTRODUCTION TO INFORMATION SYSTEMS 23, 88-116 (8th ed. 1997) (presenting an overview of the structure and function of computer software). It should be noted that Microsoft, Inc. has stated that both Windows 95 and 98 are Y2K compliant. That is, these operating systems should continue to function as normal when the year changes from 1999 to 2000.

13. A date field is used in any calculation that involves a calendar date. Typical computer-maintained applications that require date fields include interest computations, client billing, inventory management, and other financial applications. The Y2K problem also arises with regard to embedded systems in various devices, which will be discussed later in this section.

14. *See* SCOTT & REID, *supra* note 7, at 1-6.2.

IBM.¹⁵ In the early days of the computer, the "Hollerith Card" or "IBM Card" was *the* way to compute.¹⁶ Unfortunately, the card, which was about the size of a dollar bill, had severe space limitations.¹⁷ Each hole on the card represented one "byte" of data. A byte is, basically, one character of data such as "9," "%," or "A." Only eighty bytes were available on each card, so there was real incentive to save space.¹⁸ One easy way to maximize space was to eliminate the first two digits of the year from any date and assume that the first two digits were "19."¹⁹

Around the middle of the twentieth century, computers were developed that understood a mathematical binary language—a series of 1s and 0s that told the computer what to do.²⁰ Generally, only experts and mathematicians were able to program in this complex code. The first large-scale computer, known as the Mark I, was fifty-one feet long, eight feet high, eight feet deep, and could perform a miraculous three additions every second and store seventy-two words.²¹ One such expert tapped to program the Mark I was Grace Hopper, the matriarch of modern computing.²² Hopper became only the third person ever to program the early behemoth.²³ Her experience with the Mark I prompted her to devise a more efficient system of programming computers than the time-consuming and extremely complex process of communicating in 1s and 0s.²⁴ She

15. *See id.*

16. *See id.*

17. *See id.*

18. *See id.*

19. *See id.*

20. *See* ETHLIE ANN VARE & GREG PTACEK, WOMEN INVENTORS & THEIR DISCOVERIES 113-14 (1993).

21. *See id.* at 113. At the time, three additions per second and a 72-word memory really were significant accomplishments. In comparison, the Apple G4 personal computers, introduced in the fall of 1999, perform one gigaflop (one billion operations) per second. *See* Leander Kahney, *Lavish Debut for Apple's G4* (visited Sept. 1, 1999) <<http://www.wired.com/news/news/technology/story/21522.html>>. Remarkably, these computers can perform one computation in less time than it takes the lights from the monitor to reach the user's face. *See id.*

22. Grace Hopper was known as "Amazing Grace" to her colleagues. *See* Robert Sam Anson, *The Y2K Nightmare*, VANITY FAIR, Jan. 1999, at 80, 83. In addition to her groundbreaking achievements in computer science, Hopper was also a female rear admiral in the U.S. Navy and was respected and admired by her peers for her tenacity and intelligence. *See* VARE & PTACEK, *supra* note 20, at 111-23.

23. *See* VARE & PTACEK, *supra* note 20, at 113.

24. *See id.* at 113-14.

invented the first user-friendly computer language that non-mathematicians could employ in everyday life: COBOL, short for COMmon Business Oriented Language.²⁵ Early COBOL programming relied on the Hollerith Cards to operate, so computer programmers were still faced with space limitations. At that time, one megabyte (one million bytes of memory) cost about \$600,000, compared to less than ten cents today;²⁶ therefore, space-savers such as two-digit dates were crucial.²⁷ Even when computers made the switch from the cumbersome Hollerith Cards to the modern floppy disk drive, which can store greater amounts of information, space limitations remained a concern.

In the 1970s, disk drive storage space was very expensive. Although the price of memory dropped considerably, one megabyte of disk space still cost over \$10,000 (in inflation-adjusted dollars).²⁸ Space-obsessed and budget-conscious programmers consequently developed incredibly complex software in extremely limited space.²⁹ To overcome the limitations of space, these programmers created short cuts and mechanical tricks to allow the computers to perform tasks.³⁰ Although what these programmers were doing was groundbreaking, they continued to incorporate the two-digit date field in a "spaghetti code,"³¹

25. See *id.* at 114.

26. See *Don't Get Stung by the Year 2000 Bug* (visited Nov. 9, 1998) <<http://www.pathfinder.com/money/y2k/nine.html>>.

27. The cost to lease one megabyte of memory in 1963 was around \$175 per month, but is less than 10 cents per month today, which is approximately 1/1,000,000 of the 1963 cost. See Leon A. Kappelman & Phil Scott, *Accrued Savings of the Year 2000 Problem*, in *YEAR 2000 PROBLEM: STRATEGIES AND SOLUTIONS FROM THE FORTUNE 100*, at 53 (Leon A. Kappelman ed., 1997).

28. See SCOTT & REID, *supra* note 7, at 1-8. By comparison, today you can purchase two, five, and eight gigabyte (one gigabyte = one billion bytes) hard disk drives for a few hundred dollars. See, e.g., *COMPUTER SHOPPER*, Jan. 1999 (containing hundreds of advertisements throughout for inexpensive, multi-gigabyte hard disk drives).

29. See SCOTT & REID, *supra* note 7, at 1-8.

[These programmers] were the ones that walked around with white smocks, pocket protectors, and goatees in Armonk, New York, and other computer meccas. These were the original "geniuses and nerds" that were allegedly fed pizza through a hole in the bottom of the door so they could work their wizardry without having to deal with the niceties and logic of the real world outside.

Id. at 1-8 to 1-9.

30. See *id.*

31. "Spaghetti code" is a term that denotes a type of computer code that is illogical, unstructured, and patched together in a way that makes the program do what it is supposed to do, but is almost impossible for anyone except its

which was developed to enhance computer performance. This code, complex and illogical as it was, served as the well from which all future computer applications would be drawn. It would also, rather ironically, serve as the root of all Y2K evil.

2. Evolution

It is important to appreciate why there were no successful efforts earlier to introduce four-digit date codes.³² First, the

creator to follow. *See id.* at 1-9 n.16. Spaghetti code is one of the most difficult obstacles modern programmers face in dealing with the Y2K problem as they must delve into these old programs and source codes and rewrite the date functions. *See id.* To make matters worse, sometimes these "COBOL Cowboys," as they called themselves, intentionally hid date codes or encrypted them by using names of their girlfriends, cars, or even *Star Trek* characters as substitutes for certain numbers. *See Anson, supra* note 22, at 84.

32. There were unsuccessful efforts to alert the computer world to the perils of two-digit date fields. *See Anson, supra* note 22, at 83-84. In 1960, a group of 47 computer industry and government experts lobbied for industry-wide standards that would mandate four-digit date fields in all COBOL programs. *See id.* In 1967, the White House ordered the National Bureau of Standards (now the National Institute for Standards and Technology) to decide the matter. *See id.* Unfortunately, the Department of Defense, which had the loudest voice in the debate, vehemently opposed four-digit date fields. *See id.* So the two-digit field remained. Robert Bemer, an IBM executive and inventor of the "Escape" key and the "ASCII" language, unsuccessfully lobbied big businesses to voluntarily switch to a four-digit date field. In a 1979 computer magazine Bemer warned, "Don't drop the first two digits [of the century]. [If you do,] [t]he program may well fail from ambiguity in the year 2000." *Id.* at 84. Bemer recalled that the response to his warnings was laughter. *See id.*

Over the years, there have been other attempts to notify the computer industry that there would be a problem at the turn of the century. Jerome and Marilyn Murray co-authored a book in 1984 entitled *Computers in Crisis: How to Avert the Coming Worldwide Computer Systems Collapse*. In it, the Murrys predicted domestic and international chaos if the problem were not addressed, and addressed soon. *See JEROME MURRAY & MARILYN MURRAY, COMPUTERS IN CRISIS: HOW TO AVERT THE COMING WORLDWIDE COMPUTER SYSTEMS COLLAPSE* (1984). The Murrys warned, "we have placed our confidence, physical and economic well-being, and future hope in the development of a technology now seen to be fatally flawed through collective human oversight. What have we done? What will we do?" *Id.* at xvii. In the early 1990s, Peter de Jager, a noted expert on the Y2K problem, issued a warning over the Internet analogizing the impending millennium date change to a car crash: "It's too late to avoid it—you're going to crash. All you can do now is watch it happen." Peter de Jager, *Doomsday 2000* (visited Nov. 9, 1998) <<http://www.year2000.com/archive/cw-article.html>>. Peter de Jager currently maintains a project entitled "Project Damocles" through which he receives information about a noncompliant system and confidentially notifies companies that they may have a potential problem when the date changes. *See Ann Devlin, Listen to Peter de Jager the Interview* (visited Dec. 30, 1998) <<http://www.annonline.com/interviews/980311>>. Such notification may aid

simple answer: Though programmers knew of the problem and what the potential consequences of maintaining a two-digit date function would be as the year 2000 approached, most believed that, given the pace of computer development and innovation, (1) those primordial programs would be long gone, or at least obsolete, by the turn of the century, and (2) even if those programs were still in use, the problem would be remedied by technological progress years before the next millennium. Basically, technology was moving too rapidly to expend time and resources on a project that would be anachronistic in a few years. It was no great leap of faith for early programmers to expect that technological advances would solve a problem created by the absence of two minuscule bytes of data. With only days left until the turn of the century, it is apparent that the programmers' faith was misplaced.³³

There is a second, and more complex reason for the reluctance to change to a four-digit date code. The early programmers in COBOL and other primitive computer languages established "rules." The "rules" and the computer applications they ran worked, and worked well. Programmers in COBOL and the languages that evolved, such as OS/VS COBOL, PL/1, Assembler, Focus, Nomad, Ramis, Easytrieve, DL260, DYL280 (and hundreds more),³⁴ continued to use the two-digit date function because it was a "rule." Many knew that this "rule" did not make sense, but to change it would be to completely rework the paradigm upon which the theories, processes and innovations of computer programming were built.³⁵ So, the "rule" remained in place. It was the state of the art.

litigants attempting to prove notice in future lawsuits.

33. There are those that maintain that a "silver bullet" will be discovered that will magically make all Y2K problems disappear. Such a "silver bullet" neither exists, nor will it surface—the problem is just too large.

34. See David Eddy, *Is This Only a COBOL Problem?*, in *THE YEAR 2000 FAQ 1.5* (visited Nov. 9, 1998) <<http://ourworld.compuserve.com/homepages/rsandler/y2kfaq.htm>>.

35. See Dale Way, *Why Old Software Is Still Used* (visited Nov. 9, 1998) <<http://www.2k-times.com/y2k-a112.htm>> (discussing, in part two of a three-part series, the theory of rules-based computer programming). Way's trilogy discusses the failed attempt to reengineer major computer systems and the complexity inherent in attempting to do so. See *id.* He argues that it is difficult, if not impossible, to acquire the deep systemic understanding and knowledge necessary to perform a complete overhaul of systems to make them Y2K compliant. See *id.* For parts one and three of his series, see <<http://www.2k-times.com/y2k-a111.htm>> and <<http://www.2k-times.com/y2k-a113.htm>>.

3. Revelation

The previous two subsections provided a brief history of the Y2K problem. The next subsection will explain what in fact will happen when that history catches up with us. Two Y2K problems will emerge: software systems failures and embedded systems failures. We treat them seriatim.

a. Software Systems Failures

Any computer running software that is not Y2K compliant, utilizing an operating system that is not Y2K compliant, or sharing information with a computer that is not Y2K compliant³⁶ will read the year 2000 as "00" and erroneously assume that "00" represents the year 1900.³⁷ It has been observed that the date anomaly is particularly vexing because we, as humans, perceive time as an endless, forward-moving continuum.³⁸ Each moment in time we view as "the present." Once the moment passes it becomes "the past." Everything yet to occur is "the future." These simple facts have no meaning for a computer, which has no concept of time in the human sense.

Computers recognize time and dates as mere numbers.³⁹ As time passes, the numbers get bigger and bigger. In other words, dates in the future are (or should be) larger than dates in the past.⁴⁰ The computer uses the two-digit date primarily in data manipulation such as addition, subtraction, and comparisons. As a rudimentary example, if a woman born in 1968 asked a computer in 1999 to calculate her age, the computer would subtract "68" (the current year in two-digit format) from "99" and report that she is thirty-one years old. With a two-digit date function, the year 2000, represented as "00," is smaller than "99." To the computer, this occurrence will be

36. This is one of the most frightening and frustratingly unpredictable scenarios of the coming millennium. Regardless of how thoroughly a business or organization has cleansed itself of Y2K problems, any interface with a computer or system that is not Y2K compliant could cause the same amount of damage as if that company had never corrected their Y2K problem.

37. There are other Y2K problems that will, or have, arisen before the actual date change. See, e.g., Willard, *supra* note 7, at 13 (reporting on Produce Palace International's settlement of a lawsuit with TEC-America for damages caused by the inability of credit card processing devices, designed by TEC-America, to recognize cards with expiration dates later than January 2000).

38. See Duncan G. Connall, *What Is the Year 2000 Problem?*, in THE YEAR 2000 FAQ, *supra* note 34, at 1.1.

39. See *id.*

40. See *id.*

profoundly confusing. Time will appear to have reversed, and "OLD will seem YOUNG, a FEW moments will seem like an ENTIRE century, [and] FUTURE events will have ALREADY occurred."⁴¹ The result of the computer's confusion is unpredictable. The computer may spew garbage data that is worthless to the user and could corrupt other data fields; the computer may abend (computerese for "shut down"); it may "lock up"; or nothing at all may happen. Unfortunately, it appears that many businesses in the United States have assumed that nothing will happen.⁴²

Software that uses a two-digit date system in its code has the potential to wreak havoc at the turn of the century. This is particularly true of software that computes interest or bills for goods or services. Noncompliant software that calculates interest will interpret "00" as 1900. In many cases, the computer will calculate ninety-nine years' worth of interest. Imagine arriving at your bank on Monday, January 3, 2000 to discover that your savings account balance of \$10,000 has grown to over \$521,000 in one weekend.⁴³ Your happiness will subside when your credit card statement arrives indicating that you owe over \$27 million on your balance that, only last month, was \$200.⁴⁴

The scenarios worsen and may easily result in the destruction of property. One example is automated inventory systems. On January 1, 2000, automated inventory systems may determine that inventory placed on the shelves only days before is one hundred years old and order the destruction of millions of dollars worth of medicine, food or other materials. Unfortunately, deficient software is only part of, and perhaps the less insidious part of, the Y2K problem.

41. *Id.*

42. A poll of an online community of large American corporations revealed that 78% of chief information officers stated that their companies are devoting less than 10% of their budgets to Y2K problems. See Thomas A. Unger, *Legal Issues for Year 2000 Software Compliance*, in UNDERSTANDING, PREVENTING AND LITIGATING YEAR 2000 ISSUES 9, 11 (Practising Law Institute ed., 1998). This fact is unsettling given estimates by the Gartner Group, a respected computer systems analysis company, that 50% of businesses are predicted to miss Y2K remediation deadlines and that 50-70% of all business-related systems will fail. See *Year 2000 Bug Offers "No Reprieves,"* BESTWIRE, Nov. 16, 1998, available in LEXIS, News Group File.

43. This calculation assumes a 4% interest rate, compounded annually, on the savings account balance.

44. This calculation assumes a conservative 12% interest rate, compounded annually, on the credit card balance.

b. Embedded Systems

Possibly more frightening than what could occur as a result of noncompliant software failures are the potential consequences attending failure of embedded systems, the devices inserted in machinery or other systems that have "built-in" computer logic.⁴⁵ These devices, also commonly known as computer chips, basically instruct the machine or system to perform a function, such as reset a digital answering machine or perform a routine self-check. The difference between the software and embedded systems is that the logic of the embedded system is "burned in" to the computer chip; therefore, unlike software, it cannot be changed by reprogramming.⁴⁶ Instead, noncompliant chips must be replaced.

That sounds like a simple task. Actually, discovering and replacing noncompliant chips is nearly impossible for the following reasons: First, the sheer number of chips makes replacing them virtually impossible. There are approximately 25 billion chips in use today. Between five and ten percent of the chips will not process the century change correctly; approximately two percent will fail completely.⁴⁷ Even that conservative estimate would mean that an astounding 500 million chips would have to be replaced. Second, even if replacement of the chips were feasible, there is no way to know with any certainty which chips would fail. Seasoned experts are unable to determine the behavior of an embedded chip.⁴⁸ Third, assuming that there is a way to determine with precision which chips would fail, identifying, locating, and replacing the chips would, in many cases, be difficult, if not impossible.⁴⁹ An obvious and particularly problematic example is satellites, which may have hundreds of embedded chips.⁵⁰

Additional examples of devices that may malfunction because of Y2K problems with embedded chips include: elevators, medical devices (such as respirators and x-ray machines that could shut down or malfunction), telephone services, power grids, railroad switching mechanisms, security systems and devices with internal timers (e.g., video cassette recorders,

45. See YOURDON & YOURDON, *supra* note 1, at 285.

46. See *id.* at 285-86.

47. See SCOTT & REID, *supra* note 7, at 1-25 n.34.

48. See YOURDON & YOURDON, *supra* note 1, at 287.

49. See *id.*

50. See *id.*; see also *id.* at 98-100 (discussing potential Y2K problems with the Navy's satellite-based Global Positioning System).

alarm clocks, digital watches, microwave ovens).⁵¹ The damage caused by failure of some of these systems clearly would be negligible. Other systems, however, may be deemed "mission critical," and the failure of those systems could lead to serious damage and loss.

4. Legislative Responses

Given the scope of the Y2K challenge, recent months have seen the promulgation of legislation designed to minimize the consequences of Y2K failures.

a. The Year 2000 Information and Readiness Disclosure Act

On October 19, 1998, President Clinton signed into law the "Year 2000 Information and Readiness Disclosure Act" (Act).⁵² The Act is designed to encourage businesses to share information about tactics, strategies, solutions, and problems encountered in connection with remedying their Y2K problems while providing a limited "safe harbor" against litigation that could arise from certain Y2K disclosures.⁵³ Basically, the Act is intended to preclude reinvention of the wheel each time a business sets out to solve its Y2K problems.

The Act is unique for several reasons. First, it is the initial congressional and presidential recognition of the Y2K problem.⁵⁴ Second, it received unanimous support in the Senate⁵⁵ and passed by voice vote in the House.⁵⁶ Third, because of time constraints, Congress neither conducted hearings, nor generated significant committee reports that could aid courts in

51. For a more detailed discussion of embedded systems and potential failures, see SCOTT & REID, *supra* note 7, at 1-25 to 1-29; YOURDON & YOURDON, *supra* note 1, at 283-99.

52. Pub. L. No. 105-271, 112 Stat. 2386 (1998). Interestingly, for a President who vowed to build a bridge to the 21st Century, this Act, which is intended to do just that, was signed a mere 439 days before the turn of the century.

53. *See id.* § 2.

54. Senator Daniel Patrick Moynihan had previously introduced bills attempting to establish a Y2K Czar to deal with the problem, but the bills went nowhere in Congress. *See* Anson, *supra* note 22, at 141. President Clinton was aware of the problem in 1995, when Howard Rubin, chairman of the computer science department at Hunter College, thoroughly briefed the President on the problem. *See id.* Although the President was "very interested and concerned," he failed to act. *Id.*

55. *See* 144 CONG. REC. S11065 (daily ed. Sept. 28, 1998).

56. *See* 144 CONG. REC. H9208 (daily ed. Oct. 1, 1998).

statutory interpretation. That could pose a problem when inevitable litigation arises.⁵⁷

The most important function of the Act is to limit liability (i.e., provide a "safe harbor") for businesses that share information on their Y2K remedies, readiness, test practices and test results, with each other, the public, and competitors.⁵⁸ The safe harbor extends only to disclosure of such information and does not extend to liability that may arise because of failures of systems that are not Y2K compliant.⁵⁹

The Act is designed to protect those that share Y2K information by precluding the admission into evidence of two types of statements. The first is a statement of "year 2000 readiness disclosure."⁶⁰ That is a statement that comments on the preparedness of any company to deal with projected Y2K problems. Such statements may include, for example, an airline's assessment of its capability to operate, or a bank's ability to distribute cash through its automated teller machines after January 1, 2000.⁶¹ The Act also precludes the admission of any "Y2K statements" to prove the accuracy or truth of those

57. See Bill Tracking Report S. 2392 (Congressional Research Serv.) (July 30, 1998), available in LEXIS, GENFED Library; *ITAA Guide to the Year 2000 Information and Readiness Act* (visited Sept. 9, 1999) <<http://www.ita.org/year2000/irdaguide.htm>>. This website, presented in question and answer format, is an excellent resource for additional in-depth information on the Act and how it pertains to businesses.

58. See Year 2000 Information and Readiness Disclosure Act § 2.

59. See Dean R. Nicyper, *New Law Limits Liability for Year-2000 Disclosure*, NAT'L L. J., Nov. 16, 1998, at B7.

60. Year 2000 Information and Readiness Disclosure Act § 3(9).

61. See Barnaby J. Feder, *Companies Still Hesitate to Share Year 2000 Information*, N.Y. TIMES, Dec. 7, 1998, at C2. These disclosures are covered under the Act if made between October 19, 1998 and July 14, 2001. See Year 2000 Information and Readiness Disclosure Act § 7(a)(3)(B). In addition, disclosures made after January 1, 1996, but prior to passage of the Act on October 19, 1998, are also covered under the Act if such disclosure was declared a readiness disclosure statement by December 3, 1998. See *id.* § 7(b)(1)-(2). To qualify for the exemption, all recipients of the disclosure must be given notice that the identified disclosure is a Y2K readiness disclosure statement. See *id.* § 7(b). Generally, a posting on the company's Y2K Internet website for 45 days is adequate notice; however, such notice is not adequate in cases involving "personal injury or serious physical damage to property." *Id.* § 4(d)(1). This form of notice is not an adequate mechanism if it "is contrary to express prior representations regarding the mechanism of notice made by the party giving notice[,] . . . is materially inconsistent with the regular course of dealing between the parties . . . or [when] actual notice is clearly the most commercially reasonable means of providing notice." *Id.* § 4(d)(2).

statements.⁶² A Y2K statement must be in writing,⁶³ clearly identified on its face as a Y2K statement,⁶⁴ inscribed on paper or readable electronic form,⁶⁵ and must address Y2K processing of the issuing entity with respect to products or services offered by that entity.⁶⁶ Congress clearly intended the definition of a Y2K statement to be very broad, to include any communication of information in any form or medium "concerning an assessment, projection, or estimate concerning year 2000 processing capabilities of an entity, product, service, or set of products and services."⁶⁷ In addition, a Y2K statement includes any information "concerning plans, objectives, or timetables for implementing or verifying the year 2000 processing capabilities of an entity, product, service, or set of products and services,"⁶⁸ as well as, statements "concerning test plans, test dates, test results, or operational problems or solutions related to year 2000 processing⁶⁹ by . . . products⁷⁰ . . . or services that incorporate or utilize products."⁷¹ The Act also covers statements that review, comment on, or otherwise directly or indirectly relate "to year 2000 processing capabilities."⁷²

The term "year 2000 processing capabilities" was given a "practical and broad-reaching definition,"⁷³ to include representations concerning the ability to process, transmit, or receive date-related data "from, into, and between the 20th and 21st centuries, and during the years 1999 and 2000 and leap year calculations."⁷⁴ Evidently, the Act was envisioned to anticipate and address myriad problems encountered relative to Y2K remediation.⁷⁵

62. See Year 2000 Information and Readiness Disclosure Act § 4(a).

63. See *id.* § 3(9).

64. See *id.* § 3(9)(A).

65. See *id.* § 3(9)(B).

66. See *id.* § 3(9)(C).

67. *Id.* § 3(11)(A)(i).

68. *Id.* § 3(11)(A)(ii).

69. *Id.* § 3(11)(A)(iii).

70. *Id.* § 3(11)(A)(iii)(I).

71. *Id.* § 3(11)(A)(iii)(II).

72. *Id.* § 3(11)(A)(iv).

73. Terry E. Thornton et al., *Congress Passes Safe Harbor for Y2K Readiness Statements*, 154 N.J.L.J. 565, 565 (1998).

74. Year 2000 Information and Readiness Disclosure Act § 3(8).

75. See Thornton et al., *supra* note 73, at 565, 568-69 (outlining the different provisions of the Act).

The impact of the Act appears to be limited so far. Companies have sought legal counsel for interpretation of the new law,⁷⁶ and information seems to be flowing between companies. The motivating factor behind this activity is apparently customer pressure and regulatory concerns, rather than a feeling of protected cooperation engendered by the Act.⁷⁷ The Act, and the disclosures and exchanges of information it may encourage, will have no direct impact on the Y2K liability of those who programmed Y2K deficient software or Y2K deficient embedded chips. However, the Act may operate in (at least) two other ways to affect Y2K liability. First, the information market the Act promotes will effectively lift the veil of ignorance that might otherwise confront Y2K plaintiffs because the costs (and means) of Y2K remediation will become common knowledge. Second, insofar as product liability theories are dependent on the plaintiffs and defendant's state of mind, the Act may generate the exchanges of information the courts would find probative of misrepresentation, warranty, and strict liability of software and embedded chip developers.

Still more dramatic Y2K legislation was to follow.

b. The "Y2K Act"

The "Y2K Act" was signed into law on July 20, 1999.⁷⁸ It was promulgated as a preemptive strike to curtail the predicted deluge of Y2K-related lawsuits.⁷⁹ The Y2K Act applies to any Y2K-related action brought after January 1, 2000, for a Y2K failure that occurs on or before January 1, 2003, or any potential failure that will occur before that date.⁸⁰

The Y2K Act's avowed purpose is to prevent frivolous litigation and unnecessary strain on the judicial system that will arise because of relatively minor Y2K-related glitches.⁸¹ Additionally, it seeks to protect businesses and individuals that rely heavily on computer technology, but have limited access to the legal system, by providing them with alternate methods to resolve their Y2K disputes.⁸² The Y2K Act, however, specifically preserves the ability of individuals and businesses that have

76. *See* Feder, *supra* note 61, at C2.

77. *See id.*

78. Y2K Act of 1999, 15 U.S.C.A. §§ 6601-17 (1999).

79. *See id.* § 6601.

80. *See id.* § 6603(a).

81. *See id.* § 6601.

82. *See id.* § 6603(h).

suffered substantial injury to resort to the legal system for relief.⁸³

Some of the more notable provisions of the Y2K Act include protection against foreclosure for mortgagors whose mortgage payments are not timely processed because of a Y2K failure,⁸⁴ limitation on punitive damages for unintentional Y2K-related injury,⁸⁵ and a provision of criteria for establishing liability and contribution among co-defendants.⁸⁶

The Y2K Act implements a notice requirement for any Y2K-related claim.⁸⁷ Under this requirement, a plaintiff must notify every prospective defendant in a cause of action of the nature of the claim and how the plaintiff would like the defendant to remedy the problem.⁸⁸ The plaintiff must then allow the defendant sixty days to implement a remedy or engage in alternative dispute resolution before commencing legal action.⁸⁹ The Y2K Act also imposes a duty on the plaintiff to mitigate any damages that are reasonably avoidable.⁹⁰

Most importantly, the Y2K Act preserves a cause of action in tort for recovery of economic loss to other property.⁹¹ However, the Y2K Act states that a plaintiff may not recover damages for economic loss unless "such losses result directly from damage to tangible personal property caused by the Y2K failure involved in the action (other than damage to property that is the subject of the contract between the parties to the Y2K action . . .)."⁹² This concept, which is the crux of this Article, is discussed in detail in Part IV.

83. *See id.* § 6601(b)(4).

84. *See id.* § 6603(h).

85. *See id.* § 6604(b).

86. *See id.* § 6605.

87. *See id.* § 6606.

88. *See id.* § 6606(a).

89. *See id.* § 6606(e)(1).

90. *See id.* § 6608(a).

91. *See id.* § 6611. An economic loss claim may only be recovered if three criteria are met. The plaintiff must be a party to the contract that provides for recovery of economic losses, the Y2K failure must have directly caused such losses to tangible personal or real property, and such damages must be permitted under state and federal law. *See id.* § 6611(a).

92. *Id.* § 6611(2).

B. THE UNIQUE LEGAL INCIDENTS OF Y2K FAILURE

The Y2K problem is an atypical software deficiency. Indeed, Y2K is probably unique. It is difficult to imagine another set of circumstances that could portend pervasive, catastrophic, and coincident system failure. Further, the Y2K event (or events) will be triggered by both software and embedded chip failures. Just as Y2K is a unique technological and social phenomenon, it presents unique challenges to our liability systems. This section catalogs six legally significant aspects of Y2K that distinguish this event from other instances of technology failure and poses the questions for which the law will have to provide answers.⁹³

First, Y2K failure is a breach of contract or tort that is more than foreseeable; we can predict Saturday, January 1, 2000 with some confidence.⁹⁴ Most breaches of contract and torts are not similarly inevitable. What we do not know, and may not know for some time, is the extent of the Y2K calamity. Indeed, that is a great part of the problem. Without a sense of the Y2K consequences it is difficult to know what steps we can or should take. Predictions of the extent of the failures we may encounter range from minor inconvenience to the end of the civilized world as we know it.

Second, those who entered Y2K deficient code and incorporated date-sensitive embedded chips knew at the time that they did so that the technology would not function properly if still in use on January 1, 2000. While the first COBOL programmers may have had very good reason to believe that their programming would be out of use before the millennium,⁹⁵ programmers and manufacturers continued to encode and embed Y2K deficient products into the 1990s, well after the potential consequences of doing so were manifest.

93. Though we do not endeavor to answer all of the questions in this Article.

94. There were some pre-2000-date events that could have triggered Y2K problems. On August 22, 1999, Global Positioning Satellite ("GPS") software rolled over its week counter for the first time since its inception. See Paul Boutin, *The Bugs in Your Future*, WIRED, Jan. 1999, at 76. Some companies that rely on the GPS dating system (which uses approximately a 20-year cycle) could have experienced 20-year errors in interest calculations. See *id.* On September 9, 1999, programs that use the number "9999" as an end-of-file marker could have interpreted this date as a signal for the software to end its program. See *id.* Neither event caused significant disruption.

95. See *supra* notes 25-35 and accompanying text.

Third, to the extent that they are still viable entities, the individuals and businesses that exposed technology users to Y2K risk may be in the best position to do something to mitigate the damages flowing from their breach of contract or tort. But if all such potential defendants were forced to remedy the programmed-in and embedded Y2K deficiencies to which they have subjected their victims, it is unlikely that many of them could remain viable. Further, it might not be clear what exactly it would make economic sense for them to do. Would we want to require them to fix systems and products that would be essentially obsolete by 2001? If we conclude that ordering such specific relief is inefficient, what would be the appropriate measure of substitutional relief?

Fourth, and alternatively, the licensees of Y2K deficient software and owners of products with deficient date-sensitive chips may in some contexts themselves be in the best position to determine the proper remedial response and to avoid, at least in substantial part, the potential consequential loss. Just as licensors and manufacturers are now (and have been) aware that January 1, 2000 is approaching, so too are licensees and owners of deficient products. But what can we expect those potential victims to do? Will the burden that we impose on them to take remedial measures be determined by the liability theory(ies) that may operate against potential defendants? Further, to the extent that victims must retain the technological expertise to remedy their Y2K problems, what impact will their being dilatory (and perhaps running out of time or paying exorbitantly for the available talent) have on the existence and extent of their right to recover against parties liable to them?

Fifth, Y2K presents unique corporate director and officer liability issues. Insofar as many of the potential plaintiffs are large multinational companies with responsible directors and officers, how will the liability of those directors and officers to shareholders of firms crippled by Y2K be affected by the underlying liability theories and availability of directors' and officers' liability insurance?⁹⁶ That of course raises only one of the insurance and insurability issues. Therefore, we may antici-

96. See Cook & Dvorsky, *supra* note 11, at 496-500; Sharon R. Klein & Kara W. Swanson, *Getting Ready: Where Might Your Client Find a Y2K Problem?*, BUS. L. TODAY, Sept./Oct. 1998, at 20, 22-23, 35. See generally J&H MARSH & MCLENNAN, Y2K AND YOUR INSURANCE: THE ISSUES (1998) (on file with authors).

pate that the insurance industry will take part in the Y2K liability dialogue.⁹⁷

Sixth, Y2K has already generated state and federal legislation designed to address the particular problems presented by Y2K software failure. The federal legislation described above⁹⁸ insulates those who share Y2K compliance information from liability for some types of inaccuracies that the information might contain.⁹⁹ But there is also federal and state legislation that may actually insulate some entities from liability for Y2K failures.¹⁰⁰ In addition, there may be more such legislative initiatives limited to Y2K software failure and the problems attending the business community's response to Y2K. The fit between this Y2K legislation focused on the Millennium Bug and the array of available software products liability theories presents compelling jurisprudential and practical incongruities. While the real public policy challenges presented by Y2K are manifest, why should liability be limited in this one context when the damages resulting from affected products' actual and possible failures are so foreseeable and so potentially cataclysmic? Does this type of protective legislation amount to a bail out of an industry that, perhaps with impunity, exposed its customers to the risk of such loss? Beyond that, if software developers need protective legislation to insulate their industry from products liability, what does that say about non-Y2K software deficiencies? The negative implication of the industry's enthusiasm for Y2K liability insulation legislation may backfire when courts consider the invocation of software products liability theories in the case of other software deficiencies. In other words, the industry's embrace of the protective legislation suggests that the industry recognizes the viability of software liability theories heretofore un- or under-appreciated by disappointed software licensees and the courts.

For the foregoing reasons, the Y2K phenomenon is just a part, albeit a unique part, of the greater software liability question. While the scope of the Y2K threat is as yet undetermined, software liability law is not and will not be either defined or finally settled when the fallout from Y2K is more certainly discerned. Just as asbestos product failure was a remarkable

97. See Douglas W. Hammond, *Insuring Against Catastrophe*, BUS. L. TODAY, Sept./Oct. 1998, at 25-28 (discussing insurance issues).

98. See *supra* notes 52-92 and accompanying text.

99. See *supra* notes 52-92 and accompanying text.

100. See *supra* note 8.

event in the products liability law,¹⁰¹ its resolution has not marked the end of strict products liability or provided the final word on judicial and legislative response to mass torts. Instead, courts have learned from the asbestos cases, and products liability law has evolved to address other mass torts, ultimately supporting the invocation of the enhanced liability theories confronting the tobacco¹⁰² and handgun¹⁰³ industries. Liability theories will expand to cover more conduct and more transactors; we would not expect that courts familiar with Y2K would circumscribe liability principles developed in the Y2K context as other instances of software failure become the subject of products liability litigation.

Although Y2K liability does flow from software failure, it would be no more accurate to say Y2K certainly defines the software liability jurisprudence than it would be to say that

101. See *Lorenz v. Celotex Corp.*, 896 F.2d 148, 150-51 (5th Cir. 1990) (holding that full compliance with government safety standards for asbestos constitutes strong evidence that a product is not defective); *Borel v. Fibreboard Paper Prod. Corp.*, 493 F.2d 1076, 1088 (5th Cir. 1973) (holding that asbestos constitutes an unavoidably unsafe product within the meaning of products liability law); *Owens-Illinois, Inc. v. Zenobia*, 601 A.2d 633, 639 (Md. 1992) (holding that the manufacturer of asbestos is held to the standard of an expert); *Fischer v. Johns-Manville Corp.* 512 A.2d 466, 472-74 (N.J. 1986) (placing limits on punitive damages in asbestos cases). See generally John P. Burns et al., *Special Project: An Analysis of the Legal, Social, and Political Issues Raised by Asbestos Litigation*, 36 VAND. L. REV. 573 (Charles D. Maguire, Jr. ed., 1983).

102. The two landmark cases that confronted the tobacco industry were *Cipollone v. Liggett Group, Inc.*, 505 U.S. 504 (1992), and *Castano v. American Tobacco Co.*, 160 F.R.D. 544 (E.D. La. 1995), *rev'd*, 84 F.3d 734 (5th Cir. 1996). Although these cases were failures from the plaintiffs' perspectives, they paved the way for the recent multi-billion dollar settlements by the tobacco industry with state governments. See Sandra Torry & John Schwartz, *Cigarette Firm Agrees to Settle Suit: Liggett to Accept Tobacco Regulation, Anti-Smoking Role*, WASH. POST, Mar. 13, 1996, at A1, available in 1996 WL 3068657. Attorneys general from eight states subsequently unveiled a \$206 billion deal with tobacco companies. See David S. Broder & Dan Balz, *Governors Don't Want U.S. to Share in Tobacco Funds*, WASH. POST, Feb. 22, 1999, available in 1999 WL 2201194.

For a summary of the various types of liability claims against tobacco companies that have made their way through the judicial system with differing degrees of success, see Paul A. LeBel, *Beginning the Endgame: The Search for an Injury Compensation System Alternative to Tort Liability for Tobacco-Related Harms*, 24 N. KY. L. REV. 457, 457-65 (1997).

103. At least five cities, including Atlanta, Bridgeport, Connecticut, Chicago, Miami, and New Orleans, have filed lawsuits seeking to recoup policing and medical costs caused by hand guns. See *Gun Lawsuits: The Fog of Battle*, ECONOMIST, Feb. 20, 1999, at 26. Many other cities are considering similar lawsuits. See *id.*

pharmaceutical industry products liability came to an end after the thalidomide tragedy. As software continues to proliferate, software failures will be increasingly common, and software liability theories will evolve to respond to deficiencies beyond the (relatively pedestrian) date confusion caused by some computers' inability to understand the turn of the century. Y2K will contribute to the development of some strict liability legal arguments, but its enduring significance is opaque. In fact, Y2K's most profound impact on the development of software liability theory will probably be in its impact on public perception of (as well as potential contempt for) the industry responsible for the considerable dislocations January 1, 2000 may occasion. This Article posits that Y2K will be the catalyst that provokes reconsideration of software licensor liability, an event that will reveal the weaknesses of an industry we do not understand well. The phenomenon's uniqueness will engender, not *preempt*, the evolution of software liability theory; that is, it will prove to be a point of departure, not a destination.

III. EXTANT SOFTWARE LIABILITY THEORIES APPLIED TO Y2K

Though the principal object of this Article is to demonstrate the application of strict products liability principles to Y2K failures, an appreciation of complementary theories is fundamental to a determination of the scope and operation of strict liability doctrine. That is, strict liability emerged as a judicially crafted response to the perceived deficiencies of contract and tort theories in the case of defective products. The relationship between strict liability theory and the legal landscape to which it responds has been developed elsewhere, at considerable length.¹⁰⁴ That narrative will not be recounted

104. See, e.g., *Greenman v. Yuba Power Prods., Inc.*, 377 P.2d 897, 900 (Cal. 1962) (providing the first judicially recognized strict products liability theory and holding that "[a] manufacturer is strictly liable in tort when an article he places on the market, knowing that it is to be used without inspection for defects, proves to have a defect that causes injury to a human being"); *Escola v. Coca Cola Bottling Co.*, 150 P.2d 436, 440-44 (Cal. 1944) (Traynor, J., concurring); *Henningsen v. Bloomfield Motors, Inc.*, 161 A.2d 69, 95 (N.J. 1960). See generally RICHARD A. POSNER, *ECONOMIC ANALYSIS OF LAW* 160-71 (3d ed. 1986) [hereinafter POSNER, *ECONOMIC ANALYSIS*]; Howard C. Klemme, *The Enterprise Liability Theory of Torts*, 47 U. COLO. L. REV. 153 (1976); Richard A. Posner, *Strict Liability: A Comment*, 2 J. LEGAL STUD. 205 (1972) [hereinafter Posner, *Strict Liability*]; William A. Prosser, *Assault Upon the Citadel (Strict Liability to the Consumer)*, 69 YALE L.J. 1099 (1960); William A. Prosser, *The Fall of the Citadel*, 50 MINN. L. REV. 791 (1966); Steven

here. But the conclusion of the courts and commentators to the effect that strict liability theory complements the ambient contract and tort environment in the deficient products context¹⁰⁵ is the engine that powers our argument: Without strict liability theory, Y2K losses would be misallocated because courts would be denied the means to fix responsibility when Y2K noncompliance causes products to fail. The sections that follow briefly posit the deficiencies of the other extant contract and tort recovery theories.

A. WARRANTY

The extent to which the warranty regime provided by Articles 2 or 2A of the Uniform Commercial Code¹⁰⁶ (the UCC, or Code) would apply to either phase of the Y2K problem—deficient software or embedded chips—is problematic. There are the scope questions: Does noncompliant software constitute a “good” and is its transfer to the ultimate user a “sale”? The answer to both of those questions is probably “no.” Is the noncompliant embedded chip that is a component of a component of a good subject to the UCC warranty regime? The answer to that question is almost certainly “yes.” Once the scope issues are addressed, there is the problem of determining the substance of the Code’s warranties: Is noncompliant software or a noncompliant embedded chip in breach of the express or implied warranties in Articles 2 or 2A? If the bargain promises of warranty are not established, the Code’s warranty regime will fail. This section of the Article briefly introduces issues concerning the application of commercial law warranties to product failures caused by Y2K.

1. The Scope of UCC Articles 2 and 2A

The two types of Y2K problems present distinct UCC scope issues. On the one hand, software is essentially intellectual property—a copyrightable expression of an idea, the directions that enable computers to process information in the manner in-

Shavell, *Strict Liability Versus Negligence*, 9 J. LEGAL STUD. 1 (1980).

105. See POSNER, *ECONOMIC ANALYSIS*, *supra* note 104, at 160-67; Klemme, *supra* note 104, at 158-65; Posner, *Strict Liability*, *supra* note 104, at 205-12; Shavell, *supra* note 104, at 2-9.

106. For the Article 2 warranty regime, see sections 2-312 to 2-318 of the UCC. For the Article 2A warranty regime, see sections 2A-210 to 2A-216 of the UCC.

tended by the user.¹⁰⁷ Software is intangible, incorporeal. On the other hand, an embedded chip is a component of tangible property, a "good." The scope provision of Article 2 of the UCC provides, in pertinent part, that "this Article applies to transactions in goods."¹⁰⁸ Section 2-105(1) defines "goods" as "all things . . . which are movable at the time of identification to the contract for sale."¹⁰⁹ The scope provision of Article 2A provides that "[t]his Article applies to any transaction, regardless of form, that creates a lease."¹¹⁰ "Lease," in turn, is defined as "a transfer of the right to possession" of "goods,"¹¹¹ defined as "all things that are movable at the time of identification to the lease contract."¹¹² Though there might be a quibble based on insubstantial differences in the language of the two articles' definition provisions,¹¹³ it is clear that the scope provisions of both articles intend to exclude intangible property such as software, but include goods containing embedded chips.

Software, either system or application,¹¹⁴ would not fall within the scope of either the Article 2 or 2A warranty provisions because software is intangible. The fact that it is captured in a tangible form should not be dispositive.¹¹⁵ While a

107. See O'BRIEN, *supra* note 12, at 23, 88-116 (presenting an overview of the structure and function of computer software).

108. U.C.C. § 2-102 (1995).

109. *Id.* § 2-105(1).

110. *Id.* § 2A-102.

111. *Id.* § 2A-103(1)(j).

112. *Id.* § 2A-103(1)(h).

113. See *id.* § 2A-103(1)(h) ("Goods" means all things that are movable at the time of identification to the lease contract . . . but . . . does not include . . . general intangibles . . ."). For further discussion of section 2A-103(1)(h), see PETER A. ALCES & HAROLD F. SEE, *THE COMMERCIAL LAW OF INTELLECTUAL PROPERTY* 10-12 (1994).

114. System software includes programs that basically enable the computer to operate, e.g., the operating system, telecommunications monitors, and security monitors. See O'BRIEN, *supra* note 12, at 88. Application software, on the other hand, includes programs that tell the computer to perform a particular task that is suited to the end needs of the particular user, e.g., word processing, databases, and spreadsheets. See *id.*

115. Many court decisions have found that software is sufficiently tangible to fall within Article 2. See, e.g., *Advent Sys. Ltd. v. Unisys Corp.*, 925 F.2d 670, 675-76 (3d Cir. 1991); *RRX Indus., Inc. v. Lab-Con, Inc.*, 772 F.2d 543, 546 (9th Cir. 1985) (discussing the California Commercial Code); *Triangle Underwriters, Inc. v. Honeywell, Inc.*, 604 F.2d 737, 743 (2d Cir. 1979); *In re Amica*, 135 B.R. 534, 545 (Bankr. N.D. Ill. 1992) (citing *RRX Indus., Inc. v. Lab-Con, Inc.*, 772 F.2d 543 (9th Cir. 1985)). But see *Data Processing Servs., Inc. v. LH Smith Oil Corp.*, 492 N.E.2d 314, 318-19 (Ind. Ct. App. 1986) (excluding software from Article 2); *Micro-Managers, Inc. v. Gregory*, 434 N.W.2d

book or magazine is tangible in the way that matters for the scope of Articles 2 and 2A, the *idea* of *Moby Dick* that is incorporated into the book or magazine is not the proper subject of UCC regulation in the sales or lease articles—at least not by the *direct* application of the Code's sales and lease provisions.

That is not to say, however, that there could not be warranty protections afforded the buyer/licensee of software. A court could decide that the Code applies by analogy to the terms of a software license. And that has been done.¹¹⁶ If a court determines that the same commercial principles are implicated in the license of software as are vindicated by the warranty provisions of Articles 2 and 2A, then it would be entirely appropriate for the court to apply the UCC provisions by analogy. Courts used that logic with regard to lease transactions prior to the promulgation of Article 2A.¹¹⁷ Such analysis by analogy supports application of the Code's implied warranties in cases where the parties have said nothing explicit about the quality assurances that would attend their transaction.

2. Substance of Warranty Protection

Insofar as a software transaction is essentially a contract transaction, there is nothing to preclude the courts' finding that terms of the parties' agreement gives rise to express warranty protections. Any representation by the licensor regard-

97, 100 (Wis. Ct. App. 1988) (same). For a discussion of the application of Articles 2 and 2A of the UCC to software, see *ALCES & SEE*, *supra* note 113, at 265-302.

116. See *Samuel Black Co. v. Burroughs Corp.*, 33 U.C.C. Rep. Serv. (CBC) 954, 962 (D. Mass. 1981) (applying UCC Article 2 provisions by analogy to a sale of software); see also *ALCES & SEE*, *supra* note 113, at 4-6; Robert A. Holmes, *Application of Article Two of the Uniform Commercial Code to Computer Systems Acquisitions*, 9 RUTGERS COMPUTER & TECH. L.J. 1, 24 (1982); Andrew Rodau, *Computer Software: Does Article 2 of the Uniform Commercial Code Apply?*, 35 EMORY L.J. 853, 901 (1986).

117. See *Maryland Nat'l Bank v. Kings Plaza Carpet, Inc.*, 6 U.C.C. Rep. Serv. 2d (CBC) 20, 21 (4th Cir. 1987) (discussing damages under the Maryland Commercial Code); *Neilson Bus. Equip. Ctr., Inc. v. ITALO*, 524 A.2d 1172, 1175 (Del. 1987) (express and implied warranties); *Advanced Computer Sales, Inc. v. Sizemore*, 366 S.E.2d 303, 304-05 (Ga. Ct. App. 1988) (revocation); *Northwest Acceptance Corp. v. Almost Gravel, Inc.*, 412 N.W.2d 719, 722-24 (Mich. Ct. App. 1987) (unconscionability); *Chemical Bank v. Rinden Profl Ass'n*, 498 A.2d 706, 710-11 (N.H. 1985) (modification); *Pactel Fin. v. D.C. Marine Serv. Corp.*, 518 N.Y.S.2d 317, 319 (Dist. Ct. 1987) (unconscionability); *C. Ray Miles Const. Co. v. Weaver*, 373 S.E.2d 905, 905-06 (S.C. Ct. App. 1988) (express and implied warranties); see also Geoffrey C. Hazard, *Foreword* to U.C.C. § 2A (commenting that Article 2A borrows conceptually from Article 2).

ing the fitness of software, including a representation concerning the Y2K integrity of software, may be actionable in the event the software is not Y2K compliant and causes damage to the licensee's business.¹¹⁸ That would constitute a breach of contract, whether or not the contract is within the scope of the UCC, and would afford the nonbreaching party damages for breach.¹¹⁹

Whether deficient software breaches the Article 2 or 2A implied warranties of merchantability¹²⁰ or fitness for particular purpose¹²¹ is determined, in the first instance, by considering the scope of those uniform enactments and also by the terms of the two implied warranties. When, for purposes of applying the merchantability warranty, is software not "fit for the ordinary purposes for which such goods are used?"¹²² when will it not "pass without objection in the trade?"¹²³ And for the "fitness for particular purpose warranty," what does it mean to say that software is not "fit for its particular purpose," as distinguished from its "ordinary purpose?"¹²⁴

The drafters of what would have been Article 2B of the Code have despaired that the familiar Article 2 and 2A formulations of implied warranty protection have no currency in the software context.¹²⁵ That conclusion is dubious and may confound further an already unsettled area of the law. The argu-

118. See *Clements Auto Co. v. Service Bureau Corp.*, 444 F.2d 169, 175-86 (8th Cir. 1971) (discussing claim for misrepresentation).

119. See RESTATEMENT (SECOND) OF CONTRACTS §§ 347-52 (1981); 3 E. ALLAN FARNSWORTH, FARNSWORTH ON CONTRACTS 187-318 (2d ed. 1998); see also *Chronister Oil Co. v. Unocal Ref. & Mktg.*, 34 F.3d 462, 466 (7th Cir. 1994) (stating that in a contract case, unlike a tort case, every victim of a breach of contract case is entitled to at least nominal damages).

120. See U.C.C. §§ 2-314, 2A-212 (1995).

121. See *id.* §§ 2-315, 2A-213.

122. *Id.* § 2-314(2)(c); see *id.* § 2A-212(2)(c) (using similar language).

123. *Id.* §§ 2-314(2)(a), 2A-212(2)(a).

124. The UCC drafting committee distinguished "particular purpose" from "ordinary purpose." See *id.* § 2-315 cmt. 2.

125. See U.C.C. art. 2B discussion memo of Mar. 10, 1998, at 1 (Proposed Draft, Mar. 1998); see also Holly K. Towle, No Good Deed Goes Unpunished: Comment on "Whither Warranty: The Bloom of Products Liability Theory in Cases of Deficient Software Design" 1-5 (1998) (unpublished manuscript, on file with authors). See generally *The Conference of Commissioners on Uniform State Laws Drafts of Uniform and Model Acts Official Site* (last modified Sept. 9, 1999) <http://www.law.upenn.edu/bll/ulc/ulc_frame.htm>. Ultimately, what had evolved as Article 2B, was enacted as the Uniform Computer Transactions Act by the National Conference of Commissioners on Uniform State Laws at its annual meeting in July of 1999. See *infra* note 129.

ment can be made, notwithstanding the reservations that might be prompted by the Article 2B drafters' conclusion, that in the context of a Y2K failure, the sales/lease implied warranty analysis does advance the inquiry. That is, Y2K software failure does support invocation of Article 2 or 2A implied warranties even if those provisions would be inapposite, or even impotent, in the case of other software design deficiencies.

If a software program fails on January 1, 2000, because the program believes that the year is 1900, it does not seem too much of a reach to conclude that the software was fit for neither its ordinary nor any particular purpose. It is difficult to imagine how even the designers of such a program could argue that a program that shuts down, perhaps confounding profoundly the licensee's business, would pass without objection in the trade or would have been responsive to the particular needs of the licensee of which the licensor was aware. Y2K is acknowledged as a problem, a pernicious deficiency, and the software professionals who are peddling their expertise to fix it would be hard pressed to argue that the infested software they are "debugging" currently satisfies the commercial standards fixed in the sales and lease law.

If a court does determine that Y2K software failures are outside the scope of the UCC, it would not be difficult to find the source for essentially the same implied warranty protections in the common law of contract. A court may find implied warranties in the event that the parties have not expressly provided them in circumstances in which the court determines that the transactional dynamic supports imposition of implicit quality assurances. That can be done by inventing a new implied warranty, as was the implied warranty of habitability in the real property context,¹²⁶ or by deciding that a transaction is sufficiently analogous to a sale or lease within the scope of the UCC to find implied warranty by analogy to the commercial law.¹²⁷

The warranty by analogy paradigm is both supported and refuted by the Uniform Computer Information Transactions

126. See ROGER A. CUNNINGHAM ET AL., *THE LAW OF PROPERTY* § 6.38 (2d ed. 1993).

127. See, e.g., *KLPR TV, Inc. v. Visual Elecs. Corp.*, 465 F.2d 1382, 1385-86 (8th Cir. 1972); *Interstate Indus. Unif. Rental Serv., Inc. v. F.R. Lepage Bakery, Inc.*, 413 A.2d 516, 520-22 (Me. 1980); *Cintrone v. Hertz Truck Leasing & Rental Serv.*, 212 A.2d 769, 775-76 (N.J. 1965); *Baker v. City of Seattle*, 484 P.2d 405, 407-08 (Wash. 1971) (en banc).

Act (UCITA) (née Article 2B).¹²⁸ It is supported because the most recent iteration of the law includes an implied warranty of merchantability.¹²⁹ It is refuted by UCITA because the Reporter of UCITA and influential commentators expressed considerable skepticism that the warranty of merchantability has any meaning at all in the context of computer software.¹³⁰

Notwithstanding arguments for limiting code warranties in the software context generally, Y2K may provide a uniquely fertile ground for argument by analogy, in light of the observations cataloged above. A court could, of course, find that the Y2K problem provides a proper context in which to invoke warranty of merchantability conceptions even if the parameters of that implied warranty, as they have developed in Articles 2 and 2A, are otherwise deficient in the software license context. The court could conclude that the Y2K bug compromises ordinary purpose in ways that are easier to isolate than would normally be the case when software disappoints the licensee's expectations.¹³¹

128. See Uniform Computer Information Transaction Act (UCITA) § 403 (Adopted Draft Aug. 4, 1999), available in *The Conference of Commissioners on Uniform State Laws Drafts of Uniform and Model Acts Official Site* (last modified Sept. 9, 1999) <http://www.law.upenn.edu/bll/ulc/ucita/ucita_99.htm>.

129. See *id.* The section states:

(a) Unless the warranty is disclaimed or modified, a merchant licensor of a computer program warrants:

(1) to the end user that the computer program is fit for the ordinary purposes for which such computer programs are used;

(2) to the distributor that:

(A) the program is adequately packaged and labeled as the agreement or the circumstances may require; and

(B) in the case of multiple copies, the copies are within the variations permitted by the agreement, of even kind, quality, and quantity, within each unit and among all units involved; and

(3) that the program conforms to the promises or affirmations of fact made on the container or label, if any.

(b) Unless disclaimed or modified, other implied warranties with respect to computer programs may arise from course of dealing or usage of trade.

(c) No warranty is created under this section with respect to informational content, but an implied warranty may arise under Section 404.

Id.; see also Alces, *W(h)ither Warranty*, *supra* note 5, at 273.

130. See Alces, *W(h)ither Warranty*, *supra* note 5, at 272 (quoting U.C.C. § 2B-403 general note 4 (Proposed Draft Feb. 1998)).

131. See *id.* at 284-86.

3. Damages

If deficient software or a product with a faulty embedded chip causes either economic or personal injury, the warranty law would support the plaintiff's recovery of damages. Warranty is, for purposes of damages characterization, understood to be contractual—bargain based. The warrantor will be liable to the party who suffers personal or economic injury for the frustration of that party's expectation interest (including all consequential damages). While pure economic loss is compensable under the Article 2 and 2A warranty law,¹³² exemplary recovery would not be available for the breach of warranty alone.¹³³ A court could find, however, that the breach of the Article 2 or 2A warranty was also the type of tortious breach of contract that would support the award of punitive damages.¹³⁴

Breach of warranty, then, is an attractive alternative from the perspective of the plaintiff who has suffered economic injury as a result of a Y2K failure but is not able to demonstrate any personal injury. In fact, but for a breach of contract or license action, it may be the only alternative.

132. Section 2-715 of the UCC provides:

- (2) Consequential damages resulting from the seller's breach include
- (a) any loss resulting from general or particular requirements and needs of which the seller at the time of contracting had reason to know and which could not reasonably be prevented by cover or otherwise; and
 - (b) injury to person or property proximately resulting from any breach of warranty.

U.C.C. § 2-715(2) (1995). Section 2A-520 of the UCC provides:

- (2) Consequential damages resulting from a lessor's default include:
- (a) any loss resulting from general or particular requirements and needs of which the lessor at the time of contracting had reason to know and which could not reasonably be prevented by cover or otherwise; and
 - (b) injury to person or property proximately resulting from any breach of warranty.

Id. § 2A-520(2).

133. See PETER A. ALCES, *THE LAW OF FRAUDULENT TRANSACTIONS* ¶ 2.02[6][b][iii] (1989) [hereinafter ALCES, *FRAUD*] (discussing punitive damages). Note that fraud damages would not be displaced if otherwise available under sections 1-103 and 2-721 of the UCC.

134. See, e.g., *Smith v. Blue Cross & Blue Shield United*, 959 F.2d 655, 657-58 (7th Cir. 1992) (holding that tortious breach of contract may lead to punitive damages).

B. NEGLIGENCE

The elements of a common law negligence cause of action are no different in the case of a Y2K "tort" than they are in any other deficient product setting. The plaintiff must show duty and breach, and that breach of the duty proximately caused damage to the plaintiff's interest.¹³⁵ So when software fails for Y2K reasons, the plaintiff may maintain a negligence action so long as the court finds that the defendant software developer owed a duty to the plaintiff to provide software that was Y2K compliant or to modify plaintiff's software to assure that it was Y2K compliant.¹³⁶ Should the plaintiff establish the existence and breach of that duty, plaintiff could recover all damages proximately caused by the breach. The same analysis would pertain in the case of Y2K failure caused by a noncompliant embedded chip.

Defendants responsible for Y2K deficient software or embedded chips may be able to interpose contributory negligence, comparative negligence, or assumption of risk defenses against the plaintiff. Whether such defenses would prove viable would turn on the particular facts presented by particular Y2K actions. While it is true that the Y2K risk is reasonably foreseeable, it is similarly foreseeable to many potential plaintiffs. Therefore, the very facts that support the imposition of liability on a defendant may well operate against a plaintiff in a position to avoid the Y2K calamity.

A significant deficiency of such a negligence action is the limit courts impose on the damages recoverable in the case where the damage does not include personal injury: There may be no recovery for pure "economic loss."¹³⁷ That limitation is treated below with regard to the operation of the economic loss doctrine in strict liability cases.¹³⁸

135. See WILLIAM L. PROSSER & W. PAGE KEETON, *THE LAW OF TORTS* § 30 (5th ed. 1984).

136. See, e.g., *Kaczmarek v. Microsoft Corp.*, 39 F. Supp. 2d 974, 977-78 (N.D. Ill. 1999) (alleging negligent design of Foxpro software but finding no defect); *Yu v. IBM Corp.*, No. 98-C-8241, 1999 WL 104159, at *1 (N.D. Ill. Feb. 24, 1999) (alleging negligent design of medical history tracking software but dismissed for lack of subject matter jurisdiction).

137. See *infra* notes 162-215 and accompanying text.

138. See *infra* notes 162-215 and accompanying text.

C. MISREPRESENTATION

A software licensee or buyer of a product containing a Y2K deficiency may impose on the defendant licensor/seller liability for intentional,¹³⁹ reckless,¹⁴⁰ negligent,¹⁴¹ or even innocent¹⁴² misrepresentation. The phases of fraud have evolved over the last half-century of American commercial law. No longer is finding an actual intent to defraud necessary to establish a defendant's liability for the inaccuracy of a representation when a

139. To recover for fraud a plaintiff must show that there was a misrepresentation concerning a material fact upon which the plaintiff has relied and suffered damage as a result. *See generally* ALCES, FRAUD, *supra* note 133, ¶ 2.02 (discussing elements). Intentional (or actual) fraud requires proof of scienter, an intent to deceive and knowledge on the part of the defendant of the falsity of his representation. *See id.* ¶ 2.02[3].

140. Although intent is an essential ingredient of actual fraud, a lesser degree of scienter is permitted for false statements made without actual knowledge of falsity, but made in such manner or under such circumstances that knowledge of falsity is imputed to the representor. False statements that are made recklessly, without knowing or caring whether they are true or false, will support a misrepresentation action. *See id.* ¶ 2.02[3][a] (discussing elements).

141. *See id.* ¶ 2.02[3][b] (discussing elements). In a section entitled "Information Negligently Supplied for the Guidance of Others," the *Restatement (Second) of Torts* provides:

(1) One who, in the course of his business, profession or employment, or in any other transaction in which he has a pecuniary interest, supplies false information for the guidance of others in their business transactions, is subject to liability for pecuniary loss caused to them by their justifiable reliance upon the information, if he fails to exercise reasonable care or competence in obtaining or communicating the information.

(2) Except as stated in Subsection (3), the liability stated in Subsection (1) is limited to loss suffered

(a) by the person or one of a limited group of persons for whose benefit and guidance he intends to supply the information or knows that the recipient intends to supply it; and

(b) through reliance upon it in a transaction that he intends the information to influence or knows that the recipient so intends or in a substantially similar transaction.

(3) The liability of one who is under a public duty to give the information extends to loss suffered by any of the class of persons for whose benefit the duty is created, in any of the transactions in which it is intended to protect them.

RESTATEMENT (SECOND) OF TORTS § 552 (1976).

142. Even though no actual intent on the part of the representor is shown (if the misrepresentations were made), liability may be imputed as a result of misapprehension or mistake of the hearer. A plaintiff must show that the representation was false and that the misrepresentation actually mislead the plaintiff. *See* ALCES, FRAUD, *supra* note 133, ¶ 2.02[3][c] (discussing elements); *see also* RESTATEMENT (SECOND) OF TORTS § 402B (requiring justifiable reliance on innocent product misrepresentation).

plaintiff suffers injury as a result of the plaintiff's reasonable reliance on the inaccurate representation.¹⁴³

Again, however, there is a potential limitation on the damages recoverable by a plaintiff who has suffered only an economic loss as a result of a defendant's misrepresentation. Courts have demonstrated a reluctance to recognize the misrepresentation cause of action as a means to recognize a plaintiff's right to recover for economic loss.¹⁴⁴ To the extent that the misrepresentation action tracks the breach of contract action available to a disappointed software licensee or buyer of goods with a defective embedded chip, there is authority to the effect that a misrepresentation action will not lie to recover purely economic loss.¹⁴⁵

143. See generally *ALCES, FRAUD*, *supra* note 133, ¶ 2.02[3] (citing cases in which courts have pursued relaxed scienter theories). The most recent *Restatement (Third) of Torts: Products Liability* adopts the lesser mental state theories:

Liability of Commercial Product Seller or Distributor for Harm Caused by Misrepresentation

One engaged in the business of selling or otherwise distributing products who, in connection with the sale of a product, makes a fraudulent, negligent, or innocent misrepresentation of material fact concerning the product is subject to liability for harm to persons or property caused by the misrepresentation.

RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 9 (1998).

144. See, e.g., *Moorman Mfg. Co. v. National Tank Co.*, 435 N.E.2d 443, 453 (Ill. 1982) (holding that a products liability plaintiff cannot recover purely economic losses under the tort theories of strict liability, negligence, and innocent misrepresentation). See generally *ALCES, FRAUD*, *supra* note 133, ¶ 2.04.

145. See, e.g., *Apollo Group, Inc. v. Avnet, Inc.*, 58 F.3d 477, 479-80 (9th Cir. 1995) (holding that the entire transaction is governed by the UCC and barring a negligent misrepresentation claim for economic loss due to computer hardware failure); *NMP Corp. v. Parametric Tech. Corp.*, 958 F. Supp. 1536, 1547 (N.D. Okla. 1997) (holding software company not liable for negligent misrepresentation because it had no duty outside the licensing agreement and warranties contained therein); *Hoke, Inc. v. Cullinet Software, Inc.*, Civ. No. 89-1319 (HLS), 1992 WL 102715, at *5 (D.N.J. 1992) (barring claim of negligent misrepresentation for computer software because claim arose from sales transaction between commercial entities and should be analyzed within the framework of the UCC rather than by the rules of unintentional tort law); cf. *Walter Raczynski Prod. Design v. IBM Corp.*, No. 92-C-6423, 1994 WL 247130, at *2 (N.D. Ill. 1994) (holding that manufacturers of computer software and hardware are not information providers and thus cannot be charged with negligent misrepresentation).

D. STRICT PRODUCTS LIABILITY

For a disappointed buyer of a product,¹⁴⁶ a strict liability action will lie against the manufacturer¹⁴⁷ of that product if the plaintiff-buyer can establish that the product was defective. To do so, the plaintiff-buyer must present evidence of either a manufacturing defect, a design defect, or a failure to warn of the dangerous propensities of the product.¹⁴⁸ The software or embedded chip failure caused by Y2K noncompliance can be conceived in terms of any or all of those three alternative forms of defect.

146. "Product" is defined by the *Restatement (Third) of Torts: Products Liability* as follows:

(a) A product is tangible personal property distributed commercially for use or consumption. Other items, such as real property and electricity, are products when the context of their distribution and use is sufficiently analogous to the distribution and use of tangible personal property that it is appropriate to apply the rules stated in this Restatement.

(b) Services, even when provided commercially, are not products.

(c) Human blood and human tissue, even when provided commercially, are not subject to the rules of this Restatement.

RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 19 (1998).

147. "One Who Sells or Otherwise Distributes" is defined by the *Restatement (Third) of Torts: Products Liability* as follows:

(a) One sells a product when, in a commercial context, one transfers ownership thereto either for use or consumption or for resale lending to ultimate use or consumption. Commercial product sellers include, but are not limited to, manufacturers, wholesalers, and retailers.

(b) One otherwise distributes a product when, in a commercial transaction other than a sale, one provides the product to another either for use or consumption or as a preliminary step leading to ultimate use or consumption. Commercial nonsale product distributors include, but are not limited to, lessors, bailors, and those who provide products to others as a means of promoting either the use or consumption of such products or some other commercial activity.

(c) One also sells or otherwise distributes a product when, in a commercial transaction, one provides a combination of products and services and either the transaction taken as a whole, or the product component thereof, satisfies the criteria in Subsection (a) or (b).

Id. § 20.

148. The *Restatement (Third) of Torts: Products Liability* seeks to fill the breach left by the deficiencies in negligence and warranty law. In this sense products liability is the nexus of tort, contract, and the commercial law of warranty. See generally *id.* § 2. Many courts treat failure to warn as a design defect when, given the nature of the product or the user, it is foreseeable that warnings will not be seen or will be disregarded. Comment *l* of section 2 sets forth the simple rationale: "Warnings are not, however, a substitute for the provision of a reasonably safe design." *Id.* § 2 cmt. *l*.

1. Manufacturing Defect

A product contains a manufacturing defect when the product departs from the manufacturer's design.¹⁴⁹ Applied to the Y2K context, if the software developer or goods manufacturer intended that the product would operate beyond the year 2000 without date-related failure and the software or good in fact does fail when the clock strikes January 1, 2000, as a result of Y2K noncompliance, then there is a manufacturing defect and the plaintiff will be able to recover. That would certainly be the case if the licensor/seller were not aware of the software's or good's Y2K noncompliance at the time of the license/sale. It would also be the case if the developer/seller had every reason to believe that the product was Y2K compliant but the product turned out not to be, perhaps when used in combination with other products. The Restatement of Products Liability provides that a product "contains a manufacturing defect when the product departs from its intended design even though all possible care was exercised in the preparation and marketing of the product."¹⁵⁰ The plaintiff in an action based on manufacturing defect bears the burden of establishing that the defect existed when the product left the control of the manufacturer.¹⁵¹ Does software that is not Y2K compliant contain a manufacturing defect? Does a product containing a Y2K noncompliant embedded chip contain a manufacturing defect? The analysis may prove problematic, but it is by no means clear that this portion of the strict products liability law is inapposite in the Y2K setting.

Certainly the designer of Y2K noncompliant software can argue that the software was intended to read only the last two digits of the date year and, therefore, the software's failing to read "00" as "2000" is not a manufacturing defect. Plaintiffs could respond, however, that the software designer did not intend to provide software that would itself shut down or corrupt other software on January 1, 2000. Also, if the software designer sold or licensed software that would fail on January 1, 2000, and failed to disclose that fact, representing instead that there was no such limitation on the efficacy of the product, then breach of warranty and misrepresentation liability may attach.

149. *See id.* § 2(a); *id.* § 2(a) reporter's note to cmt. c.

150. *Id.* § 2(a); *see id.* § 2(a) reporter's note to cmt. c.

151. *See id.* § 2 cmt. c.

The Y2K Bug is a manufacturing defect insofar as it causes the software to behave in a manner not intended by the designer. The argument that the "00" shorthand was a necessary expedient at the time that the software was designed would not seem responsive to the manufacturing defect theory. There was certainly nothing to preclude the designer's informing the software user of the product's limitation.¹⁵² In fact, it is quite likely in many if not most cases of Y2K deficient software that there was a continuing relationship between licensor and licensee that would have afforded the licensor the opportunity to bring the deficiency to the licensee's attention and take steps to remedy it. If the designer responds that the designer did not foresee the plaintiff's use of the product into the year 2000, the plaintiff can establish that once it became clear that Y2K non-compliant software would be used into the next millennium, the designer had a duty to warn the plaintiff of the software's deficiency and to remedy the defect. In fact, the availability and viability of the failure-to-warn cause of action may well make the manufacturing defect cause of action in the Y2K context superfluous (more on failure-to-warn liability below).¹⁵³ The significance of Y2K for strict products liability software law after Y2K, however, may well make it worthwhile to come to terms with the manufacturing defect issue so far as it concerns Y2K noncompliant software.

The manufacturing defect issues in the case of embedded chips may be less difficult. If a product, such as a piece of heavy machinery, shuts down because an embedded chip misleads the product into believing that necessary maintenance has not been performed in a century, the product has behaved in a manner not intended by the manufacturer. The product contains a manufacturing defect in that embedded chip. The same warning issues may well arise, but the premises of the manufacturing defect cause of action should not be difficult to establish.

152. Cf. *Gray v. Manitowoc Co.*, 771 F.2d 866, 868-70 (5th Cir. 1985) (utilizing the "consumer expectations" theory of manufacturing defect); *Browner v. Liberty Indus. Inc.*, 573 S.W.2d 376, 377-78 (Mo. Ct. App. 1978) (same); *Keller v. Welles Dep't Store*, 276 N.W.2d 319, 322-23 (Wis. Ct. App. 1979) (same).

153. See *infra* notes 154-60 and accompanying text.

2. Design Defect and the Failure to Warn

The Restatement of Products Liability adopts the "risk-utility"¹⁵⁴ test of design defect:

A product . . .

(b) is defective in design when the foreseeable risks of harm posed by the product could have been reduced or avoided by the adoption of a reasonable alternative design by the seller or other distributor, or a predecessor in the commercial chain of distribution, and the omission of the alternative design renders the product not reasonably safe.¹⁵⁵

That formula provides the calculus for determining whether Y2K noncompliant software or a Y2K noncompliant embedded chip is defective in design. A court approaching the defect issue from that perspective can take into account the design choices made by the licensor/seller at the time of the software or product's license or sale and determine whether the risk presented by Y2K noncompliance was outweighed by the utility of the design choice. In those jurisdictions that consider a failure-to-warn cause of action as a matter of design defect,¹⁵⁶ the courts will need to determine whether there should be failure-to-warn liability even in the case in which it was rational and appropriate for the software product designer to take the short cut that led to Y2K noncompliance.¹⁵⁷

In jurisdictions that do not so collapse the design defect/failure-to-warn causes of action, subsection 2(c) of the Products Liability Restatement will be pertinent:

A product . . .

(c) is defective because of inadequate instructions or warnings when the foreseeable risks of harm posed by the product could have been reduced or avoided by the provision of reasonable instructions or warnings by the seller or other distributor, or a predecessor in the

154. The risk-utility balancing test "is whether a reasonable alternative design would, at reasonable cost, have reduced the foreseeable risks of harm posed by the product and, if so, whether the omission of the alternative design by the seller or a predecessor in the distributive chain rendered the product not reasonably safe." RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2 cmt. d (1998); *see also* *United States v. Carroll Towing Co.*, 159 F.2d 169, 173 (2d Cir. 1947) (instituting the algebraic formula for the risk-utility test: if the probability be called P ; the injury, L ; and the burden, B ; liability depends upon whether B is less than L multiplied by P , i.e., whether $B < PL$).

155. RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2(b) (1998).

156. *See, e.g., Finn v. D. Searle & Co.*, 677 P.2d 1147, 1151-54 (Cal. 1984).

157. *See* RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2 reporter's notes to cmts. *l* & *o* (1998) (citing cases regarding the intersection of design defect and failure-to-warn causes of action).

commercial chain of distribution, and the omission of the instructions or warnings renders the product not reasonably safe.¹⁵⁸

While it might be possible to imagine that at the time of non-compliant software's first design the Y2K deficiency may not have been manifest, in a legal if not physical sense,¹⁵⁹ the media attention that the issue has attracted since 1997 and the recently enacted federal safe harbor legislation¹⁶⁰ certainly would make it difficult to argue that a duty to warn has not emerged.

3. Damages

As in the case of the negligence and misrepresentation causes of action, strict products liability is a tort means to provide plaintiffs recovery for personal injury, not "mere" economic injury. While the elements of the strict liability cause of action will require careful analysis in the context of Y2K noncompliance,¹⁶¹ perhaps the single most crucial issue will concern the economic loss doctrine, the rule that limits plaintiffs' recovery to personal injury damages. The next Part of the Article focuses on this issue.

IV. THE "ECONOMIC LOSS" DOCTRINE: THE LIMITED LOGIC OF THE CONTRACT/TORT DICHOTOMY

Strict liability is a response to the failure of more conventional tort and contract doctrine to redress perceived transactional inequities. The characterization of the means strict liability employs to effect equitable balance (and perhaps efficiency) may vary depending on the perspective of the characterizer. Strict liability, alternatively, relaxes the tort concept of duty, making it easier to find a breach of duty.¹⁶² In addi-

158. *Id.* § 2(c).

159. By legal sense, we mean the designer would only have had a need to warn if the product would clearly be used into the next millennium; by physical, we mean the certainty that 2000 would arrive.

160. See *supra* notes 52-92 and accompanying text.

161. See RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 1 (1998) (describing the contours of the strict liability cause of action). As a threshold issue, one must be "engaged in the business" of either "selling" or "otherwise distributing" products. *Id.* One who "sells" or "distributes" a "defective product" will be liable if that product injures "persons" or "property" as a result of the defect. *Id.*

162. Much like *MacPherson v. Buick Motor Company*, 111 N.E. 1050 (N.Y. 1916), expanded the duty concept by abrogating the privity requirement in negligence cases, one could also find that duty is redefined when strict liability

tion, strict liability relaxes the evidentiary burden imposed on plaintiffs in much the same way the *res ipsa loquitur* device enables plaintiffs to "prove" the unprovable.¹⁶³ Perhaps the most remarkable impact of the strict liability jurisprudence is the way that it enables courts to avoid contract limitations on plaintiffs' recovery in what are, essentially, the type of "consensual" settings to which contracts normally respond.¹⁶⁴

A. THE RULE

If strict liability were carried to its (some might say illogical) extreme, there might be little left to occupy the contract and torts classes in the first year of law school.¹⁶⁵ Consequently, there are limitations on the strict liability cause of action. The defendant must be "engaged in the business of selling or otherwise distributing products,"¹⁶⁶ a definition essentially coextensive with the definition of "merchant" in Article 2 of the UCC.¹⁶⁷ The cause of loss must be a "product," as opposed, say,

operates to encourage a court to use a hindsight rather than foresight test. *Cf.* Casrell v. Atlec Indus., Inc., 335 So. 2d 128, 131-34 (Ala. 1987); Dart v. Wiebe Mfg., Inc., 709 P.2d 876, 880-82 (Ariz. 1985); Barker v. Lull Eng'g Co., 573 P.2d 443, 453-57 (Cal. 1978); Armentrout v. FMC Corp., 842 P.2d 175, 183-87 (Colo. 1992) (en banc); Valk Mfg. Co. v. Rangswamy, 537 A.2d 622, 625-29 (Md. Ct. Spec. App. 1988), *rev'd on other grounds*, 562 A.2d 845 (Md. 1988); Sperry-New Holland v. Prestage, 617 So. 2d 248, 252-57 (Miss. 1993); Fabian v. Minster Mach. Co., 609 A.2d 487, 492-95 (N.J. Super. Ct. App. Div. 1991); Phillips v. Kimwood Mach. Co., 525 P.2d 1033, 1036-41 (Or. 1974); Berkebile v. Brantly Helicopter Corp., 337 A.2d 893, 898-900 (Pa. 1975).

163. See *Escola v. Coca Cola Bottling Co.*, 150 P.2d 436, 440 (Cal. 1944) (Traynor, J., concurring). This is the seminal case in which Justice Roger J. Traynor (later Chief Justice) first enunciated the theory of strict liability in tort for all defective products.

164. See Alces, *W(h)ither Warranty*, *supra* note 5, at 284-86.

165. See William Powers, Jr., *A Modest Proposal to Abandon Strict Products Liability*, 1991 U. ILL. L. REV. 639, 644.

166. RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 1 (1998).

167. U.C.C. § 2-104(1) (1995).

"Merchant" means a person who deals in goods of the kind or otherwise by his occupation holds himself out as having knowledge or skill peculiar to the practices or goods involved in the transaction or to whom such knowledge or skill may be attributed by his employment of an agent or broker or other intermediary who by his occupation holds himself out as having such knowledge.

Id.; see also *Siemen v. Alden*, 341 N.E.2d 713, 714-15 (Ill. Ct. App. 1975); *Nelson v. Union Equity Co-op. Exch.*, 548 S.W.2d 352, 354-58 (Tex. 1977). The *Restatement (Third) of Torts: Products Liability*, defines "one who sells" as one who, in a commercial context "transfers ownership [to a product] either for use or consumption or for resale leading to ultimate use or consumption." RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 20 (1998).

to a service.¹⁶⁸ And, of course, the product must be in some way defective.¹⁶⁹ But foremost, the plaintiff must generally suffer personal injury; economic loss alone will not do.¹⁷⁰ So constrained, strict liability provides the means to vindicate the individual's interest in personal integrity without compromising the law's delicate balance between letting the loss lie where it has fallen and shifting the loss when justice would thereby be served. The personal injury limitation is, admittedly, a curious one, and has proven problematic in the course of the law reform movement.¹⁷¹ The new Restatement of Products Liability captures, as best as possible, the substance of the personal injury/economic loss distinction in section 21 and in two illustrations of the provision's operation:

§ 21. Definition of "Harm to Persons or Property": Recovery for Economic Loss

For purposes of this Restatement, harm to persons or property includes economic loss if caused by harm to:

- (a) the plaintiff's person; or
- (b) the person of another when harm to the other interferes with an interest of the plaintiff protected by tort law; or
- (c) the plaintiff's property other than the defective product itself.¹⁷²

What that definition clearly excludes is damage to the product itself, an interest the reporters and the strict liability law gen-

168. A service is not a product, even when commercially provided. See RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 4(b) (Tentative Draft No. 2, 1995). "Most but not necessarily all products are tangible personal property; most have been subjected to processing and fabricating prior to entering the stream of commerce; and most pass through a commercial chain of distribution before ultimate use and consumption." *Id.* § 4(a).

169. See RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2 (1998). "A product is defective when, at the time of sale or distribution, it contains a manufacturing defect, is defective in design, or is defective because of inadequate instructions or warnings." *Id.* Strict liability imposes liability without fault "on manufacturers for harm caused by manufacturing defects . . ." *Id.* § 2 cmt. a. Liability for defects and design defects based on inadequate warnings is governed by a standard closer to negligence and involves a balancing of the risks inherent in using the product with the usefulness of the product itself. See *id.*

170. See *id.* § 21.

171. See U.C.C. § 2-404 cmt. 5 (Proposed Draft Feb. 1, 1999), available in *The Conference of Commissioners on Uniform State Laws Drafts of Uniform and Model Acts Official Site* (last modified Sept. 9, 1999) <http://www.law.upenn.edu/bll/ulc/ulc_frame.htm>.

172. RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 21 (1998).

erally assume to be vindicated by the contract law, particularly Article 2 of the UCC.¹⁷³

The object of the provision is to make clear that the strict liability law is to be understood as part of the contract/tort mosaic, and as a means to redress the compromise of tort and contract interests. The incongruities of the distinction drawn by section 21 are not difficult to discern. Damage, arguably, is damage, and there is nothing fundamental about personal injury loss that would reliably distinguish it from other forms of economic loss. Personal injury need not necessarily be more severe than an economic loss. It is likely that many people would prefer a broken arm (without nasty complications, of course) to the destruction of significant wealth.

Also, insofar as subsection (c) of section 21 captures accurately the "other property" exception to the rule barring recovery for pure economic loss, the contract law preemption argument evaporates. Strict liability law leaves to the law of contract economic loss resulting from damage to the product because the parties' deal is deemed to have fixed the risk between them by fixing the price for the product.¹⁷⁴ Were the strict liability law to intercede to redress "imbalance," contract would be undermined, and the consensual relations world as we know it would crumble. That "contract integrity" argument probably explains as well the unwillingness of courts reviewing arm's length transactions to provide recovery for pure economic loss.¹⁷⁵

The "other property" exception, given those premises, is difficult to figure. After all, if the reason for excluding economic loss is fear that permitting its recovery would undermine contract, does not the "other property" exception compromise the allocation of risk in the very same fashion? Casualty to

173. *Id.* § 21 cmt. a. ("[P]roducts liability law lies at the boundary between tort and contract. Some categories of loss . . . are more appropriately assigned to contract law and the remedies set forth in Articles 2 and 2A of the Uniform Commercial Code.").

174. *Cf.* Hal S. Scott, *The Risk Fixers*, 91 HARV. L. REV. 737, 772-75 (1978) (describing the relationship between price and risk).

175. *See, e.g.*, *Picker Int'l, Inc. v. Mayo Found.*, 6 F. Supp. 2d 685, 688-89 (N.D. Ohio 1998); *Raytheon Co. v. McGraw-Edison Co.*, 979 F. Supp. 858, 866 (E.D. Wis. 1997); *Bowling Green Mun. Utils. v. Thomasson Lumber Co.*, 902 F. Supp. 134, 136-37 (W.D. Ky. 1995); *Portland Gen. Elec. Co. v. Westinghouse Elec. Corp.*, 842 F. Supp. 161, 165 (W.D. Pa. 1993); *Colorado Nat'l Bank v. Adventura Assocs.*, 757 F. Supp. 1167, 1172 (D. Colo. 1991); *Iowa Elec. Light & Power Co. v. Allis-Chalmers Mfg. Co.*, 360 F. Supp. 25, 32 (S.D. Iowa 1973); *Spring Motors Distribs., Inc. v. Ford Motor Co.*, 489 A.2d 660, 665 (N.J. 1985).

"other property" would not be compensable in a contract action if the seller of the goods effectively disclaimed liability for consequential damages.¹⁷⁶ So, would not contract be undermined if a buyer could use the "other property" exception to the economic loss limitation to circumvent such a consequential damages disclaimer? Certainly it would, and the case for the fine distinction made by the strict products liability law (and the Restatement's restatement of it) would seem indefensible.

Further, the contract law justification for excluding pure economic loss from the scope of damages recoverable on a strict product liability theory is eviscerated once we encounter a context in which contract fails. One example of such failure would be the case in which the parties to the transaction are of unequal bargaining power and it strains credulity to conclude that the relationship was a true "bargain of the parties in fact." Similarly, however, when the contract law governing a particular transactional form has not matured to the point that the relationships between the transactors may be reasonably conceived in contract terms, then, we would argue, it would be improvident to deny the disappointed transactor redress on the tort strict liability theory, the very theory that is designed to fill the void left when contract fails.¹⁷⁷

In the case of Y2K software and embedded chip failures, it may well be appropriate to conclude that contract has failed. In the case of software, that case is easier to make because we have no preemptive body of law, like UCC Article 2, to fix reliably the parties' bargain. Even the Reporter of Proposed Article 2B of the Code is not sanguine about the efficacy of the Article 2 warranty regime's application to computer software.¹⁷⁸

176. See U.C.C. § 2-719 (1995).

177. The contract limitations of warranties were an important factor in the development of strict products liability law. The court in *Henningsen v. Bloomfield Motors, Inc.*, 161 A.2d 69, 95 (N.J. 1960), applied what came to be known as strict product liability principles by limiting the operation of contract remedies where a consumer was injured in a not-entirely-consensual transaction with a commercial entity. See Alces, *W(h)ither Warranty*, *supra* note 5, at 286-90.

178. The Reporter noted:

The content of a merchantability obligation turns basically on the meaning of the terms of the agreement as recognized in the applicable business, trade or industry. A computer program delivered under an agreement by a merchant must be of a quality fit for the purpose for which it was distributed. . . . In the software environment, it is virtually impossible to produce software of complexity that contains no errors in instructions that intermittently cause the program to malfunction, so-called "bugs." The presence of errors in general

And, the most recent effort to formulate an implied warranty of merchantability to govern software transactions does little to provide certainty and reliability for an area of commerce that has not achieved repose.¹⁷⁹

B. THE SPECIOUS "OTHER PROPERTY" DISTINCTION

The lengths to which the strict liability law goes, at least in the Products Liability Restatement iteration, to draw the fine line between compensable economic loss to "other property" and the noncompensable pure economic loss to the product itself, defies jurisprudential logic and rests on the type of formalistic babble that earned the admiration of Christopher Columbus Langdell.¹⁸⁰ To be clear, the fault does not lie with the Reporters of the Products Liability Restatement; the fault lies with the courts that developed the specious doctrine. The illustrations following section 21 present the distinction that the black letter is designed to capture:

1. A machine that is used to anesthetize dental patients was delivered to Dr. Smith with the labels for nitrous oxide and oxygen reversed. Dr. Smith, believing she was administering oxygen to a pa-

commercial products is fully within common commercial expectation. . . . In this commercial environment, the contract law issue is whether the level of error exceeds the bounds of ordinary merchantability.

U.C.C. § 2B-403 reporter's note 2 (ALI Council Draft Dec. 1998); *see also* Towle, *supra* note 125, at 6.

A warranty that is routinely disclaimed cannot be said to be fundamental to commercial expectations. Minimum quality is fundamental, but that expectation is not addressed, as a commercial reality, in the implied warranty of merchantability. . . .

Buyers and licensees know that their vendor/licensor cannot live with the ambiguity of the implied warranty of merchantability and will disclaim it. Therefore the buyer/licensee must obtain an express warranty or rely on the willingness of the many vendor/licensors who voluntarily allow return of products

Towle, *supra* note 125, at 6.

179. *See supra* note 132 for a reproduction of the current formulation of the implied warranty of merchantability in sales and lease transactions.

180. Christopher Columbus Langdell, a legal theorist, was the Harvard Law School Dean beginning in the 1870s and the father of the case method of instruction for the study of law. Langdell believed that law was a science, and thus the best way to teach law was for students to undergo a systematic study of a series of cases dealing with a particular legal issue. *See* WILLIAM TWining, KARL LLEWELLYN AND THE REALIST MOVEMENT 17 (1973). According to Langdell, "[t]he true lawyer" is one who has such a mastery of legal principles as to be able to apply them with "constant facility and certainty to the ever-tangled skein of human affairs." CHRISTOPHER COLUMBUS LANGDELL, A SELECTION OF CASES ON THE LAW OF CONTRACTS vi (1871).

tient, mistakenly administered nitrous oxide, which caused the patient to die. Due to the adverse publicity arising from accurate media reporting of the case, Dr. Smith suffered a sharp drop in her practice and substantial economic loss. Dr. Smith's interest in her professional reputation is an interest protected by tort law against economic loss arising from harm to a patient in her care. Thus, Dr. Smith's damages for economic loss are recoverable in tort from the seller of the machine under subsection (b) [of section 21].

2. Robert, a skilled electrical engineer, was employed by ABC Contractors, Inc. Robert was killed in an automobile accident caused by a defect in an automobile manufactured by XYZ. ABC suffered substantial economic loss as a result of Robert's death because ABC was unable to complete a building contract in a timely fashion. ABC cannot recover its economic loss from XYZ because an employer does not have a tort cause of action against a third party for deprivation of the services of an employee arising from personal injury to the employee.¹⁸¹

The strategic strong point that supports the distinction given effect by the Restatement, "interest . . . protected by tort law," is difficult to square with the substantial policy that would support exclusion of pure economic loss in consensual arrangements—the efficacy of contract.

1. The Argument from Case Law: Identifying the Essential Incongruity

To make much sense of the economic loss doctrine and the other property exception to it, it is worthwhile to come to terms with the United States Supreme Court's treatment of the tension in the admiralty context.¹⁸² There are two cases that formulate the Court's response to the issue and that have provided several state courts the foundation for their reconciliation of the competing interests.

In what has become the seminal decision on the economic loss issue, *East River Steamship Corp. v. Transamerica Delaval, Inc.*,¹⁸³ the Supreme Court determined that a plaintiff who suffered lost income and repair costs as a result of defective turbines in the tanker plaintiff purchased from defendant could not recover on a strict products liability theory.¹⁸⁴ The

181. RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 21 (1998).

182. See U.S. CONST. art. III, § 2, cl. 1 (mandating that the United States's judicial power extends to "all Cases of admiralty and maritime Jurisdiction"); 28 U.S.C. § 1333 (1994) (conferring original admiralty jurisdiction on the federal district courts).

183. 476 U.S. 858 (1986).

184. See *id.* at 876.

Court did recognize that the policies supporting the imposition of strict liability when life and limb are imperiled also support the application of strict liability principles when property damage results from product failure.¹⁸⁵ The opinion further acknowledged that damage to property alone "is considered so akin to personal injury that the two are treated alike."¹⁸⁶ Nonetheless, the *East River* opinion stands for the proposition that only damage to "other property," property other than the defective product, may be recovered on a strict products liability theory.¹⁸⁷ Because the turbines that failed were an integral part of the tankers that the plaintiff had purchased, the action was not one to recover for the failure of "other property" but instead an action to recover for damage to the defective product itself.

The Court reviewed the case law that had developed in the lower courts concerning the application of strict products liability theory to nonpersonal injury actions and concluded that the minority view, which would provide recovery for purely economic loss to the defective product itself, was inconsistent with the tort/contract dynamic: "[L]oss due to repair costs, decreased value, and lost profits is essentially the failure of the purchaser to receive the benefit of its bargain—traditionally the core concern of contract law."¹⁸⁸ The Court elaborated in terms that formulate the crucial tension well for purposes of the software liability calculus:

Damage to a product itself is most naturally understood as a warranty claim. Such damage means simply that the product has not met the customer's expectations, or, in other words, that the customer has received "insufficient product value." . . . The maintenance of product value and quality is precisely the purpose of express and implied warranties. Therefore, a claim of a nonworking product can be brought as a breach-of-warranty action. Or, if the customer prefers, it can reject the product or revoke its acceptance and sue for breach of contract.¹⁸⁹

The focus of the opinion is on the contract law and the preemption of tort theory in cases that involve arms' length com-

185. See *id.* at 866.

186. *Id.* at 867.

187. See *id.* at 875.

188. *Id.* at 870 (citing E. FARNSWORTH, CONTRACTS § 12.8 at 839-40 (1982)).

189. *Id.* at 872 (footnotes omitted) (citing U.C.C. §§ 2-313, 2-314, 2-315, 2-601, 2-608, 2-612).

mercial transactors.¹⁹⁰ There is a concern with maintaining the integrity of contract, of the bargain in fact, and a deference to warranty.¹⁹¹ The Court also took account of consequential damages, albeit curiously:

A warranty action also has a built-in limitation on liability, whereas a tort action could subject the manufacturer to damages of an indefinite amount. The limitation in a contract action comes from the agreement of the parties and the requirement that consequential damages, such as lost profits, be a foreseeable result of the breach.¹⁹²

Frankly, it is not so clear that the "foreseeability" of consequential damages in a contract action, which the Court deemed to be formulated by *Hadley v. Baxendale*,¹⁹³ is markedly more limited than the "damages proximately caused" recoverable in a tort action.

In that regard it is worthwhile to recall the opinion of Judge Richard Posner in an important commercial law decision, *Evra Corp. v. Swiss Bank*.¹⁹⁴ The case involved a wire transfer of funds gone awry, as a result of which the plaintiff lost a valuable business opportunity.¹⁹⁵ The action against the bank that had mishandled the wire transfer instruction proceeded in tort rather than contract, and Judge Posner found that *Hadley* provided the appropriate damage limitation.

It is true that in . . . *Hadley* there was a contract between the parties and here there was none. . . . We must therefore ask what difference it should make whether the parties are or are not bound to each other

190. *See id.* at 859.

191. *See id.* at 867-68. Obviously, damage to a product itself has certain attributes of a products liability claim. But the injury suffered—the failure of the product to function properly—is the essence of a warranty action, through which a contracting party can seek to recoup the benefit of its bargain. *See id.*

192. *Id.* at 874 (citing *Hadley v. Baxendale*, 156 Eng. Rep. 145 (1854)).

193. 156 Eng. Rep. 145, 147 (1854). In *Hadley*, the plaintiff sued a common carrier for damages incurred in the delay of shipping a broken mill engine shaft to the company that was to fashion a new shaft from the old. *See id.* at 145-46. The plaintiff contended that the delay caused the mill to remain inoperable for longer than it would have been had the defendant delivered the shaft within the time promised. *See id.* at 147. The court held that damages under contract are limited to those "reasonably . . . in the contemplation of both parties, at the time they made the contract bargain." *Id.* The court concluded that the plaintiff had failed to communicate these "special circumstances" to the defendants and thus could not recover their lost profits. *See id.* *Hadley* appears in casebooks on contract and tort law. *See, e.g.,* E. ALLEN FARNSWORTH & WILLIAM F. YOUNG, CASES AND MATERIALS ON CONTRACTS 534 (5th ed. 1995); WILLIAM L. PROSSER & YOUNG B. SMITH, CASES AND MATERIALS ON TORTS 783-84 (4th ed. 1967).

194. 673 F.2d 951 (7th Cir. 1982).

195. *See id.* at 954.

by a contract. . . . [I]t seems odd that the absence of contract would enlarge rather than limit the extent of liability. . . . [The animating principle of *Hadley*] is that the costs of the untoward consequence of a course of dealings should be borne by that party who was able to avert the consequence at least cost and failed to do so.¹⁹⁶

The opinion goes on to emphasize the tort-contract hydrogeny of the liability limitation rule in *Hadley v. Baxendale*.¹⁹⁷ Therefore, when the Supreme Court relies on *Hadley*, it ignores the tort law parallel at its peril and compromises the logical foundation of the economic loss doctrine that *East River* posits.

The Supreme Court's strict products liability economic loss jurisprudence was further explicated in its decision in *Saratoga Fishing Co. v. J.M. Martinac & Co.*¹⁹⁸ The case involved the sale of a used vessel¹⁹⁹ to which the original purchaser had added equipment.²⁰⁰ After resale of the boat, an engine room fire damaged the add-on equipment and the plaintiff sought recovery on a strict liability theory for the loss of that additional equipment in the fire.²⁰¹ The Court determined that strict liability did provide a viable basis to support recovery of the economic loss caused to that "other property"; that is, the "other property" exception to the economic loss limitation provided the means to circumvent the neat contract/tort tension posited in *East River*.²⁰²

The Court in *Saratoga* took pains to come to terms with the contract basis of *East River* and the consequences of that theory's support of the economic loss doctrine.²⁰³ The fact that the goods at issue in *Saratoga* had been resold was, apparently, fundamental to the Court's conclusion.

[W]hy should a series of resales, after replacement and additions of ever more physical items, progressively immunize a manufacturer to

196. *Id.* at 956-57.

197. *See id.* at 957-58. "We are not the first to remark the affinity between the rule of *Hadley v. Baxendale* and the doctrine, which is one of tort as well as contract law . . . of avoidable consequences." *Id.* Similarly, where only foreseeable damages can be recovered in a breach of contract action, tort liability is limited to the foreseeable consequences of the defendant's negligence. *See id.* at 958.

198. 520 U.S. 875, *reh'g denied*, 521 U.S. 875 (1997).

199. *See supra* note 182 for a discussion of the Court's admiralty jurisdiction.

200. *See Saratoga*, 520 U.S. at 877.

201. *See id.*

202. *See id.* at 884-85.

203. *See id.* at 880.

an even greater extent from the liability for foreseeable physical damage that would otherwise fall upon it?

The *East River* answer to this question—because the parties can contract for appropriate sharing of the risks of harm—is not as satisfactory in the context of resale after an initial use. . . . [T]he Subsequent User does not contract directly with the Manufacturer (or distributor).²⁰⁴

The Court recognized that no court had denied an initial user's tort recovery for damage to other property,²⁰⁵ and the fact that contract theory provides less reason to deny such protection to a subsequent user compelled the conclusion that the subsequent user, the purchaser from the original purchaser in *Saratoga*, should have access to a strict products liability tort when a defective product damages "other property" resulting in economic loss.²⁰⁶ Again, failure of contract provided the basis for strict liability.

The problem with the "other property" exception to the economic loss rule is that the exception makes no more sense than the rule.²⁰⁷ Just as it is ludicrous to distinguish economic loss from personal injury loss, it is incongruous to distinguish economic loss to other property from economic loss to the product itself. We either should trust contract to allocate the risk of product failure or we should not, and it is the existence of a real bargain in fact, not nice distinctions of the type of property loss, that will guide a coherent conclusion regarding the allocation of risk among the parties to a sale, lease, or license transaction when a product, including software, fails. Even the dissent in *Saratoga*, which would have reached a different decision from the majority with regard to what constitutes "other property,"²⁰⁸ recognized that the best conception of the

204. *Id.* at 882.

205. *See id.* at 883.

206. *See id.* at 884-85.

207. *See, e.g.,* Harvey S. Perlman, *Interference with Contract and Other Economic Expectancies: A Clash of Tort and Contract Doctrine*, 49 U. CHI. L. REV. 61, 70 (1982); Meredith J. Ringler, *Saratoga Fishing Co. v. J.M. Martinac & Co.: Bailing Out the Lazy Commercial Purchaser from the Murky Waters of Resale*, 30 LOY. U. CHI. L.J. 133, 150 (1998); Chadwick J. Mollere, Comment, *Saratoga Fishing Co. v. J.M. Martinac & Co.: Charting the Course of "Other Property" in Products Liability Law*, 58 LA. L. REV. 1281, 1298 (1998).

208. 520 U.S. at 890 (Scalia, J., dissenting) ("[O]ne must look to the product purchased by the plaintiff, not the product sold by the defendant" to determine the character of the loss.) (quoting *Casa Clara Condominium Ass'n v. Charley Toppino & Sons, Inc.*, 620 So. 2d 1244, 1247 (Fla. 1993)).

"product" for purposes of the *East River* rule is the "object of the purchaser's bargain."²⁰⁹

2. Y2K Damage to "Other Property"

Applied to Y2K failure of software and embedded chips, the economic loss doctrine and the other property exception thereto may be problematic. Insofar as the basis of the economic loss doctrine is reliance on contract to allocate efficiently risk between the parties to a transaction, the efficacy of contract in the particular instance, in light of the specific product deficiency and the transactional context, should determine the availability of strict liability and thus the interrelation of the economic loss rule and the other property exception. Given the scope of the other property exception, it would not seem too difficult to conclude that software or embedded chip Y2K failure may well result in the type of damage that would be compensable on a products liability theory under *Saratoga*.

Software is introduced into existing hardware and, perhaps as well, will interface with software currently used by the licensee. In fact, to the extent that independent computer systems maintained by the same or distinct licensees interface, Y2K noncompliant software used by X may corrupt the software of Y. If the Y2K noncompliant software malfunctions, the software may be useless, and ultimately of no value to the licensee. The licensee's loss of the investment in the software, or the license fee, is economic loss, which is not recoverable on a strict liability theory. However, if Y2K noncompliant software corrupts other software or business records of the licensee, the loss, though economic, is loss to "other property" and thus compensable under the rule of *Saratoga*.

Similarly, if a Y2K noncompliant embedded chip causes product disruption, the other property exception to the economic loss rule may support application of strict products liability theory if the chip was part of a component added to the product originally acquired by the buyer or lessee. The *Saratoga* "other property" test focuses on whether the defective product was "extra equipment . . . added" to the other property that was ultimately damaged by the defective product.²¹⁰ As a result, if the noncompliant chip were part of an accessory added to the original merchandise, damage to the original mer-

209. *Id.* at 892 (Scalia, J., dissenting) (emphasis added).

210. *Id.* at 884-85.

chandise would be compensable on a strict liability theory. If the noncompliant embedded chip were part of the original merchandise, however, there might be no strict liability recovery for economic loss to that merchandise. That is a specious distinction that cannot be supported by any rational construction of the contract/tort dynamic.

V. SUMMATION AND CONCLUSION

The greatest impact of Y2K may well be its legacy. That is, wholly apart from the strain that the phenomenon has on the economy and on the litigation system's fabric today, Y2K will change the commercial law's disposition toward the liability of those who develop and market computer technology that fails. To date, the law has responded to software failure tentatively, uncertain about the fit between tort and contract, perhaps unwilling to compromise the development of the new technology. In the course of the Article 2B drafting project, the argument was made that software does not fit so neatly the goods/services construction that has informed the application of extant contract and tort liability theories.²¹¹

There are persistent uncertainties. Is software a good or a service? Are software developers to be held to the professional liability standard of attorneys and physicians or are software products to be determined by reference to warranty? Does it make sense to think of software as having an "ordinary purpose"? The fact that these questions are generated by the licensing of computer software is particularly important for the products liability law. It provides the means to approach a perplexing discontinuity in the law: the stubborn tangible vs. intangible property distinction. The enduring contribution of the Article 2B project may well be the initiative's jurisprudential proposition that distinctions in the commercial law based on the tangibility of the contract subject matter are specious. The significance of that conclusion must not be lost; it may well change the way we think about the important liability questions of the next millennium.

Crucially, the lesson of the products liability law as it has evolved from its contract/tort antecedents is that liability pro-

211. See U.C.C. § 2B-403 general note 1 (Proposed Draft Apr. 14, 1997), available in *The Conference of Commissioners on Uniform State Laws Drafts of Uniform and Model Acts Official Site* (last modified Sept. 9, 1999) <http://www.law.upenn.edu/bll/ulc/ulc_frame.htm>.

ceeds from principle, and flows from transactional realities, not insubstantial, formalistic legal distinctions.²¹² If we conclude that the developers of software are not strictly liable when their product fails, ultimately we will have reached that conclusion because other liability theories have provided sufficient means to police the transactions and maintain the integrity of the parties' deal. However, if the bargain fails, the contract fails, and if courts determine that the contract has failed, the courts will look to strict products liability just as they did in cases such as *Henningsen v. Bloomfield Motors*.²¹³ The fact that Y2K failure may occur both in the case of deficient software (not clearly tangible) and in the case of a noncompliant embedded chip (clearly tangible) emphasizes the fortuity of

212. Over a period of several decades, the courts began chipping away at the footholds existing within the law, which enabled manufacturers to insulate themselves from liability to consumers or users of their products. The first case to have a major effect on limiting the privity of contract requirement was *MacPherson v. Buick Motor Co.*, 111 N.E. 1050, 1053 (N.Y. 1916). In *MacPherson*, the court held that a manufacturer of a finished product who puts his product on the market to be used without inspection by the consumer incurs liability when he is negligent and the danger is foreseeable. *See id.* In *Escola v. Coca Cola Bottling Co.*, the California Supreme Court held that where a defect reasonably discoverable upon inspection is not discovered, the inference arises that a proper inspection was not made. 150 P.2d 436, 439 (Cal. 1944). Justice Traynor, in his oft-quoted concurrence, further recognized that "a manufacturer incurs an absolute liability when an article that he has placed on the market, knowing that it is to be used without inspection, proves to have a defect that causes injury to human beings." *Id.* at 440 (Traynor, J., concurring) (citing *MacPherson v. Buick Motor Co.*, 111 N.E. 1050 (N.Y. 1916)).

Justice Traynor believed that traditional theories were inadequate to handle the complexities of product cases. *See id.* at 441. He was able to expand on this view in 1963 in *Greenman v. Yuba Power Products, Inc.*, the case that officially launched the theory of "strict tort liability." 377 P.2d 897 (Cal. 1963). In *Greenman*, Justice Traynor, writing for the majority, stated "[a] manufacturer is strictly liable in tort when an article he places on the market, knowing that it is to be used without inspection for defects, proves to have a defect that causes injury to a human being." *Id.* at 900. He explained the reasoning behind the new theory as follows: "The purpose of such liability is to insure that the costs of injuries resulting from defective products are borne by the manufacturers that put such products on the market rather than by the injured persons who are powerless to protect themselves." *Id.* at 901. It was shortly after the *Greenman* opinion that the American Law Institute adopted Section 402A of the *Restatement (Second) of Torts* officially embracing the theory of strict liability in tort. *See supra* note 3.

213. 161 A.2d 69, 95 (N.J. 1960) ("[W]e are of the opinion that Chrysler's attempted disclaimer of an implied warranty of merchantability and of the obligations arising therefrom is so inimical to the public good as to compel an adjudication of its invalidity.").

tangibility in this setting. If there is to be strict liability when a chip fails on account of Y2K noncompliance, the same result should obtain when software fails for the same reason. Freed from the tangibility/intangibility distinction, courts will be able to focus on the transactional realities that determine the relationship between the supplier and user of Y2K noncompliant software and products.

If we are likely to find that contract fails in the software setting, it is difficult to imagine a more compelling setting than Y2K. While personal injury loss can flow from Y2K noncompliance,²¹⁴ it may well be that Y2K leaves a permanent impression on the products liability law by offering an elaboration of the "other property" exception to the economic loss rule.

There is a further point that distinguishes computer software from other property forms in terms that might be pertinent to the courts' receptiveness to a plaintiff's attempt to impose strict liability on the supplier of Y2K noncompliant software and products: Software is pervasive, even omnipresent in contemporary commerce. In fact, this is the greatest concern about Y2K. The Millennium Bug is insidious. We have no way of knowing all the ways that Y2K noncompliant software will fail; we may not even yet know the consequences of the failure. But we do know the great cost that Y2K has exacted. The remediation expense so far has been staggering²¹⁵ and the final tally will likely not be known for some time. Businesses will certainly fail; fortunes will be lost.

While other forms of software failure may not be so spectacular, once the courts have breached the economic loss impediment with the "other property" bludgeon, strict liability for software failure may be the rule rather than the exception. The obstacle that will remain, however, is the contract failure requirement. In other words, strict liability for software failure should only be available when the allocation of risk fixed by

214. A potential source of severe personal injury is the failure of the 911 public safety telephone service. Even minimal disruption in this service could lead to devastating personal injury loss. See *Telephony*, COMM. DAILY, Feb. 25, 1999, available in LEXIS, News Library, Communications Daily File. Other essential services are possible sources for personal injury loss. Computer-controlled water treatment facilities may dump lethal amounts of chemicals into public water supplies if their computers interpret "00" to mean that the water has not been treated in 100 years. See Karin Schill, *Smaller Water, Sewer Companies Appear Unprepared for Y2K Bug* (visited Feb. 25, 1999) <<http://www.news-observer.com/daily/1998/09/30/biz02.html>>.

215. See *supra* note 9.

contract is not reliable. This may prove to be easier to establish in the Y2K context than it would be in the case of other software failures. But the case can be made that contract fails in other software settings, and each time that failure is demonstrated, strict liability for the consequences of defective software may follow.